

An architectural rendering of modern buildings, featuring a mix of low-rise and high-rise structures with large windows and balconies. The entire image is overlaid with a semi-transparent blue filter. The sky is filled with soft, white clouds. In the foreground, there are some trees and a few small figures of people, suggesting a public space or park area.

June 2023
A2 Site Investigation
Phase 1 Ground Investigation Desk Study
Upper Brook Street Masterplan
(McLaren / Kadans)



Project Name	53 – 57 Upper Brook Street
Project Number	28723
Client	McLaren Property Ltd. And Kadans Science Partner
Document Name	Phase I Desk Study

This document has been prepared for the sole benefit, use and information of McLaren Property Ltd. And Kadans Science Partner for the purposes set out in the document or instructions commissioning it. The liability of A2 Site Investigation Limited in respect of the information contained in this document is as per the A2SI Terms & Conditions and will not extend to any third party. All concepts and proposals are copyright © May 2023. Issued in commercial confidence.

A2 Site Investigation Limited

One Westminster Bridge Rd
London, SE1 7XW

020 7021 0396
contact@a2-si.com
www.a2-si.com

Prepared by

Charlie Mason
BSc

Engineering Geologist

Checked by

Justyna Edgar
MSc PhD DIC FGS

Head of Geology

Approved by

Darren Seeley
FCMI MAPM

Director

Document Reference	Status	Notes	Revision	Issued by	Date
28723-A2SI-XX-XX-RP-Y-0001-00	First Issue	-	00	CM	06/04/2023
28723-A2SI-XX-XX-RP-Y-0001-01	Second Issue	Updated with comments from Civic Engineers	01	JP	25/05/2023



Contents

1.	Introduction	1
2.	Site Setting	3
3.	Geological Setting	7
4.	Site History	11
5.	Environmental Setting	17
6.	Proposed Development	21
7.	Conceptual Site Model (CSM) and Preliminary Risk Assessment (PRA).....	24
8.	Closing Remarks.....	31

Appendices

Appendix A: Qualitative Risk Assessment Matrix

Appendix B: Envirocheck Report

Appendix C: Unexploded Ordnance Risk Assessment

Appendix D: Site Walkover Records

Appendix E: Regulatory Correspondence

Appendix F: Coal Authority Report



1. Introduction

A2 Site Investigation Ltd (A2SI) has been engaged by Civic Engineers on behalf of McLaren Property Ltd. and Kadans Science Partner to prepare a phase I desk study report for the proposed development at 53-57 Upper Brook St (A34), Manchester M13 9TF. This report has been prepared to support a full planning application for a Sci-Tech and purpose-built student accommodation scheme (PBSA) scheme (hereafter referred to as the 'Proposed Development') on Phase One of the Upper Brook Street Masterplan (hereafter referred to as the 'Site'). This scheme would bring forward development on a Previously Developed site which is earmarked for commercial and PBSA uses in the Oxford Road Corridor SRFG 2019. This application has been accompanied by a suite of technical documents, reports and plans.

1.1. Study Aims and Objectives

The desk study develops an initial Conceptual Site Model (CSM) and provides a qualitative Preliminary Risk Assessment (PRA) for the proposed development in accordance with *Land Contamination Risk Management* (LCRM) guidance, published by the Environment Agency on the UK Government website. The desk study has also been prepared in the context of the *National Planning Policy Framework* (NPPF) and *The Building Regulations 2010, Approved Document C - Site preparation and resistance to contaminants and moisture (2004 Edition incorporating 2010 and 2013 amendments)*. The desk study includes an assessment of whether there are any unacceptable risks (ref. *LCRM* guidance) which require further geo-environmental investigation.

Potential historical and current sources of contamination have been identified based on information available in the public domain and in provided documentation (including information sources referenced in Section 1.2).

The proposed development is described in more detail in Section 6 but can generally be described as the demolition of the existing DS Automobile dealership to allow the construction of new 9 to 23 story, purpose-built student accommodation and science technology building.

Preliminary geotechnical assessment is not included in this desk study.

The outcomes of this desk study have been developed based on information current at the time of writing.

1.2. Information Sources

The primary sources of information which have informed the assessments presented herein include the following:

- Envirocheck Report for 53-57 Upper Brook Street prepared by Landmark Information Group, dated 21st February 2023 (ref. 307504612_1_1), included in Appendix B.
- *Preliminary UXO Risk Assessment* for 53 – 57 Upper Brook Street prepared by Brimstone, dated February 2023 (ref. PRA-23-2045), included in Appendix C.
- Site walkover undertaken by representatives of A2SI on 27th March, 2023.
- British Geological Survey, GeoIndex Onshore GIS database (accessed 24th February 2023); <https://mapapps2.bgs.ac.uk/geoindex/>.
- Department for Environment, Food & Rural Affairs (DEFRA), Magic Map Application (accessed 24th March 2021); <http://magic.defra.gov.uk/MagicMap.aspx>.
- Historic England, online Aerial Photo Explorer (accessed 24th February 2023); <https://historicengland.org.uk/images-books/archive/collections/aerial-photos/>.
- UK Health Security Agency (UKHSA) and BGS radon mapping (accessed 24th February 2023); <https://www.ukradon.org/information/ukmaps>.
- Google Earth (ref. earth.google.com/web/), accessed 27th February 2023.



- Flood Maps for Planning (ref. <https://flood-map-for-planning.service.gov.uk/>), accessed 27th February 2023).
- Manchester City Council Planning Portal - <https://www.manchester.gov.uk/info/200074/planning/5865/planning/1> (accessed 27th February 2023).



2. Site Setting

2.1. Development Location and Current Site Use

The development site is located at 53-57 Upper Brook St (A34), Manchester M13 9TF, as shown in Figure 2.1. The approximate National Grid reference for the site is 384840, 396870. The approximate ground surface elevation at the site is 38.0 – 41.0 m above Ordnance Datum and ground surface levels in the surrounding area fall towards the south. The development site falls within the administrative boundaries of the Manchester City Council.

The Site extends to 1.084 hectares (ha) and is partially in use as a temporary paid car park. The paid car park is located on a section of the Site which was formerly in use as a Citroën car dealership and is accessed from both Upper Brook Street (UBS) to the west and Kincardine Road to the east. The remainder of the Site comprises the former Elizabeth Yarwood Court residential complex, which is accessed from Kincardine Road to the east of the Site.

The Site is identified for redevelopment within the Oxford Road Corridor SRF with mixed commercial uses in-line with the SRF being a priority for the UBS site.

The Proposed Development forms one element of the wider Upper Brook Street Illustrative Masterplan which can be seen within the submitted Supporting Planning Statement.

The masterplan proposals are being brought forward by Kadans Science Partner, McLaren Property, Property Alliance Group and Moda Living. The masterplan intends to transform the currently vacant sites, re-establishing their important role in the area by re-introducing permeability, public realm, and active community-facing uses at ground floor. The emerging masterplan includes over 2 acres of new public realm and green spaces, a new public square, as well as a series of high-quality new buildings of varying heights to provide for approximately 700,000ft² of sci-tech accommodation, 1,800 purpose-built student accommodation beds, and 25,000ft² of active ground floor uses.

The current land uses within a 250 m radius surrounding the site are summarised in Table 2.1.



Figure 2.1 Location of the proposed development (red line reflects the site boundary used for this assessment)



Table 2.1 Surrounding land uses summary

Bearing from Site	Features directly adjacent to the site boundary	Other identified land uses and key structures
North	vacant single-storey commercial building associated parking (also identified for redevelopment within the Oxford Road Corridor SRF) and the Grade II* listed 'Former Unitarian Chapel' which now functions as student accommodation. Kincardine Road – single carriageway road	'Hello' student accommodation approximately 57m north. Kincardine Court student accommodation approximately 17m north-east along Kincardine Road. Gartside Gardens public park including tennis courts approximately 32m north. Large disused commercial unit and associated parking approximately 141m north. Detached residential properties along Mawson Road approximately 170m north and Hanworth Close approximately 235m north.
South	Cottenham Street – single carriageway road A34 Upper Brook Street – dual carriageway road	W.H. Lung Supermarket and Tai Wu restaurant approximately 17m south. Terraced residential properties along Brunswick Street approximately 85m south. Schuster Building associated with the University of Manchester approximately 93m south. Residential complex construction site approximately 100m south. Chemistry Building associated with the University of Manchester approximately 120m south. Michael Smith Building associated with the University of Manchester approximately 210m south.
East	Kincardine Road – single carriageway road.	Terraced residential properties along Kincardine Road approximately 20m east. beyond which is a 4 to 6-storey student accommodation building and 2-storey residential dwellings that form a part of the wider Brunswick Estate. The Brunswick Estate is an area currently undergoing extensive urban regeneration (see Cumulative Scheme 1 (Brunswick Neighbourhood)).
West	A34 Upper Brook Street – dual carriageway road	Alan Turing Building associated with Manchester University approximately 20m west. Henry Royce Institute approximately 20m west with buildings ranging from 4-storeys to 10-storeys in height. Buildings and soft landscaping associated with the University of Manchester campus

2.2. Site Walkover

A site walkover was undertaken by A2SI on the 27th March 2023. A summary is presented in this Section 2.2. Walkover records are included as Appendix D and these should be reviewed alongside the summary details below.

