AUTO SERVICE (PONTYPOOL) LTD

AUTO SERVICE LTD
ROCKHILL ROAD, PONTYMOEL, PONTYPOOL, TORFAEN NP4 8AN

PRELIMINARY INVESTIGATION REPORT

Contract: 70413

Date: JUNE 2017

Ian Farmer Associates (1998) Limited
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carried out at

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Prepared for

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EXECUTIVE SUMMARY

On the instructions of Steve Skinner and Company, a Preliminary Investigation in the form of a desk study and site reconnaissance has been carried out in order to assess the potential hazards on and adjacent to the site and prepare a risk assessment for further consideration.

It is understood that it is proposed to develop the site for a three/four storey block of flats with car parking and some landscaped areas around the building.

The site is situated at south east of Rockhill Road, north east of Fountain Road, Pontymoel and may be located by Grid Reference SO 290 004. A site location plan, site plan and aerial photograph are included in Appendix 1, Figures A1.1, A1.2 and A1.3.

At the time of the walkover survey, the site was occupied by a single/two storey light industrial unit of concrete frame and masonry construction which was used for the sale and repair of light commercial vehicles. A yard was located to the south east of the building which was being used to store vans.

An above ground oil tank was also present south of the building in the western corner of the yard. A small area of hardstanding was also present to the north west of the building which was used as a display area for vans. A row of man hole covers were located in the north of this area of hard standing which possibly indicates that some underground storage tanks were located in that area.

The site was open ground with an armoury in the western corner and a feeder stream along the north eastern boundary up until between 1938 and 1963 when the garage appears to have been built. The feeder stream was abandoned by 1964 and the Nant Dar was culverted between 1983 and 1993. The buildings on the site were expanded remodelled between 1983 and 1993 and remain to the present.

The 1:50000 British Geological Map number 249 indicates the site to be underlain by Alluvium overlying the Brownstone Formation of the Old Red Sandstone

The guidance recommends that basic radon protective measures should be installed in the proposed development in line with the Building Research Establishment, Report BR211

The geological map indicated that the site is likely to be underlain by Alluvium. The river bed to the north east of the site was 5m below the site therefore it is likely that there is up to 5m of material overlying the bedrock. This material is likely to be granular and may include cobbles and boulders. Alternatively the ground level may have been raised to alleviate the risk from flooding and the soil below the site may be made ground.

The Envirocheck data provided indicates only a low risk of landslip subsidence. However, the embankment down from the site to the river needs to be carefully assessed prior to landscaping or altering that area of the site

There is likely to be made ground from backfilling the feeder channel and the culverting of the Nant Dar. Also some underground tanks and old foundations may be present particularly in the northern corner of the site. The foundations from the existing garage will also need to be grubbed out.

The research has identified the following potential sources of contamination which may form part of a pollutant linkage:

- Contamination associated with vehicle repair on-site.
- Contamination from underground storage tanks from the former filling station in the north of the site.
- Contamination from above ground storage tank.
- Contamination associated with Made Ground from back filling the feeder stream and culverting the Nant Dar.
- Potential gas associated with back filling the feeder stream and culverting the Nant Dar.
- Radon
- There is evidence for the potential for radon to be present at levels for which basic protection measures have been recommended. The risk to end-users is considered to be moderate.
- There is the potential for the migration of explosive gases from made ground on the site. The risk is considered to be moderate.

There is considered to be a risk to end users and controlled waters from the vehicle maintenance on site and also the underground and above ground storage tanks. The risk to end users is considered to be high.

The site is located adjacent to the Afon Lwyd and the Nant Dar runs below the site. The underlying geology is likely to be permeable, therefore, the risk to these waters from the vehicle maintenance and the storage tanks on the site is considered to be high.

The following scope of works is suggested in order to collect the required data:

- The sinking of boreholes and trial pits for the recovery of samples for geotechnical and chemical contamination analysis. Investigation of the tanks in the northern corner of the site may have to be carried out as a phase 2 once the site has been cleared.
- The installation and monitoring of gas and groundwater monitoring standpipes.
- Sampling of water upstream and downstream in the Nant Dar and the Afon Lwyd.

CONTENTS

1.0 INTRODUCTION

1.1 General

1.1.1 On the instructions of Steve Skinner and Company, a Preliminary Investigation in the form of a desk study and site reconnaissance has been carried out in order to assess the potential hazards on and adjacent to the site and prepare a risk assessment for further consideration.

1.1.2 It is understood that it is proposed to develop the site for a three/four storey block of flats with car parking and some landscaped areas around the building.

