PRELIMINARY CONTAMINATED LAND RISK ASSESSMENT

Desk Study Report

Site Address
Land adjoining 98 Milton Street,
Belvedere, DA17 5BA

Client

Report Reference: PRV/MS/16

Prepared by:
STM Environmental Consultants Ltd

Date:
30/09/2016

DOCUMENT CONTROL

PRELIMINARY CONTAMINATED LAND RISK ASSESSMENT
Desk Study Report

Site Address:	Land Adjoining 98 Milton Street Belvedere, DA17 5BA
Site Coordinates:	549163, 178704
STM Reference:	PRV/MS/16
Version No:	2.0
Prepared for:	Brennan Acquisitions Limited
Date:	30/09/2016
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1 Disclaimer

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2 Executive Summary and Decision Record

Site Location and Description	The site is located at the land adjoining 98 Milton Street, Belvedere, DA17 5BA within a predominantly residential setting. It is approximately centred at national grid reference 549163, 178704 and occupies an area of approximately 0.12ha.
Proposed Development	The site is to be developed into a 3 story building compromising 8 self-contained dwellings with communal gardens, new access and a parking area.
Site History	Historical maps dating back to 1870 show the site has remained largely unchanged to the present date. Anecdotal evidence suggests the site formed part of the adjacent residential dwelling. The surrounding areas have been predominantly residential from 1909 to the present day.
Geology	Geological data indicates that the site is underlain by the Thanet Formation in the bedrock geology. No British Geological Society data could found for the superficial deposits.
Hydrogeology	The bedrock geology is classified as a Secondary A Aquifer. The site is not located within a Ground Source Protection Zone and there are no groundwater abstractions within 1km of the site.
Hydrology	There are no significant surface water features within 500m of the site.
Contamination Assessment	A search of historic maps and other data sources suggests the site has not been subject to any potentially contaminative past land uses. As such the man-made contamination risks associated with the site are considered to be low. However the desk study identified that the site lies in a “Radon Affected” area (Radon Class 2).
Recommendations	It is considered that no further action is required in relation to potential man-made soil contamination and the proposed development. However it is recommended that a “watching brief” be employed and the Council or STM should be contacted if any unexpected contamination is encountered during the development. With regard to Radon, it is recommended that gas monitoring is undertaken to confirm whether levels of Radon at the site present a risk. If so, then Radon protection measures will need to be incorporated into any buildings.
This table is intended as a summary of the desk study findings and should be read in conjunction with the main report.	

3 Introduction

STM Environmental Consultants Ltd. were commissioned by Brennan Acquisitions Limited to undertake a Preliminary Risk Assessment (PRA) consisting of a desk study and site walkover at the land adjoining 98 Milton Street, Belvedere, DA17 5BA. The planning proposal is for the development of 8 self-contained residential dwellings, communal gardens, new access and parking area.

The main objectives of the study were to:

- Enable a conceptual site risk model to be constructed;
- Provide sufficient information for a preliminary qualitative risk assessment to be undertaken;
- Inform the need for and scope of any intrusive investigations that may be required.

4 Site Information

4.1 Site Location

The site is located at the land adjoining 98 Milton Street, Belvedere, DA17 5BA. It is approximately centred at national grid reference 549163, 178704. The site occupies an area of approximately 0.12ha.

A site location map is included in the Environmental Search Report presented in Appendix 1.

4.2 Site Current Use

The site is currently unused and covered by dense overgrown vegetation.

4.3 Surrounding Land Use

The surrounding area is predominantly residential in nature. The site adjoins Milton Street to the south and is bordered by Ruskin Road to the west and a public stairway that separates the site from Samson Court to the north. The site is accessed via Milton Road to the east.

4.4 Proposed Use of Site

The development proposal is for the erection of a 3 story building comprising of 8 self-contained residential dwellings. The development will also include new access, a parking area and communal gardens.

Proposed site elevations and roof plans are presented in Appendix 2.

5 Site History

5.1 Analysis of OS Maps

Historical maps published by the Ordnance Survey dating back to 1870 were reviewed in order to ascertain whether or not the site has been subject to previous industrial land uses. Below is a summary of the main observations from the analysis.

Map Year & Scale	On Site	Off Site
1870-1875 (1:10,560)	Field/Open space. No buildings on site.	The surrounding area is largely rural in nature. The proposed site is bordered by an orchard to the east and Prospect Cottage to the south east and Letitia Cottages to the north west. A group of orchards can be seen to the south west of the site at approx. 149 metres. Heron Hill Farm can be seen to the south west of the site at approx. 315 metres, Chalkstile Farm can be seen to the north west of the site at approx. 304 metres. Two wells can be seen to the north west of the site at 142 metres and 320 metres respectively.
1895 (1:2500)	No significant change.	A sand pit can be seen to the west of the site at approx. 320 metres, an old gravel pit can be seen to the south east of the site at approx. 563m.
1897 (1:2,500)	No significant change.	There is a significant increase in what appears to be residential dwellings in the surrounding. The orchard to the east of the site is significantly smaller and replaced with a row of housing and separated from the by Orchard Road and Kentish Road. A Smithy can now be seen to the south west of the site at approx. 508 metres, a railway line titled the 'North Kent Line' and Belvedere Station can be seen to the north of the site at approx. 495 metres. Chalkstile Farm to the north west and the Sand Pit to the west are no longer present on the map.
1898-1899 (1:10,560)	No significant change.	A nursery can be seen to the south of the site approx. 219 metres. No other significant change.
1909 (1:2,500)	No significant change.	A row of what appears to be residential dwellings can be seen immediately adjacent to the site. The Chalk Pit to the west and Gravel Pit to the south east are no longer present on the map.
1910 (1:10,560)	No significant change.	Nurseries can be seen 280 metres and 398 metres west of the site. Heron Hill farm to the south west is

