42-50 Thomas Street, Manchester

Phase 1 Desk-top Study

Project No: 1601-09
June 2016
Revision 00

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Revision	Description	Issued by	Date	Checked
00	Issue for Planning	P Clayton	28.06.16	KG

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EXECUTIVE SUMMARY

For full details and exclusions refer to the main report. However, in summary:

Site Description:
The site is currently developed with 42-50 Thomas Street which is typically three storeys high. The ground floors to the properties are used for retail units with associated basements used primarily for storage. The upper floors to the properties are currently used for small scale offices / storage and back of house retail facilities, with some areas vacant.

No. 7 Kelvin Street occupies the corner plot of Kelvin and Back Turner Street and is Grade II listed. There is no basement to this plot and the ground, first and second floors are used for retail back of house facilities.

The developments on site appear to have changed relatively little from the initial urbanisation of this part of Manchester from agricultural land in the mid-18th Century.

Proposed Development:
The proposed scheme provides a series of terraced blocks stepping in height from six to three storeys along Thomas Street and incorporates the retention and refurbishment of an existing Grade II listed warehouse. Significant basement works are proposed in order to provide basement and ground floor suitable for modern retail and food and beverage use, with residential accommodation above.

Hydrology:
The nearest watercourse is the River Irwell (primary river), 550m to the West.

Hydrogeology:
The superficial deposits beneath the site are classed as a Secondary Aquifer (Undifferentiated Layers). The underlying bedrock deposit is classified as a principal aquifer and is not within a source protection zone.

Flood Risk:
The site lies within a 'Flood Zone 1' indicating a low risk from fluvial and tidal flooding.

Initial Conceptual Site Model:
Based on the assessment there is/are potential contaminant-pathway-receptor linkages with respect to the following receptors:

- Human Health – Low to Moderate
- Development End Use - Low
- Controlled Waters – Low to Moderate
- Ecological receptors – Low

Preliminary Geotechnical Assessment:
The anticipated ground conditions are till deposits (clay, sand and gravels) over sandstone. At this stage a raft spread footing foundation solution is proposed. The ground conditions are to be confirmed on site as part of the Phase II works.

Soil Gas:
The site is not in an area requiring Radon protection. Gas monitoring is to be undertaken during the Phase II investigation works. At this stage the risk of ground gases is considered to be low.

1.0 INTRODUCTION

Renaissance has been commissioned by Red Partnership, to prepare a Phase I Desk-Top study to accompany the planning application for the redevelopment of this subject site at 42-50 Thomas Street, Manchester.

The site is to be redeveloped with the provision of a mixed use retail/food and beverage and residential scheme.

In order to comply with the Environment Act 1995, a Phase I Desk Study has been commissioned. The desk study is intended to assess the environmental impact of historical, current and future factors on the development. This report presents the data obtained and provides a conceptual model and preliminary risk assessment as well as discussing the scope of any intrusive investigations that may be required. This report does not consider ecological impacts (e.g. bats) or botanical risks (e.g. Japanese Knotweed etc.).

2.0 SITE

2.1 Site Location

The site is located on Thomas Street within Manchester City Centre and is bounded by Thomas Street, Back Turner Street, Kelvin Street and 40 Thomas Street. The site is approximately 0.5ha. The site location is described below:

- Postcode M4 1NA
- OS X (Eastings) 384394
- OS Y (Northings) 398622
- Nat Grid SJ843986 / SJ8439498622

2.2 Site Walkover & Description

The site is currently fully developed and split into various plots as described in **Figure 2.1** below.

