

Former Plant Hill Police Station

Phase 1 Preliminary Risk Assessment

Curtins Ref: 077873-CUR-00-XX-RP-GE-014

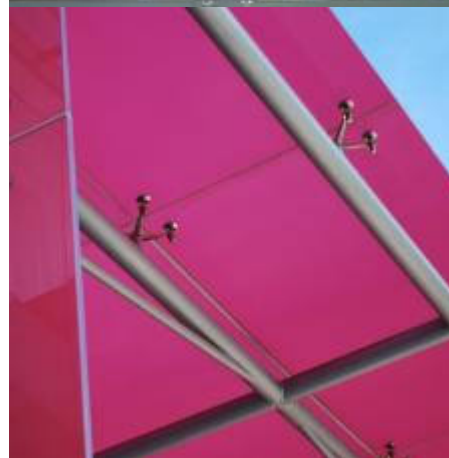
Revision: V01

Issue Date: 07 May 2021

Client Name: Irwell Valley Housing Association

Client Address: Soapworks, First Floor, Colgate Ln, Salford M5 3LZ

Site Address: Plant Hill Road, Manchester M9 8LU



Curtins
Merchant Exchange
17-19 Whitworth Street West
Manchester, M1 5WG
Tel: 0161 236 2394
www.curtins.com

CIVILS & STRUCTURES • TRANSPORT PLANNING • ENVIRONMENTAL • INFRASTRUCTURE • GEOTECHNICAL • CONSERVATION & HERITAGE • PRINCIPAL DESIGNER
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham



Rev	Description	Issued by	Checked	Date

This report has been prepared for the sole benefit, use, and information for the client. The liability of Curtins Limited with respect to the information contained in the report will not extend to any third party.

Author	Signature	Date
S Hyde BSc (Hons) MSc Senior Geo-Environmental Engineer		29 April 2021

Reviewed & Authorised	Signature	Date
B Corps BSc (Hons) MSc CSci FGS Associate		06 May 2021

Executive Summary

Appointment	In March 2021 Curtins were instructed by One Manchester on behalf of Irwell Valley Housing Association to undertake a Phase 1 Preliminary Risk Assessment of the former Plant Hill Police Station, Plant Hill Rd, Manchester M9 8LU. The site is centred on NGR SD 85190 03449 and covers an area of approximately 0.19 Ha. It is understood that the site is to be redeveloped as residential properties with associated gardens and car parking.
Current Site Status	The site is bound by Bank House Rd to the west; Plant Hill Rd to the south; vacant land (demolished school) to the north; and woodland to the east. The site is occupied by the vacant Former Plant Hill Police Station and associated outbuildings. It is understood that the main building has a basement underlying part of the building footprint. The site is relatively flat, with an area of hard standing car park in the centre and on the western boundary.
Site History	Earliest mapping (1848) shows that the site was undeveloped and surrounded by farmland. By the 1970s, the site was developed as Plant Hill Police Station, with a main building in the west and outbuildings in the east. The nearest historical landfills are located from 13m south and 41m northeast. A water course 41m east, which flowed southwards, was backfilled in the 1950s.
Geology	BGS mapping indicates the site is underlain by Glacial Till Deposits, Devensian superficial deposits and Manchester Marls Formation (mudstone) bedrock. There are no BGS borehole logs available within 250m of the site. The site is located in a low probability radon area where <1% of homes are estimated to be at or above the radon Action Level.
Mining	The site is located within a Coal Mining reporting area, however the Pennine Lower and Middle Coal Measures Formation and associated mine entries, coal outcrops and probable shallow coal mine workings are located from 1km northeast. The risk from shallow coal mining is therefore considered to be Low.
Hydrogeology	The site is underlain by a Secondary B Aquifer associated with the bedrock formation. The superficial deposits are designated as a Secondary Undifferentiated Aquifer. The site is not located within a Source Protection Zone (SPZ). There are no recorded potable groundwater abstraction points within 500m.
Hydrology	The nearest surface water feature is an issue 154m southeast which flows south. There are no recorded surface water abstractions within 1km.
Unexploded Ordnance	The risk from UXO associated with WWII bombing to future intrusive investigation is considered to be Low.
Initial Ground Contamination Assessment	The risk from Made Ground posed to the site's end-users is considered to be Moderate / Low due to the lack of historical industrial land use. The risk posed to surface water and groundwater receptors is considered to be Very Low due to the non-sensitivity of the nearest surface water feature underlying aquifers. The risk posed to site end-users from ground generating gases arising from organic / putrescible soils on or near the site is considered to be Moderate/Low.
Recommendations	The following recommendations are made with regards to further works at the site: 1. Undertake an intrusive ground investigation; 2. Undertake a GQRA as part of the ground investigation; and 3. Undertake Ground Gas Monitoring over a period of two-three months for methane, carbon dioxide, oxygen, hydrogen sulphide, gas flow in l/hr, weather conditions and barometric pressure (with confirmation if falling, steady or rising). It is further recommended that this work is completed in advance of any development works taking place.