Map Year & Scale	On Site	Off Site
		no longer present on the map.
1916 (1:10,560)	Partial map only, no data available.	Partial map only, no data available.
1919 -1920 (1:10,560)	Partial map only, no data available.	Partial map only, no data available.
1921 (1:10,560)	Partial map only, no data available.	Partial map only, no data available.
1933 (1:2,500)	No significant change from 1910 map	Two large allotment gardens can be seen to the north west and west of the site at approx. 193 metres and 494 metres respectively. The Smithy to the west is no longer present on the map.
1938 (1:10, 560)	No significant change.	No significant change.
1949 -1961 (1:10,560)	No significant change.	No significant change.
1958-1959 (1:1,250)	No significant change.	The orchard to the east of the site is no longer present on the map. No significant change.
1966-1969 (1:10,560)	No significant change.	No significant change.
1967-1970 (1:1,250)	No significant change.	The orchard to the south west is significantly smaller and woodland. A Transport Depot can be seen to the north east of the site at approx. 138 metres.
1975-1976 (1:10,000)	No significant change.	The orchard to the south west no longer present on the map.
1984 - 1987 (1:10,000)	Partial map only, no data available.	Partial map only, no data available.
1993-1996 (1:10,000)	No significant change.	The transport depot to the north east is no longer present on the map.

5.2 Planning History And Previous Site Investigations

A search of historical planning information on the London Borough of Bexley Planning Portal did not find any applications with information relevant to potential soil contamination at the site. In general terms, however it is understood that the site currently has planning permission for the development of flats with underground parking.

However a Desk Study Assessment report undertaken by Southern Testing (Project Ref: DS2300) on behalf of Kent Design and Build in September 2008 was found. The report assessed the risks associated with the orchards surrounding the site and potentially infilled land and concluded that they were low.

6 Environmental Characteristics

6.1 Geology

6.1.1 Superficial deposits

British Geological Society maps show that the site is on the boundary of the Harwich formation overlying soils of the Lambeth Group.

The Harwich Formation varies regionally. In the south of the London Basin, it typically comprises glauconitic silty or sandy clays, silts and fine- to coarse-grained glauconitic sands, some gravelly, varying to flint gravel beds.

The Lambeth Group, formerly known as the Woolwich and Reading Beds, occurs in the London and Hampshire Basins. It typically consists of vertically and laterally variable sequences mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate.

6.1.2 Bedrock deposits

The underlying bedrock is the Thanet Formation with a lithology that typically consists of glauconite-coated, nodular flint at base, overlain by pale yellow-brown, fine-grained sand that can be clayey and glauconitic. Rare calcareous or siliceous sandstones.

6.2 Hydrogeology

The site is not located within a Groundwater Source Protection Zone. There are no aquifers present in the superficial deposits and the bedrock has been designated as a Secondary A Aquifer.

There are no groundwater abstractions within 1km of the site; the nearest abstractions are sourced from Thames Surface Water and licenced for the purposes of non-remedial River/Wetland Support and located approx. 1,346m north east and 1,645m south east of the site.

6.3 Hydrology

The nearest surface water feature is the River Thames which is located at approx. 1,883 metres to the site.

6.4 Ecology and Protected Sites

No designated environmental sensitive ecological sites (i.e. SSSI, Ramsar, SPA, NNR or SAC) were located with 500m of the site.

Parish Church of All Saints which is approx. 376m south of the site is a grade II listed building. Lesnes Abbey Woods which is approx. 317m west of the site is a Local Nature Reserve.

6.5 Radon

The area in which the site is falls into Radon Class 2 which is considered to “Radon Affected”. This means that Radon levels at the property have a 1-3% chance of being above the action level of 200 Bqm-3 according to Public Health England.

7 Site Walkover

A site walkover was conducted on the 25th September 2016. The site largely inaccessible as it was covered by very dense overgrown vegetation with some mature trees bordering the southern and western boundary of the site. Some general household debris was observed at the site entrance and along the site boundary. A derelict structure was observed on site along the western boundary and is likely to have been a storage unit associated with the adjacent property, its condition and the poor accessibility to the site suggest it has remained unused for a significant period of time. The site is bordered by residential dwellings. 98

Milton Street is immediately adjacent to the southern boundary of the site separated by a low brick wall, Ruskin Road borders the site to the east and Samson Court is to the north of the site separated by a concrete public staircase. During the walkover no significant visual or olfactory signs of contamination were observed.

During the walkover, the consultant spoke with the occupier of 98 Milton Road. He informed that the land was previously owned by his father before he sold it some 20 -30 years ago. He informed that the site had been used as part of their garden during the time his family owned it.

Photographs taken during the site walkover are presented in Appendix 3.

8 Preliminary Conceptual Site Risk Model

8.1 Potential Sources

Information gained from historical maps along with anecdotal and other evidence indicates that the site has not been subject to any industrial land uses.

The nearest industrial land uses were identified as an existing allotment garden, established c. 1933 and located approx. 193 metres north west of the site and a Transport Depot established c. 1967 and located approx. 138 m metres north east of the site; according to the historical map records, the depot closed in approx. 1993-1996 and is now residential housing without gardens.

8.2 Potential Receptors

8.3 Potential Human Health Receptors

Potential human health receptors include construction workers and future users of the site.

8.4 Potential Groundwater Receptors

Potential groundwater receptors include the Secondary A Aquifer in the bedrock geology beneath the site. There are no source protection zones or drinking water abstractions in the vicinity of the site.

8.5 Potential Surface Water Receptors

No significant surface water receptors were identified within 500 metres of the site.

