

CONTAMINATED LAND RISK ASSESSMENT

Phase 1 Desk Study Report

Site Address

Land Adjacent to Jolly Masons Pub
Rock Road
Rhosymedre
LL14 3YF

Client:

Gemma Hanley

Report Reference

PH1-2018-001014

Prepared by

STM Environmental Consultants Ltd

Date:

08/08/2018



**CONSULTING GEO-ENVIRONMENTAL
ENGINEERS AND SCIENTISTS**

Phase 1 Contaminated Land Desk Studies, Geo-Environmental Site Investigations, Environmental Due Diligence, Flood Risk Assessments, Surface Water Management Strategies (SuDS), Ecology, Noise and Air Quality Assessments, Environmental Management Systems, GIS & Data Management Systems

1	CONTENTS	
1	Contents	2
2	Document Control	5
3	Disclaimer.....	6
4	Executive Summary.....	7
5	Introduction.....	8
6	Context and Objectives for the Risk Assessment.....	8
6.1	Legislative Context	8
6.1.1	Part IIA	8
6.1.2	Environmental Damage Regulations	8
6.2	Objectives.....	9
6.3	Summary of Research Undertaken	9
7	Site Description	9
7.1	Site Location and Size.....	9
7.2	Site Current Use	11
7.3	Surrounding Land Uses.....	11
7.4	Proposed Development	11
8	Site History.....	11
8.1	Analysis of Historical Ordnance Survey Mapping.....	11
9	Environmental Characteristics.....	13
9.1	Geology	13
9.2	Hydrogeology	13
9.3	Hydrology	13
9.4	Topography	13
9.5	Designated Ecological Protection Zones.....	13
9.6	Designated Protected Buildings and Monuments.....	13
9.7	IPC Processes.....	13
9.8	Dangerous Substance and Radioactive Substance Registrations	13
9.9	Pollution Incidents	13
9.10	Waste Disposal Activities (Landfills).....	13
9.11	Coal Mining.....	14
9.12	Radon	14
9.13	Flood Risk.....	14
10	Relevant Planning History	14
11	Site Walkover	14
12	Preliminary Conceptual Risk Model (CRM).....	14
12.1	Potential Sources	14
12.2	Potential Receptors	15

12.2.1	Potential Human Health receptors	15
12.2.2	Potential Groundwater Receptors	15
12.2.3	Potential Surface Water Receptors	15
12.2.4	Potential Ecological Receptors.....	15
12.2.5	Potential Property Receptors	16
12.3	Potential Pathways	16
12.3.1	Potential Pathways for Human Receptors.....	16
12.3.2	Potential Pathways for Groundwater Receptors	16
12.3.3	Potential Pathways for Surface Water Receptors	16
12.3.4	Potential Pathways for Ecological Receptors.....	16
12.3.5	Potential Pathways for Property Receptors.....	16
12.4	Potential Pollutant Linkages	16
13	Qualitative Risk Assessment.....	17
13.1	Assessment of Potential Significance of Potential Pollutant Linkages	19
13.1.1	Potential Risks to On-Site Human Health	19
13.1.2	Potential Risks to Off-Site Human Health	19
13.1.3	Potential Risks to Groundwater Receptors.....	19
13.1.4	Potential Risks to Surface Water Receptors	19
13.1.5	Potential Risks to Property Receptors.....	19
14	Conclusions	19
15	Recommendations.....	20
15.1	Watching Brief and Discovery Strategy	20
15.2	Health and Safety	20
15.3	Services.....	21
16	Information Gaps and Uncertainties	21
17	Appendix 1 – Proposed Development Plans.....	22
18	Appendix 2 – Environmental Screening Report.....	25
18.1	Summary Datasheet.....	25
18.2	Historical Industrial and Waste Uses.....	27
18.2.1	Search Information for Potential Contaminated Land	28
18.3	Hydrogeology	29
18.3.1	Search Information for Aquifer (Superficial)	29
18.3.2	Search Information for Aquifer (Bedrock).....	29
18.4	Ecological Receptors.....	30
18.4.1	Search Information for World Heritage Sites.....	30
18.5	Coal Mining.....	31
18.5.1	Search Information for BGS Coalfields	31
18.5.2	Search Information for BGS Methane/CO2 Bedrock.....	31

18.6	Radon Gas	32
18.6.1	Search Information for Areas Potentially Affected by Radon	32
19	Appendix 3 – Site Photography.....	33
20	Appendix 4 - Risk Assessment Methodology	34
21	Abbreviations.....	36

List of Tables

Table 1:	Summary of surrounding land uses	11
Table 2:	Summary of historical land use identified from historical maps	11
Table 3:	Summary of potential contamination sources, period of operation and distance from site.	15
Table 4:	Conceptual Site Risk Model - Potential Sources, Pathways and Receptors identified on the site.	18
Table 5:	Summary of qualitative risk assessment.....	20
Table 6:	Contamination Risk Matrix	34
Table 7:	Assessment description for risk scores.....	34
Table 8:	Risk Classification System.....	34

2 DOCUMENT CONTROL



CONTAMINATED LAND RISK ASSESSMENT Phase 1 Desk Study Report



Site Address:	Land Adjacent to Jolly Masons Pub Rock Road Rhosymedre LL14 3YF
Site Coordinates:	328308, 342575
STM Reference:	PH1-2018-001014
Version No:	2.0
Prepared for:	Gemma Hanley
Date:	08/08/2018
Report Author:	Lara Griffin (BSc) Graduate Environmental Consultant
Authorised by:	Simon Makoni (BSc, MSc) Director

3 DISCLAIMER

This report and any information or advice which it contains, is provided by STM Environmental Consultants Ltd and is solely for use by Gemma Hanley (Client). Any other party using or placing reliance upon any information contained in this report does so at their own risk.

STM Environmental Consultants Ltd has exercised such professional skill, care and diligence as may reasonably be expected of a properly qualified and competent consultant when undertaking works of this nature. However, STM Environmental Consultants Ltd gives no warranty, representation or assurance as to the accuracy or completeness of any information, assessments or evaluations presented within this report. Furthermore, STM Environmental accepts no liability whatsoever for any loss or damage arising from the interpretation or use of the information contained within this report.

It is noted that some of the findings presented in this report are based on information obtained from third parties (i.e. Environmental Search Report). Whilst we assume that all information is representative of the site and of present conditions we can offer no guarantee as to its validity regarding the short term or long-term history of the Site.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities.

It should be noted that this report has been produced for environmental purposes only. It should not in any way be construed to be or used to replace a geotechnical survey, structural survey, asbestos survey, buried services survey, unexploded ordnance survey or Invasive Plant Survey.