The site includes commercial and residential facilities, divided by a brick wall through the middle of the site (NE-SW) with external car parking space and associated soft landscaping. The commercial facilities include a disused car warehouse and showroom with associated storage space and offices as well as a disused fuel filling station in the southwest of the site with no surface evidence of leaks or spills. The residential facilities consist of a multi-storey 'court' with surrounding garden space. The car parking areas are constructed of hardstanding concrete or bituminous materials in moderate to good condition. A few minor cracks were observed in the carpark areas and potholes were present, some of which had been repaired. These were concentrated in the northern most part of the site.



Along the north boundary wall is a covered car store/washing area and a non-specified brick store immediately west of this that was not accessible at the time of the walkover. Both buildings displayed Fragile Roof caution signs. A non-accessible storage container and an area housing 4 no. drums of unspecified contents were also observed along the north boundary wall.

No electrical substations were observed on site.

Off-site land-uses are commercial (car garages and supermarkets) and residential (typically student accommodation and new build estates).

Ground levels across the site are generally flat.

Some surface water drainage infrastructure was observed.

Although the current on-site features include potential sources of contamination, such as vehicle parking, vehicle fuelling (inactive) and a vehicle warehouse, in general the potential for significant contamination from these sources is low.

A site features plan is provided as Figure 2.2.



Figure 2.2 Site features plan

2.3. Planning Records

The Local Authority Planning Portal has been searched for relevant records. The following Planning reference numbers have been identified with respect to previous applications made for the site:

- 101578/AO/2013/N2



- 074286/AO/2004/N2
- No: 038507, No: 038533
- No: 032240

None of the above applications had any relevant geo-environmental documentation associated with them.

2.4. Regulatory Consultation

Requests for information have been made to the following bodies:

- Environment Agency (EA), contacted via email on the 23rd February 2023. Response received 10th March 2023.
- Manchester City Council, contacted via email on the 23rd February 2023. Response awaited.

Copies of the regulatory consultation undertaken are included as Appendix E.

The response from the EA supplied information not included within the Envirocheck Report. This pertains to a presence of a minor watercourse located south of the site. It was established that this watercourse covers the same outline as four Unknown Filled Ground (Pond, marsh, river, stream, dock etc) locations listed in Table 5.1 (395m W, 143m SW, 175m E and 112m SE). These are further considered as off-site sources of contamination later in this report. In addition, EA revealed water quality results associated with two sampling points located at Royal Moss Side Brewery (1.5km southwest of the site) and Hydes Anvil Brewery ABH (located 4.6km west of the site). Due to the distance from site and anticipated groundwater flow direction, these abstractions are not considered to be hydraulically connected to the site.

2.5. Unexploded Ordnance

An unexploded ordnance (UXO) preliminary risk assessment has been carried out by Brimstone Ltd, included in Appendix C. The assessment indicates that the County Borough of Manchester, the borough in which the site is located, recorded between 27 bombs per 1,000 acres: a low to moderate level of bombing. Luftwaffe bombing targets include the University of Manchester which was 300m west of the site, Hospital 700m west and railway depot 1km west.

Manchester City Council bomb plot & damage mapping records one HE bomb strike and six IBs within a 300m radius of the Site, with the closest recorded adjacent to the northern Site boundary. Post-war aerial photography shows clearances within the north and south of the site, which can be indicative of bomb damage.

Recommended action prior to any intrusive site works listed in the report comprised the commission of a Stage 2 Detailed Risk Assessment.

The above provides a summary of the available UXO risk assessment. However, the full assessment provided in Appendix C must be referred to and takes precedence.



3. Geological Setting

3.1. Regional Geological Overview

The development site is located within Manchester, which overlies a complex mixture of numerous bedrock formations, predominantly sandstone. In the area surrounding the development site, the following formations can typically be found, in order of increasing depth:

- Chester Pebble Beds Formation, reddish brown, moderately cemented sandstones deposited during the Triassic period, forming part of the Sherwood Sandstone Group.
- Manchester Marls Formation, deposited in the upper Permian period.
- Collyhurst Sandstone Formation, red-brown sandstone deposited during the Lower Permian period.
- Pennine Upper Coal Measures Formation - mudstone, siltstone and sandstone. Sedimentary bedrock formed during the Carboniferous period.

3.2. Site Geology and Anticipated Ground Conditions

Figure 3.1 illustrates the location of the development within the context of a regional geological map. The map illustrates the spatial distribution of superficial (drift) deposits and bedrock outcrops at the ground surface. Made Ground is generally not shown but is assumed to be present on site due to historical demolition and construction works.

The geology map indicates that the site is underlain by superficial deposits of glacial till, and further maps show bedrock deposits of the Chester Formation beneath the site.

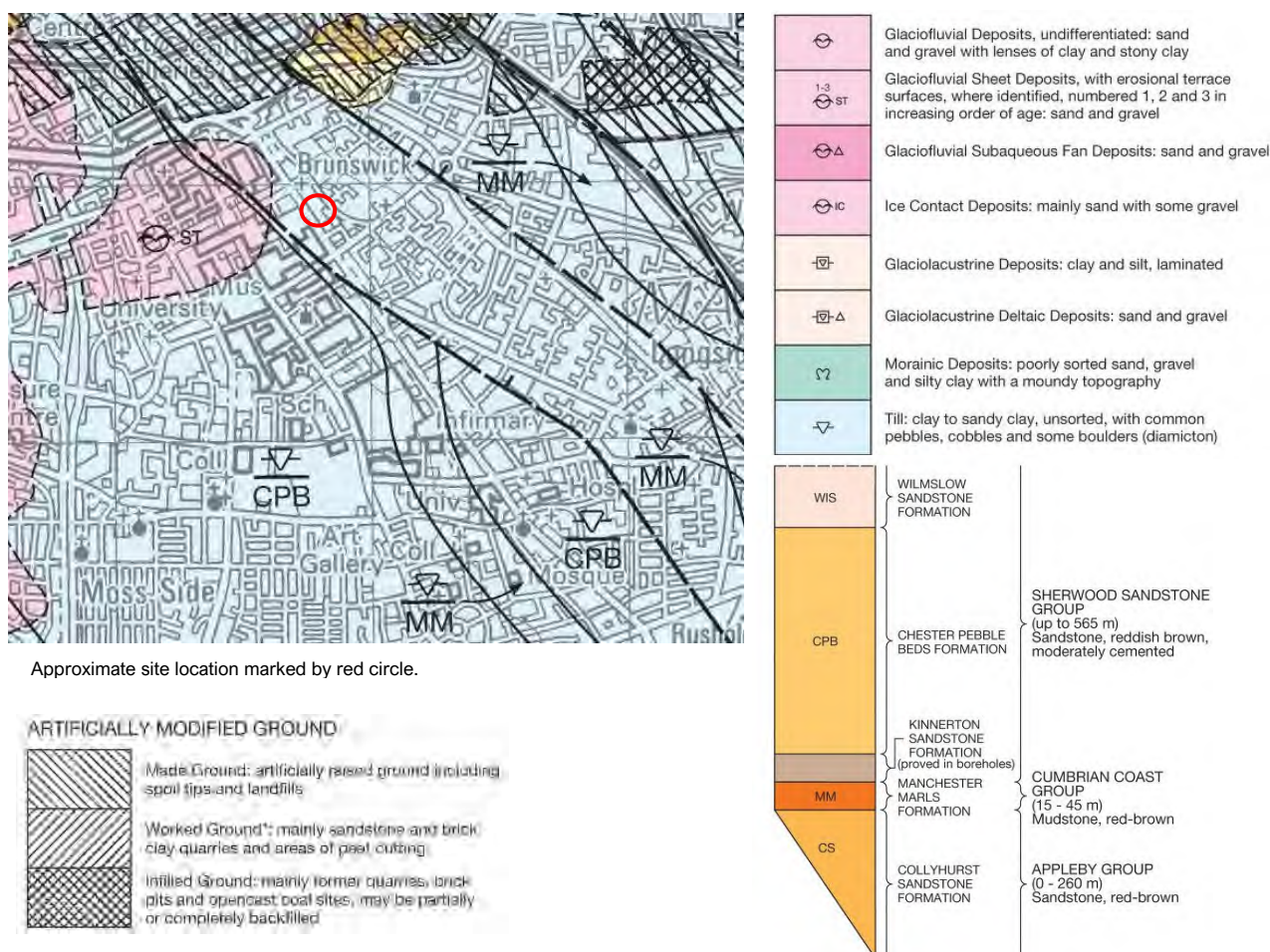
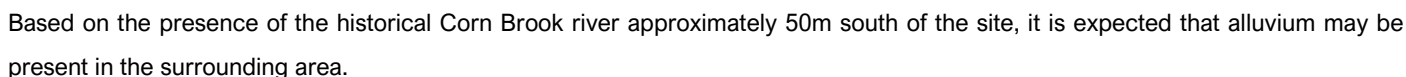


