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Development at Former Angel Pub, Bolton Upon Dearne

Phase I Desk Study Report

January 2019



Former Angel Pub

Phase I Desk Study Report

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Disclaimer

This report was produced by RB Geotechnical for Wath Construction for the specific purposes of a Phase I Desk Study for the demolition of the current pub building and replace with residential houses at the site of the Angel Pub in Bolton Upon Dearne, South Yorkshire. This report may not be used by anyone else other than the client without their express permission. In any event, RB Geotechnical accepts no liability for any costs, liabilities or losses arising from the use of reliance upon the contents of this report by anyone other than the client.

1.0 Introduction

RB Geotechnical was commissioned by the client to carry out a Phase I Desk Study for the land of the former Angel Pub in Bolton Upon Dearne in South Yorkshire. This Phase I Desk Study is to form part of a planning application for the proposed development of new houses in place of the current pub building. Therefore, the final land use will be **Residential**.

1.1 Aims and Scope

The principal aims of this Phase I Desk Study is to interpret information pertaining to the site, obtained during a desk based review of available data and a site walkover survey of the site.

The scope of this study is as follows:

- To provide general information on the site such as location and description;
- To discuss the geology, hydrogeology and hydrology at, and in the vicinity of, the site;
- To summarise the environmental setting of the site; e.g. landfills, permits and sensitive land uses;
- To summarise potential geotechnical risks associated with the site;
- To provide a preliminary summary of potential coal mining risks to the site;
- To discuss and summarise any historical development that have occurred at the site and in the surrounding area;
- To assess potential contamination issues pertaining to the site with consideration of the site's historic use;
- To develop an initial conceptual model linking sources of potential contamination with pathways and receptors; and

- To provide a preliminary risk assessment for the current and proposed end use of the site.

Please note that this Phase I Desk Study excludes an assessment of risks arising from asbestos, unexploded ordnance and/or invasive species.

1.2 Terms and Conditions

This report has been prepared for Wath Construction in support of a planning application relating to the proposed development on the land at the Former Angel Pub in Bolton Upon Dearne.

1.3 Sources of information

Information on the site layout and current land use of the site is mainly based on information collected from online sources and photos from other sources.

An environmental database search was undertaken by GroundSure to provide supplementary Environmental information for the site and surrounding area. This was collated into an Insight Report by Ground Sure and as such the potential for further data to exist cannot be ruled out.

The existing database and other sources of which this study is based comprise:

- GroundSure EnviroInsight Report, Former Angel Pub, 6th November 2017 - Appendix A
- GroundSure 1:10,000 Historical Maps, Former Angel Pub, 6th November 2017 - Appendix B
- GroundSure 1:2,500 Historical Maps, Former Angel Pub, 6th November 2017 - Appendix B
- Site Walkover Photographs – Appendix C
- Environment Agency website (www.environment-agency.gov.uk);
- British Geological Survey (BGS) Geoindex website (www.bgs.ac.uk/geoindex)
- Coal Authority Interactive Viewer (www.mapapps2.bgs.ac.uk/coalauthority/home.html)

Although every effort has been made to ensure the accuracy of the information contained herein, no checks have been carried out to ensure the accuracy of information obtained from third parties and no liability can be accepted for any errors or misinterpretation of the third party information where it has been incorporated into this report.

2.0 Site Details

2.1 Site Location and Description

The site is situated at a 0.24ha sized plot of land located in the centre of the small South Yorkshire town of Bolton Upon Dearne at the former Angel Pub on Angel Street. The National Grid Reference for the centre of the site is 445598, 402581.

The site can be accessed from one entrance to the east (Angel Street) which leads into the main tarmac car park. The site is bounded in all directions by a brick wall, apart from along the South which is bounded by a wooden fence. The main tarmac car parking area is situated to the North of the main pub building, The West of the site is largely covered by grass and former pub gardens.

The main pub building is situated roughly in the centre of the site and is three storeys high and of a Yorkshire Stone construction.

Topographically, the site is generally flat.

The immediate surrounding area consists of mainly residential buildings. The site location is shown by the red circle in Figure 2.1.