8.6 Potential Ecological Receptors

No potential ecological receptors were identified within 500 metres of the site.

8.7 Potential Property Receptors

Potential property receptors include the proposed residential dwellings on site

8.8 Potential Pathways

8.9 Pathways for Human Receptors

The main pathways via which on and off-site human receptors are likely to come into contact with, or be affected by any contamination present on the site can be summarised as follows:

- Dermal contact with contaminated soil (i.e. absorption through the skin) – through garden activities such as children playing, gardening etc.
- Ingestion of contaminated soil (either directly or via soil adhering to vegetables grown on the site)
- Inhalation of contaminated soil, fugitive dust and vapors.

8.10 Potential Pathways to Groundwater Receptors

The principal means by which contaminants can reach the groundwater is by leaching (i.e. downward movement through the soil pores with percolating and infiltrating water) of contaminants through the soil.

8.11 Surface Water Pathways

Routes by which contaminants from the site could surface water include via overland run-off, drainage and groundwater entering the river as base flow.

8.12 Potential Pathways to Ecological Receptors

The exposure pathways for terrestrial ecological receptors will be similar to those for humans. Pathways for aquatic receptors are via uptake of contaminated sediments and water.

8.13 Potential Pathways to Property Receptors

Pathways by which property receptors are exposed to potential contaminants include vapour migration through the unsaturated zone and absorption of water containing dissolved contaminants (i.e. as in the case of sulphate attack).

8.14 Conceptual Site Model

Although no man made potential contamination sources were identified, the site is located in an area where Radon gas may be present in concentrations above the recommended threshold for dwellings.

It is considered that the most vulnerable potential receptors are residents and construction workers. The primary exposure route will be via inhalation. Table 1 provides a summary of the sources, pathways and receptors for the potential contamination at the site.

Table 1: Source, Pathways and Receptors

POTENTIAL SOURCES	POTENTIAL RADON GAS
Main Potential Pathways	Gas migration into buildings Inhalation
Main Potential Receptors	**ON SITE HUMANS** Future residents, construction workers
Hazard	Adverse Health Effects (i.e. Cancer)
Pollutant Linkage ID	**PPL1**

9 Qualitative risk assessment

For land to be considered 'contaminated land' under Part IIA, the potential contamination source must be causing or have the significant possibility of causing harm to designated receptors. It is therefore necessary to focus on pollutant linkages that have the potential to be significant (i.e. those that are most likely to lead to a determination).

9.1 Assessment Methodology

- Severity considers the potential impact of the linkage on the receptors, if the linkage was active. Categories range from slight/superficial to fatal.
- Likelihood considers the chances of the linkage occurring and is classified into categories from improbable to frequent.

By assigning scores with each of the above categories, the risk assessment can be undertaken using the formula:

RISK = LIKELIHOOD × SEVERITY

The resulting risk matrix is given in Table 3; while Table 4 provides the risk assessment based on the risk score.

		Potential Severity				
		Fatal = 5	Major = 4	Moderate = 3	Minor = 2	Slight = 1
Probable Likelihood	Frequent = 5	Very High	High	Moderate	Low	Very Low
	Probable = 4	High	High	Moderate	Low	Very Low
	Possible = 3	Moderate	Moderate	Moderate	Low	Very Low
	Remote = 2	Low	Low	Low	Low	Very Low
	Improbable = 1	Very Low	Very Low	Very Low	Very Low	Very Low

Table 2: Contamination Risk Matrix

Risk Score	Assessment
1-5	Very low
6-10	Low
11-15	Moderate
16-20	High
21-25	Very High

Table 3: Assessment description for a given risk score.

9.2 Assessment of the significance of potential pollutant linkages

The results of the qualitative risk assessment are shown in the table below. All Potential Pollutant Linkages were considered to be low risk (i.e. unlikely to have the potential to be significant).

The assessment of the PPLs was undertaken based on a worst case scenario (i.e. where the potential contamination being discussed is actually present on the site at depths where it can be accessed.

POTENTIAL POLLUTANT LINKAGE	**PPL1** On site humans and constructions
SEVERITY	Major (4)
LIKELIHOOD	Possible (3)
RISK	Moderate (12)
POTENTIALLY SIGNIFCANT?	**YES**

Table 3: Assessment description for a given risk score.

Given that the site is in a potential Radon affected area it is considered that risks to future residents and construction works is moderate.

The qualitative risk assessment considers the site to be a moderate risk in relation to potential Radon gas.

10 Conclusions and Recommendations

This desk study was carried out to support a planning application seeking permission for the erection of a 3 story building compromised of 8 self-contained dwellings with communal gardens, new access and parking area.

A review of historical maps, planning records and anecdotal evidence suggests that the site has not been subject to any previous industrial land uses. A site walkover was conducted that did not identify any obvious contamination sources. However it should be noted that access to the site was restricted as it was overgrown.

It is considered that risks in relation to potential **man made** soil contamination at the site are low and that no further action is required at this stage. The matter should be reviewed once the site has been cleared and the development commences. A “watching brief” should be employed and if any unforeseen contamination is encountered then the applicant should contact the Council’s Contaminated Land Officer and/or STM Environmental Consultants immediately.

The area in which the site lies falls into Radon Class 2 and is considered to be “Radon Affected”. This means that Radon levels at the site have a 1-3% chance of being above the action level of 200 Bqm-3. It is recommended that Radon gas monitoring is undertaken to confirm whether levels of Radon at the site actually present a risk. If so, then it is recommended that Radon protection measures are incorporated into any buildings.