Table of Contents

1.0	Introduction	1
1.1	Project Background	1
1.2	Scope of Services	1
2.0	Current Site and Surrounding Area Details	2
2.1	Site Location and Current Details	2
2.2	Surrounding Area Details	2
3.0	Site History	4
4.0	Geology, Hydrogeology and Hydrology	5
4.1	Geology and Hydrogeology	5
4.1.1	Mining	5
4.1.2	Other Ground Stability Issues	6
4.1.3	Ground Gas	6
4.2	Hydrology	6
5.0	Unexploded Ordnance Risk Assessment	7
5.1	Preliminary UXO Assessment	7
6.0	Conceptual Site Model & Qualitative Risk Assessment	8
6.1	Additional Risk Assessments	8
7.0	Conclusion and Recommendations	10
7.1	Contaminants of Concern	10
7.2	Other Considerations	10
8.0	References	11

Appendices

- Appendix A Drawings**
- Appendix B Envirocheck Report**
- Appendix C Qualitative Risk Assessment Rationale**

1.0 Introduction

1.1 Project Background

In March 2021 Curtins were instructed by One Manchester on behalf of Irwell Valley Housing Association to undertake a Phase 1 Preliminary Risk Assessment of the Former Plant Hill Police Station, Plant Hill Road, Manchester M9 8LU.

The location and extent of the site is shown in *Figure 2.1* on the following page. It is understood that the site is to be developed for residential dwellings.

At the time of writing, no proposed site plans were available for review.

1.2 Scope of Services

The Phase 1 PRA is intended to provide an overview of the geo-environmental and geotechnical setting of the site, prior to the proposed development of the site.

Through this overview, the Phase 1 PRA aims to develop both a working conceptual and ground model for the site, as well as present an initial assessment of any risks that could be presented to the development including its intended end users and the wider environment.

Specifically, the Phase 1 PRA provides an initial assessment of the site regarding:

- a) Potential on and offsite contamination from historical and/or current uses, including potential ground gas generating sources;
- b) The potential impact on the wider environment by historical and or current use of the site of interest;
- c) The potential impact from surrounding land uses and other environmental factors;
- d) Potential problems associated with geological features such as faulting, mineral extraction, mining and land instability; and
- e) The location of apparent sub-surface structures that may affect the proposed redevelopment.

Consideration of detailed flood risk, ecology and archaeological issues are outside of the scope of this report.

2.0 Current Site and Surrounding Area Details

2.1 Site Location and Current Details

Site use, location and description are shown below in *Table 2.1* and *Figure 2.1*.

Table 2.1 – Site Details

Site Address	Plant Hill Road, Manchester, M9 8LU
NGR	SD 85190 03449
Area of Site	Approximately 0.19 Ha.
Current Site Use and Description	The site is occupied by the Former Plant Hill Police Station main building and associated out buildings which are vacant. It is understood that the main building has a basement underlying part of the building footprint The site is relatively flat, with an area of hard standing car park in the centre and on the western boundary.