Figure 2.1 Site Location (Ordnance Survey)



2.2 Proposed Development

The proposed development is to comprise the construction of ten new residential properties across the site, with private driveways and back gardens. The proposed development plan is shown in Appendix D.

2.3 Site Walkover Observations

A site walkover was carried out on 8th November by RB Geotechnical to assess the current site condition. Photographs from this site walkover are included in Appendix C.

The following observations were made during the site walkover:

- The site currently comprises a large pub building with tarmac car park and old grassed pub gardens.
- No obvious visual or olfactory signs of contamination sources were identified to be present on site during the walkover;
- Access to the site is good and suitable for most construction plant;
- Topographically, the site is flat lying.

3.0 Site History

3.1 History of site and surrounding area

Information relating to the historical development of the site and the surrounding area has been obtained from Historical Ordnance Survey Maps (1:10,000 and 1:2,500). These are presented in Appendix B.

Historical maps show the site to initially a plot of land with a number of buildings running along the northern and Southern site boundaries. By the 1890s however, the majority of these buildings have been removed, and just a square building situated in the South centre of the site along with some outbuildings in the North East and South East of the site remain. By the early 1900s however, only the main building remains, labelled as a pub. The site remains largely unchanged up until labelled as a pub. The site remains

generally unchanged up until the 1930s when some new buildings are constructed in the South West corner of the site. No further development of demolition is carried out on the site beyond this period. The surrounding area has largely undergone slow residential growth, along with the construction of a railway line to the East. .

Table 3.1 Summary of on-site and surrounding area history

Map	On-Site Features	Surrounding Area
1854	The site is occupied by a number of small buildings, running along the Northern and Southern site boundaries.	The site situated virtually in the middle of the small village of Bolton upon Dearne. A number of houses and lanes surround the site. A grave yard is mapped from approximately 20m to the South of the site. Further afield a Sandstone Quarry is mapped from approximately 400m to the North West of the site.
1854 - 1893	At some point before 1890, the majority of buildings on the site have been demolished, and instead a square building with rectangular extension is situated in the South East corner of the site, and smaller rectangular buildings exist in the North East corner of the site. A footpath or access path is shown cutting diagonally across the site from the South East to the North West.	A railway line is shown running in a North to South direction from approximately 120m to the East of the site, with a station shown approximately 120m to the North East. By 1893 a Gas Works is mapped approximately 400m to the North East of the site.
1890 - 1903	The buildings once situated in the North East corner of the site have been removed, along with the rectangular extension on the South East corner of the site. The building now situated in the South Centre of the site is now labelled as a pub.	The surrounding area remains largely unchanged during this period.
1903 – 1930.	The site remains largely unchanged	Residential development in the town of Bolton upon Dearne. A large cemetery is also mapped from approximately 200m to the South East of the site.
1930 – 1961	During this period small buildings have been constructed in the South West corner of the site. The pub is now labelled as the Angel Hotel.	Further residential development in surrounding area. Additionally, the buildings adjacent to the Northern site boundary are now mapped as a depot.
1961-	The site remains largely unchanged.	The depot mapped to the North is now labelled as a

Map	On-Site Features	Surrounding Area
1974		Council Depot. A Builders Depot is mapped approximately 150m to the South West of the site.
1974 – present day	The site remains unchanged during this period	New streets and further largely residential development in the surrounding area.

4.0 Geology, Hydrogeology and Hydrology

4.1 Geology

Information relating to the geology of the site has primarily been sourced from the EnviroInsight Report and the BGS Geoindex website.

4.1.1 Made Ground

According to the published geological maps and information on the BGS GeoIndex website, Made Ground is not mapped beneath the site. However, as buildings have previously existed across the majority of the site, Made Ground of some form will exist.

4.1.2 Superficial Deposits

Geological maps do not indicate any superficial deposits beneath the site. Weathered bedrock is likely to be encountered at shallow depths

4.1.3 Solid Geology

Geological maps indicate that the site is underlain by Sandstone of the Mexborough Rock Formation.

4.1.4 BGS Boreholes

There are no historical BGS boreholes of use for this site.