Figure 3.1 Geological context of the site



The map shows the study area in the north-east of London, centered around the River Thames. A red rectangle highlights the area around the River Thames, which is the focus of the study. The map includes labels for various streets and landmarks, such as the River Thames, Greenwich, and the Greenwich Peninsula. The map also shows the locations of the study sites, which are marked with black dots and labeled with codes such as SJ89NW1564, SJ89NW1563, SJ89NW3810, SJ89NW3809, SJ89NW3811, SJ89NW3812, SJ89NW3813, SJ89NW3815, SJ89NW3814, SJ89NW3816, SJ89NW3817, SJ89NW3818, SJ89NW3819, SJ89NW3820, SJ89NW3821, SJ89NW3822, SJ89NW3823, SJ89NW3824, SJ89NW3825, SJ89NW3826, SJ89NW3827, SJ89NW3828, SJ89NW3829, SJ89NW3830, SJ89NW3831, SJ89NW4274, SJ89NW4275, SJ89NW4276, SJ89NW4277, SJ89NW4278, SJ89NW4279, SJ89NW4280, SJ89NW4281, SJ89NW4282, SJ89NW4283, SJ89NW4284, SJ89NW4285, SJ89NW4286, SJ89NW4287, SJ89NW4288, SJ89NW4289, SJ89NW4290, SJ89NW4291, SJ89NW4292, SJ89NW4293, SJ89NW4294, SJ89NW4295, SJ89NW4296, SJ89NW4297, SJ89NW4298, SJ89NW4299, SJ89NW4300, SJ89NW4301, SJ89NW4302, SJ89NW4303, SJ89NW4304, SJ89NW4305, SJ89NW4306, SJ89NW4307, SJ89NW4308, SJ89NW4309, SJ89NW4310, SJ89NW4311, SJ89NW4312, SJ89NW4313, SJ89NW4314, SJ89NW4315, SJ89NW4316, SJ89NW4317, SJ89NW4318, SJ89NW4319, SJ89NW4320, SJ89NW4321, SJ89NW4322, SJ89NW4323, SJ89NW4324, SJ89NW4325, SJ89NW4326, SJ89NW4327, SJ89NW4328, SJ89NW4329, SJ89NW4330, SJ89NW4331, SJ89NW4332, SJ89NW4333, SJ89NW4334, SJ89NW4335, SJ89NW4336, SJ89NW4337, SJ89NW4338, SJ89NW4339, SJ89NW4340, SJ89NW4341, SJ89NW4342, SJ89NW4343, SJ89NW4344, SJ89NW4345, SJ89NW4346, SJ89NW4347, SJ89NW4348, SJ89NW4349, SJ89NW4350, SJ89NW4351, SJ89NW4352, SJ89NW4353, SJ89NW4354, SJ89NW4355, SJ89NW4356, SJ89NW4357, SJ89NW4358, SJ89NW4359, SJ89NW4360, SJ89NW4361, SJ89NW4362, SJ89NW4363, SJ89NW4364, SJ89NW4365, SJ89NW4366, SJ89NW4367, SJ89NW4368, SJ89NW4369, SJ89NW4370, SJ89NW4371, SJ89NW4372, SJ89NW4373, SJ89NW4374, SJ89NW4375, SJ89NW4376, SJ89NW4377, SJ89NW4378, SJ89NW4379, SJ89NW4380, SJ89NW4381, SJ89NW4382, SJ89NW4383, SJ89NW4384, SJ89NW4385, SJ89NW4386, SJ89NW4387, SJ89NW4388, SJ89NW4389, SJ89NW4390, SJ89NW4391, SJ89NW4392, SJ89NW4393, SJ89NW4394, SJ89NW4395, SJ89NW4396, SJ89NW4397, SJ89NW4398, SJ89NW4399, SJ89NW4400, SJ89NW4401, SJ89NW4402, SJ89NW4403, SJ89NW4404, SJ89NW4405, SJ89NW4406, SJ89NW4407, SJ89NW4408, SJ89NW4409, SJ89NW4410, SJ89NW4411, SJ89NW4412, SJ89NW4413, SJ89NW4414, SJ89NW4415, SJ89NW4416, SJ89NW4417, SJ89NW4418, SJ89NW4419, SJ89NW4420, SJ89NW4421, SJ89NW4422, SJ89NW4423, SJ89NW4424, SJ89NW4425, SJ89NW4426, SJ89NW4427, SJ89NW4428, SJ89NW4429, SJ89NW4430, SJ89NW4431, SJ89NW4432, SJ89NW4433, SJ89NW4434, SJ89NW4435, SJ89NW4436, SJ89NW4437, SJ89NW4438, SJ89NW4439, SJ89NW4440, SJ89NW4441, SJ89NW4442, SJ89NW4443, SJ89NW4444, SJ89NW4445, SJ89NW4446, SJ89NW4447, SJ89NW4448, SJ89NW4449, SJ89NW4450, SJ89NW4451, SJ89NW4452, SJ89NW4453, SJ89NW4454, SJ89NW4455, SJ89NW4456, SJ89NW4457, SJ89NW4458, SJ89NW4459, SJ89NW4460, SJ89NW4461, SJ89NW4462, SJ89NW4463, SJ89NW4464, SJ89NW4465, SJ89NW4466, SJ89NW4467, SJ89NW4468, SJ89NW4469, SJ89NW4470, SJ89NW4471, SJ89NW4472, SJ89NW4473, SJ89NW4474, SJ89NW4475, SJ89NW4476, SJ89NW4477, SJ89NW4478, SJ89NW4479, SJ89NW4480, SJ89NW4481, SJ89NW4482, SJ89NW4483, SJ89NW4484, SJ89NW4485, SJ89NW4486, SJ89NW4487, SJ89NW4488, SJ89NW4489, SJ89NW4490, SJ89NW4491, SJ89NW4492, SJ89NW4493, SJ89NW4494, SJ89NW4495, SJ89NW4496, SJ89NW4497, SJ89NW4498, SJ89NW4499, SJ89NW4500, SJ89NW4501, SJ89NW4502, SJ89NW4503, SJ89NW4504, SJ89NW4505, SJ89NW4506, SJ89NW4507, SJ89NW4508, SJ89NW4509, SJ89NW4510, SJ89NW4511, SJ89NW4512, SJ89NW4513, SJ89NW4514, SJ89NW4515, SJ89NW4516, SJ89NW4517, SJ89NW4518, SJ89NW4519, SJ89NW4520, SJ89NW4521, SJ89NW4522, SJ89NW4523, SJ89NW4524, SJ89NW4525, SJ89NW4526, SJ89NW4527, SJ89NW4528, SJ89NW4529, SJ89NW4530, SJ89NW4531, SJ89NW4532, SJ89NW4533, SJ89NW4534, SJ89NW4535, SJ89NW4536, SJ89NW4537, SJ89NW4538, SJ89NW4539, SJ89NW4540, SJ89NW4541, SJ89NW4542, SJ89NW4543, SJ89NW4544, SJ89NW4545, SJ89NW4546, SJ89NW4547, SJ89NW4548, SJ89NW4549, SJ89NW4550, SJ89NW4551, SJ89NW4552, SJ89NW4553, SJ89NW4554, SJ89NW4555, SJ89NW4556, SJ89NW4557, SJ89NW4558, SJ89NW4559, SJ89NW4560, SJ89NW4561, SJ89NW4562, SJ89NW4563, SJ89NW4564, SJ89NW4565, SJ89NW4566, SJ89NW4567, SJ89NW4568, SJ89NW4569, SJ89NW4570, SJ89NW4571, SJ89NW4572, SJ89NW4573, SJ89NW4574, SJ89NW4575, SJ89NW4576, SJ89NW4577, SJ89NW4578, SJ89NW4579, SJ89NW4580, SJ89NW4581, SJ89NW4582, SJ89NW4583, SJ89NW4584, SJ89NW4585, SJ89NW4586, SJ89NW4587, SJ89NW4588, SJ89NW4589, SJ89NW4590, SJ89NW4591, SJ89NW4592, SJ89NW4593, SJ89NW4594, SJ89NW4595, SJ89NW4596, SJ89NW4597, SJ89NW4598, SJ89NW4599, SJ89NW4600, SJ89NW4601, SJ89NW4602, SJ89NW4603, SJ89NW4604, SJ89NW4605, SJ89NW4606, SJ89NW4607, SJ89NW4608, SJ89NW4609, SJ89NW4610, SJ89NW4611, SJ89NW4612, SJ89NW4613, SJ89NW4614, SJ89NW4615, SJ89NW4616, SJ89NW4617, SJ89NW4618, SJ89NW4619, SJ89NW4620, SJ89NW4621, SJ89NW4622, SJ89NW4623, SJ89NW4624, SJ89NW4625, SJ89NW4626, SJ89NW4627, SJ89NW4628, SJ89NW4629, SJ89NW4630, SJ89NW4631, SJ89NW4632, SJ89NW4633, SJ89NW4634, SJ89NW4635, SJ89NW4636, SJ89NW4637, SJ89NW4638, SJ89NW4639, SJ89NW4640, SJ89NW4641, SJ89NW4642, SJ89NW4643, SJ89NW4644, SJ89NW4645, SJ89NW4646, SJ89NW4647, SJ89NW4648, SJ89NW4649, SJ89NW4650, SJ89NW4651, SJ89NW4652, SJ89NW4653, SJ89NW4654, SJ89NW4655, SJ89NW4656, SJ89NW4657, SJ89NW4658, SJ89NW4659, SJ89NW4660, SJ89NW4661, SJ89NW4662, SJ89NW4663, SJ89NW4664, SJ89NW4665, SJ89NW4666, SJ89NW4667, SJ89NW4668, SJ89NW4669, SJ89NW4670, SJ89NW4671, SJ89NW4672, SJ89NW4673, SJ89NW4674, SJ89NW4675, SJ89NW4676, SJ89NW4677, SJ89NW4678, SJ89NW4679, SJ89NW4680, SJ89NW4681, SJ89NW4682, SJ89NW4683, SJ89NW4684, SJ89NW4685, SJ89NW4686, SJ8