1.1.3 This report has been prepared for the sole use of the Client for the purpose described and no extended duty of care to any third party is implied or offered. Third parties using any information contained within this report do so at their own risk.

1.1.4 It is recommended that a copy of this report be submitted to the relevant authorities to enable them to carry out their own site assessment and provide any comments.

1.1.5 The comments given in this report and the opinions expressed herein are based on the information obtained from the desk study and site reconnaissance. No intrusive investigation has been carried out to confirm the actual ground or environmental conditions.

1.1.6 Any risks identified in this report are perceived risks based on information reviewed. Actual risks can only be assessed following a physical investigation of the site.

1.1.7 This report has been based, in part, on information supplied by others. The report has been prepared on the basis of that information being accurate.

1.1.8 The conclusions presented in this report are based on the guidance available at the time of preparation of the report. No liability can be accepted for the retrospective effects of any changes or amendments to legislation or guidance.

1.1.9 This Preliminary Investigation has been conducted in general accordance with CLR 3, ref. 8.1, CLR 11, ref 8.2, BS 10175, ref 8.3, and GPLC 1, ref 8.4.

2.0 SITE

2.1 Site Location

2.1.1 The site is situated at south east of Rockhill Road, north east of Fountain Road, Pontymoel and may be located by Grid Reference SO 290 004. A site location plan, site plan and aerial photograph are included in Appendix 1, Figures A1.1, A1.2 and A1.3.

2.2 Site Walkover and Description

2.2.1 A walkover survey of the site was conducted on 23rd May 2017. The walkover was carried out in general accordance with CLR 2, ref. 8.5.

2.2.2 The site is approximately rectangular in shape and is 0.36 hectares in area. The site was generally level although the banks to the Afon Llwyd were present within the northern boundary of the site which sloped down to the river bed some 5m below site level.

2.2.3 At the time of the walkover survey, the site was occupied by a single/two storey light industrial unit of concrete frame and masonry construction which was used for the sale and repair of light commercial vehicles. A ramp and stairway to the north of the building gave vehicular access to the first floor of the unit.

2.2.4 A yard was located to the south east of the building which was being used to store vans. An above ground oil tank was also present south of the building in the western corner of the yard. A small area of hardstanding was also present to the north west of the building which was used as a display area for vans. A row of man hole covers were located in the north of this area of hard standing which possibly indicates that some underground storage tanks were located in that area.

2.2.5 A row of houses and a small area of park land were located to the south west of the site. The Nant Dar Stream ran through the park in an easterly direction towards the site and appeared to run in a culvert under the southern corner of the site to the outfall into the Afon Lwyd in the eastern corner of the site.

2.2.6 An over grown area including some mature trees was locate to the south east of the site.

2.2.7 A petrol filling station was located to the north west of the site and the Afon Lwyd ran north west along the north eastern boundary of the site. A second petrol filling station and a small industrial estate was present on the other side of the river north east of the site.

2.2.8 Photographs from the walkover survey are included within Appendix 2, Figure A2.1. A site plan is included in Figure A1.2.

2.3 Historical Maps

2.3.1 A review of the history of the site has been conducted based on readily available historical maps. Details of the findings are provided in the table below. All maps are provided in Appendix 4.

Map, Date and Scale	Site Description	Regional Setting
Monmouthshire 1882 1:2500	The site appeared to be vacant with the Nant Dar Stream running across the southern third of the site to a weir outfall into the Afon Lwyd which was located on the north eastern boundary of the site. Some mature trees were located along the banks of the stream and the river. Two small buildings were present in the western corner of the site which were indicated to be an 'Armoury'. A 'feeder' stream was present inside and parallel to the north eastern boundary of the site which passed through the site and appeared to feed the Pontymoil Tin Works to the north west of the site.	The Pontymoil Tin Works was present to the north west of the site which consisted of a number of large buildings and a tramway. The tramway was also present outside but parallel with the south western boundary of the site. Two terraces of small rectangular structures were present south west of the site on the other side of the tramway. A gas works and foundry were located 40m west of the site. The areas to the south, south east and north of the site were open fields or woodland although the feeder stream approached the site across the field from the south east.
Monmouthshire 1886 1:10560	Similar to the previous map	Similar to the previous map
Monmouthshire 1901 1:2500	The trees were not indicated on the site and the Nant Dar stream appeared to cross the feeder stream on a viaduct in the eastern corner of the site.	No significant changes
Monmouthshire 1920 1:2500	No significant changes although the buildings in the western corner of the site were no longer indicated to be an armoury.	The Tin Works to the north west of the site appears to have been demolished although the foundry was still present to the west of the site. The tramway was also absent.
Monmouthshire 1938 1:10560	Three undesignated small buildings were located on the site north of the Nant Dar stream in addition to the buildings in the western corner.	No significant changes