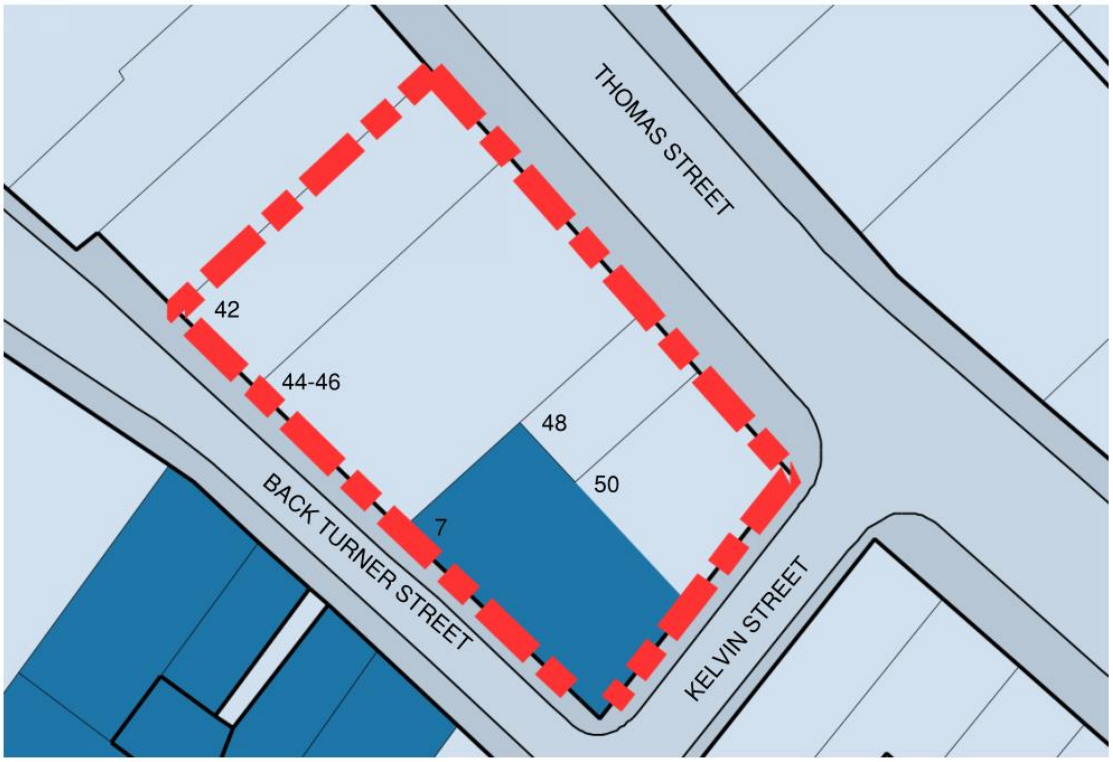


Figure 2.1 – Existing Development

The current development throughout 42-50 typically consists of three storey properties with ground floor retail units with basements used primarily for storage. The upper floors are to these premises are currently used for small scale offices / storage and back of house retail facilities, with some areas vacant.

No. 7 Kelvin Street occupies the corner plot of Kelvin and Back Turner Street and is Grade II listed. There is no basement unit to this plot and the ground, first and second floors are used for retail back of house facilities.

A site walkover was undertaken in May 2016. Photos from the site walkover are presented in Appendix 1.

During the walkover a strong hydrocarbon odour was detected within the basement spaces at 50 Thomas Street. Two historic boilers / tanks and associated flues are present within these spaces and appeared to be out of use.

2.3 Historical Land Use

As part of this desk study the following data has been considered: -

GroundSure EnviroInsight (GS-3087255)
GroundSure GeoInsight Plus (GS-3087259)
GroundSure MapInsight largescale(GS-3087257)
GroundSure MapInsight smallscale(GS-3087257)

Map Dates	Scale	Comments
1851	1:1,056	The detailed OS map of the area shows the site broadly developed as it is in its current state. Notable exceptions include; the internal courtyard areas appear to not be infilled with development & No. 7 Kelvin Street doesn't appear to be constructed or developed to its current state. It also appears that the constructions to Back Turner Street are not connected to those fronting Thomas Street.
1891	1:500	No.7 Kelvin Street is now present to what appears to be its current footprint. No further changes are observed.
1893	1:2,500	The site remains the same as the 1891 map.
1908	1:2,500	The internal courtyard areas now appear to be infilled & the properties to Back Turner street appear to become connected through to the properties along Thomas Street. This arrangement broadly matches that observed today.
1922	1:2,500	The site remains the same as the 1908 map.
1933	1:2,500	The site remains the same as the 1908 map.
1953	1:2,500	The site remains the same as the 1908 map.
1965	1:1,250	The site remains the same as the 1908 map.
1963	1:1,125	The site remains the same as the 1908 map.
1980	1:1,250	The site remains the same as the 1908 map.
1985	1:1,250	The site remains the same as the 1908 map.
1993	1:1,250	The site remains the same as the 1908 map.