10.1 Information Gaps and Uncertainties

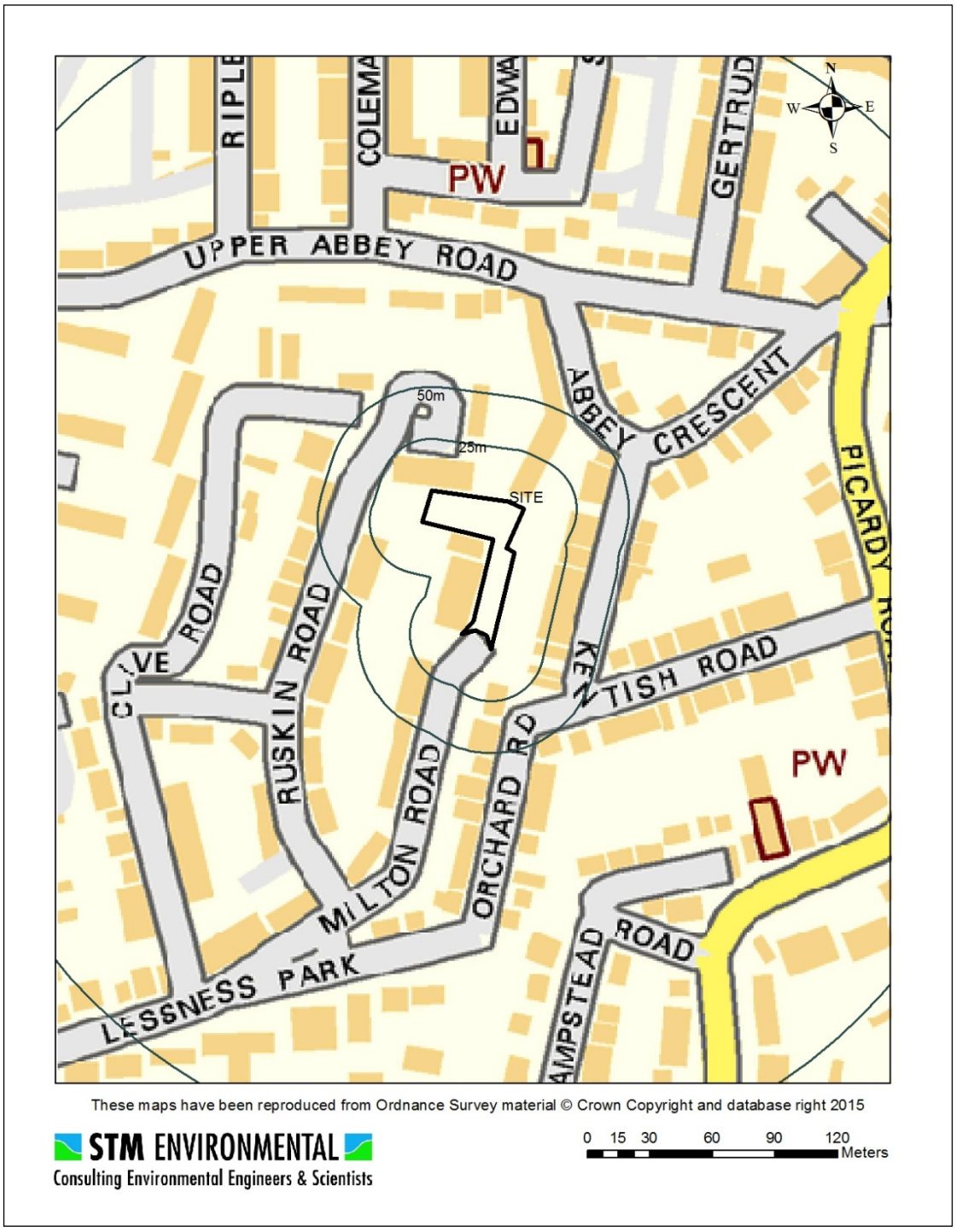
Assumptions have been made regarding the nature and scale of the activities that took place on the site and the types of potential contaminants that may have resulted. These assumptions will need to be reviewed along with the Conceptual Site Model should further information come to light.

11 Appendices

11.1 Appendix 1 – Site location map and Desk Study Search Report

Site Centre Coordinates (British National Grid): 549164, 178704
Approx. area of search feature: 1,302.29m^2
Selection Summary: A total of 6 features were selected on 4 out of 22 target layers.