Monmouthshire 1954 1:10560	No significant changes	No significant changes
Ordnance Survey Map 1963/64 1:1250	The site was occupied by a garage which consisted of a number of buildings to the north of the Nant Dar stream. The old armoury buildings in the western corner of the site were indicated to be 'Old Weighbridge House'. Four small buildings were also indicated south east of the Nant Dar stream. The feeder stream parallel with the north eastern boundary was not present but there appeared to be a dry ditch indicated.	No significant changes. Garages were also present to the north west and north east of the site.
Ordnance Survey Map 1972 1:1250	Similar to the previous map although the dry ditch was not indicated.	Similar to the previous map. A Transport Depot was located 100m north west of the site.
Ordnance Survey Map 1979 1:10000	Similar to the previous map	Similar to the previous map
Additional SIMS 1983 1:1250	Similar to the previous map	Similar to the previous map although the buildings to the south west of the site were not present.
Ordnance Survey Map 1989 1:10000	Similar to the previous map	Similar to the previous map although the buildings to the south west of the site were present.
Large Scale National Grid Data 1993 1:1250	The garage buildings had been remodelled and consisted of two large adjoining buildings with three smaller structures to the north similar to the existing layout. The Nan Dar Stream was not indicated apart from in the eastern corner of the site indicating that it had probably been placed in a culvert.	Similar to the previous map.

10k Raster Map 1999 1:10000	Similar to the previous map	Similar to the previous map.
10k Raster Map 2006 1:10000	Similar to the previous map	Similar to the previous map.
Vector Local Map 2017 1:10000	Similar to the previous map	Similar to the previous map.

2.4 Summary

2.4.1 The site was open ground with an armoury in the western corner and a feeder stream along the north eastern boundary up until between 1938 and 1963 when the garage appears to have been built. The feeder stream was abandoned by 1964 and the Nant Dar was culverted between 1983 and 1993. The buildings on the site were expanded remodelled between 1983 and 1993 and remain to the present.

3.0 SITE SETTING

3.1 Geological Setting

3.1.1 The 1:50000 British Geological Map number 249 indicates the site to be underlain by Alluvium overlying the Brownstone Formation of the Old Red Sandstone.

3.1.2 Although not indicated as present on the site from the geological maps, there is the possibility that Made Ground may exist on the site from the backfill feeder channel and the culverting of the Nant Dar.

3.2 Hydrogeological Setting

3.2.1 The hydrogeological records, provided by the Environment Agency, indicate that the site is situated on a Secondary A Aquifer relating to the alluvium and the underlying bedrock.

3.2.2 The Environment Agency defines Secondary A aquifers as 'permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers'.

3.2.3 The Envirocheck vulnerability map indicates the soil to be of high leaching potential.

3.2.4 Soils of high leaching potential are soils that readily transmit liquid discharges because they are either shallow or susceptible to rapid by-pass flow directly to rock, gravel or groundwater.

3.2.5 The site is not located within a groundwater source protection zone.

3.2.6 There is no groundwater abstraction well within 1km of the site.

3.3 Hydrological Setting

3.3.1 The nearest surface watercourses are the Afon Lwyd on the north eastern boundary of the site and the Nant Dar Stream is culverted below the southern third of the site. At the time of the site visit the water in the Afon Lwyd was very shallow and approximately 5m below site level.

3.3.2 The site is situated within an area defined by the Environment Agency as being at risk of flooding from rivers.

3.3.3 There is the potential for ground water flooding to occur at surface level.

3.3.4 The available river quality classification for the Afon Lwyd is Grade B for chemistry and Grade B for biology. The main parameters for this classification are provided below:

GQA Grade	Environmental Quality	Chemical Parameters			Biological Parameters	
		DO (%)	BOD (mg/l)	Ammonia (mgN/l)	EQI for ASPT	EQI for no. of taxa
B	Good	70	4	0.6	0.90	0.70
Ref: Landmark Envirocheck						

3.3.5 There are one surface water abstractions within 500m of the site which is 490m north west of the site and is the lake and pond at a park.