4.1.5 Faults and Seams

A fault is mapped 130m to the South East of the site trending in a North East to South West direction. Additionally, a fault is also mapped trending in a North West to South East direction from approximately 150m to the South East of the site. No coal seams are mapped within 250m of the site boundary.

4.1.6 Radon

The EnviroInsight Report indicates that the property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level. No protective measures deemed necessary by EnviroInsight.

4.2 Hydrogeology

4.2.1 Aquifers

The underlying superficial deposits and bedrock beneath the site are classified as being a Secondary A Aquifer. This indicates 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.

4.2.2 Groundwater, Surface Water and Potable Water Abstraction Licences

The EnviroInsight Report indicates that there are no Groundwater or Potable Water Abstraction Licences within 1000m of the site boundary. Three Surface Water Abstraction Licences exist within 1000m of the site boundary, situated from 570m to the South East at the River Dearne.

4.2.3 Soil Leaching Potential

The EnviroInsight Report indicates that the underlying soils have a High Urban Leaching Potential with soils which are assumed to be highly permeable for pollutants to penetrate.

4.2.4 Discharge Consents

There are records of two Licensed Discharge Consents within 500m of the site boundary, situated 397m to the South and 443m to the South both as Sewage Discharges into the River Dearne.

4.2.5 Pollution Incidents to Controlled Waters

The EnviroInsight Report shows no pollution incidents to controlled waters on site or within 500m of the site.

4.3 Hydrology

No surface water features exist on site. The nearest water feature is a drain mapped 342m to the North East of the site. The nearest river is the River Dearne mapped from 443m to the South of the site.

4.3.1 Flood Risk

The EnviroInsight Report states that the site is not within a floodplain area and is at a **Very Low** risk of flooding from rivers and sea. It also states that the site is in an area where there is the potential for Clearwater flooding.

4.3.2 Source Protection Zones

There are no Source Protection Zones within 500m of the site boundary.

5.0 Environmental Setting

5.1 Waste Treatment and Disposal

5.1.1 Landfill Sites

Four historical landfill sites are mapped within 1000m of the site boundary. Situated 258m to the West, 755m to the South, 930m to the North East and 958m to the South East. Three other licensed waste sites exist within 1000m of the site boundary, situated 287m to the West, 359m to the North East and 934m to the South West.

5.1.2 Waste Management, Waste Treatment, Waste Transfer Facilities or Disposal Sites

Two waste management, waste treatment, waste transfer or disposal sites exist within 1000m of the site boundary, situated 266m to the North East and 329m to the North East at Breakers Yard.

5.2 Regulatory Permits, Incidents and Registers

5.2.1 Control of Major Hazard Sites /Notification of Installations Handling Substances

The EnviroInsight Report lists no Control of Major Hazard sites (COMAH) or Notification of Installations Handling Substances (NIHHS) within 500m of the site.

5.2.2 Planning Hazardous Substance Consents

There are no records of Planning Hazardous Substance Consents and Enforcements located within 500m of the site.

5.2.3 Recorded Pollution Incidents

Four recorded pollution incidents have occurred within 500m of the site boundary. These are situated 196m to the North East, 400m to the North West, 421m to the North East and 475m to the East.

5.3 Potentially Infilled Land

A number of infilled land features have been mapped within 500m of the site boundary. These include the cemetery mapped 195m to the South West, cuttings situated from 252m to the West, the old quarry mapped from 286m to the West and sewage works mapped 330m to the South East.

5.4 Sensitive Land Uses

The site itself is within a Nitrate Vulnerable Zone. Additionally, there are four records of Green Belt Land within 1000m of the site boundary, situate 126m to the East, 443m to the South, 447m to the South and 991m to the West. No other sensitive land uses are mapped within 1000m of the site boundary.

6.0 Potentially Contaminative Sites

6.1 Potentially Contaminative Land Uses

A number of t potentially contaminative historic land uses have been mapped within 500m of the site boundary, these include the depot situated 6m to the West, railway sidings from 92m to the North East, factory mapped 154m to the East, and the cemetery mapped 195m to the South West. There are five mapped current potentially contaminative land uses within 250m of the site boundary. These are mapped as electrical engineers situated 127m to the South, a builder's depot mapped 138m to the South West, Electricity Sub-Stations mapped 144m to the North and 175m to the West, and the railway station mapped 158m to the North East.