11.1.1 Site Location Map



11.1.2 Aerial Photography

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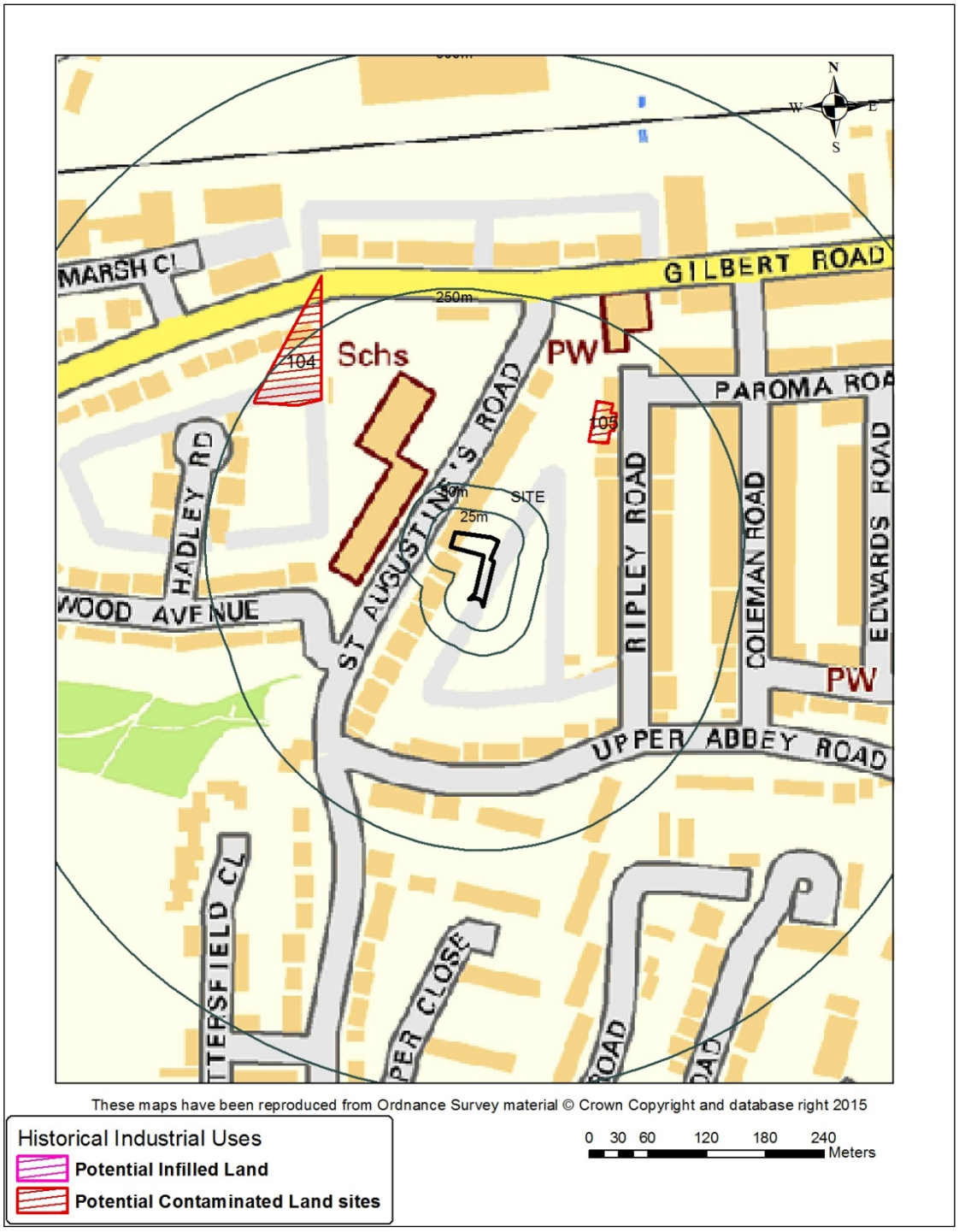
0 40 80 160 240 320
Meters

11.1.3 Summary of GIS Layers Searched

Search Layer Name	Search Distance	Data Available	No. of features identified
Potential Contaminated Land sites	250 m	Yes	2
Potential Infilled Land	250 m	No	0
EA Historic Landfill sites	250 m	No	0
EA Authorised Landfill sites	250 m	No	0
Industrial sites	250 m	No	0
Red List Discharge Consents	250 m	No	0
Environmental Pollution Incident	250 m	No	0
List 1 Dangerous Substance Inventory sites	250 m	No	0
List 2 Dangerous Substance Inventory sites	250 m	No	0
Areas of Outstanding Natural Beauty	500 m	No	0
Listed Building	500 m	Yes	1
SSSI	500 m	No	0
Special Protection Sites	500 m	No	0
Special Area of Conservations	500 m	No	0
Ramsar	500 m	No	0
National Nature Reserves	500 m	No	0
Local Nature Reserves	500 m	Yes	1
Areas of Outstanding Natural Beauty	500 m	No	0
World Heritage Site	500 m	No	0
Scheduled Monument	500 m	No	0
Park and Garden	500 m	No	0
Radon	50 m	Yes	2

Historical Industrial Uses

We have used information compiled from historical maps and the Environment Agency's various databases to make an assessment as to whether the property of interest is on potentially contaminated land and whether it could be at risk of being declared as "Contaminated Land" under Part 2A of the Environmental Protection Act 1990.