4 EXECUTIVE SUMMARY

SECTION	SUMMARY
Site Location And Size	The site is located at the Land Adjacent to Jolly Masons Pub, Rock Road, Rhosymedre, LL14 3YF and is centred at national grid reference 328308, 342575. The site has an area of approximately 0.023 ha.
Current Use	The site is currently disused land consisting of a metal storage container and boundary wall underlain by tarmac chippings.
Proposed Development	The proposal is for the development of a 2-bedroom residential dwelling including a rear parking area and brick paved area to the front of the property.
Site History	Examination of Ordnance Survey historic maps revealed that the site was part of terraced residential cottages c. 1868. These have since been demolished, sometime after c.1995, and the site has remained undeveloped ever since.
Geology	The geology beneath the site consists of bedrock of Pennine Lower and Middle Coal consisting of mudstone, siltstone and sandstone. The superficial deposits consist of a Till Devensian diamicton.
Hydrogeology	The site is underlain by a Bedrock Secondary A Aquifer and there are no groundwater Source Protection Zones within 250 m of the site.
Hydrology	There are no surface water bodies located within 250m of the site
Topography	The site is at an elevation of approximately 120.1 mAOD (above Ordnance Datum).
Coal Mining	The site is located in a Coalfield of North Wales Movable Coal. It is recommended that a Coal Mining Risk Assessment is undertaken for the site; as it is outside the scope of our assessment.
Radon	The site is located in an area with 3 – 5% chance of being affected by naturally occurring Radon gas. Public Health England recommends that properties with a greater than 1% chance should test their homes for radon.
Contamination Assessment	No onsite potentially contaminative land uses (PCLUs) have been identified, however, offsite PCLUs include a Car Park, Railway Line and Disused Quarries. A conceptual site risk model was developed and a qualitative risk assessment carried out. Potentially significant potential pollutant linkages were identified in respect of: • Human Health – i.e. future occupiers and construction workers • Property Receptors – i.e. Buildings & services
Recommendations	Given that potentially significant potential pollutant linkages were identified, it is recommended that an intrusive site investigation, including ground gas monitoring, is undertaken with the objective of determining the presence and extent of any soil contamination at the site. The scope of the investigation should be agreed with the Local Planning Authority prior to commencement of the works. It is also recommended that Radon protection measures are incorporated into the building design.
This table is intended as a summary of the desk study findings and should be read in conjunction with the main report.	

5 INTRODUCTION

STM Environmental Consultants Ltd (STM) were commissioned by Gemma Hanley (Client) to undertake a Phase 1 Contaminated Land Risk Assessment (CLRA) at a site located at Land Adjacent to Jolly Masons Pub, Rock Road, Rhosymedre, LL14 3YF.

The study is required to support planning permission for the development of a 2-bedroom residential dwelling including a rear parking area and brick paved area to the front of the property.

6 CONTEXT AND OBJECTIVES FOR THE RISK ASSESSMENT

6.1 Legislative Context

6.1.1 Part IIA

Part IIA of the Environmental Protection Act 1990, which came into force in Wales in 2001, introduced a new statutory regime for the identification and remediation of contaminated land in the United Kingdom.

The legislation considers risks from contaminated land to human beings, controlled waters (surface and ground water), protected ecological systems and property. Under the legislation "contaminated land" is defined as:

"Any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land that: -

(a) Significant harm is being caused or there is significant possibility of such harm being caused: or

(b) Pollution of controlled waters is being caused, or is likely to be, caused."

In order for land to be considered contaminated, there must be a contaminant, a receptor and a pathway (via which the contaminant can reach the receptor) present at the site. When these three components are identified at a site, a *pollutant linkage* is said to exist.

Pollutant Linkage = Contaminant -> Pathway -> Receptor

In order for a local authority to make a determination that a site is contaminated land, it must be satisfied that the pollutant linkage is a *significant pollutant linkage* and that the land in question is causing, or that there is a significant possibility that it will cause significant harm (SPOSH) to humans, habitats, buildings or livestock and crops if remedial work is not carried out.

6.1.2 Environmental Damage Regulations

The Environmental Damage (Protections and Remediation) Regulations 2015 transpose the provisions of the EU Environmental Liability Directive into law in England and Wales.

The Regulations require action in response to the most significant cases of environmental damage. They cover specific types of:

-  damage to species and habitats;
-  damage to water; or

risks to human health from contamination of land.

The Regulations apply to both imminent threats and actual cases of damage. Where these arise, those responsible must take immediate action to prevent damage occurring or remediate damage where it does occur.

The Regulations are based on the polluter pays principle 'requiring those responsible to meet the cost of preventive and remedial measures.

6.2 Objectives

This Desk Study has been written so as to provide an initial overview of the nature and extent of contamination hazards that may exist at the site. It has been undertaken in accordance with the specifications outlined in the British Standard BS 10175:2011+A2:2017 Code of Practice for the Investigation of potentially contaminated sites and the Environment Agency Document, CLR11 Model Procedures for the Management of Land Contamination.

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.

6.3 Summary of Research Undertaken

Details of information sources researched in order to compile this desk study are given below.

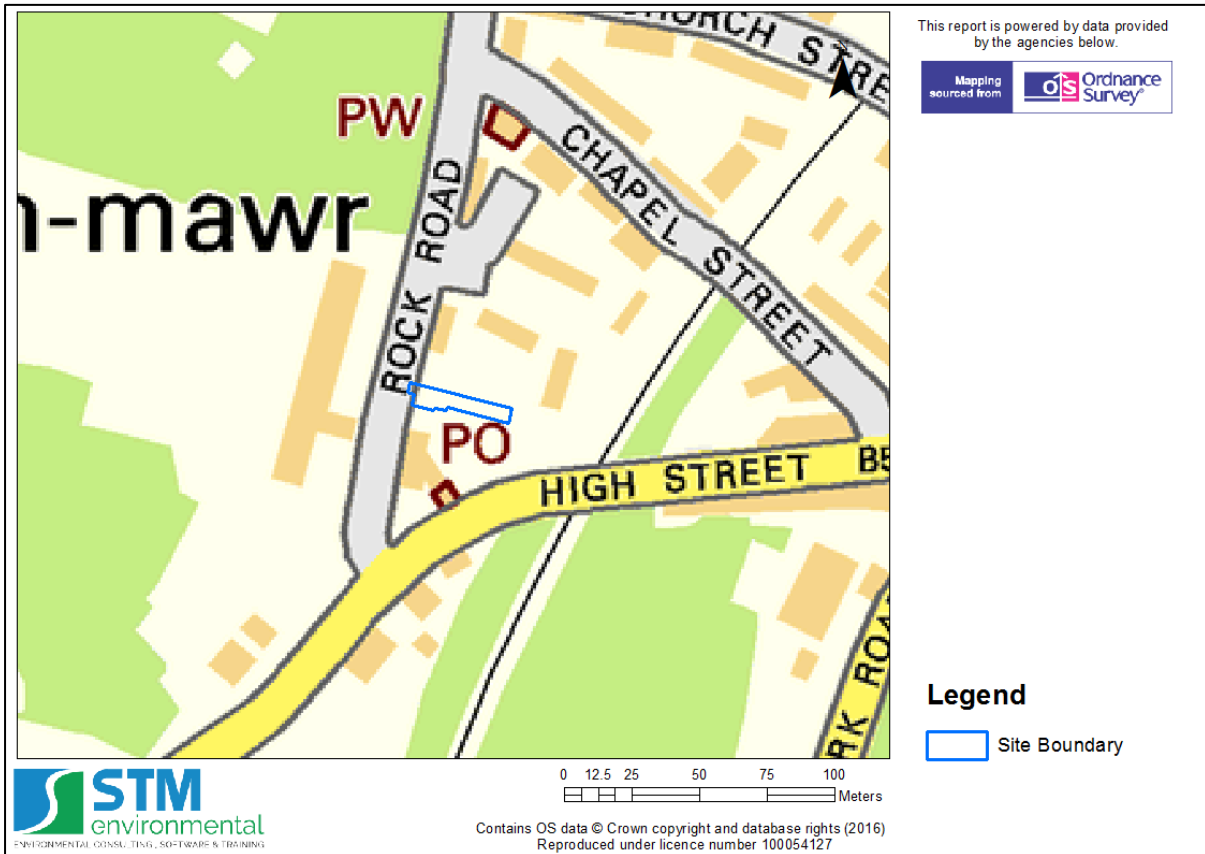
- Natural Resources Wales (GIS)
- English Nature Open Data (GIS)
- English Heritage Open Data (GIS)
- British Geological Survey GeoIndex Web Map Service
- Coal Authority Open Data and Web Map Service.
- Historical Ordnance Survey Maps
- Local Authority Planning Application Portal

7 SITE DESCRIPTION

7.1 Site Location and Size

The site is located at the Land Adjacent to Jolly Masons Pub, Rock Road, Rhosymedre, LL14 3YF and is centred at national grid reference 328308, 342575. The site has an area of approximately 0.023 ha.