6.2 Fuel Stations and Tanks

A number of historical tanks are mapped within 250m of the site boundary, the nearest situated 74m to the East. A fuel station is mapped 384 to the South of the site. No other historic or current fuel stations or tanks exist within 1000m of the site boundary.

7.0 Geotechnical Assessment

7.1 Natural Hazards

The EnviroInsight Report states that the site has a **Negligible** risk of Shrink Swell Clay, Soluble Rocks, Compressible Ground and Running Sands and a **Very Low** risk of Natural Ground Subsidence, Landslides and Collapsible Rocks.

7.2 Ground Workings

No current Ground Workings are mapped nearby to the site.

8.0 Mining

The Groundsure reports indicate that the site is within a coal mining area. However, upon inspecting the Coal Authority Interactive Viewer the site is not in an area defined as being of 'Development High Risk', and is therefore not deemed to be at a substantial risk from coal mining.

9.0 Conceptual Site Model

9.1 Introduction

A preliminary **Conceptual Site Model** (CSM) has been developed for the site, to assess any constraints on the proposed development arising from contamination which may be present. The CSM describes the relationship between contamination which may be present from past and current activities, both on and off site, along with potential receptors of that contamination.

The site has been assessed in line with current UK guidelines, namely the Contaminated Land (England) Regulations 2000 and Part IIA of the Environmental Protection Act 1990 and follows the procedures set out in the Environmental Agency 'Model Procedures for the Management of Land Contamination – Contamination Land Report (CLR).11'.

CLR.11 provides the technical framework for structured decision making about land contamination and builds on previous work carried out under the Contaminated Land Research Programme of the former

Department of the Environment. CLR 11 has adopted and refined the methodology and terminology that has been used in contaminated land risk assessment for a number of years.

CLR.11 defines the three essential elements to any risk:

- **A contaminant source** - a substance that is in, on or under land and has the potential to cause harm or to cause pollution of controlled waters;
- **A receptor** – in general terms, something that could be adversely affected by a contaminant, such as people, an ecological system, property or a water body; and
- **A pathway** - a route or means by which a receptor can be exposed to, or affected by a contaminant.

Each of these elements can exist independently, but they create a risk only where they are linked together, so that a particular contaminant affects a particular receptor through a particular pathway. This kind of linked combination of source-pathway-receptor is described as a **Potential Pollutant Linkage (PPL)**.

It should be noted that at this preliminary stage, the assessment is based only on a desk-based study and site walkover survey. A quantitative assessment of the potential risk is not possible at this stage of the assessment.

This report presents a Preliminary Conceptual Site Model and Preliminary Risk Assessments for the site, based on the proposed **Residential** end use.

9.2 Potential Contamination Sources

9.2.1 On Site Sources

Historical maps show how the site has experienced construction and demolition over the years, with the earliest maps of 1854 showing the site to contain a number of buildings. Now the site contains just the main pub building and small out buildings.

On-site sources of contamination identified are in the form of Made Ground around the areas of the previous buildings and beneath any hard standing areas. Additionally, there is the potential for fuel/oil leaks from parked vehicles over the years which may result in contamination within the underlying soils.

9.2.2 Off Site Sources

Off-site sources of contamination have been identified in the form of historical infilled land features within 250m of the site boundary which include backfilled cuttings and a cemetery. These features have the potential for ground gas which may migrate to the site.

9.3 Potential Receptors

9.3.1 Human Receptors

Based on the proposed use of the site, on-site receptors include:

- Residents living in the new houses.
- Construction workers involved in the proposed development. Note that potential contamination risks to construction workers will be mitigated by appropriate risk assessments and mitigation measures required by Control of Substances Hazardous to Health (COSHH) and Construction, Design and Management (CDM) regulations.

9.3.2 Controlled Waters Receptors

The following on-site controlled waters receptors include:

- Groundwater within the underlying Secondary A Aquifer.