3.4 Radon

3.4.1 The British Geological Survey, in conjunction with the Radiation Protection Division of the Health Protection Agency, ref. 8.6, indicates the site to lie within an area where there is a probability of 5% to 10% of present or future homes being above the action level of 200Bq/m^3. As such, the site is classified as a Radon Affected Area.

3.4.2 Therefore, the guidance recommends that basic radon protective measures should be installed in the proposed development in line with the Building Research Establishment, Report BR211, ref 8.7.

4.0 ASSESSMENT OF GEOTECHNICAL RISK

4.1 Geological Constraints

4.1.1 The following are brief findings relating to factors identified during the research from the Envirocheck data at the site that may have a potential impact upon the engineering of the proposed development.

Potential Hazard	Assessed Risk	Comment
BGS Recorded Mineral Sites	Very Low	One site within 500m at 354m south west which was a sandpit.
Coal Mining / Mining Instability	Very low	Site is just outside the South Wales Coal Field. Coal seams are located in the upland area to the west.
Other shallow mine workings	Very low	
Natural Cavities	Very low	Nearest solution feature 823m west of the site in limestone
Collapsible Ground	Very low	
Compressible Ground	Moderate	Some alluvium below the site may be compressible.
Ground Dissolution	Very low	
Landslide	Low	The slope down to the river should be considered when designing the landscaping on the site.
Running Sand	Low	
Shrinking or Swelling Clay	Very Low	
Subterranean Structures	Moderate to high	There is likely to be made ground from backfilling the feeder channel and the culverting of the Nant Dar. Also some underground tanks and old foundations may be present particularly in the northern corner of the site. The foundations from the existing garage will also need to be grubbed out.

4.2 Geotechnical Risk Assessment

4.2.1 An assessment of the main hazards associated with the site is detailed below. Unless stated otherwise, the presence of such hazards are based on information from the research or reconnaissance and have not been confirmed by an intrusive investigation.

- Soil Conditions

  The geological map indicated that the site is likely to be underlain by Alluvium. The river bed to the north east of the site was 5m below the site therefore it is likely that there is up to 5m of material overlying the bedrock. This material is likely to be granular and may include cobbles

and boulders. Alternatively the ground level may have been raised to alleviate the risk from flooding and the soil below the site may be made ground.

- Topography

  The Envirocheck data provided indicates only a low risk of landslip subsidence. However, the embankment down from the site to the river needs to be carefully assessed prior to landscaping or altering that area of the site.

- Previous Use

  There is likely to be made ground from backfilling the feeder channel and the culverting of the Nant Dar. Also some underground tanks and old foundations may be present particularly in the northern corner of the site. The foundations from the existing garage will also need to be grubbed out.

4.3 Conclusions of Geotechnical Risk Assessment

4.3.1 The research has identified evidence of potential hazards associated with underlying ground conditions, either natural or man-made, and therefore it is recommended that further work be carried out to confirm the presence, nature or extent of those hazards anticipated to impact on the site.

5.0 ENVIRONMENTAL SEARCHES

5.1 Potential Sources of Contamination

5.1.1 A search was made of records held by the various regulatory authorities and other statutory bodies to determine the presence or otherwise of past and current activities on or within 500m of the site which have the potential to give rise to the presence on site of contaminants. The findings are given in the table below:

Activity	On Site	Off Site (distance / direction)	Detail
Contaminated Land Register Entries	None	None within 500m	
Discharge Consents	None	Two up to 250m, six at 250-500m	Closest at 4m east of the site which is a storm sewage outflow into the Afon Lwyd.
Integrated and Local Authority Pollution Prevention and Controls	None	Four within 250m, one at 250-500m	Nearest 38m north east of the site which is the Park Gate Garage and a second is located 48m north east of the site at the Esso Garage.
Pollution Incidents to Controlled Waters	None	One within 250m, one at 250-500m	Nearest 34m south west of the site which was a significant release of crude sewage in 1992
Prosecutions Relating to Authorised Processes or Controlled Waters	None	None within 500m	
Registered Radioactive Substances	None	One at 323m east	Authorisation expired
Substantiated Pollution Incident Register	None	None within 500m	
BGS Recorded Landfill Sites	None	None within 500m	
Historical Landfill Sites	None	None within 500m	
Licenced Waste Management Facilities	None	None within 500m	
Local Authority Recorded Landfill Sites	None	None within 500m	
Registered Landfill Sites	None	None within 500m	
Registered Waste Transfer Sites	None	None within 500m	
Registered Waste Treatment or Disposal Sites	None	None within 500m	
Hazardous Substances	None	None within 500m	
Explosive Sites	None	None within 500m	

Activity	On Site	Off Site (distance / direction)	Detail
Contemporary Trade Entries	Two	Seventeen within 250m, twelve at 250-500m	Two on site both commercial vehicle dealers. Seven within 50m include builders merchant, car dealers, petrol filling station and car body repair.
Fuel Station Entries	None	One within 250m and two between 250m and 500m	Nearest is 32m north east of the site at Park Gate Garage.

