



Civil & Structural Engineers
Building Surveyors
Geo-Environmentalists

Phase I Preliminary Risk Assessment

at

Dinting Road,
Glossop

Liverpool

T: 0151 227 3155

Manchester

T: 0161 817 5180

Wrexham

T: 01978 664071

London

T: 020 74 584136

Head Office

18-20 Harrington Street
Liverpool L2 9QA

T: 0151 227 3155

F: 0151 227 3156

E: enquiries@sutcliffe.co.uk

www.sutcliffe.co.uk

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SUTCLIFFE INVESTIGATIONS

Phase I Preliminary Risk Assessment

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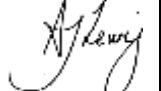
Prepared by:

Name:	K Davies
Title:	Environmental Scientist
Qualifications:	BSc (Hons) MMarBiol

Checked / Approved by:

Name:	D Bowen	A Lewis
Title:	Environmental Scientist	Geo-Environmental Manager
Qualifications:	BSc (Hons) FGS	BSc Environmental Science MSc Geology AIEMA FGS

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Executive Summary

Introduction	Sutcliffe Investigations were instructed Halton Housing & OSUK Ltd to undertake a Phase I Preliminary Risk Assessment (PRA) of the site known as Dinting road, Glossop, Derbyshire, SK13 7UU.
Aims & Objectives	The Phase 1 PRA is required to assess the ground based environmental and geotechnical risks, development constraints and liabilities associated with the development of the site, required in support of an application for outline planning. This report constitutes a preliminary investigation as defined in BS10175 and contains the following: - Summary of the information obtained from an Envirocheck Report (<i>Report Reference: 196456292</i>), which is presented in <i>Appendix A</i>. - A preliminary risk assessment of potential environmental risks associated with the proposed redevelopment of the site to identified receptors, following the methodology of CLR11 and their recommendations on contamination reports.
Development Plans	The proposed development for the site is for 145No. 2, 3, 4 & 5 bed houses with private gardens and associated car parking and infrastructure facilities.
Site Location & Description	The site is approximately 1.62km north west from the centre of Glossop and is surrounded on by residential properties to the north, a railway line to the east and agricultural/industrial development to the south/west. The site is triangular in shape, and can be accessed via Dinting Road to the south of the site. The site comprises 100% vegetation cover, with a number of trees across the site and a public footpath striking north to south through the centre of the site. The site slopes from east to west and also from north to south, with a raised section along the eastern boundary and a dip located to the north of the site. A small wire fence borders the site at the south and vegetation to the north. The site is currently undeveloped.
Site History	Onsite – The earliest available historical map (1882) indicated that the site was largely under agricultural usage with no development noted and a public footpath was noted through the centre of the site. In 1898 a pond fed by a stream was noted to the north of the site, this was no longer recorded on site from 1938. Following this no significant changes were noted on site until present day (2019). With the exception of potentially infilled land being present on site, no significant identifiable sources of environmental concern were identified. The potential for significant contamination to have arisen at the site as a result of the current and former usage on site is considered to be low. However, the possibility of contamination albeit likely to be localised cannot be discounted. Offsite - The earliest historical map dated 1882 indicated that the surrounding area of the site was largely under agricultural usage with the following features noted in the surrounding area: - Railway line – 0m E - Clay / gravel pit – 60m NW - Well – 60m W - Reservoir – 115m W - Several ponds – nearest = 2m SW - Dinting Vale Printing Works – 360m SW Later in 1898 a quarry was noted (175m NE), believed to be a stone quarry. From 1938 several ventilators are noted (175-250m S) in areas of infilled land.