Table 2.1: Historical Land Use

2.4 Summary

The developments on site appear to have changed relatively little from the initial urbanisation of this part of Manchester from agricultural land in the mid-18th Century.

The properties fronting to Thomas Street are shown on the earliest available maps, although through observations on site it would appear that some elements of the properties are of a more modern nature and may have been historically rebuilt. The properties to Back Turner Street appear to have originally been separated from those on Thomas Street by internal courtyard areas. However these appear to have been infilled in the early 20th Century & the properties connected through Thomas Street to Back Turner Street.

The Grade II listed warehouse at 7 Kelvin Street appears to have at least partly replaced the original developments on Back Turner Street in the late 19th Century.

Research has established that in the mid-18th Century, the Northern Quarter (then known as St Paul's district) could be described 'that the character of the St Paul's district was that of a mixed working class residential, commercial and manufacturing district.' The 1800 directory for Manchester indicates that 'of the 114 people listed as resident in the St Paul's district, the largest single grouping were textile workers and manufacturers, …. By 1800, most of the St Paul's district was covered in small-scale vernacular workshop dwellings.'[1]

The Stephen Levrant Heritage Architecture Ltd. Heritage Assessment report from 2014 contains a detailed historical study of the buildings on site, as summarised below;

- The buildings fronting Thomas Street at 42-50 are likely to have been workshop-dwellings, particularly 'weaver's cottages' dating from pre 1794
- The buildings fronting Back Turner Street were originally separate, smaller dwellings dating from pre 1794 separated to Thomas Street via an internal courtyard access via an alleyway to the street
- The Grade II listed warehouse building is an example of an early small scale purpose built warehouse building which was built to replace/convert the original dwellings present to this location
- The ground floor units were likely to have originally been living accommodation & changed to retail usage as early as the late-19th Century
- The basement units have undergone significant alteration in 1939 to provide an air raid shelter but are in other areas generally unchanged from their original form

The site is currently used for retail purposes primarily by Shop-Fittings Manchester Ltd. The site is classed as an industrial use site used for the manufacture of shop and office equipment although limited evidence of industrial activity was encountered during the site walk-over. A strong hydrocarbon odour was, however, present within the basement area of No.50 Thomas Street. Based on the historic and current site usage the potential sources of contamination should therefore be considered:

- Industrial processes used within the textile industry including possible dyeing and printing. More recently these industrial activities include processes associated with the current usage with the small-scale manufacture of office and shop equipment
- Potential hydrocarbon contamination within the basement space of No. 50 Thomas Street

[1] 'Manchester The Hidden History'- Michael Nevell

3.0 GEOLOGY, HYDROGEOLOGY & HYDROLOGY

3.1 Published Geology and Geological Hazards

The GroundSure Reports indicate the geology underlying the site to comprise of drift deposits of Till (clay, sands and gravels), overlying Sandstone – Chester Pebble Beds Formation.

British Geological Boreholes logs for the surrounding area indicate the ground conditions to comprise made ground overlying boulder clay and sand, with sandstone bedrock present at around 15m below ground level.

A geological fault line is indicated to the immediate Southwest of the site and runs Northwest to Southeast. The feature is described as a normal fault.