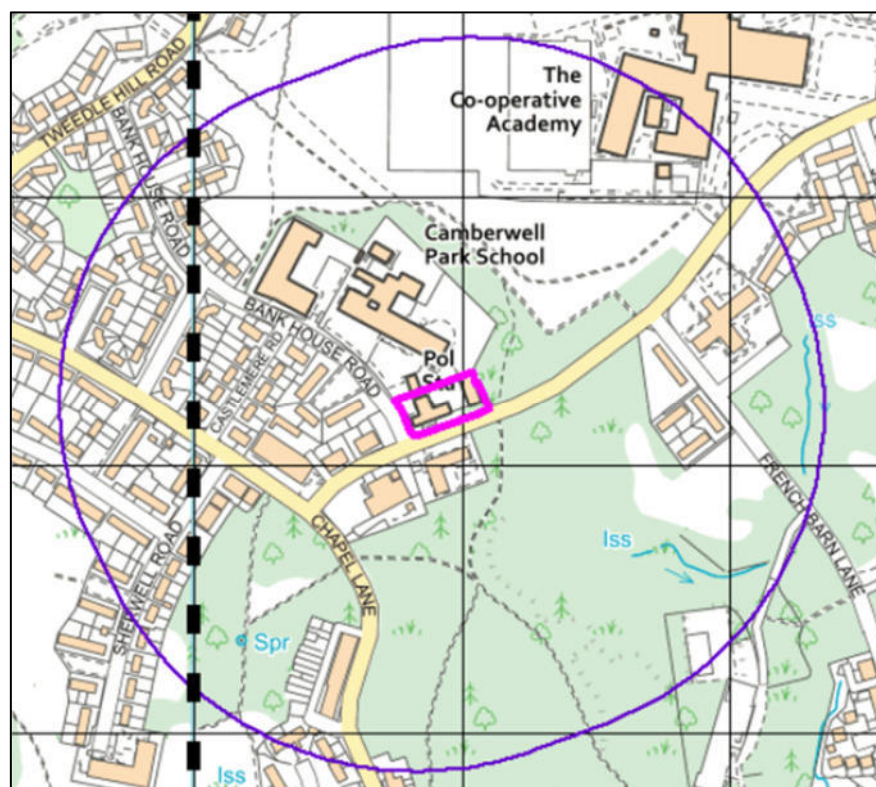


Figure 2.1 – Site Location Plan (site boundary shown in pink and 250m buffer in purple).
Crown Copyright. License Number 100022432.

2.2 Surrounding Area Details

The following information was established through undertaking an environmental database search. The full Envirocheck report (Ref. 1) is included in *Appendix B*.

Table 2.2 – Surrounding Land Uses

Surrounding Area	N	Vacant land, historical school recently demolished.
	E	Woodland and recreational areas, Co-op Academy Manchester.
	W	Bank House Road, residential housing beyond.
	S	Plant Hill Road; with health clinic, nursery and woodland beyond.

3.0 Site History

A review of the available historical mapping and other information for the site, as presented within the Envirocheck Report (Ref. 1), has been undertaken and is presented in *Table 3.0* below.

Table 3.0 – Previous Site and Surrounding Area Uses and Potential Sources of Contamination. Bold text refers to on-site activity.

Date	Description	Potential Sources of Contamination
1848 – 1930s	The earliest available mapping (1848) shows the site as undeveloped land, forming part of wider agricultural fields. A track exists along the eastern boundary. 1893 mapping shows a Reformatory with a pond located from 140m east. A small water course is mapped 40m east, aligned north-south and flowing south. The land to the northeast is mapped as a golf course from the 1930s. To the south, an Old Clay Pit is located from 90m and an Old Sand Pit from 200m.	• No local sources of contamination identified.
1950s	The site remains unchanged. Residential dwellings are constructed from 80m west. The water course to the east is no longer mapped by the 1950s. A garage / engineering works, joinery works and two ruins are mapped 140m east. An unnamed pit is mapped 200m southwest.	• No local sources of contamination identified. • A garage and joinery works are mapped 140m east. • Potential for ground gases arising from backfilled water course 40m east and nearby infilled pits.
1960s	The site remains unchanged. Bank House Rd and Plant Hill Rd have been constructed along the western and southern boundaries respectively. Residential properties have been constructed from opposite Bank House Rd to the west; with a welfare centre and public house constructed south of Plant Hill Rd. Two refuse tips are mapped north of the site. To the east, Plant Hill Comprehensive School and residential properties have been constructed from 200m east.	• Potential for Made Ground on or adjacent to the site due to construction of roads along western and southern boundaries. • Potential for ground gases arising from Refuse Tip to the north.
1970s	Plant Hill Police Station has been constructed on site, with the main building in the west and small outbuildings in the east. An unnamed small property has been constructed directly to the north, with Telford School beyond. The garage (later named as an engineering works) and joinery works 140m east have been replaced by residential properties.	• Potential for Made Ground on site associated with the construction of police station. • Potential for leakages and spillages related to parked vehicles.
Present Day	The police station is vacant, and the site closed and fenced from the public. The school and buildings directly north have been demolished. The remaining surrounding area remains relatively unchanged.	• No significant sources of contamination identified. • Potential for asbestos in soils during demolition works of the school.