The site lies within the jurisdiction of Wrexham Council in terms of the planning process.



7.2 Site Current Use

The site is currently disused land consisting of tarmac chippings and a boundary fence.

7.3 Surrounding Land Uses

A description of current land uses surrounding the boundaries of the site is given below in Table 1 below.

Table 1: Summary of surrounding land uses

Boundary	Land Use Description
Northern	Open Public Land/ Residential Housing
Eastern	Railway Line
Southern	Jolly Masons Public House/ Car Park
Western	Open Public Land/ Residential Housing

7.4 Proposed Development

The proposal is for the development of a 2-bedroom residential dwelling including a rear parking area and brick paved area to the front of the property. It is understood that there are no proposals to include soft landscaping in the development.

The proposed development plans are contained in [Appendix 1](#).

8 SITE HISTORY

8.1 Analysis of Historical Ordnance Survey Mapping

Historical maps published by the Ordnance Survey dating back to the late 1800's were reviewed in order to ascertain any previous industrial use at the site. A summary of the historic map analysis is provided in Table 2.

Table 2: Summary of historical land use identified from historical maps

Map Year & Scale	POTENTIALLY CONTAMINATIVE LAND USES	
	On Site	Off Site
1873-75 1:2,500	Site appears to be an unspecified building.	Surrounding area is largely developed with open land W. Railway Line 21m E, Quarry 46m NW and Quarry 86m W.
1879 1:10,560	Map unclear	Map unclear
1899 1:2,500	Site appears to be a terraced residential cottage with associated land.	Smithy 180m SW and Smithy 170m SE.
1900 1:10,560	No significant changes	No significant changes

Table 2: Summary of historical land use identified from historical maps

Map Year & Scale	POTENTIALLY CONTAMINATIVE LAND USES	
	On Site	Off Site
1912 1:2,500	No significant changes	No significant changes
1914 1:10,560	No significant changes	No significant changes
1938-1954 1:10,560	Map unclear	Map unclear
1954-63 1:10,560	Map unclear	Map unclear
1962-63 1:2,500	Residential cottage onsite is labelled number 5.	Terraced buildings adjacent N and S now numbered with a Public House also labelled 20m S. Potential residential housing developed opposite the site 20m W. Smithy 180m SW and Smithy 170m SE no longer labelled. Quarry 46m NW and Quarry 86m W now labelled as disused. Works 175m SE and Garage 185m SW.
1968 1:10,560	Blank map	Blank map
1977 1:1,10,000	No significant changes	No significant changes
1986 1:10,000	No significant changes	No significant changes
1993-95 1:10,000	No significant changes	No significant changes
Current Use	The site is currently disused land consisting of tarmac chippings and a boundary fence.	The surrounding area is currently largely residential with the Jolly Masons Inn Pub with car parking adjacent S and open public land opposite W. Railway Line 21m E, Car Park 59m E, Wheatsheaf Workshop 92m E, Electrical Substation 88m NE, Electrical Substation 63m SW and potentially infilled land from the previous Quarries 46m NW and 86m SW.

9 ENVIRONMENTAL CHARACTERISTICS

A variety of Environmental datasets provided by the Environment Agency, British Geological Society, English Heritage and English Nature and others were screened in order to assess the environmental sensitivity of the site. The LandCheck Environmental Screen report is presented in [Appendix 2](#). The results are summarised below.

9.1 Geology

The site is located on bedrock of Pennine Lower and Middle Coal consisting of mudstone, siltstone and sandstone. The superficial deposits consist of a Till Devensian diamicton

9.2 Hydrogeology

The Environment Agency classifies the superficial deposits as an Unproductive aquifer. The bedrock is classified as a Secondary A aquifer. There are no groundwater Source Protection Zones within 250 m of the site.

9.3 Hydrology

No surface water bodies were identified within 250m of the site.

9.4 Topography

According to [Elevation Finder](#), the general site level is at 120.1 mAOD.

9.5 Designated Ecological Protection Zones

The following World Heritage Site was identified onsite:

-  Pontcysyllte Aqueduct and Canal

9.6 Designated Protected Buildings and Monuments

No listed buildings or scheduled ancient monuments were identified onsite or within 50m of the proposed development.

9.7 IPC Processes

No IPC processes were identified onsite or within 50m of the site.

9.8 Dangerous Substance and Radioactive Substance Registrations

No List 1 or List 2 Dangerous Substance Registrations were identified onsite or within 50m of the site. No Radioactive Substance Registrations were identified onsite or within 50m of the site.

9.9 Pollution Incidents

No pollution incidents were identified onsite or within 50m of the site.

9.10 Waste Disposal Activities (Landfills)

A search of Environment Agency Historic and Authorised Landfill and Natural Resources Wales datasets did not identify any evidence of historic authorised or non-authorised landfills on or within 250m of the site. However, it has been informed by the Client that Rhosydmedre Quarry (former landfill site) is located within 250m of the site.

9.11 Coal Mining

A search of the BGS Areas potentially affected by coal mining dataset indicates that the site is located in an area of minable coal:

-  BGS Coalfield - North Wales Movable Coal
-  BGS Methane/CO₂ Bedrock - potential gas hazard from bedrock and coal mining

The site is located in a Coalfield of North Wales Movable Coal. It is recommended that a Coal Mining Risk Assessment is undertaken for the site; this as it is outside the scope of our assessment.

9.12 Radon

A search of the BGS Radon dataset indicates that the property lies in an area with 3 – 5% chance of being affected by naturally occurring radon gas. Therefore, it is possible that it is in area affected by Radon.

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.

9.13 Flood Risk

The site is not located within a flood zone.

10 RELEVANT PLANNING HISTORY

Wrexham Council's online planning portal was searched in an effort to identify any relevant planning applications. However, no relevant documents were identified.

11 SITE WALKOVER

A site walkover was not undertaken as part of the initial scope of works. Photographs of the site which have been provided by the client are presented in [Appendix 3](#).

12 PRELIMINARY CONCEPTUAL RISK MODEL (CRM)

A conceptual site risk model (CRM) aims to summarise all the potential pollutant linkages or risk that may be associated with a site. It considers the potential pollution sources, receptors and pathways by which receptors can be impacted.

12.1 Potential Sources

Potentially contaminative land uses (PCLUs) of concern were identified based on their proximity to the site and whether they had the potential to generate significant quantities of ground gases, vapours and/or mobile volatile contamination (i.e. high pollution migration potential).

Any PCLs within a 50m radius of the site as well as any PCLs with high pollution migration potential within 250m of the site were considered to be of concern and were included within the assessment.

A summary is provided in Table 3 below.

Table 3: Summary of potential contamination sources, period of operation and distance from site.

Site Name	Industrial Profile	Approx. Year Use Established	Approx. Year Use Ended	Direction	Approx. Distance from Site (m)
Car Park	Car Park	c. 1995	Current (2018)	Adjacent	0
Railway Line	Railway Land	c. 1868	Current (2018)	E	21
Quarry	Unknown Filled Ground (Pit, quarry etc.)	c. 1873	c. 1962	NW	46
Quarry	Unknown Filled Ground (Pit, quarry etc.)	c. 1873	c. 1962	W	86

Typical contaminants associated with the above PCLUs are:

-  PCBs
-  PAHs
-  Heavy Metals
-  Chlorinated and Non-Chlorinated Solvents
-  Petrol Hydrocarbons
-  Diesel
-  Fuel and Fuel Oils
-  Landfill Gases – Methane & CO₂

Please note, this list is not exhaustive of all contaminants that may be present on or off site.