Geological hazards are noted:-

- Potential for natural ground subsidence – Very Low
- Potential for collapsible ground stability hazards – Very Low
- Potential for compressible ground stability – Negligible
- Potential for ground dissolution stability - Negligible
- Potential for landslide ground stability – Very Low
- Potential for running sand ground stability – Very Low
- Potential for shrinking or swelling clay ground stability – Very Low

The site is in a lower probability radon area, as less than 1% of properties are above the action level. The GroundSure report states that radon protection measures are not necessary in the construction of new properties or extensions.

3.2 Mining

The Ground Sure documentation suggests there is no evidence of past or present underground coal mining.

3.3 Waste Management & Gas Monitoring

Landfill Sites: There are no records of landfill sites within 250m of the site.

3.4 Hydrogeology, Hydrology

The GroundSure Report and maps suggest that the solid geology comprises a Principle Aquifer underlying the site and the nearest groundwater abstraction licensed site is present within circa 600m to the West of the site. There are no locations with Potable Water Abstraction Licences within 750m of the site.

The superficial deposits are designated as Secondary Aquifer Undifferentiated Layers.

3.5 Industrial Land Use & Potential Sources of Contamination

Industrial Sites: There are 39 potentially contaminative industrial sites within 250m of the study site.

Petrol and Fuel Sites; High Pressure Oil and Gas: There are two petrol and fuel sites within 500m of the site, the status of these are considered obsolete. There are no high pressure oil and gas transmission pipelines within 500m of the site.

3.6 Flood Risks

The site sits within Flood Zone 1 & the overall risk of flooding from rivers and the sea is very low (less than 1 in 1000 chance of flooding in any given year). There is limited potential for ground flooding associated with unconfined aquifers.

3.7 Unexploded Ordnance Risk

A bomb risk map for Manchester has been obtained from Zetica which indicates that the site is located within a moderate risk zone. Should planning permission be granted, it is recommended that a statement regarding a UXO risk assessment be undertaken by a UXO specialist prior to any site investigation and construction activities. The UXO assessment will be in accordance with 'Unexploded ordnance (UXO) A guide for the construction industry', CIRIA C681, 2009.



Figure 3.1 Extract of Manchester Bomb Risk Map (Zetica)

4.0 CONCEPTUAL GROUND MODEL & PRELIMINARY RISK ASSESSMENT

The potential of contamination hazards on the land has been identified as moderate to low risk. However, in accordance with industry practice and the "suitable for use" approach risks are to be assessed and confirmed in the following preliminary risk assessment. This has been conducted with reference to The Department for Environment, Food and Rural Affairs (DEFRA) and The Environment Agency (EA) advice on the assessment of risks arising from the presence of contamination in soils and using the source-pathway-receptor approach. This method dictates that there must be a risk contaminant produced at a 'source' in sufficient concentration to cause harm and there must be a 'pathway' for the contaminant to reach an identifiable 'receptor' for the linkage to be proved and a contamination hazard to be considered to be a risk. Indeed DEFRA and The EA state that "a contaminant is a substance which has the potential to cause harm, while a risk is considered to exist if such a substance is present in sufficient concentrations to cause harm and a pathway exist for a receptor to be exposed to the substance."

This advice also states that the effects of a pollution linkage and the groups at risk of harm (receptors) can be identified by the following categorisation:

1. Human health – receptors: site personnel, visitors and the general public, and humans on surrounding sites.
2. The water environment – receptors: humans, aquatic life and the wider eco-system, and construction and building materials i.e. concrete, cement, rubber and plastic.
3. Plants and the wider eco-system – receptors: plants and animals.

An appraisal of the source of contamination, potential and actual, on and in the area of the site has therefore been completed with reference to this pollution linkage. The risk of harm to the receptors has also been evaluated with reference to the following ratings and definitions:

Low	A pollution linkage is unlikely and/or the likelihood of harm occurring is low and of minor consequence.
Moderate	The linkage exists but further field or laboratory data is required to confirm that the contaminant has reached the receptor and the level of contaminant are harmful
High	The linkage exists and the available data indicates that significant harm may be caused and remedial action could be necessary.

4.1 Risk Assessment of Ground Contamination via On-Site Sources

The site is proposed to be developed into a mix of retail and residential accommodation across the site. Therefore, guideline values for residential development should be adopted.