9.3.3 Buildings Receptors

The proposed new buildings are a potential receptor.

9.4 Potential Pathways

9.4.1 On-Site Human Receptors

Potential pathways to future human receptors on site include:

- Dermal contact or ingestion with contaminated soils;
- Inhalation of contaminants in soil derived dust;
- Migration and inhalation of gases and vapours outdoors or indoors;
- Contamination of drinking water pipes by contaminated soils/water leading to the ingestion of contaminated drinking water.

9.4.2 Controlled Waters

Potential pathways to on-site controlled water receptors (groundwater) include:

- Leaching of contaminants and/or migration of contaminants from the unsaturated zone of soils to groundwater (Secondary A Aquifer) in natural strata;
- Vertical migration of contaminants in shallow groundwater to deeper strata and aquifers;
- Lateral migration of impacted water through service conduits, drainage systems and possible perched groundwater pathways to surface water receptors.

9.4.3 Buildings

Potential pathways from off-site sources to the on-site property receptor include:

- Migration and accumulation of ground gas or vapours in buildings or structures.

9.5 Preliminary Risk Assessment

Based on the stated potential sources of contaminants identified and the receptors and pathways described, an assessment of the environmental risks has been made with reference to the significance and degree of risk. This assessment is based on consideration of whether the source contamination can reach a receptor and hence whether it is of a major or minor significance.

A preliminary Conceptual Site Model (CSM) of the Potential Pollutant Linkages (PPL) has been developed based on the information derived from this desk study for the site. This CSM has been used to identify

potentially Relevant PPL's for the current and proposed end uses which have been assessed qualitatively using CIRIA 552 guidance, as described in Table 9.1 and Table 9.2.

Table 9.1 Classification of Consequence

Consequence	Criteria
Severe	Short term (acute) risk to Human Health likely to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIa. Short term risk of pollution of sensitive water resource. Catastrophic damage to buildings / property
Moderate	Chronic damage to Human Health likely, over a long term, to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIa. Pollution of sensitive water resources
Mild	Health effects to Human Health that are unlikely to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIa. Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings / structures / services or the environment
Negligible	Non-permanent health effects to Human Health that are unlikely to result in "significant harm" as defined by the Environmental Protection Act 1990, Part IIa. Those that are easily prevented by means such as personal protective clothing. Harm, although not necessarily significant harm, which may result in a financial loss, or expenditure to resolve.

Table 9.2 Classification of Probability

Probability	Criteria
Almost Certain	Circumstances are such that an event either appears very likely in the short term and almost inevitable over the long term or there is evidence of currently harm occurring
Likely	Circumstances are such that an event, whilst not inevitable, is possible in the short term and is likely to occur over the long term
Unlikely	Circumstances are such that it is possible an event could occur but it is by no means certain to occur even over a longer period, and it is less likely in the shorter term
Very Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable even in the medium to long term
Extremely Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are highly improbable even in the long term

Once the consequence and probability have been classified, these can then be compared to produce a risk category (using Table 9.3), ranging from **Very High Risk** to **Very Low Risk,** with the definitions summarised in Table 9.4.

Table 9.3 Comparison of Consequence against Probability

Consequence / Probability	Severe	Moderate	Mild	Negligible
Almost Certain	Very High Risk	High Risk	Moderate Risk	Low Risk
Likely	High Risk	Moderate Risk	Moderate/ Low Risk	Low Risk
Unlikely	Moderate Risk	Moderate/ Low Risk	Low Risk	Very Low Risk
Very Unlikely	Low Risk	Low Risk	Very Low Risk	Very Low Risk
Extremely Unlikely	Very Low Risk	Very Low Risk	Very Low Risk	Very Low Risk

Table 9.4 Description of the Classified Risks and Likely Action Required

Risk	Criteria
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action.
Moderate	It is possible that without appropriate remediation action, harm could arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild
Low	It is possible that harm could arise to a designated receptor from an identified hazard. It is likely that, at works, if any harm were to be realised, any such effects would be mild.
Very Low	There is very low possibility that harm could arise to the receptor, but it is likely that this harm, if realised, would be mild at worst

In accordance with CLR11, professional judgement has been employed to evaluate the risk on a qualitative basis using available information.