12.2 Potential Receptors

The potential receptors include human, water, ecological and infrastructure receptors.

12.2.1 Potential Human Health receptors

Potential human health receptors include construction workers and future occupants or users of the site and the proposed development.

12.2.2 Potential Groundwater Receptors

Potential groundwater receptors include the Secondary A Aquifer.

12.2.3 Potential Surface Water Receptors

There are no potential surface water receptors in the vicinity of the site.

12.2.4 Potential Ecological Receptors

Potential ecological receptors include the World Heritage Site (Pontcysyllte Aqueduct and Canal) onsite.

12.2.5 Potential Property Receptors

Potential property receptors include the proposed development as well as neighbouring properties and associated services.

12.3 Potential Pathways

12.3.1 Potential 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 vapours.

12.3.2 Potential Pathways for 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).

12.3.3 Potential Pathways for Surface Water Receptors

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

12.3.4 Potential Pathways for 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.

12.3.5 Potential Pathways for Property Receptors

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

12.4 Potential Pollutant Linkages

The Potential Pollutant Linkages (PPLs) were identified as part of the CRM. These were concerned with the following:

-  Risk of direct contact with and inhalation of contaminants to on-site human health receptors (PPL1a)
-  Risk of injury/death of on-site human health receptors as a result of explosion due to accumulation of ground gas from off-site sources in confined spaces within on-site dwellings. (PPL1b)
-  Risk of direct contact with and inhalation of contaminants to off-site human health receptors as a result of on-site contaminants migrating off-site (PPL2a)
-  Risk of injury/death to off-site human health receptors as a result of explosion due to migration of on-site ground gas and subsequent accumulation in confined spaces in off-site buildings. (PPL2b)

-  Risk of derogation of groundwater quality resulting from the migration of on-site contaminants into the underlying aquifer (PPL3)
-  Risk of derogation of surface water quality resulting from the migration and entry of on-site contaminants into the surface water receptor (PPL4)
-  Risk of damage to buildings and services from on-site contaminants (PPL5a)
-  Risk of damage to property as a result of explosion due to migration of on-site ground gas and subsequent accumulation in confined spaces in off-site buildings (PPL5b).

13 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).

The identified PPLs were therefore individually qualitatively assessed using a basic risk assessment methodology which considers "Likelihood" and "Severity" to assess the magnitude of the potential risk. The methodology is summarised in [Appendix 4](#).

Table 4 below summarises the conceptual site risk model (CRM) including the identified PPLs and the results of the qualitative risk assessment.

Table 4: Conceptual Site Risk Model - Potential Sources, Pathways and Receptors identified on the site.

Source	Potential Contaminants Associated with Adjacent Uses as a Car Park, Railway Line and Disused Quarries. PCBs, PAHs, Heavy Metals, Chlorinated and Non-Chlorinated Solvents, Petrol Hydrocarbons, Diesel, Fuel and Fuel Oils & Landfill Gases							
Potential Contaminants	On and Off-Site Contaminants		On Site Contaminants		On Site Contaminants		On and Off-Site Contaminants	
Potential Pathways	- Ingestion of soils, garden vegetables and dust - Ingestion of contaminated drinking water - Dermal Absorption - Inhalation of dusts and vapours indoors and outdoors - Migration of ground gases and vapours into properties			Leaching in the unsaturated zone and diffusion in the saturated zone		- Overland run-off - Drainage channels - Base flow	- Migration of ground gases and vapours through the unsaturated zone - Attack on water supply service pipes	
Potential Receptors	ON SITE HUMANS Future occupiers, visitors, construction workers		OFF SITE HUMANS Residents, visitors		GROUND WATER Secondary A	SURFACE WATER None	ON SITE PROPERTY Buildings and services	
Potential Hazards	- Adverse health effects - Injury/Death	Explosion/ Methane build up in confined spaces	- Adverse health effects - Injury/ Death	Explosion/ Methane build up in confined spaces	Derogation of groundwater quality	- Derogation of surface water quality - Ecological impacts	Damage to property and services	Explosion Methane build up in confined spaces
Potential Pollutant Linkage ID	PPL1a	PPL1b	PPL2a	PPL2b	PPL3	PPL4	PPL5a	PPL5b
SEVERITY	Major (4)	Major (4)	Major (4)	Major (4)	Moderate (3)	Moderate (3)	Major (4)	Major (4)
LIKELIHOOD	Possible (3)	Possible (3)	Improbable (1)	Improbable (1)	Improbable (1)	Improbable (1)	Possible (3)	Possible (3)
RISK	Moderate (12)	Moderate (12)	Low (4)	Low (4)	Very Low (3)	Very Low (3)	Moderate (12)	Moderate (12)
POTENTIALLY SIGNIFICANT?	YES	YES	NO	NO	NO	NO	YES	YES

13.1 Assessment of Potential Significance of Potential Pollutant Linkages

13.1.1 Potential Risks to On-Site Human Health

PPL1a was considered to have the potential to be significant. Our search indicates that the site is also potentially affected by Radon gas and Coal Mining. As the proposal is to introduce a residential dwelling, it is possible that human health receptors, including construction workers and future occupiers of the dwellings, could be exposed to any potential contamination during groundworks and after completion via indoor exposure/inhalation of Radon/ground gases and vapours respectively.

PPL1b was considered to have the potential to be significant as potential sources of explosive ground gases (i.e. Potentially Infilled Land, BGS Coalfields and BGS Methane/CO₂ Bedrock) were identified in the vicinity of the site.

13.1.2 Potential Risks to Off-Site Human Health

PPL2a was considered unlikely to have the potential to be significant. It is considered unlikely that any contaminants present at the site would be of sufficient magnitude as to significantly impact off-site human receptors.

PPL2b was considered unlikely to have the potential to be significant as no potential sources of explosive ground gases (i.e. landfills) were identified onsite.

13.1.3 Potential Risks to Groundwater Receptors

PPL3 was considered unlikely to have the potential to be significant as it is considered unlikely that any contaminants present at the site would be of sufficient magnitude as to significantly impact the Secondary A Aquifer.

13.1.4 Potential Risks to Surface Water Receptors

PPL4 was considered unlikely to have the potential to be significant as no surface water bodies were identified within 250m of the site.

13.1.5 Potential Risks to Property Receptors

PPL5a is considered to have the potential to be significant. If contaminated, the soil may contain aggressive chemicals (i.e. Sulphates) that can attack building materials and services.

PPL5b was considered to have the potential to be significant as potential sources of explosive ground gases (i.e. Potentially Infilled Land, BGS Coalfields and BGS Methane/CO₂ Bedrock) were identified in the vicinity of the site.

14 CONCLUSIONS

This Phase 1 Desk Study was carried out to support planning permission for the development of a 2-bedroom residential dwelling including a rear parking area and brick paved area to the front of the property.

A review of historical maps and planning records suggests that the site and immediate adjacent land have been subject to previous potentially contaminative land uses (PCLUs). No onsite PCLUs have been identified, however, offsite PCLUs include a Car Park, Railway Line and Disused Quarries. Our search indicates that the site is also potentially affected by Radon Gas.

A conceptual site risk model was developed and a qualitative risk assessment undertaken. The conclusions of the risk assessment are presented in Table 5 below.