Table 4.1 below provides a risk assessment of ground contamination via on-site sources.

On-site Sources	Potential Contaminants	Pathway	Receptor	Risk
Demolition of former buildings	Asbestos Heavy Metals	Inhalation Dermal contact Eye contact Ingestion Contact Migration, dilution and dispersion through soils Hydrological flow within groundwater Migration via permeable strata Uptake via root system	Humans: construction workers site end users off-site residents Fabric of buildings, structures & services *(concrete foundations)* Controlled waters: Groundwater *(principle aquifer)* Flora & fauna	LOW/MOD RISK
Imported fill material	Petroleum Hydrocarbons Metals/metalloids Sulphates Acidity/alkalinity Asbestos Soil Gas			LOW/MOD RISK
Vehicle movement	Petroleum Hydrocarbons			LOW RISK
Historic Boilers/Tanks within Basement	Petroleum Hydrocarbons			LOW/MOD RISK
Historic manufacturing processes	Heavy Metals Chemical dyes Phenols Acidity/alkalinity			LOW/MOD RISK

RISK IDENTIFICATION		*CONSEQUENCE*			
		SEVERE	*MEDIUM*	*MILD*	*MINOR*
LIKELYHOOD	*HIGH*	VERY HIGH RISK	HIGH RISK	MODERATE RISK	LOW/MOD RISK
	LIKELY	HIGH RISK	MODERATE RISK	LOW/MOD RISK	LOW RISK
	LOW	MODERATE RISK	LOW/MOD RISK	LOW RISK	VERY LOW RISK
	UNLIKELY	LOW/MOD RISK	LOW RISK	VERY LOW RISK	VERY LOW RISK

Table 4.1: Ground Contamination Assessment *via On-site Sources*

Comments on Table 4.1:

a) The proposed development includes the reducing of the existing basement levels by some 1.7m. As the site has been fully developed for over 130 years it is considered that all made ground and a large amount of the shallow superficial strata below the existing basement will be removed from the site during the basement works. It is therefore considered that any contaminates which are found to be present on-site will be removed during the basement works thus eliminating the long-term risk to receptors on the site.
b) The risk of short-term exposure to potential soil contamination by construction workers is to be mitigated by the adoption of safe working practices including the use of appropriate personal protection equipment.
c) The risk to controlled waters and major ecological receptors is considered moderate to low due to the presence of low-permeability clay beneath the site and the proposed full development of the site with hardstanding which will reduce infiltration through the ground.
d) The clay strata beneath the site and surrounding area are likely to be low permeability. The risk of vertical migration of potential contaminants into the lower strata (aquifer) is considered to be of low risk as the foundation solution is understood to be a raft spread footing solution. If a piled foundation is adopted with piles socketed into bedrock, the risk is increased as this construction could provide a potential pathway of contaminants during construction of the foundations. Contamination levels and leachate testing would therefore be required should this foundation option be adopted.
e) As stated in the GroundSure report, basic radon protection measures are not necessary in the construction of the new structures so the risk of inhalation is considered low for site operatives and end users.

It is therefore deemed that such sources of contamination are moderate-low. The requirement for intrusive testing will therefore be assessed following the conclusion of the recommended investigations as set out in section 4.3.

4.2 Risk Assessment of Ground Contamination via Off-Site Sources

Table 4.2 below provides a risk assessment of ground contamination via off-site sources.