Table 3.1 Preliminary ground model

1. Elevation and depth refer to top of stratum.



3.3. Groundwater and Hydrogeology

Localised perched water may also be present associated within any Made Ground at the site. As there are no significant clay deposits expected beneath the Made Ground, perched groundwater tables are not anticipated any deeper.

Based on information from the surrounding historical BGS boreholes, groundwater is expected to rest between 8.0 and 12.0m bgl. Groundwater monitoring as part of the ground investigation conducted under planning reference 124472/FO/2019, indicates no shallow groundwater table as all boreholes monitored were recorded as dry.

The Chester Formation is classified as a Principal bedrock Aquifer, defined as a regionally extensive aquifer or aquifer system that has the potential to be used as a source of potable (drinkable) water.

The glacial till deposits onsite are classified as a Secondary Aquifer – Undifferentiated. This is defined as aquifers where it is not possible to apply either a Secondary A or B definition because of the variable characteristics of the rock type. These aquifers have a minor value.

The dominant direction of groundwater flow within the Principal Aquifer is anticipated to be from southeast to northwest/east to west, towards the Rivers Medlock and Irwell (both likely to flow in the westward direction).

The site is identified as being located within a groundwater Source Protection Zone (SPZ), Zone III (total catchment).

There are no groundwater water abstractions within 500m of the site boundary. The nearest record to the site is 616m west, operated by Manchester Metropolitan University for general use.

3.4. Hydrology

There are no surface water features within 500m of the site boundary. The nearest surface water feature is the River Medlock located 585m north of the site.

The historical Corn Brook River ran approximately 50m south of the site. The river now runs underground near the site, through predominantly brick and concrete lined culverts.

There are no surface water abstractions within 500m of the site boundary. The nearest record to the site is 1.04km northwest, operated by North Western Electricity Board for cooling.

3.5. Mining and Mineral Extraction

The site is listed within the Envirocheck Report as within an area affected by coal mining.

A coal mining report from the Coal Authority found that the site is located within the coal field.

The report also states that the property is not within a surface area that could be affected by any past recorded underground coal mining or within a surface area that could be affected by present underground mining.

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.

There are no recorded coal mine entries known to the Coal Authority on, or within 20 metres, of the site.

There are no recorded instances of mine gas within the enquiry boundary, this does not mean that mine gas is not present within the vicinity. Therefore, the Coal Authority recommends that a more detailed Gas Risk Assessment is undertaken by a competent assessor.

This is only a summary of the coal mining report, the full version can be found within Appendix F.



There is one record of man-made mining cavities within 500m of the site boundary, 179m north listed as a shaft entrance to a sandstone workings.

There are no BGS Mineral Site entries listed within the Envirocheck Report within 500m of the site.

No record of mining instability or natural cavities have been recorded within 500m.

3.6. Radon

UK Health Security Agency (UKHSA) and BGS radon mapping indicates that the site is in an area with less than 1% of homes estimated to be at or above the Action Level. *The Building Regulations 2010, Approved Document C* state that without a site-specific Radon Risk Report the maximum requirement for radon protection in these areas is 'None'.

Since no new basement is to be incorporated for the proposed development, no further radon assessment is required, and no radon protection needs to be incorporated into the proposed building fabric.



4. Site History

Detailed historical maps, fire insurance plans and aerial photographs of the site and surrounding area dated between 1848 and 2023 (at scales of 1:500, 1:1,056, 1:1,250, 1:2,500, 1:10,000, 1:10,560 and 1:25,000), provided as part of the Envirocheck Report (Appendix B), have been reviewed as part of the study. This process has been undertaken to identify any former land uses at the site and within the surrounding area that may have geo-environmental implications for the proposed redevelopment.

The findings are summarised in Table 4.1. Only features considered to have a potential geo-environmental impact on the site and usually within a notional 250m radius of the site boundaries are presented and discussed, with the exception of any potentially infilled land which is identified within 500m of the site. Any distances quoted for features remote from the site have been scaled from the maps and are approximate. Other information sources available in the public domain have also been reviewed to support this assessment, including the Historic England online Aerial Photo Explorer and historical aerial photographs available on Google Earth.

Table 4.1 History of the site and surrounding areas

Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
<i>On-Site</i>				
Semi-detached residential properties with large gardens	-	1848	1860	Yes
Terraced residential properties with small gardens alongside the original semi-detached properties	-	1891	1960	Yes
Robert Street runs along the northern boundary of the site	-	1891	1983	Yes
Timber Yard in the centre of the site	-	1891	1891	Yes
Multiple works across the site	-	1948	1960	Yes
Auction Rooms	-	1969	1969	No (It is assumed that this is merely a repurpose of an existing works building and therefore not a source of contamination)
Works	-	1978	1978	Yes
Large commercial property and associated parking to the north of the site	-	1999	Present	Yes
Car dealership structure on the south-eastern border of the site	-	1999	Present	Yes
Elizabeth Yarwood Court to the south of the site	-	1960	Present	No (Residential use – unlikely source of contamination)



Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
<i>Off-Site</i>				
Upper Brook Street	0m W	1848	Present	Yes
Terraced residential properties	0m all directions	1848	Present	Yes
Hospital	140m W	1893	1908	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Works (carriage manufactory, shopfitting works, wire works)	180m SW	1893	1955	Yes
Rusholme Road Cemetery	40m N	1893	1955	Yes
Public Laundry	200m NW	1893	1932	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Textile works	100m NW	1932	1960	No (Due to anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Coach works	100m S	1932	1950	Yes
Bakery	200m SE	1932	1955	No (Due to distance from site and type of production - factory not considered a significant source of contamination)
Cabinet works	110m N	1932	1955	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Clothing works	180m W	1932	1932	No



Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
				(Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Joinery works	180m SW	1932	1950	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Works	70m SW	1948	1955	Yes
Garage	70m SW	1948	1955	Yes
Works	185m W	1948	1960	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Clothing works	130m SW	1948	1948	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Joinery works	170m SW	1948	1950	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Works	180m SW	1948	1950	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Works	150m S	1948	1950	Yes
Glass works	15m S	1948	1950	Yes



Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
Electrical Substation	210m E	1948	1954	No (Due to distance from site, migration of contamination onto site is unlikely)
Electrical Substation	125m E	1948	1951	Yes
Works	35m N	1948	1950	Yes
Graveyard	60m NW	1948	1948	Yes
Clothing factory	200m NW	1948	1955	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Printing works	220m NW	1948	1955	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Tank	230m N	1948	1955	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Warehouse	200m NW	1948	1965	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Theatrical Scenery works	220m NW	1948	1960	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Electrical Substation	250m S	1948	1951	Yes



Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
Garage	100m S	1954	1960	Yes
Williamson Building	170m SW	1954	Present	No (Due to use of building purely as an educational facility - not considered a potential source of contamination)
Garage	220m NW	1954	1954	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Road Haulage Depot	110m NE	1954	1954	Yes
Warehouse	190m NE	1954	1954	No (Due to distance from site, migration of contamination onto site is unlikely)
Stables	200m NE	1954	1954	No (Due to distance from site, migration of contamination onto site is unlikely)
Garage	40m N	1954	1965	Yes
Electrical Substation	120m E	1960	1992	Yes
Laboratory	50m SW	1960	Present	Yes
Laboratory	180m SW	1960	Present	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
University Buildings Complex	100m SW	1960	Present	No (Due to use of building purely as an educational facility - not considered a potential source of contamination)
Electrical Substation	40m SW	1960	Present	Yes



Historical Feature	Distance and Bearing from Site	Date of First Map Appearance	Date of Last Map Appearance	Potential to Impact the Site
Garage	130m N	1978	Present (disused)	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)



5. Environmental Setting

5.1. Regulatory Data

Regulatory data from the Envirocheck Report in close proximity to the development site (generally within 250m of the site boundary, with the exception of landfill and infilled ground which is identified within 500m of the site) has been summarised in Table 5.1. The information provided for each item in Table 5.1 has been summarised from the Envirocheck Report for risk assessment purposes. For a full breakdown of the regulatory data refer to the Envirocheck Report in Appendix B.