Potential sources of onsite contamination are further discussed in *Section 6.0*.

4.0 Geology, Hydrogeology and Hydrology

4.1 Geology and Hydrogeology

A study of the Envirocheck (Ref. 1) Report and the British Geological Survey (BGS) 1:50,000 mapping records (Bedrock and Superficial Editions) for Manchester (Sheet 085) dated 2010 (Ref. 2) indicates the following geological and hydrogeological succession underlying the site:

Table 4.1 – Geological/Hydrogeological Succession

Geology	Associated Hydrogeological Classification
Glacial Till – Devensian, Diamicton ¹	Secondary Aquifer, Undifferentiated ²
Manchester Marls Formation – mudstone ³	Secondary B Aquifer ⁴

Notes:

1. A heterogeneous mixture of clay, sand, gravel, and boulders varying widely in size and shape.
2. These layers have not been assigned an attribute either category A or B rock type due to not being possible. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.
3. Red marl (calcareous mudstone and siltstone) with thin beds of fossiliferous marine limestone and dolomite; locally green; sandy in places especially in top part; local breccias and pebbly beds.
4. Predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

BGS Records do not indicate the presence of Made Ground on site, however the site's historical land use, primarily as a Police Station, with known basement and car parking areas constructed in the 1970s, suggests that made ground soils may be present beneath the site.

There are no BGS recorded borehole logs available for review (Ref. 3) within 250m of the site.

There is one geological fault line within 250m of the site, located approximately 110m northeast aligned generally northwest-southeast. The geological fault identifies the boundary between the Chester Formation to the north and the Manchester Marls Formation on site.

The site is not situated within a Source Protection Zone (SPZ). There are no recorded groundwater abstraction points within 500m of the site.

4.1.1 Mining

A review of the Coal Authority interactive mapping (Ref. 4) for the area indicates that the site is located within a Coal Mining Reporting Area, however the Pennine Lower and Middle Coal Measures Formations and associated mine entries, coal outcrops, probable shallow coal mine workings and Development High-Risk Areas are located over 1km northeast from the site.

Consequently, the risk to development from historical coal mining is considered to be **Low**. No further actions are required to further assess the risk to development from historical coal mining.

The closest recorded BGS mineral site is located 113m southeast at Pike Fold Clay Pit which was an opencast clay and shale quarry which has ceased operations. Pike Fold Sand Pit was also located 220m southeast.

4.1.2 Other Ground Stability Issues

The Envirocheck Report (Ref. 1) confirms that there is a no hazard to low risk from the following ground stability hazards on the site; collapsible ground, compressible ground, ground dissolution, landslide ground, running sands and shrinking or swelling clay.

4.1.3 Ground Gas

Given the historical development on site, it is possible that made ground soils may be present on site. These soils may act as a source of ground gas generation.

There are two historical landfills located within 50m, located 13m south and 41m northeast. No further information regarding type of waste deposited or input dates is supplied for both sites.

One infilled water feature (pond, marsh, river, stream etc.) is located 41m northeast dated 1956, likely the water course no longer mapped from the 1950s.

The Envirocheck Report (Ref. 1) and BGS Radon Mapping (Ref. 5) confirms the site is situated in an area where <1% of homes are above the radon action level. Radon protection measures are therefore not considered necessary within the proposed development. However, where the new development incorporates a basement the advice of a specialist Radon assessor must be obtained.

4.2 Hydrology

The nearest surface water feature is an issue located 154m southeast which flows southeast-wards.

No recorded pollution incidents to controlled waters have occurred within 500m of the site.

There are no recorded surface water abstractions within 1km.

There are no discharge consents located within 450m of the site.