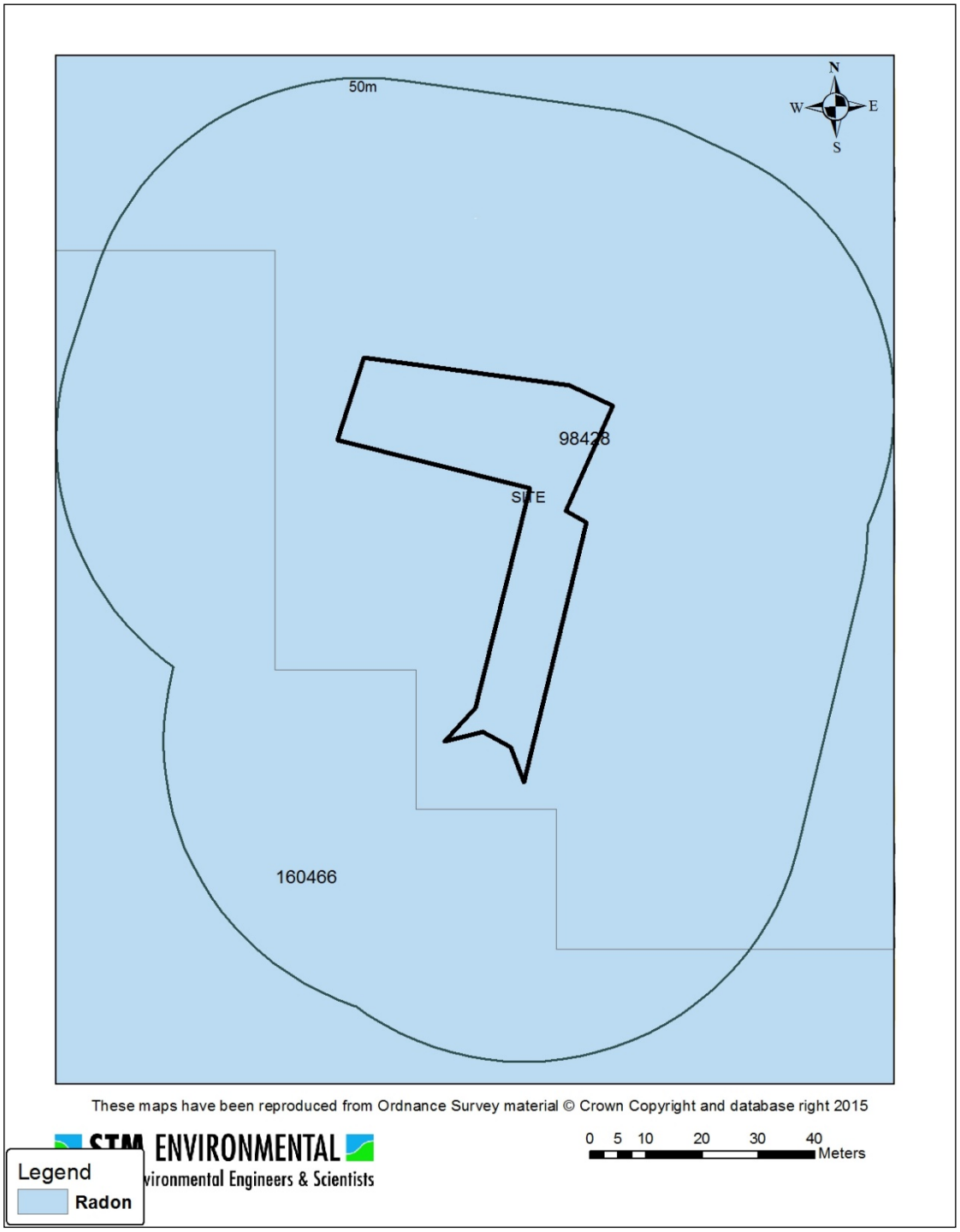
Search Information for Potential Contaminated Land sites

Selection Summary for layer
0 feature(s) identified on site.
0 feature(s) identified off site within 50 metres
2 feature(s) identified off site within 50 - 250 metres

id	name	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
On Site				
None				
Identified Off-site - Within 0-50m				
None				
Identified Off-site - Within 50-250m				
PCL/000106	Allotment Gardens	192.76	4586.62	548981, 178907
Previous Industrial Uses Industry Profile: NONE Year Use Established: c. 1933 Year Use Ended: Current Comments: Allotment Gardens Note: No Data Area: No Data				
PCL/000107	Transport Depot	137.72	832.47	549291, 178843
Previous Industrial Uses Industry Profile: NONE Year Use Established: c. 1967 Year Use Ended: c. 1993 Comments: Transport Depot Note: No Data Area: No Data				

Radon

Radon is a natural radioactive gas that is produced from small amounts of uranium that are found in the rocks and soil. Different rock types have different amounts of uranium and therefore the levels of this gas vary across the UK. The map below shows which category your property lies in.


50m
N
W
E
S
98428
SITE
160466
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ENVIRONMENTAL
vironmental Engineers & Scientists
0 5 10 20 30 40
Meters
Legend
Radon

Search Information for Radon

Selection Summary for layer
1 feature(s) identified on site.
1 feature(s) identified off site within 50 metres

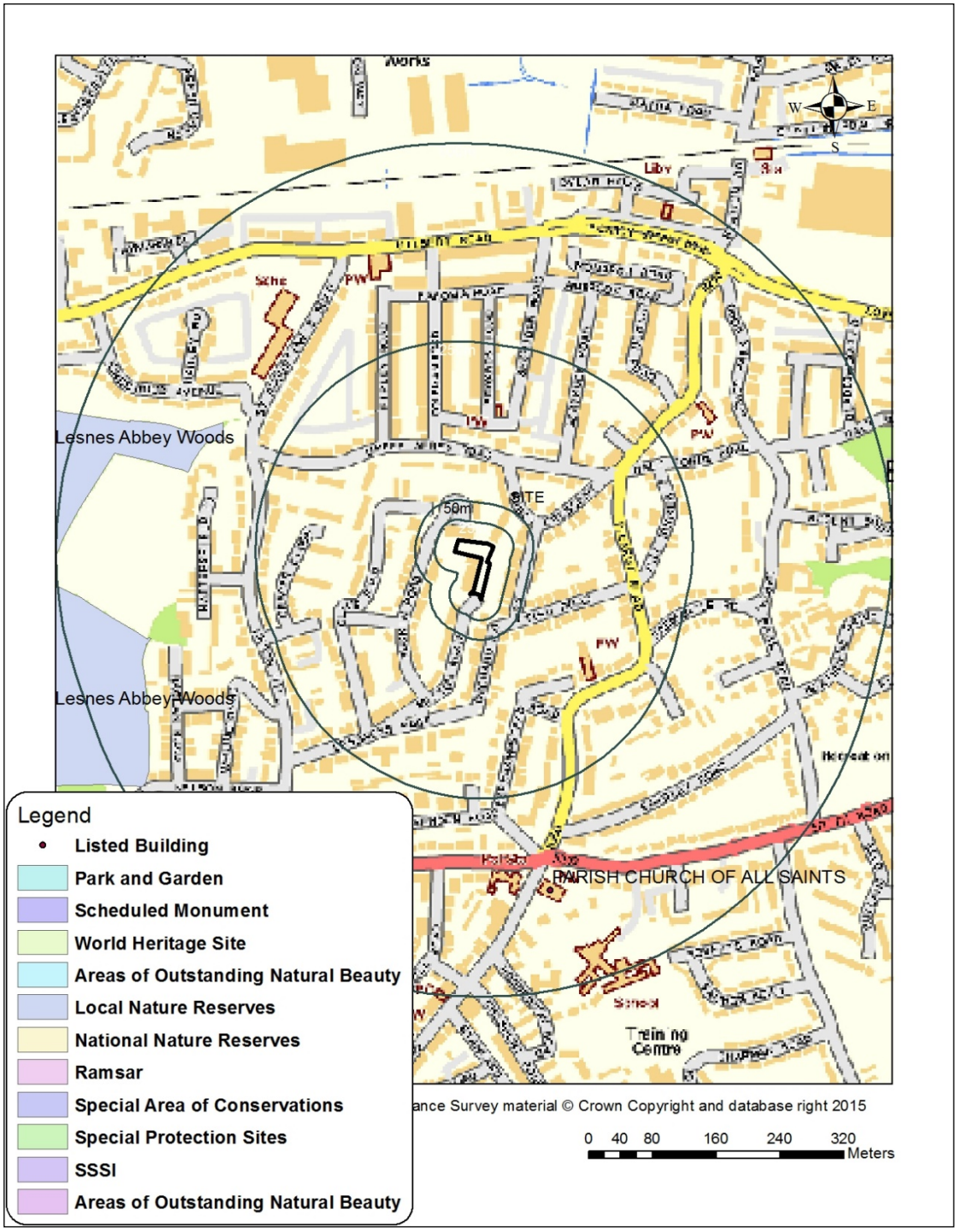
CLASS	Grid Ref.
On Site	
2	547183, 178383
Identified Off-site - Within 0-50m	
1	547658, 176629