Off-site Sources	Potential Contaminants	Pathway	Receptor	Risk
Industrial Activities recorded with a 250m radius	Petroleum hydrocarbons Metals/metalloids Sulphates Acidity/alkalinity PCB's	Inhalation Dermal contact Eye contact Ingestion Contact Migration, dilution and dispersion through soils Hydrological flow within groundwater Migration via permeable strata Uptake via root system	Humans: construction workers site end users off-site residents Fabric of buildings, structures & services *(concrete foundations)* Controlled waters: Groundwater *(principle aquifer)* River Irwell *(55m North)* Flora & fauna	LOW RISK

RISK IDENTIFICATION		*CONSEQUENCE*			
		SEVERE	*MEDIUM*	*MILD*	*MINOR*
LIKELYHOOD	*HIGH*	VERY HIGH RISK	HIGH RISK	MODERATE RISK	LOW/MOD RISK
	LIKELY	HIGH RISK	MODERATE RISK	LOW/MOD RISK	LOW RISK
	LOW	MODERATE RISK	LOW/MOD RISK	LOW RISK	VERY LOW RISK
	UNLIKELY	LOW/MOD RISK	LOW RISK	VERY LOW RISK	VERY LOW RISK

Table 4.2: Ground Contamination Assessment *via Off-site Sources*

Comments on Table 4.2:

a) The clay beneath the site and surrounding area is unproductive and therefore unlikely to be permeable. Consequently, the risk of vertical migration into the lower strata (aquifer) is considered to be low. However, the risk is increased by the integration of piled foundations which will be toed into the bedrock and therefore provide a potential pathway of contaminants during construction of the foundations.

As stated in the introduction to this section, where a risk is deemed to be moderate or low, it is said that “a linkage is unlikely and/or the likelihood of harm occurring is low and of medium consequence”.

The above assessment indicates the possibility of contamination at the site from the stated sources. However, the responsibility for contamination occurring at the site from off-site sources would lie with the respective site owners/occupiers.

4.3 Recommended Investigations

Given the nature of the development site and the low to medium risks involved, it is considered that a detailed Phase II site investigation should be undertaken following planning and prior to any site activities. This is to include further investigation of the fuel tanks within the basement and localised contamination and leachate testing.

5.0 INTRUSIVE INVESTIGATIONS

Given the structural proposal a detailed intrusive geotechnical site investigation will be required. During these works soil and ground water contamination testing is to be undertaken. This work should be undertaken with reference to CLR 4, *Sampling strategies for contaminated land*, BS 10175, *Investigation of potentially contaminated sites* and BS5930, *Code of practice for site investigations.*

The proposed redevelopment of the site includes the construction of residential and commercial accommodation. In view of the above, it is considered that the sampling strategy, based on BS 10175, Para 7.6.2.5., should include sampling points randomly positioned within a 25m grid. Therefore, for this 0.5-hectare site a minimum total of 3 soil and water sampling points would be required generally, to ensure that the site is adequately characterised.

Further sampling may be beneficial around the historic boiler/tank locations where a strong hydrocarbon odour can be detected as this contamination is likely to be highly localised. Undertaking further samples in this location would allow the contaminated areas to be delineated which would enable a pragmatic remediation strategy to be developed.

If ground water is encountered, then water samples should be taken for chemical analysis.

In accordance with Table 4.2 of CIRIA C665 *Assessing risks posed by hazardous ground gases to buildings*, the gas hazard is considered to be low and the sensitivity of the end use is low. Therefore, nominal gas wells should be considered. In view of this, it is again suggested that the amount of work be limited in the first instance.

6.0 REFERENCES

British Standards Institution (1999), BS5930: *Code of practice for site investigations*, B.S.I., London

British Standards Institution (2010), Amendment No 2 to BS5930: *Code of practice for site Investigations*, B.S.I., London

British Standards Institution (2001), BS 10175: *Investigation of potentially contaminated sites – Code of Practice,* British Standards Institute.

Department for Environment, Food and Rural Affairs and the Environment Agency, DEFRA R&D Publications, Environmental Agency, Bristol

- CLR 2, 1994 Guidance on preliminary site inspections of contaminated land, Volume 1
- CLR 4, 1994, Sampling Strategies for contaminated land
- CLR 7, 2002, Assessment of Risks to Human Health from Land Contamination: An overview of the Development of Soil Guideline Values and Related Research
- CLR 8, 2002, Potential Contaminants for the Assessment of Land

CIRIA Report C665 (2007), Assessing risks posed by ground gases in buildings

The Environmental Agency: Groundwater source protection