Table 5: Summary of qualitative risk assessment

Potential Receptor	PSPPLs	Risk
On-Site Human Health (i.e. future occupiers and construction workers)	Yes	Moderate
Off-Site Human Health (i.e. occupiers of neighbouring properties)	No	Low
Groundwater	No	Very Low
Surface Water	No	Very Low
Property (i.e. buildings and services)	Yes	Moderate

15 RECOMMENDATIONS

Given that potentially significant potential pollutant linkages (PSPPLs) were identified, it is recommended that an intrusive site investigation, including ground gas and vapour monitoring, is undertaken with the objective of determining the presence and extent of any soil contamination at the site. The scope of the investigation should be agreed with the Local Planning Authority prior to commencement of the works. It is also recommended that Radon protection measures are incorporated into the building design.

15.1 Watching Brief and Discovery Strategy

It is recommended that a “watching brief” is kept at all times during the development. Should any unexpected contamination be encountered then the discovery strategy outlined below should be followed.

- Works should be halted if any suspicious ground conditions are identified by groundworkers;
- The Contractor should assess the need for any immediate health and safety or environmental management control measures. If control measures are considered to be required, they should be implemented;
- The Contractor should notify the Client's Environmental Consultant and the Local Planning Authority;
- The Environmental Consultant should attend the site to record the extent of 'contamination' and if necessary to collect samples.
- If remedial action is considered necessary then the proposed works should be agreed with the Local Planning Authority prior to implementation;
- Once remediation is complete, the Environmental Consultant should collate evidence of work carried out for inclusion in a Remediation Verification Report which should be submitted to the Local Planning Authority.

15.2 Health and Safety

All site works should be carried out in accordance with Health and Safety Executive regulations and guidelines, the Contractor's Construction Health and Safety Plan and the Construction (Design and Management) Regulations 2015.

Precautions should be taken to minimise exposure of site workers during ground works through the implementation of site safety. Such precautions should include, but not be limited to:

-  Provision of appropriate Personal Protective Equipment (PPE);
-  Availability of site welfare;
-  Good personal hygiene, washing and changing procedures;
-  Daily safety briefings.

15.3 Services

The local Statutory Water Undertaker should be contacted in the event that new services are proposed as part of the redevelopment in order to determine their specification for the type of pipework which should be used on this site.

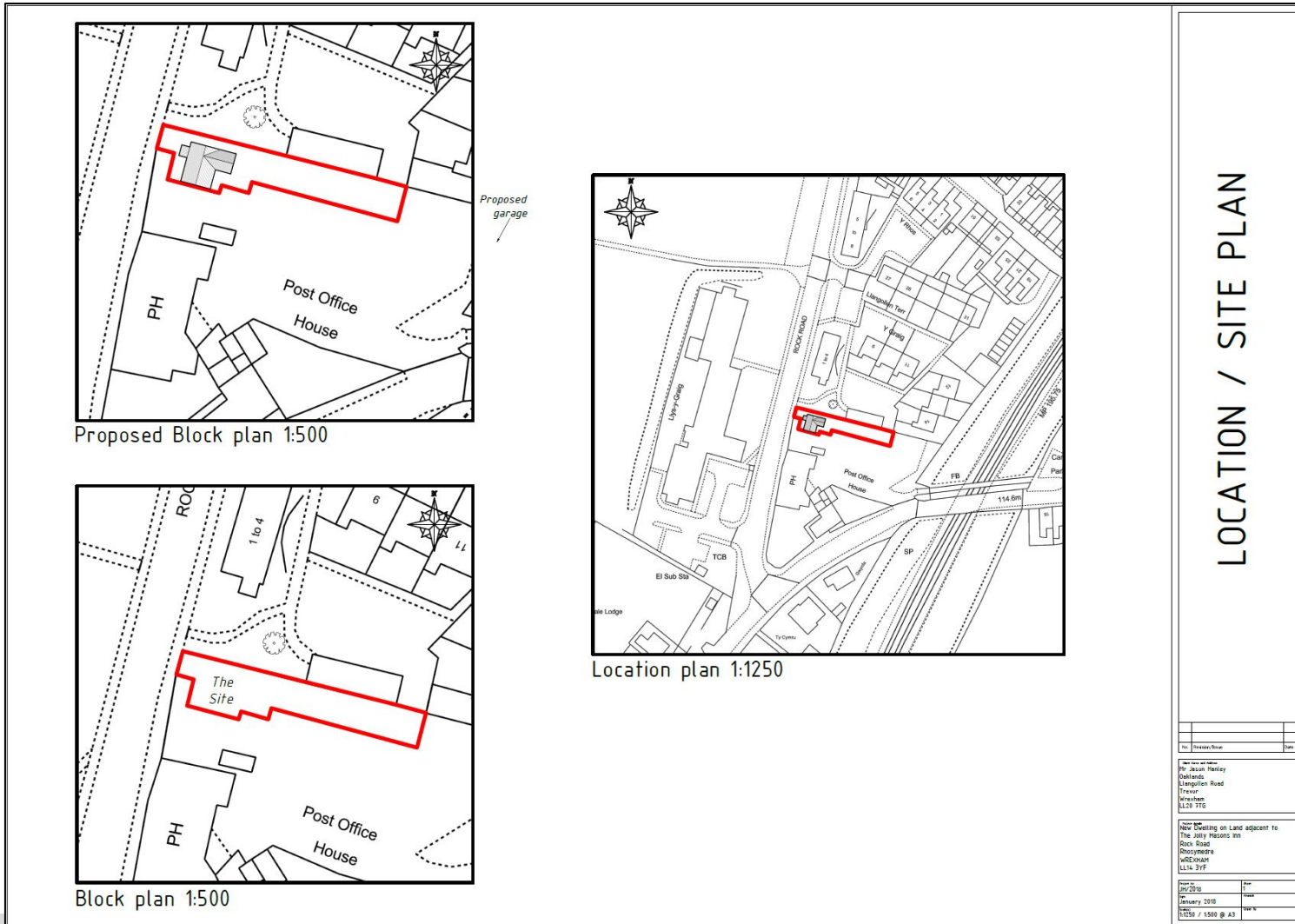
It is recommended that all services, and in particular potable water, should be supplied using materials that are resistant to attack and degradation to chemical attack.

Further information can be found within the published guidance for the '*Selection of Water Supply Pipes to be used in Brownfield Sites*', issued in January 2011 by the UK Water Industry Research.

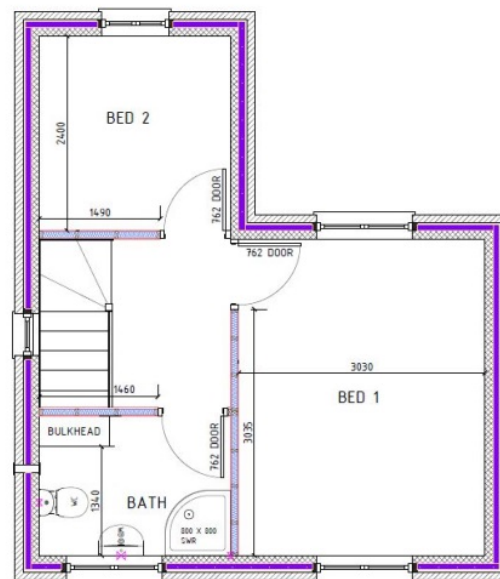
16 INFORMATION GAPS AND UNCERTAINTIES

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.

17 APPENDIX 1 – PROPOSED DEVELOPMENT PLANS







Drawings and associated specification documents are to other planning/building regulations approved/conditional approval only. All drawings are based upon information provided to the client. All work is to be carried out in accordance with local authority/approved inspector requirements, to manufacturers' recommendations/instructions, all relevant British standards codes of practice and good building practice generally. All testing appliances are to be installed in accordance with the relevant regulations and certificate of installation shall be provided upon completion of the works. All electrical works are to be completed by a competent Part F qualified electrician. All existing services within the vicinity of the works are to be located and suitably protected. The contractor is to check and verify all building conditions, dimensions, levels and sewer invert levels before the commencement of works on site. This drawing must be read in conjunction and checked against any structural or other specialist drawings provided.