A summary of the pollution linkages identified during the desk study are provided in Table 9.5.

Table 9.5 Conceptual Site Model of Potential Pollutant Linkages

Source	Receptor	Pathway	Risk
Contaminants in soil, soil derived dust, surface water run-off, groundwater, and as vapours/ground gas	Residents	• Dermal contact or ingestion contaminants in soil-derived dust and entrained surface water run-off from areas where soil is exposed at the surface or where excavation takes place and in shallow groundwater in the natural strata if excavation takes place below the water table. • Inhalation of contaminants in soil derived dust from areas where soil is exposed at the surface of where excavation takes place. • Inhalation of soil and water derived vapours and ground gas outdoors • Inhalation of soil derived and water derived vapours and ground gas indoors where it may have accumulated in buildings and enclosed spaces.	Moderate/Low
	Construction Workers		Low
Contaminants in Soil	Groundwater within the underlying soils and bedrock (Secondary A Aquifers)	• Leaching of contaminants and/or migration of free phase contaminants from the unsaturated zone soils to groundwater in the natural strata • Vertical migration of contaminants in shallow groundwater to deeper strata and aquifer	Low
Contaminants in soil, surface water runoff, groundwater and as vapours/ground gas	Surface Water	• Lateral migration of contaminants and/or migration of free phase contaminants present in the Made Ground via groundwater to surface water discharge • Lateral migration of contaminants and/or migration of free phase contaminants present in the Made Ground and entrained in surface water runoff	Low
Contaminants in soil, groundwater and as vapours/ground gas	Building	• Accumulation of soil and water derived vapours/and or ground gas in enclosed spaces	Moderate/Low

10.0 Conclusions

The site is proposed to have the current pub building demolished, with new houses built across the site.

Historical maps show the site to have been generally developed since the earliest available maps, with evidence of demolition of old buildings and construction of new buildings over the years. On-site sources of contamination identified are in the form of any potentially contaminated soils in the areas of the old buildings and beneath any hard-standing areas. Additionally, there is the potential for contamination in the soil from fuel leaks/spillages, from any previous vehicles using the site (mainly the car parking areas) which could result in contamination within the underlying soils.

Viable off-site sources of contamination have been identified within 250m of the site boundary, mainly in the form of potential sources of ground gas from infilled land features, including the cemetery and cuttings.

In summary, on the basis of the above listed contaminant sources it is concluded that:

- Contaminants may be present in, on or under the land at the site from on site sources; and
- Future on site receptors to any form of contamination have been identified as the construction workers, new residents, employees, the new buildings, surface water and the groundwater.

A qualitative risk assessment of the identified potential pathways of contamination to the site have been summarised in Table 9.5. The following risks have been designated:

- Future Human Receptors – Moderate/Low Risk
- Construction Workers –Low Risk
- Groundwater –Low Risk
- Surface Water –Low Risk
- New Buildings – Moderate/Low Risk

Based on the review of all available historical data, it has been established that overall a **MODERATE/LOW** risk of potential pollutant linkage to the site exists. This risk has been identified due to the potential for contaminated soils beneath the areas of old buildings and hard standing, along with the potential for ground gases beneath the site from off-site sources.

Given the lack of site-specific quantitative information about ground conditions, the true estimated risks are difficult to confirm.

11.0 Recommendations

Due to the potential for contamination on the site, it is recommended that an intrusive investigation is carried out. This investigation should make an allowance for the collection of shallow soil samples to be tested for a range of potential soil contaminants. Additionally, it is recommended that gas and groundwater monitoring standpipe be installed on the site, to assess for potential ground gas.

Any intrusive investigation could also make an allowance for an assessment of the geotechnical parameters of the underlying soils, thus aiding in foundation design for the proposed building.

12.0 References

- BS 5930: (2015) Code of Practice for Site Investigations. British Standards Institution.
- BS 10175: (2011) Code of Practice for the Investigation of Potentially Contaminated Sites. British Standard Institution.
- CIRIA 552: (2001) Contaminated Land Risk Assessment, A guide to good practice.