Table 5.1 Summary of regulatory data

Item	Distance and Bearing from Site	Information	Potential to Impact the Site
<i>Agency & Hydrogeological</i>			
Registered Radioactive Substances <i>Records on site: 0</i> <i>Records within 0-250m: 9</i>	165m W	Name: University of Manchester Status: Application has been authorised and any conditions apply to the operator Process Type: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7)	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: University of Manchester Status: Application has been authorised and any conditions apply to the operator Process Type: Authorisation under S7 RSA for the disposal of Radioactive waste (was RSA60 S1)	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: University of Manchester Status: Authorisation superseded by a substantial or non-substantial variation Process Type: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1)	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: University of Manchester Status: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Process Type: Authorisation superseded by a substantial or non-substantial variation	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: Central Manchester University Hospitals NHS Foundation Trust Status: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Process Type: Authorisation superseded by a substantial or non-substantial variation	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)



Item	Distance and Bearing from Site	Information	Potential to Impact the Site
	216m SW	Name: Victoria University of Manchester Status: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Process Type: Authorisation either revoked or cancelled	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: Victoria University of Manchester Status: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Process Type: Authorisation superseded by a substantial or non-substantial variation	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: Victoria University of Manchester Status: Registration under S7 RSA for the keeping and use of Radioactive materials (was RSA60 S1) Process Type: Authorisation superseded by a substantial or non-substantial variation	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
		Name: Victoria University of Manchester Status: Authorisation under S13 RSA for the disposal of Radioactive waste (was RSA60 S7) Process Type: Authorisation either revoked or cancelled	No (Due to distance from site and anticipated groundwater flow direction, migration of contamination onto site is unlikely)
Waste and Landfill			
Potentially Infilled Land (Water) Records on site: 0 Records within 0-250m: 3 Records within 250-500m: 5	112m SE	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes
	143m SW	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes
	175m SE	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes
	395m W	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes
	415m NE	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes



Item	Distance and Bearing from Site	Information	Potential to Impact the Site
	424m S	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes
	478m SE	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1848	Yes
	495m N	Use: Unknown Filled Ground (Pond, marsh, river, stream, dock etc) Date of Mapping: 1956	Yes
<i>Facilities Registered as using Hazardous Substances</i>			
No relevant records			
<i>Industrial Land Uses and Points of Interest</i>			
<i>(potential sources of contamination are identified within 100 m of the site boundary, and more distant potential sources of contamination are identified where the anticipated shallow groundwater flow direction towards the northwest/west indicates a viable pathway to the site may be present)</i>			
Contemporary Trade Directories and Points of Interest <i>Records on site: 2</i> <i>Records within 0-100m: 2</i> (only records based on the criteria in the section heading are shown opposite for risk assessment purposes. See Appendix B for all records)	On site	Type: Car Dealers Status: Inactive	Yes
	On site	Type: Oil fuel distributors Status: Inactive	Yes
	22m NW	Type: Car Dealers Status: Inactive	Yes
	47m SE	Type: Air Conditioning Equipment & Systems Status: Inactive	No (Retail unit – not considered potential source of contamination)



5.2. Flood Risk

The site is classified as having a limited potential for groundwater flooding to occur.

Flood Maps for Planning (ref. <https://flood-map-for-planning.service.gov.uk/>, accessed 27th February 2023) indicates that the site is located in Flood Zone II, with between a 1% and 0.1% chance of flooding from rivers and between a 0.5% and 0.1% chance of flooding from the sea. The site is marked as having a medium probability of flooding from rivers and the sea. A flood risk assessment (FRA) would be required as part of the planning application for this development. The site is also within the zone of Extreme Flooding from Rivers or Sea without Defences.

No further consideration of flood risk is given in this report. Specialist flood risk advice should be sought with regards to drainage and flooding.

5.3. Ecology, Flora and Fauna

No records of potentially sensitive ecological receptors as defined by the *Environmental Protection Act (1990) Part 2a (as amended)* have been identified.

An assessment of potential invasive species is not included in this report.



6. Proposed Development

The scheme for the proposed development comprises the demolition of the whole site to allow the construction of a new 9 to 23 story, purpose built student accommodation that houses 737 beds and a Sci-Tech building. The client's description of development is as follows:

"Full planning permission for the demolition of existing buildings and erection of a single 6 to 9 storey block for Sci-Tech use (Use Class E (g)(ii) and 267sqm of a café/bar (Use Class E (b), and a single 9 to 23 storey block to be used for Purpose Built Student Accommodation (Use Sui Generis), comprising 737 bedrooms in total and 293sqm of community use (Use Class F2 (b) and 80sqm of commercial floorspace (Use Class E) on Phase one of the Upper Brook Street Masterplan."

There are two developments proposed (Sci-Tech Building & Purpose-Built Student Accommodation (PBSA)) within the overall site. Both sites are adjoined via public realm spaces at ground level, which allow foot and cycle travel from Upper Brook Street through to Kincardine Road. The newly proposed soft landscape areas include a pocket-park with informal play features and seating (adjacent to potential cafe unit within Sci-Tech building), meandering garden route, landscape blocks with sufficient space for vehicle access to plant and additional landscaping area along the Upper Brook Street. A sketch of the proposed building footprints can be seen in Figure 6.1, with a 3-dimensional rendition shown in Figure 6.2.

Sci-Tech Building - The proposed building provides approximately 13,266m² of combined laboratory and office space along with a ground floor publicly accessible café, meeting room suites throughout the building, and a secure cycle store and cycle changing. The building massing is split into a low level 6 storey block (inc. plant) to Kincardine Road, jumping up to 9 storeys (inc. plant) at Upper Brook Street, with an atrium to the centre of the floorplates that houses informal breakout spaces and forum seating at ground floor.

Purpose Built Student Accommodation (PBSA) - The proposed building provides 737 student bedrooms (288 studios and 449 cluster bedrooms arranged in a variety of cluster sizes), student amenities, management suite, commercial/ community spaces and supporting ancillary areas. The proposed PBSA scheme is arranged in two parallel building blocks with central cores, which are linked on the ground floor to form spaces for indoor and outdoor student amenities. The block facing Upper Brook Street has 23 storeys and the block facing Kincardine Road has 9 storeys.