5.0 Unexploded Ordnance Risk Assessment

Military activities including those conducted as part of both the First and Second World Wars have resulted in a legacy of unexploded ordnance (UXO) being present within the shallow soils of the UK.

UXO result from various sources including both allied (military training) and German (bombing raids) with a guide figure of approximately 10% of all munitions failing to function as designed.

The likelihood of UXO being encountered on a development site is influenced by several factors including; the proximity to strategic targets, the nature of the development works being undertaken and evidence of local damage in the post-war periods amongst others. To determine the likelihood of UXO being present on a site, a step-wise risk assessment process is followed. This process is outlined within CIRIA C681 Unexploded Ordnance: A Guide for the Construction Industry (Ref. 6) with the following commentary considered to represent a Preliminary Risk Assessment intended to guide if and where there is a requirement for a Detailed Risk Assessment.

5.1 Preliminary UXO Assessment

Risk mapping (Ref. 7) for UXOs has placed the site in a **Moderate** risk area. Moderate-risk regions are those that show a bomb density of between 11 and 50 bombs per 1000 acres and that may contain potential WWII targets.

A review of the available historical mapping did not identify any evidence of bomb damage onsite or within close proximity of the site boundary. No ruins were recorded in the immediate vicinity of the development site, and no buildings appear to have been demolished following WWII on or surrounding the site. Ruins were recorded 140m east of the site. Detailed bomb strike mapping does not record any strikes or damage on the site or within 750m (Ref. 8).

Furthermore, the site was developed in the 1970s as Plant Hill Police Station indicating that if any UXO were on site, they would have been located and removed at that time.

Considering the above, the risk of encountering potential UXO as part of future intrusive investigation works is considered **Low**.

If unexploded ordnance is discovered during any works, stop immediately, prevent access to the area, and inform the police. If the site boundary or location changes then the UXO risk should be reassessed.

6.0 Conceptual Site Model & Qualitative Risk Assessment

The conceptual site model (CSM) and Qualitative Risk Assessment (QRA) are presented in the table within this section.

The CSM details the source-pathway-receptor linkages or potential pollutant linkages (PPL) that have been identified for the site. The QRA details the associated level of risk relating to these potential pollutant linkages.

The CSM and QRA concern risk to human health and water environment with additional, more specific risk assessment protocols contained within the main body of this reporting, as detailed in *Section 6.1* below.

The QRA follows the framework outlined within CIRIA C552 (Ref. 9) which is summarised within *Appendix C*.

The 'risk rating' within the QRA refers to the risk that the source, pathway, receptor linkage or PPL is complete. Unless specifically stated it does not necessarily refer to an immediate risk and is intended to be used as a tool to assess the necessity for further assessment/investigation.

6.1 Additional Risk Assessments

The following risk assessments, listed below, are not included within the main CSM and QRA but nonetheless can be of critical importance to the onward development of the site:

- The risk presented by Mining is discussed and assessed in *Section 4.1.1*.
- The risk presented by Radon is discussed and assessed in *Section 4.1.3*.
- The risk presented by Unexploded Ordnance is discussed and assessed in *Section 5.0*.

Under current health and safety legislation, employers are required to carry out their own appropriate risk assessments and mitigation to protect themselves and their employees, other human receptors and the environment from potential contamination. Such risks must be adequately mitigated by law, specifically the Construction Design Management (CDM) Regulations, 2015 (Ref. 10) which require that potential risks to human health and the environment from construction activities are appropriately identified and all necessary steps taken to eliminate / manage that risk. It has been assumed that any future construction works on site will be undertaken in compliance with these requirements.



- The table below represents the first stage in the land quality risk assessment process: The Qualitative Risk Assessment.
- For a development site to be deemed 'suitable for use', the level of risk needs to be brought down to acceptable levels, i.e. low to very low risk. The purpose of each stage of risk assessment is ultimately to establish, if there is a requirement for additional levels of assessment to be made to have sufficient confidence to support a risk characterisation or management decision, e.g. remedial action.
- In the absence of specific site data, a Generic Quantitative Risk Assessment is invariably recommended.