5.2 Designated Sites

5.2.1 The enquiries indicated there are no Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR) or Local Nature Reserves (LNR) within 1km of the site.

5.2.2 Ancient Woodland and the Brecon Beacons National Park are present 793m and 639m north east of the site.

5.3 Nitrate Vulnerable Zone

5.3.1 The site is not located within an area designated as a nitrate vulnerable zone.

6.0 ASSESSMENT OF GEOENVIRONMENTAL RISK

6.1 General

6.1.1 The definition of 'contaminated land', along with the relevant details on legislation and guidance is set out in Appendix 3.

6.1.2 The assessment of potential risk has been based on the guidelines given in CIRIA report C552, ref 8.8. These guidelines are summarised in Appendix 3.

6.1.3 The assessment of environmental risk is aimed at identifying the possible risk, if any, arising from substances used or deposited on the site, or from any other sources of land contamination, based on the principles of the pollutant linkage.

6.1.4 The assessment is based on the proposed development end use, taking account of present and previous use. It is based only on a review of historical maps, desk based data and site reconnaissance; therefore it contains some elements of conjecture based on professional judgement. A comprehensive risk assessment can only be made following an intrusive investigation and testing regime.

6.1.5 The proposed development comprises three/four storey flats with car parking and some landscaped areas.

6.2 Potential Sources of Contamination Identified

6.2.1 The research has identified the following potential sources of contamination which may form part of a pollutant linkage:

- Contamination associated with vehicle repair on-site.
- Contamination from underground storage tanks from the former filling station in the north of the site.
- Contamination from above ground storage tank.
- Contamination associated with Made Ground from back filling the feeder stream and culverting the Nant Dar.
- Potential gas associated with back filling the feeder stream and culverting the Nant Dar.
- Radon

6.3 Potential Pathways Identified

6.3.1 The research has identified a number of potential pathways which are relevant to the potential sources of contamination identified above and may form part of a pollutant linkage.

6.3.2 Those identified are detailed within the Conceptual Site Model, along with the receptors relevant to the development on a site specific basis.

6.4 Hazard Identification

6.4.1 The research has identified a number of potential sources and pathways which are considered 'likely' to be present which, taking into account the potential receptors identified, form potential pollutant linkages and have been used in the formulation of the Conceptual Site Model.

6.5 Hazard Assessment

6.5.1 An assessment of the main sources of contamination and the potential for unacceptable risk to receptors is detailed below. Unless stated otherwise, it is considered 'likely' that a potential source is present at this stage, in order to provide a preliminary estimation of the risk and therefore determine the need for further work.

- Human Health

  There is evidence for the potential for radon to be present at levels for which basic protection measures have been recommended. The risk to end-users is considered to be moderate.

  There is the potential for the migration of explosive gases from made ground on the site. The risk is considered to be moderate.

  There is considered to be a risk to end users and controlled waters from the vehicle maintenance on site and also the underground and above ground storage tanks. The risk to end users is considered to be high.

- Construction Material

  There is considered to be a moderate risk due to chemical attack on construction materials placed within the Made Ground.

- Controlled Waters

  The site is located adjacent to the Afon Lwyd and the Nant Dar runs below the site. The underlying geology is likely to be permeable, therefore, the risk to these waters from the vehicle maintenance and the storage tanks on the site is considered to be high.

6.6 Conceptual Site Model

6.6.1 The research has therefore identified the following pollutant linkages that require further consideration and have been used to formulate the Conceptual Site Model.