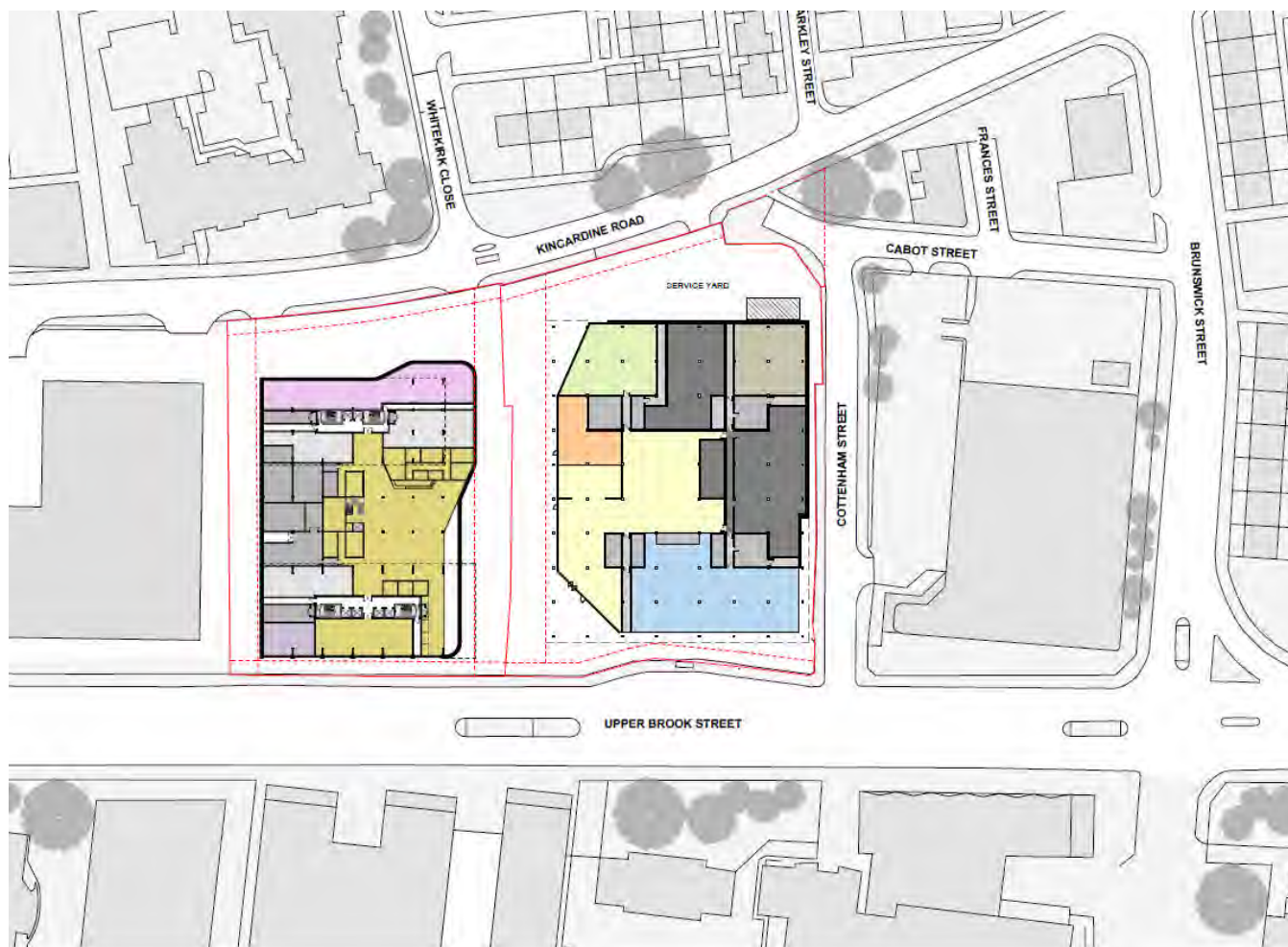


Figure 6.1 Diagram showing layout of proposed building footprints.

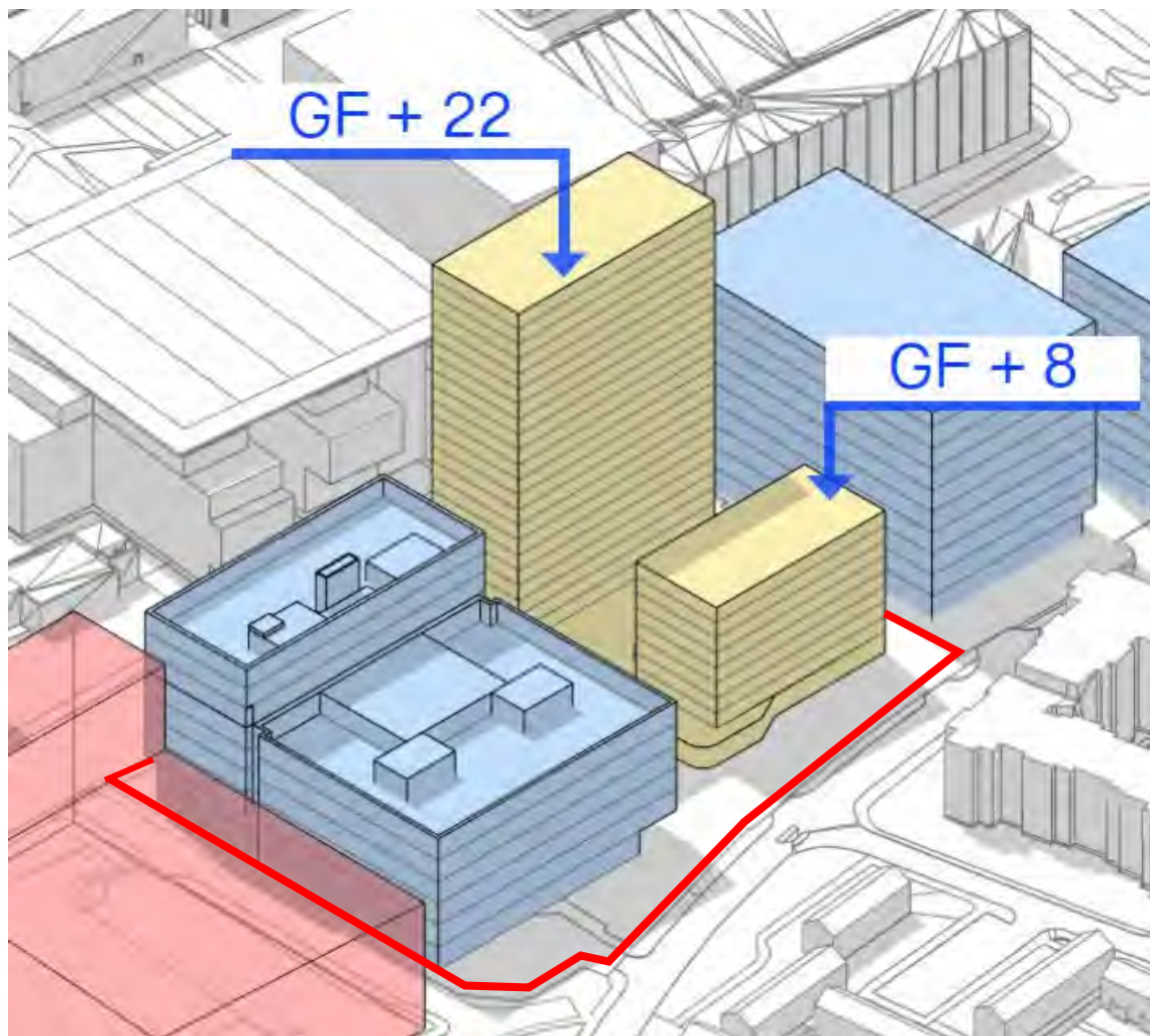


Figure 6.2 3D model of the proposed developments (yellow and blue buildings within the red line boundary)



7. Conceptual Site Model (CSM) and Preliminary Risk Assessment (PRA)

A means to qualitatively assess the risk posed by potential land contamination to a proposed development is to prepare an initial CSM and carry out a PRA. An initial CSM represents the characteristics of the site which influence the possible relationships between identified potential contaminant sources, pathways and receptors. A PRA is undertaken for each potentially complete source-pathway-receptor linkage (potential contaminant linkage). The PRA assessment matrix used in this report is included as Appendix A. The risk assessment approach is in accordance with *LCRM* guidance.

An initial CSM and PRA for the proposed development is set-out below in consideration of all the information detailed in the earlier sections of this report. Should any changes be made to the proposed development compared to the details presented herein, or should any new information become available, then the PRA must be updated.

7.1. Potential Contaminants of Concern

The potential contamination sources identified as part of this assessment are summarised in this section. Off-site potential sources of contamination within 100 m of the site boundary are identified and considered further, as well as potential sources of contamination within 250 m of the site boundary where the anticipated groundwater flow direction towards the north indicates a pathway to the site may be present. Relevant potential ground gas sources within 500 m of the site are also identified.

Current and former residential land-uses, retail units, offices and other general commercial uses (non-industrial) are not considered potential sources of contamination unless stated otherwise.

Naturally occurring radon risks are discussed in Section 3.

Please be aware that the nature of historical records mean that every potential source of contamination may not be detailed in the available documents. Therefore, there is potential for additional sources of contamination to be present.

7.1.1. On-Site Sources

- Made Ground – heavy metals and metalloids, acids / alkalis, PAHs, asbestos, elevated sulphate and ground gases.
- Semi-detached residential properties with large gardens - heavy metals and metalloids, acids / alkalis, elevated sulphate, TPHs, PAHs and asbestos.
- Terraced residential properties with small gardens - heavy metals and metalloids, acids / alkalis, elevated sulphate, TPHs, PAHs and asbestos.
- Robert Street - heavy metals and metalloids, acids / alkalis, PAHs, TPHs, VOCs and SVOCs.
- Historical site use as a timber yard and multiple works – heavy metals and metalloids, acids / alkalis, PAHs, TPHs and asbestos.
- Recent site use as a car dealership and oil fuel distributors – heavy metals and metalloids, acids / alkalis, elevated sulphate, TPHs, PAHs and asbestos.
- Large commercial property with parking - heavy metals and metalloids, acids / alkalis, elevated sulphate, TPHs, PAHs and asbestos.

Asbestos containing materials (ACMs) may be present in the current building fabric. Mitigation measures are described below separate to Table 7.1.

7.1.2. Off-Site Sources

- Car dealership 22m NW - heavy metals and metalloids, acids / alkalis, elevated sulphate, TPHs, PAHs and asbestos.
- Potentially Infilled Land (Water) 112m SE, 143m SW, 175m SE, 395m W, 415m NE, 424m S, 478m SE, 495m N – heavy metals and metalloids, acids / alkalis, PAHs, TPHs, elevated sulphates and ground gases.
- Upper Brook Street, immediately west – TPHs, PAHs.