The safety requirements of the health and safety at work act 1974, the management of health and safety at work regulations 1992 and the construction (design, safety and welfare) regulations 1997 are to be adhered to where appropriate. At all times on site operations at work must meet full protective clothing in accordance with the regulations. The contractor is to comply in all respects with the current building regulations whether specifically stated on this drawing or not. Approved Inspectors/Building Control must be notified at each stage of the building operation. All planning approval conditions, whether stated on the drawing or not must be complied with (where to be complied). Any structural variation must have the approval of planning, building control and the client. The client is to be notified by the nominated contractor of any not variation to building work before it is carried out. Any deviations from the drawings are noted out at the risk of the contractor/client. Do not scale off the drawings. All dimensions are indicative, and to be checked on site first. Client is responsible for fulfilling their obligations under the party wall act. Construction of the following requires notice as specified: (i) new walls or buildings on boundaries between adjoining properties or land, and/or (ii) any not repairs or modifications to existing party wall including underpinning or inserting a damp proof course (DPC) and (iii) foundations near to a neighbouring building or wall and excavate deeper than the adjacent structure, foundation or base of the structure. The owner should give notice using the appropriate notice form, within the specified time to the neighbour or parties involved prior to work commencing. Failure to comply with the terms of the party wall act 1997 may result in prosecution for a fine and/or paying compensation to the adjacent owner. Further information on the party wall act can be found at www.gov.uk/party-wall-act-1997-guidance. Similarly, the client is responsible for fulfilling their obligations of a build over or new to agreement with the relevant utility authority if works are to be carried out on, or near to the drain, gas, inspection chamber or manhole that is a public sewer. Client/contractor to investigate prior to commencement of works on site, and follow with the client, relevant authorities and Approved Inspectors/Building Control, as required. Existing foundations, walls, roof and associated structural support, and all other necessary aspects of existing construction to be investigated by the contractor on site and where required proved to be adequate/suitable prior to commencement of works.

FIRST FLOOR PLAN (STUDWORK)

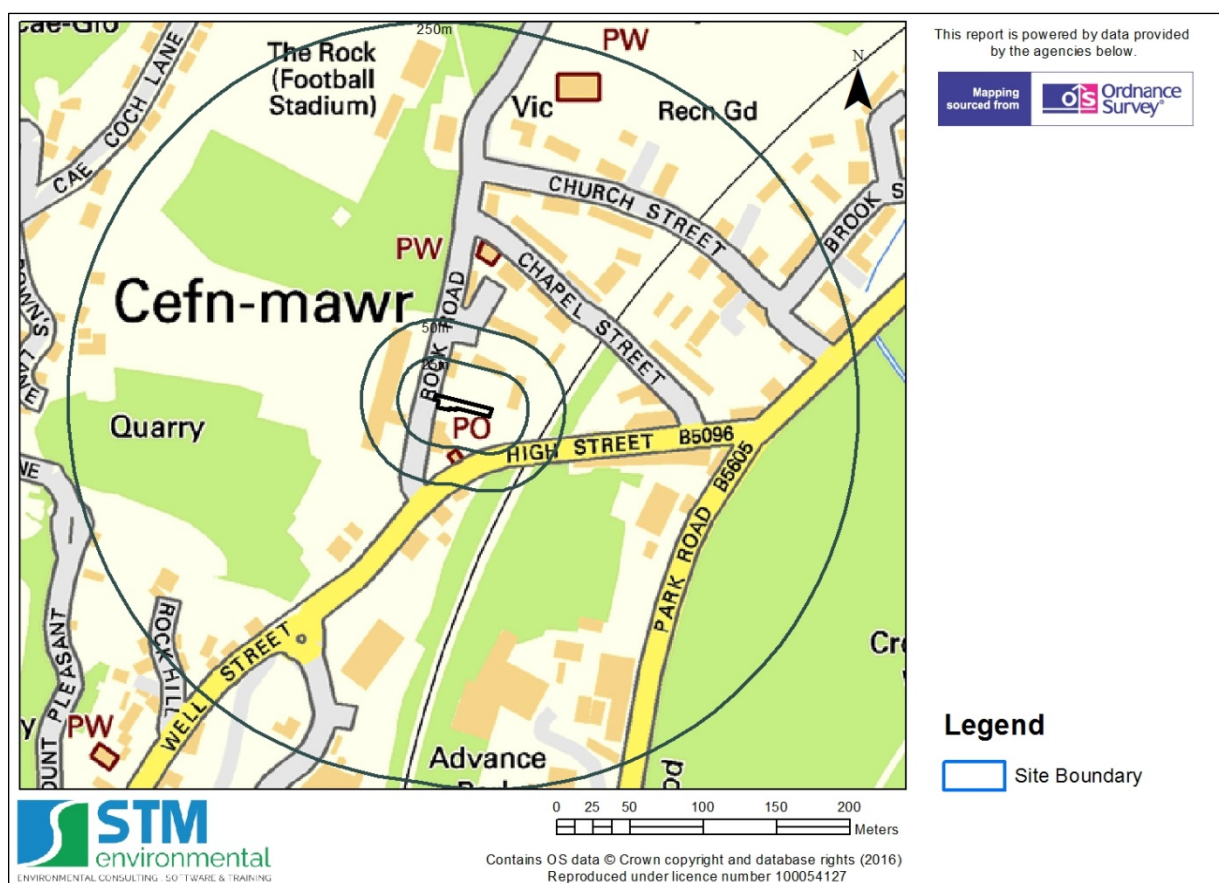
No.	Revision/Date	Rev.
Drawn by: PH1 Jason Huxley Checked by: Cavanagh Road Trewar Wrexham LL20 9TB		
New Dwelling on Land adjacent to The Jolly Masons Inn Rock Road Rhosymedre Wrexham LL14 3YF		
Date	24/01/2018	2nd
By	January 2018	Rev.
Scale	1:50 @ A3	Rev.

18 APPENDIX 2 – ENVIRONMENTAL SCREENING REPORT

18.1 Summary Datasheet

Search Layer Name	Search Distance	Data Available	No. of features identified
Potential Contaminated Land	250 m	Yes	8
Potential Infilled Land	250 m	No	0
Environment Agency Historic Landfill	250 m	No	0
Environment Agency Authorised Landfill	250 m	No	0
Industrial sites	250 m	No	0
Red List Discharge Consents	250 m	No	0
Pollution Incidents	250 m	No	0
List 1 Dangerous Substances	250 m	No	0
List 2 Dangerous Substances	250 m	No	0
Radioactive Substance Registrations	25 m	No	0
Aquifer (Superficial)	250 m	Yes	1
Source Protection Zones	250 m	No	0
Aquifer (Bedrock)	0 m	Yes	1
Superficial Geology	0 m	No	0
Bedrock Geology	0 m	No	0
Areas of Outstanding Natural Beauty	500 m	No	0
Listed Building	50 m	No	0
Special Sites of Scientific Interest	500 m	No	0
Special Protection Areas	500 m	No	0
Special Areas of Conservation	500 m	No	0
Ramsar	500 m	No	0
National Nature Reserves	500 m	No	0
Local Nature Reserves	500 m	No	0
World Heritage Sites	50 m	Yes	1

Search Layer Name	Search Distance	Data Available	No. of features identified
Historic Park and Gardens	50 m	No	0
Scheduled Ancient Monuments	50 m	No	0
BGS Coalfields	50 m	Yes	1
BGS Brine Areas	50 m	No	0
BGS Methane/CO2 Superficial	250 m	No	0
BGS Methane/CO2 Bedrock	50 m	Yes	1
Areas Potentially Affected by Radon	50 m	Yes	1
Flood Zone 3	0 m	No	0
Flood Zone 2	0 m	No	0



18.2.1 Search Information for Potential Contaminated Land

Selection Summary for layer

1 feature(s) identified on site.