Potential Contamination Sources	Potential Contaminants of Concern	Potential Pathways	Receptor Group
Possible contamination associated with vehicle maintenance and storage tanks on the site	Inorganic Compounds • Metals • Cyanide Organic Compounds • TPH • PAH • Volatile organic compounds Others • Asbestos • pH	• Dermal contact • Inhalation of contaminated dust • Vapour inhalation	Human Health • Site occupants • Site users • Construction workers • Maintenance workers • Neighbouring site users/general public
		• Plant uptake and accumulation of contaminants	Ecology • Landscaped areas • Sensitive or protected habitats
		• Lateral migration • Surface run-off • Infiltration	Controlled Waters • Surface waters • Groundwater
		• Direct contact of contaminants with building materials	Building Materials or Services • Concrete • Plastic pipes and services • Structural iron & steel work
Made Ground below site/natural geology	• Radon • Carbon dioxide • Methane • Carbon monoxide • Hydrogen sulphide	• Inhalation • Explosion	• Human Health • Property

6.7 Conclusions of Geoenvironmental Risk Assessment

6.7.1 The research has identified evidence of potential sources of contamination on or which may impact on the site, with plausible pathways to the likely receptors, and therefore potential pollutant linkages have been suggested.

6.7.2 It is recommended that further work be carried out to confirm the presence, nature or extent of any contamination which is anticipated to impact on the site.

6.8 Consultation

6.8.1 During development, consultation may be required for a number of reasons with a number of regulatory Authorities. The following provides an indication as to the most likely Authorities with which consultation may be required:

- **Local Authority.** There may be a planning condition regarding contamination and consultation will be required with a designated Contaminated Land Officer within the Environmental Health Department. The Local Authority is generally concerned with human health risks.

- **Environment Agency.** Where a site is within a groundwater protection zone or has been designated as a special site, the Environment Agency is likely to be involved to ensure that controlled waters are protected.

- **National House Building Council, NHBC.** Section 4.1 of the NHBC Standards, ref 8.9, requires land management to be addressed. For a new housing development to be approved by the NHBC, any contamination will require remediation accompanied by a validation report.

6.8.2 Based on the results of any consultation, there may be specific investigation and/or remediation requirements imposed by one or more of the Authorities.

7.0 RECOMMENDATIONS

7.1 Further Work

7.1.1 An intrusive investigation should be undertaken to address the issues raised in Chapter 4.0 and Chapter 6.0.

7.1.2 The following scope of works is suggested in order to collect the required data:

- The sinking of boreholes and trial pits for the recovery of samples for geotechnical and chemical contamination analysis. Investigation of the tanks in the northern corner of the site may have to be carried out as a phase 2 once the site has been cleared.

- The installation and monitoring of gas and groundwater monitoring standpipes.

- Sampling of water upstream and downstream in the Nant Dar and the Afon Lwyd.

7.2 Other Considerations

7.2.1 There are several other areas of research which are beyond the scope of this report. All or none of the following may be applicable to the site, either on the outcome of consultation with a regulatory body or as a result of the research for this Preliminary Investigation. They include:

- **Archaeology.** Should the site be situated on or within an area of archaeological sensitivity, the advisor to the relevant local authority should be consulted. The requirement for an archaeological report may be identified within a planning condition, if appropriate, for the site.

- **Ecology.** There may be a requirement for a detailed ecological report, dependant on the type or size of the development, or due to evidence identified during the site reconnaissance or desk study. This requirement may be identified within a planning condition, or recommended within Section 7.0.

8.0 REFERENCES

8.1 CLR 3, '*Documentary research on industrial sites*', Report by RPS Consultants Ltd, DoE, 1994

8.2 CLR 11, '*Model Procedures for the Management of Land Contamination*' Report by Defra and the Environment Agency, 2004

8.3 BS 10175: 2011 '*Investigation of potentially contaminated sites. Code of practice*', British Standards Institute, 2011

8.4 GPLC1, *'Guiding principles for land contamination'*, Environment Agency, 2010

8.5 CLR 2, '*Guidance on preliminary site inspection of contaminated land*', Report by Applied Environmental, DoE, 1994

8.6 HPA-RPD-033, '*Indicative Atlas of Radon in England and Wales*', Health Protection Agency, 2007

8.7 BR211, '*Radon: Protective measures for new dwellings*'. BRE, 2007

8.8 C552, '*Contaminated Land Risk Assessment, A Guide to Good Practice*', CIRIA, 2001

8.9 Standards, *'Land Quality – Managing Ground Conditions'*, Chapter 4, NHBC, 2010

8.10 The Environmental Protection Act, Part IIA, Section 78, 1990

8.11 Environment Act 1995, Section 57, DoE, 1995

8.12 Water Environment and Water Services (Scotland) Act, 2003

8.13 Planning Policy Statement 23: Planning and Pollution Control, ODPM, 2004

8.14 Science Report SC050021/SR2, '*Human health toxicological assessment of contaminants in soil*'. Environment Agency, 2009

8.15 Science Report SC050021/SR3, '*Updated technical background to the CLEA model*'. Environment Agency, 2009

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