Conceptual Site Model				Qualitative Risk Assessment		Recommended Actions
Source	Pathway(s)	Receptor(s)	Consequence	Likelihood of Occurrence	Risk Rating	
Significant sources of on-site contamination: • Made Ground of unknown composition from uncontrolled deposition of materials onsite during the construction of the buildings onsite • Potential for leakages and spillages on site related to vehicles Significant sources of off-site contamination: • Uncontrolled deposition of Made Ground during the construction of roads and structures near and adjacent to the site's boundaries. • Neighbouring demolition activities • Local historical industries included a Garage and Joinery 140m east. • Historical landfills from 13m south and 41m northeast	Direct contact, ingestion, inhalation (dust and vapours)	End-user of site (Residents) & Construction Workers	Medium Chronic health risk	Low Likelihood Based on the site's limited development history and lack of historical industrial use, the likelihood of encountering significant contamination within the Made Ground is considered to be Low. There is potential for localised contamination related to ACM-containing structures considering structures onsite before 2000s. There is potential for ACMs in surface soils from neighbouring demolition works. Likelihood of construction workers coming into contact with contamination on site can be reduced by appropriate PPE.	Moderate / Low	Generic Quantitative Risk Assessment Recommended as part of the ground investigation.
	Vertical migration through the superficial deposits (soils) May occur due to existing service corridors and physical processes including: capillary action and downwards into the natural deposits through infiltration.	Controlled Waters (Groundwater) Secondary B Aquifer (Bedrock), overlain by Glacial Till Deposits (Secondary Aquifer – Undifferentiated). There are no recorded potable groundwater abstraction points within 500m. The site is not within a designated Source Protection Zone.	Mild Pollution of non-sensitive water resources	Unlikely While there is the potential for localised contamination to migrate vertically through the superficial deposits to the bedrock Secondary A Aquifer, there is a low likelihood of significant contamination being present in the Made Ground due to lack of historical industrial land use and taking into account the lack of an SPZ or abstraction points within 1km.	Very Low	No further action required
	Horizontal migration over and through the superficial deposits (soils)	Controlled Waters (Surface Water) Nearest surface water feature is an issue located 154m southeast flowing south. No recorded surface water abstraction points within 1km.	Mild Pollution of non-sensitive water resources	Unlikely Considering the distance from the site to the nearest surface water receptor and the expected low levels of contamination within the Made Ground, this pathway is considered unlikely.	Very Low	No further action required
Significant sources of ground gas: • Backfilled water course 41m northeast, filled circa 1950s with unknown material. • Historical landfills 13m south and 41m northeast • Potential for Made Ground on site or superficial deposits with high organic / putrescible content	Vertical and horizontal migration through existing service corridors and the underlying superficial deposits	End-user of site (Residents)	Medium Human health risk	Low Likelihood There is potential for gas generation from historical landfills 13m south and 41m northeast.	Moderate / Low	Generic Quantitative Risk Assessment Recommended as part of the ground investigation.

7.0 Conclusion and Recommendations

The qualitative risk assessment (QRA) determined a varied level of level of risk associated with the proposed development.

The QRA concluded by recommending that generic quantitative risk assessments (GQRA) were conducted to confirm the assessment of risk ascribed to each of the respective potential pollutant linkages (PPLs). It is recommended that the GQRA is conducted as part of a ground investigation in support of the engineering design of the proposed development.

In summary, the following recommendations are made:

- Undertake an intrusive ground investigation;
- Undertake a GQRA as part of the ground investigation; and
- Undertake ground gas monitoring over a period of two-three months for potential hazardous gases.

It is further recommended that the site investigation works are completed in advance of any development works taking place, with additional consideration of the existing basement structure.

7.1 Contaminants of Concern

Potential contaminants of concern associated with the sources identified within the Conceptual Site Model in *Section 6.0* of this reporting include but are not limited to: broad range aliphatic and aromatic hydrocarbons present within any fuel oils; polycyclic aromatic hydrocarbons (PAHs); inorganic compounds including heavy metals; and asbestos present in discarded building materials.

Potential contaminants associated with the airborne dust/particulates include but are not limited to: polycyclic aromatic hydrocarbons and inorganic compounds including toxic metals that are also accounted for by potential onsite contaminants of concern.

7.2 Other Considerations

The requirement for additional surveys, e.g. arboricultural and ecological surveys, should be confirmed through advice from a suitably qualified and experienced professional.