Radon Classes

- 1 = <1%
- 2 = 1-3%
- 3 = 3-5%
- 4 = 5-10%
- 5 = 10-30%
- 6 = 30-100%

The class in which the property lies defines the percentage of properties which are above the action level of 200 Bqm-3 for radon gas within the UK according to Public Health England. Properties with a greater than 1% chance of a house having radon levels above the Action Level are designated as Affected Areas. Public Health England recommends that people in Affected Areas should test their homes for radon.

Ecological Receptors



Search Information for Listed Building

Selection Summary for layer
0 feature(s) identified on site.
1 feature(s) identified off site within 500 metres

Name	Grade	Approx. distance (m)	Grid Ref.
On Site			
None			
Identified Off-site - Within 0-500m			
PARISH CHURCH OF ALL SAINTS	II	375.62	549256, 178289

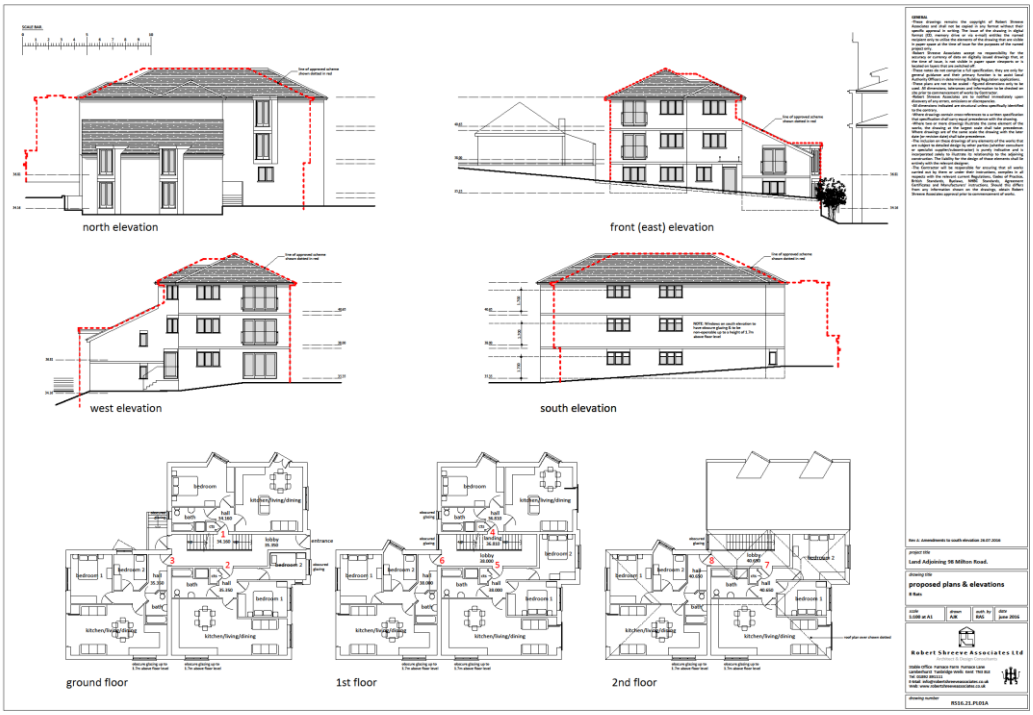
Search Information for Local Nature Reserves

Selection Summary for layer
0 feature(s) identified on site.
1 feature(s) identified off site within 500 metres