- Works (coach works, carriage manufactory, shopfitting works, wire works) 35m N, 70m SW, 100m S, 150m S, 180m S – heavy metals and metalloids, acids / alkalis, PAHs, VOCs, SVOCs, PCBs.
- Glass works 15m S – heavy metals and metalloids, acids / alkalis, PAHs, VOCs, SVOCs, PCBs.
- Garage 40m N, 70m SW, 100m S – heavy metals and metalloids, acids / alkalis, TPHs, MTBE, PAHs, VOCs, SVOCs, PCBs.
- Laboratory 50m SW – heavy metals and metalloids, acids / alkalis, PAHs, VOCs, SVOCs, PCBs.
- Electrical Substation 40m SW, 120m E, 125m E and 250m S – PAHs, TPHs, PCBs.
- Graveyards/Cemeteries 40m N, 60m NW – ammoniacal nitrogen, nitrate, heavy metals and metalloids, fertilisers, formaldehyde, necroleachate, ground gas.

Asbestos has not been indicated for potential off-site sources as there is no relevant pathway for asbestos to migrate through the ground towards the site.

Notes -

TPH – total petroleum hydrocarbons (inc. BTEX)

PAH – polycyclic aromatic hydrocarbons

MTBE - Methyl tert-Butyl Ether

VOC – volatile organic compounds

SVOC – semi-volatile organic compounds

PCBs – polychlorinated biphenyls

Asbestos – potential free fibres, debris and / or fragments of asbestos containing material (ACM).

Ground gas – methane, carbon dioxide, carbon monoxide and / or hydrogen sulphide (excludes soil vapour)

7.2. Potential Pathways

The potential pathways identified as part of this assessment include:

7.2.1. On-Site Human Health

- Dermal contact or ingestion of soils at the site.
- Inhalation of ground gas, soil vapour or soils at the site.
- Consumption of water from impacted water supply pipes installed as part of the proposed redevelopment.

7.2.2. Off-Site Human Health

- Inhalation of wind-blown soil derived from the site.
- Migration off-site at shallow depth via preferential pathways and / or shallow perched groundwater followed by direct contact / inhalation / ingestion of contaminated soils.
- Off-site migration of ground gas or soil vapour followed by accumulation and inhalation within neighbouring properties.
- Migration off-site at shallow depth via preferential pathways and / or shallow perched groundwater followed by impact to water supply pipes and ingestion.

7.2.3. On-Site Buildings and Below Ground Structures

- Direct contact of 'aggressive' ground and / or grossly impacted soils with building structures / foundations.
- Accumulation of ground gas or soil vapour within buildings followed by ignition.

7.2.4. Off-Site Buildings and Below Ground Structures

- Migration off-site via preferential pathways, shallow groundwater and / or shallow perched groundwater followed by direct contact with building structures / foundations.



- Off-site migration of ground gas or soil vapour followed by accumulation within buildings and ignition.

7.2.5. Controlled Waters

- Leaching from the unsaturated zone.
- Perched water percolation and / or lateral migration.
- Migration via advection and diffusion in the saturated zone.
- Vertical and lateral migration of free-phase product in the unsaturated and saturated zones.

7.3. Potential Receptors

The potential receptors identified as part of this assessment include:

- Human health of proposed site end users (residential occupants and occasional maintenance workers).
- Human health of off-site commercial end users, residential occupants and students (closest 17m from site to the west at University of Manchester). Open garden space is present immediately southeast of the site and approximately 7m east of the site.
- Property including on-site (proposed) and off-site buildings and below ground structures (buried concrete and underground services).
- Controlled Waters – Principal Aquifer associated with the Chester Formation bedrock deposits and Secondary A (undifferentiated) Aquifer associated with the glacial till superficial deposits.

The Client should inform A2SI of the foundation termination depths once final designs have been prepared so that no requirement for a foundation works risk assessment can be confirmed.

Given, the distance to the River Medlock (approximately 585m to the north) and River Irwell (2.1mkm west) it is considered that a viable pathway is not present between the site and Rivers Medlock and Irwell.

The historical Corn Brook river the flow is expected to be fully culverted with predominantly brick and concrete lining, therefore it is not considered to be hydraulically connected to the site.

Risks to site workers and the environment (from potential land contamination) during the construction phase of the proposed redevelopment can be appropriately managed by successful implementation of construction phase risk assessments and method statements (RAMS). The associated construction phase risks from potential contamination are not considered further in this document but should be appropriately considered and mitigated by the Principal Contractor in their preparation and implementation of construction phase RAMS and Construction Phase Plan (CPP).

7.4. Summary of Potential Contaminant Linkages

The information presented in this assessment has been compiled to produce a summary of the identified potential contaminant linkages, based on the initial CSM presented herein. Table 7.1 presents a PRA for the proposed redevelopment based on the identified potential contaminant linkages. This assessment has been performed considering the details of the proposed development presented in this report. Qualitative risk classifications are provided in accordance with *CIRIA C552: Contaminated Land Risk Assessment, A Guide to Good Practice (Rudland et al., 2001)* (see summary in Appendix A). Where no potentially complete contaminant linkage is identified then no risk classification is provided.



Table 7.1 Preliminary Risk Assessment (PRA)

Potential Contaminant Source	Potential Pathway	Potential Receptor	Potential Contaminant Linkage	Risk Level Classification
On-site See Section 7.1.1	Direct contact with soil	Human health of proposed site end users (see Section 7.3)	Yes	Low to moderate
	Inhalation of windblown soil		(The current site contains areas of soft landscaping, with new areas of soft landscaping also proposed)	Low to moderate
	Ingestion of soil			Low to moderate
	Impact to water supply pipes followed by ingestion of contaminated water supply		Yes (New pipes may be laid in impacted soils)	Low to moderate
	Ground gas generation and inhalation		Yes (Made Ground onsite represents a potential source of ground gas)	Low to moderate
	Soil vapour generation and inhalation		Yes (Volatile contaminants are potentially present within the Made Ground)	Low to moderate
	Inhalation of windblown soil from the site	Off-site human health (see Section 7.3)	Yes (The current site contains areas of soft landscaping, with new areas of soft landscaping also proposed)	Low to moderate
	Off-site migration and direct contact with impacted soil		Yes (Domestic gardens and public areas of soft landscaping are present in the near site vicinity)	Low to moderate
	Off-site migration and ingestion of impacted soil			Low to moderate
	Impact to water supply pipes followed by ingestion of contaminated water supply		Yes (Pipes may be laid in nearby soils impacted by potential contamination)	Low to moderate
	Ground gas generation, off-site migration and inhalation		Yes (Made Ground onsite represents a potential source of ground gas)	Low to moderate
	Soil vapour generation, off-site migration and inhalation		Yes (Volatile contaminants are potentially present within the Made Ground)	Low to moderate



Potential Contaminant Source	Potential Pathway	Potential Receptor	Potential Contaminant Linkage	Risk Level Classification
	Direct contact	On-site below ground structures (proposed)	Yes (Structures may be constructed in impacted soils)	Low to moderate
	Migration followed by ignition of ground gas		Yes (Made Ground onsite represents a potential source of ground gas)	Low to moderate
	Migration followed by ignition of soil vapour		Yes (Volatile contaminants are potentially present within the Made Ground)	Low to moderate
	Off-site migration followed by direct contact	Off-site below ground structures	Yes (Structures may be constructed in soils impacted by potential contamination, nearby University buildings with basements likely)	Low to moderate
	Off-site migration followed by ignition of ground gas		Yes (Made Ground onsite represents a potential source of ground gas)	Low to moderate
	Off-site migration followed by ignition of soil vapour		Yes (Volatile contaminants are potentially present within the Made Ground)	Low to moderate
	Leaching and migration to groundwater via the unsaturated zone; Perched water percolation or lateral migration; Migration via advection and diffusion in the saturated zone; and Vertical and lateral migration of free-phase	Controlled waters and Source Protection Zone (SPZ) Zone III (total catchment) - Underlying Principal Aquifer (Chester Formation)	Yes (Deep groundwater may be present associated with natural bedrock deposits beneath the site)	Low to moderate