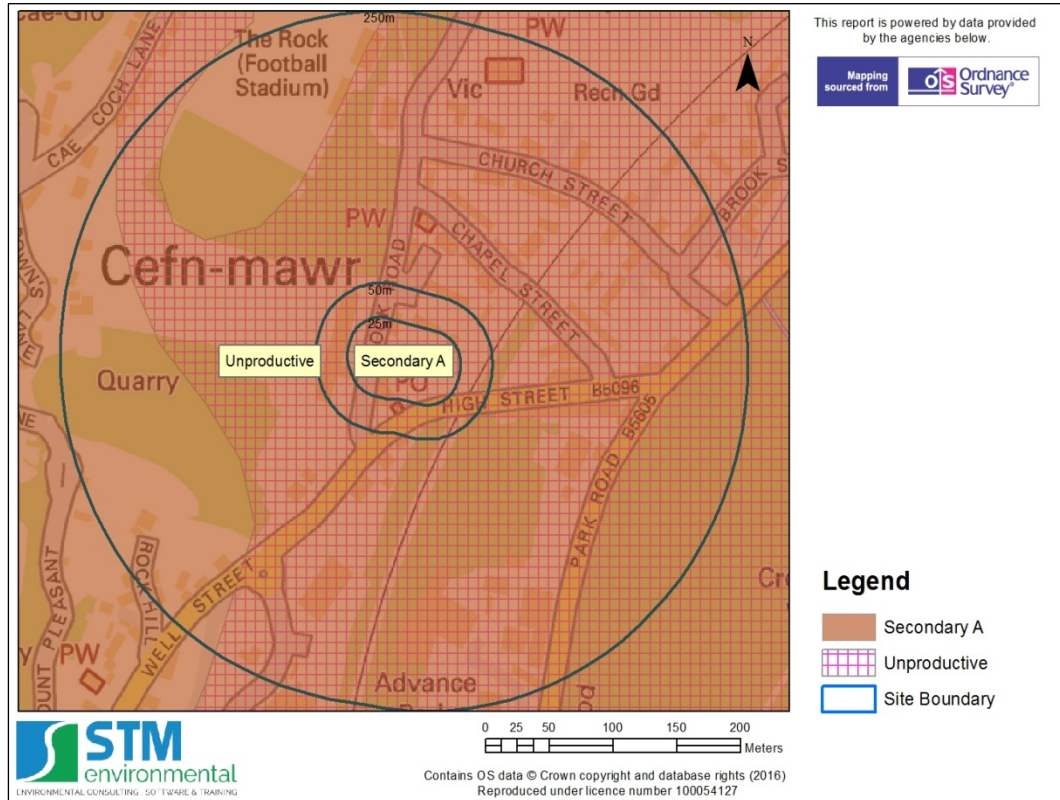
2 feature(s) identified off site within 50 metres

5 feature(s) identified off site within 50 - 250 metres

ID	Site Name	Contaminative Use	Use Start Date	Use End Date	Use Comments	Approx. distance (m)	Approx. Area (m2)	Grid Ref.
Identified Off-site - Within 0-50m								
PCL/000931	Car Park	Car Park	c. 1995	Current (2018)		0.00	611.63	328318, 342568
PCL/000932	Railway Line	Railway land	c. 1868	Current (2018)		20.80	11399.9	328391, 342587
PCL/000936	Quarry	Unknown Filled Ground (Pit, quarry etc.)	c. 1873	c. 1962		45.55	35529.64	328232, 342746
Identified Off-site - Within 50-250m								
PCL/000933	Wheatsheaf Workshops	Workshop	Unknown	Current (2018)		91.70	464.62	328441, 342566
PCL/000934	Car Park	Road vehicles: Garages and filling stations	Unknown	Current (2018)		59.28	1268.38	328412, 342578
PCL/000935	Quarry	Unknown Filled Ground (Pit, quarry etc.)	c. 1873	c. 1962		86.05	16999.23	328125, 342539
PCL/000937	Electricity Substation	Electricity Substation	Unknown	Current (2018)		87.95	49.71	328418, 342607
PCL/000938	Electricity Substation	Electricity Substation	Unknown	Current (2018)		62.84	323.28	328256, 342513

18.3 Hydrogeology

The hydrogeology classification is provided by British Geological Society Mapping describing the nature of the bedrock and superficial aquifer that might be located at the site. The ground source protection zones provide an indication of protected ground water areas and the travel time associated with a contaminant reaching the sensitive aquifer.



18.3.1 Search Information for Aquifer (Superficial)

Selection Summary for layer

1 feature(s) identified on site.

0 feature(s) identified off site within 50 metres

0 feature(s) identified off site within 50 - 250 metres

Designation	Grid Ref.
On Site	
Unproductive	327625, 343634
Identified Off-site - Within 0-50m	
None	
Identified Off-site - Within 50-250m	
None	