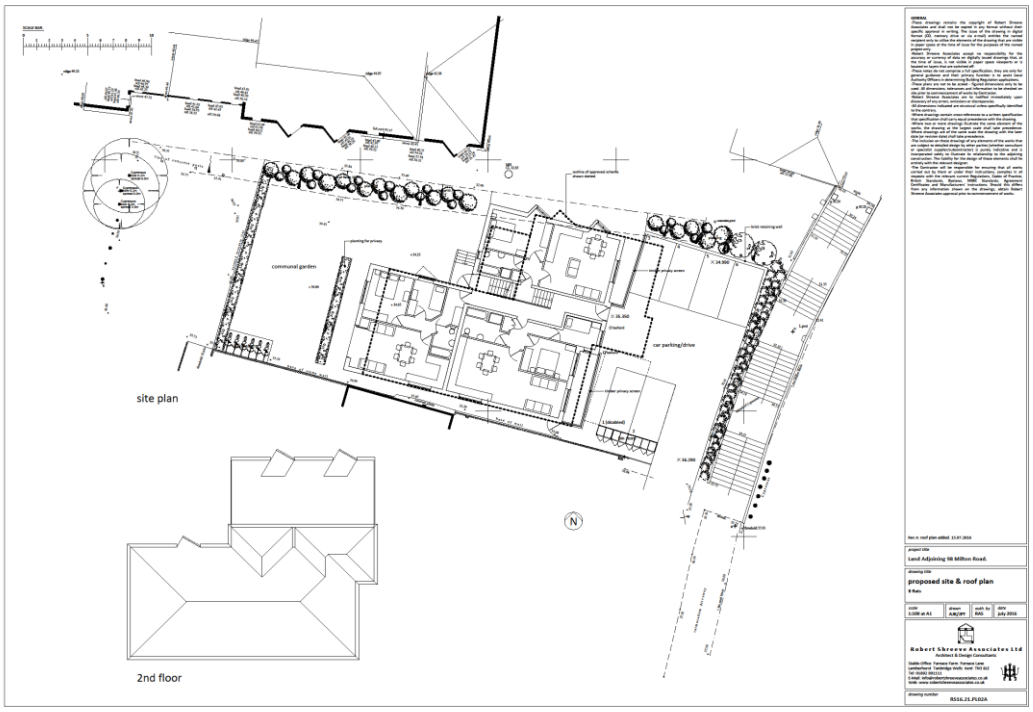
LNR_NAME	STATUS	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
On Site				
None				
Identified Off-site - Within 0-500m				
Lesnes Abbey Woods	Declared	317.10	549005.66	548244, 178528

11.2 Appendix 2 – Proposed Development Plans

11.2.1 Figure 1. Site Elevations



11.2.2 Figure 2. Site and Roof plan

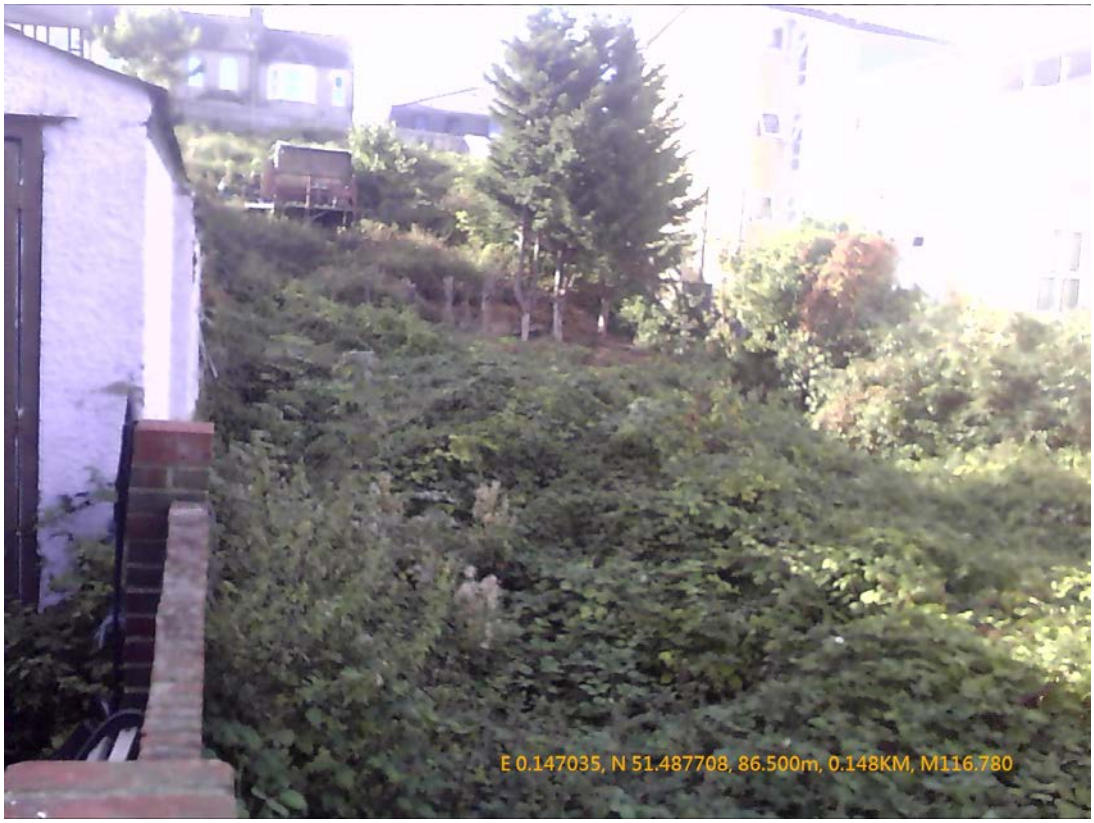


Appendix 3 – Photographs from Site Walkover

11.2.3 Figure 3. East view of the site and Samson Court

11.2.4 Figure 4. Household waste at site entrance

11.2.5 Figure 5. Site boundary with neighbouring property, 98 Milton Road



11.2.6 Figure 6. Samson Court

11.2.7 Figure 7. External boundary and walkway between the site and Samson Court

11.2.8 Figure 8. Site entrance and adjacent property, 98 Milton Road