Potential Contaminant Source	Potential Pathway	Potential Receptor	Potential Contaminant Linkage	Risk Level Classification
	product in the unsaturated and saturated zones.	Controlled waters - Underlying Principal Aquifer (Chester Formation) and Secondary A Aquifer (undifferentiated) (Glacial Till)	Yes (Shallow perched groundwater may be present associated with Made Ground beneath the site)	Low to moderate
	On-site ingestion / dermal contact / inhalation / root uptake	Flora and fauna in proposed soft-landscaped areas at the site	Yes (No ecological receptors identified onsite, proposed soft landscaping is of low sensitivity)	Low
	Off-site migration at shallow depth followed by ingestion / dermal contact / inhalation / root uptake	Off-site flora and fauna in soft-landscaped areas nearby	Yes (No ecological receptors identified onsite, proposed soft landscaping is of low sensitivity)	Low
Off-site See Section 7.1.2	On-site migration followed by direct contact or ingestion of soil	Human health of proposed site end users (see Section 7.3)	Yes (The current site contains areas of soft landscaping, with new areas of soft landscaping also proposed)	Low
	Inhalation of windblown soil from off-site		Yes (Domestic gardens and public areas of soft landscaping are present in the near site vicinity)	Low
	On-site migration followed by impact to water supply pipes and ingestion of the water supply		Yes (Pipes may be laid in soils impacted by potential off-site sources)	Low to moderate
	Ground gas generation, on-site migration and inhalation		Yes (Potential sources of ground gas have been identified in the vicinity of the site)	Low to moderate
	Soil vapour generation, on-site migration and inhalation		Yes (Potential sources of volatile contamination have been identified in the vicinity of the site)	Low to moderate



Potential Contaminant Source	Potential Pathway	Potential Receptor	Potential Contaminant Linkage	Risk Level Classification
	On-site migration followed by direct contact	On-site below ground structures (proposed)	Yes (It is unlikely that gross contamination with potential to damage structures is migrating onto site)	Low
	On-site migration followed by ignition of ground gas		Yes (Potential sources of ground gas have been identified in the vicinity of the site)	Low to moderate
	On-site migration followed by ignition of soil vapour		Yes (Potential sources of volatile contamination have been identified in the vicinity of the site)	Low to moderate
	On-site ingestion / dermal contact / inhalation / root uptake	Flora and fauna in proposed soft-landscaped areas at the site	Yes (No ecological receptors identified onsite, proposed soft landscaping is of low sensitivity)	Low

The PRA has identified potential contaminant linkages with a maximum 'low to moderate' risk classification. Based on the results of the PRA, it is considered that there are unacceptable risks (ref. *LCRM* guidance) so ground investigation is recommended. Appropriately targeted ground investigation should be undertaken for geo-environmental purposes to enable a refinement of the CSM and geo-environmental assessments. The next stage of geo-environmental assessment should include a generic quantitative risk assessment (GQRA). The recommended ground investigation and assessments should be undertaken and presented in a geo-environmental interpretive report in accordance with *BS 10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice* and *LCRM* guidance.

The risk represented by potential ACMs in the current building fabric can be addressed by commissioning an asbestos Demolition and Refurbishment Survey for the relevant areas of the current building to be demolished and / or renovated. If ACMs are identified then their onward management should be informed by an asbestos specialist, but it is considered that appropriate ACM removal will be required prior to any phases of demolition.

Design of a future geo-environmental site investigation is outside the scope of this document.



8. Closing Remarks

A2SI was appointed by Civic Engineers on behalf of McLaren Property and Kadans Science Partner to prepare a phase I desk study for the proposed development at 53-57 Upper Brook St (A34), Manchester M13 9TF. The desk study provides an initial CSM and qualitative PRA for the proposed development in accordance with *LCRM* guidance. The desk study has also been prepared in the context of the *NPPF* and *The Building Regulations 2010, Approved Document C - Site preparation and resistance to contaminants and moisture (2004 Edition incorporating 2010 and 2013 amendments)*.

The site currently includes a disused Citeron car dealership and Elizabeth Yarwood Court. The outdoor space within the property that was previously used to store and exhibit cars is now a Pay & Display car park owned by SiP. Directly south of the SiP Pay & Display is Elizabeth Yarwood Court, the former sheltered housing scheme. No basement structures are proposed. There are two developments proposed within the overall site. Both developments are adjoined via public realm spaces at ground level, which allow foot travel from Upper Brook Street through to Kincardine Road.

The ground conditions at the site indicate the presence of Made Ground overlying glacial till superficial deposits and Chester Formation bedrock. Made Ground of variable thickness is anticipated to be present across the site based on the identified site history and historical boreholes.

A low to moderate level of bombing was identified for the project site from a preliminary UXO assessment. It is recommended that a detailed UXO threat and risk assessment be performed to assess the risk in more detail. If the detailed risk assessment identifies that mitigation measures are required during future site works, a UXO specialist should be engaged to assess the site and provide recommendations on appropriate mitigation measures and strategies.

The PRA has identified potential contaminant linkages with a maximum 'low to moderate' risk classification. Based on the results of the PRA, it is considered that there are unacceptable risks (ref. *LCRM* guidance) so ground investigation is recommended. Appropriately targeted ground investigation should be undertaken for geo-environmental purposes to enable a refinement of the CSM and geo-environmental assessments. The next stage of geo-environmental assessment should include GQRA. The recommended ground investigation and assessments should be undertaken and presented in a geo-environmental interpretive report in accordance with *BS10175:2011 Investigation of Potentially Contaminated Sites – Code of Practice* and *LCRM* guidance.

The risk represented by potential ACMs in the current building fabric can be addressed by commissioning an asbestos Demolition and Refurbishment Survey for the relevant areas of the current building to be demolished and / or renovated. It is considered that appropriate ACM removal will be required prior to any phases of demolition. If ACMs are identified then their onward management should be informed by an asbestos specialist.

No further radon assessment is required and no radon protection needs to be incorporated into the proposed building fabric.

The final specification for newly installed water supply pipes should be based on the risk assessments and recommendations presented herein and also agreed with the utility provider. It is anticipated that uprated water supply pipe construction may be necessary.

Risks to site workers and the environment (from potential land contamination) during the construction phase of the proposed redevelopment can be appropriately managed by successful implementation of construction phase RAMS. The associated construction phase risks from potential contamination should be appropriately considered and mitigated by the Principal Contractor in their preparation and implementation of construction phase RAMS and CPP.

This desk study should be made available to those preparing the operational site Health & Safety File for the proposed development.

Should any changes be made to the proposed development compared to the details presented herein, or should any new information become available, then the assessments included in this desk study must be updated.



The Client should inform A2SI of the foundation termination depths once final designs have been prepared so that no requirement for a foundation works risk assessment can be confirmed.



Appendix A: Qualitative Risk Assessment Matrix

A2SI qualitative risk assessment for geo-environmental purposes is undertaken in accordance with *CIRIA C552: Contaminated Land Risk Assessment, A Guide to Good Practice (Rudland et al., 2001)*. The CIRIA C552 risk categories and the assessment methodology are summarised below in Table A.1, Table A.2 and Table A.3. Potential magnitude and potential likelihood are both classified to enable a risk rating to be assessed.

Potential magnitude takes into account the potential consequences should a complete source–pathway–receptor linkage be present. Potential magnitude is classified as per Table A.1.

Table A.1 Definition of potential magnitude of consequence

Category	Definition
Severe	Acute risks to human health, catastrophic damage to buildings / property, major pollution to controlled waters.
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures.
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures.
Minor	Damage to non-sensitive ecosystems or species.

Potential likelihood takes into account the presence of the hazard and receptor as well as the integrity of the pathway for exposure, i.e., whether a source-pathway-receptor linkage is present or not. Potential likelihood is classified as per Table A.2.

Table A.2 Definition of potential likelihood of exposure

Category	Definition
High Likelihood	Pollutant linkage may be present and is almost certain to occur in the long-term. Or there is evidence of harm to the receptor.
Likely	Pollutant linkage may be present, and it is probable that it will occur over the long-term.
Low Likelihood	Pollutant linkage may be present, and there is a possibility that it will occur, although there is no certainty that it will do so.
Unlikely	Pollutant linkage may be present, but it is improbable that it will occur.



The potential magnitude of consequence and the potential likelihood of exposure are assessed in accordance with the risk matrix presented in Table A.3.

Table A.3 Geo-environmental risk assessment matrix

		Potential Magnitude of Consequence			
		Severe	Medium	Mild	Minor
Potential Likelihood of Exposure	High Likelihood	Very High	High	Moderate	Low to Moderate
	Likely	High	Moderate	Low to Moderate	Low
	Low Likelihood	Moderate	Low to Moderate	Low	Very Low
	Unlikely	Low to Moderate	Low	Very Low	Very Low



Appendix B: Envirocheck Report



Appendix C: Unexploded Ordnance Risk Assessment



Appendix D: Site Walkover Records



Image 1: Show Room



Image 2: Electrics and pipework servicing the car garage



Image 3: Room used by squatters with waste including sharps/needles, clothing and litter



Image 4: Example of pipework associated with former site use



Image 5: Warehouse floor



Image 6: Pile of brick, paint cans and litter at access between warehouses and showroom



Image 7: Old fuelling station



Image 8: Car store/wash area and non-accessible store with Fragile Roof caution signs



Image 9: Barrel store and non-accessible container



Image 10: Access and hardstanding/carpark for Elizabeth Yarwood Court



Appendix E: Regulatory Correspondence



Appendix F: Coal Authority Report



A2 Site Investigation

A2 Site Investigation Limited
One Westminster Bridge Rd
London, SE1 7XW

020 7021 0396
contact@a2-si.com
www.a2-si.com