18.3.2 Search Information for Aquifer (Bedrock)

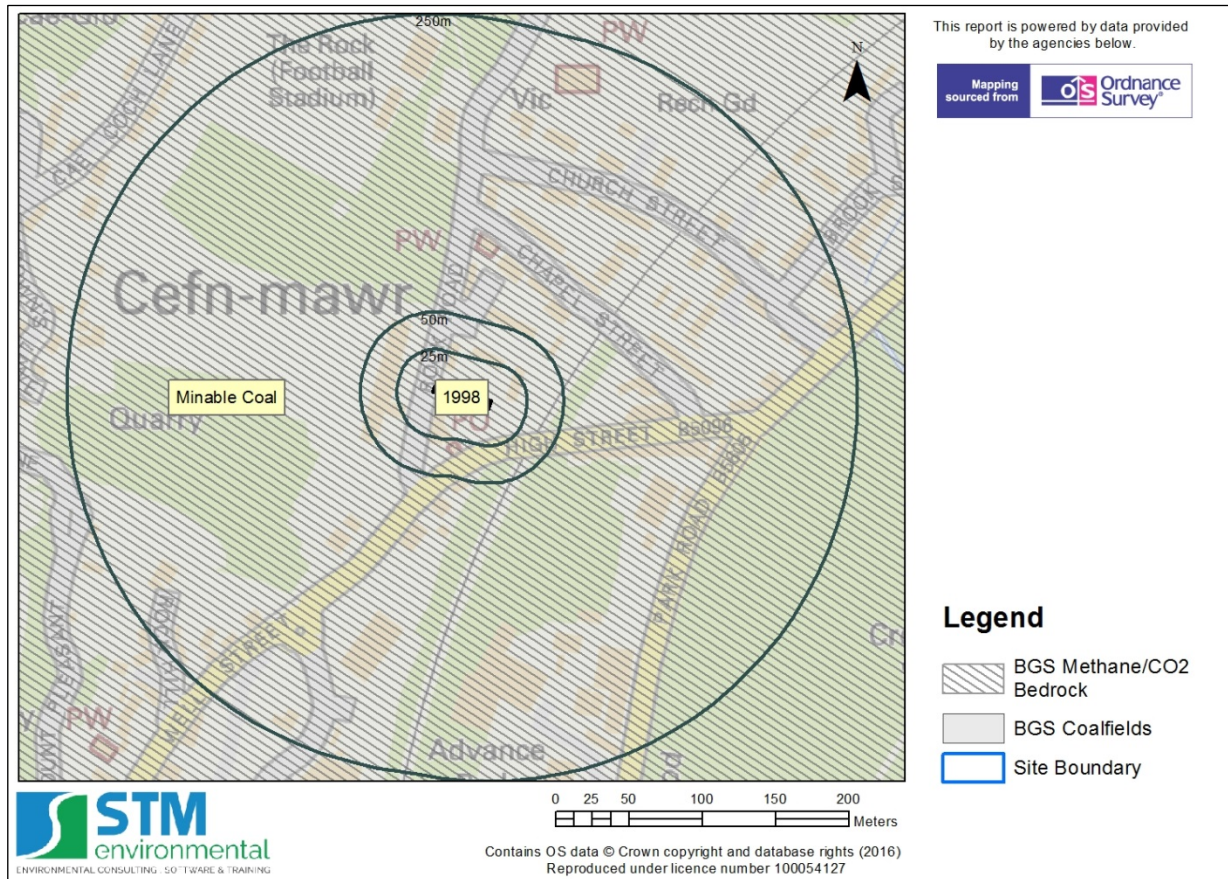
Selection Summary for layer

1 feature(s) identified on site.

Designation	Grid Ref.
On Site	
Secondary A	328015, 342835

18.5 Coal Mining

The coalfield and brine extraction information highlight potential risks from man-made ground stability issues. Methane and Carbon Dioxide gas is also associated with coal fields. As such, areas with potential for these gases are also provided from both superficial and bedrock geology.



18.5.1 Search Information for BGS Coalfields

Selection Summary for layer

1 feature(s) identified on site.

0 feature(s) identified off site within 50 metres

NAME	TYPE	Grid Ref.
On Site		
NORTH WALES	Minaible Coal	316926, 379110
Identified Off-site - Within 0-50m		
None		

18.5.2 Search Information for BGS Methane/CO2 Bedrock

Selection Summary for layer

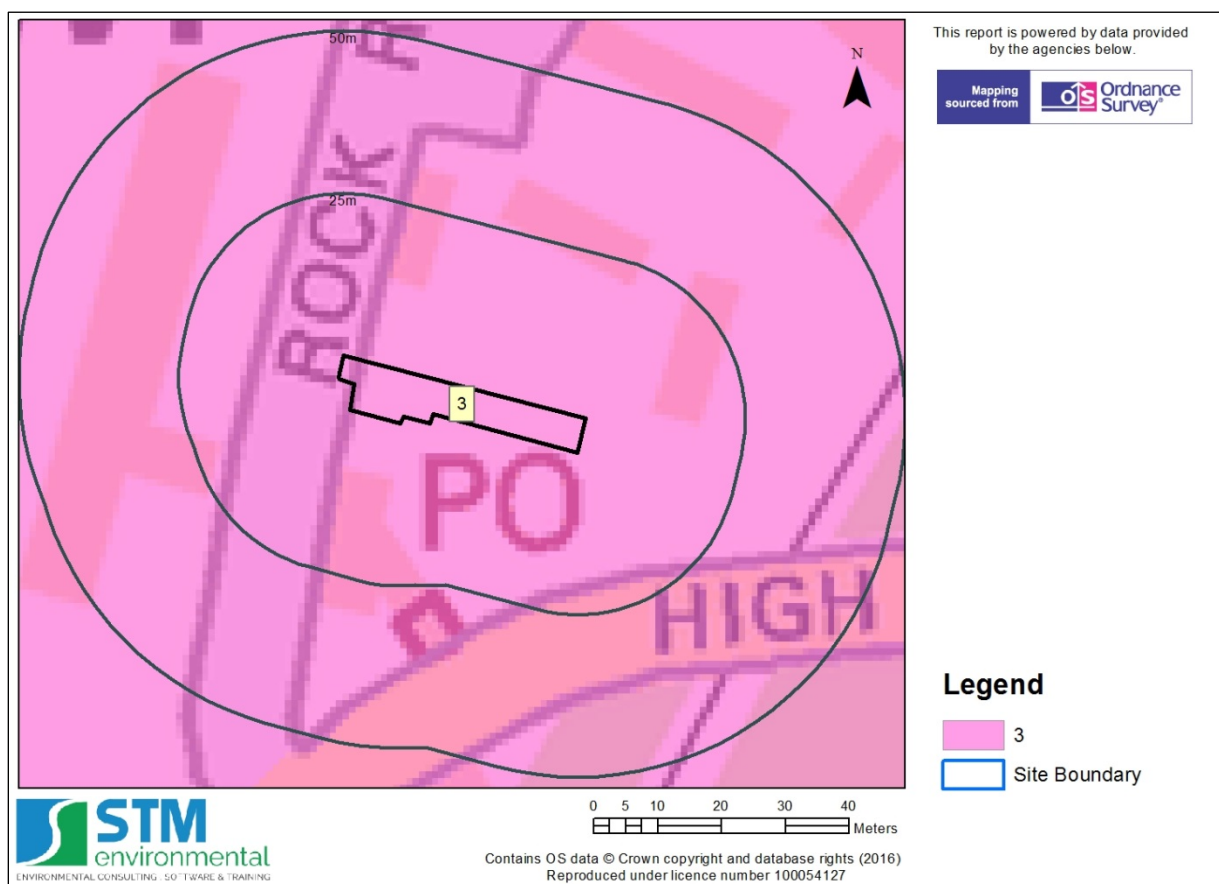
1 feature(s) identified on site.

0 feature(s) identified off site within 50 metres

HAZARD: GAS

Description: Potential gas hazard from bedrock and coal mining

18.6 Radon Gas



18.6.1 Search Information for Areas Potentially Affected by Radon

Selection Summary for layer

1 feature(s) identified on site.

0 feature(s) identified off site within 50 metres

Class	Grid Ref.
On Site	
3	327888, 343479
Identified Off-site - Within 0-50m	
None	

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.

19 APPENDIX 3 – SITE PHOTOGRAPHY



20 APPENDIX 4 - RISK 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:

$$\text{RISK} = \text{LIKELIHOOD} \times \text{SEVERITY}$$

The matrix given in Table 6 provides a means of calculating the overall risk; while Table 7 provides the qualitative assessment based on the risk score.

Table 6: Contamination Risk Matrix

		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 7: Assessment description for risk scores

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

Table 8: Risk Classification System

Risk Term	Description
Very Low to Low	The presence of an identified hazard does not give rise to the potential to cause significant harm to a designated receptor. In the event of such harm being realized, it is not likely to be Severe.
Low to Moderate	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if

	realized, would at worst normally be mild.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild. Investigation (if not already undertaken) is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
High	Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remedial action. Investigation is required and remedial works may be necessary in the short term and are likely over the longer term.
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or, there is an evidence that severe harm to a designated receptor is currently happening. Urgent investigation and remediation are likely to be required.

21 ABBREVIATIONS

Abbreviation	Description
c.	circa
CLRA	Contaminated Land Risk Assessment
CSM	Conceptual Site Risk Model
EA	Environment Agency
IPC	Integrated Pollution Control
LAPC	Local Authority Pollution Control
NPPF	National Planning Policy Framework
OS	Ordnance Survey
PAHs	Polycyclic aromatic hydrocarbons
Part IIA	Part IIA of the Environmental Protection. Act 1990
PCB	Polychlorinated Biphenyl
PCL	Potentially Contaminative Land Use
PPL	Potential Pollutant Linkage
PSPPL	Potentially Significant Potential Pollutant Linkage
SI	Site Investigation
SPOSH	Significant Possibility of Significant Harm
UXO	Unexploded Ordnance