	From 1968-1971 a brick works is noted (120m NE) and an increase in residential is recorded (250m NW). No further significant changes were noted in the surrounding area of the site, with the exception of further progressive development and an increase in residential properties.
Geotechnical Uncertainty	The site has not been subject to previous development; however the potential for infilled land or obstructions cannot be discounted.
Geology	Artificial - There are no records of any artificial ground onsite however there are 9 records of artificial ground within 500m of the site the nearest of which is 81m west of the site and is noted as Infilled Ground. Drift - The superficial deposits for the site are noted as Devensian Till. Solid - The solid geology for the site is noted as being Marsden Formation – Mudstone & Siltstone and Huddersfield White Rock - Sandstone.
Hydrogeology	- The Bedrock is classified as a Secondary A Aquifer and superficial deposits are classified as a secondary (undifferentiated) Aquifer. - There are 20 groundwater abstraction points listed in the Envirocheck Report within 2000m of the site. The closest is located 642m south east of the site at Plater Chemicals Ltd.
Faults	1 fault has been identified within the development site boundary striking from north to south along the eastern portion of the site and is identified on site by a raised ridge. Foundation design needs to mitigate the risk associated with possible differential movement.
Radon	According to the Envirocheck Report, the site is not within a radon affected area, as <1% of homes are above the action level. No radon protection measures are necessary in the construction of new dwellings or extensions.
Coal Mining	The site is within a coal mining area. However, no further action is required to assess the risks associated with coal mining assets.
Hydrology	- The nearest surface water feature is recorded 1m north of the site and refers to a water sinks. - No surface abstractions have been identified within 250m radius of the site.
Risk Assessment	The Phase I PRA has not highlighted significant areas of concern and therefore, the site is deemed to be Class 3 – Low Risk.
Conclusions & Recommendations	Based on the findings of the Phase I PRA review, Sutcliffe Investigations do not consider there to be any identifiable significant environmental issues regarding the site. However, there is limited information of the ground for geotechnical properties and as such we would therefore recommend the following sequential works are undertaken: - Submission of this Phase I PRA Report for the benefit of validating the outline planning application. - Commission a Phase II Ground Investigation designed to discharge any contaminated land conditions that may be assigned to the site and allow the design of economic foundation solutions. This should include investigation into the potentially infilled pond area for ground gas assessment and investigation of the fault line noted for foundation design. - Commission a Flood Risk Assessment.

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Appendix B: Photographic Log

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Figure 1 and 2: Site location maps (various scales)

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1 Introduction

1.1 Terms of Reference

Sutcliffe Investigations were instructed by Halton Housing & OSUK Ltd to undertake a Phase I Preliminary Risk Assessment (PRA) of the site known as Dinting road, Glossop, Derbyshire, SK13 7UU (*Figure 1*).

1.2 Proposed Development

The proposed development for the site is for 145No. 2, 3, 4 & 5 bed houses with private gardens and associated car parking and infrastructure facilities. The proposed development is presented as *Drawing No: SK.002A – Proposed Site Plan* produced by John McCall Architects.

1.3 Legislative Context

The presence of contaminants which may pose a risk to human health and / or the environment is a planning consideration. As part of the planning regime it needs to be considered whether the site is “*suitable for its proposed end use*”. Planning is concerned with the site’s proposed end use, not its current use, where the amount of contamination is required to be low relative to the level of risk.

Section 57 of the Environment Act 1995, adds Part 2A (ss. 78A to 18YC) to the Environmental Protection Act 1990 and contains the legislative framework for identifying and dealing with contaminated land. Where development is undertaken on land which may be affected by contamination, the National Planning Policy Framework, paragraphs 120 to 122 considers pollution and remediation. This links the contaminated land regime within the development process.

For there to be a significant risk requiring further investigation a perceived source (contaminant), a receptor (humans, living organisms or property) and a pathway between them must all be present, resulting in a complete contaminant linkage.

In order to assess whether this is the case, background research is required to obtain relevant information about the site and its surroundings and to assess the findings qualitatively. The scope of the assessment examined whether there is the potential for current and historic soil and/or groundwater contamination to be present, both at and in the vicinity of the site, and to assess significance in terms of the potential to pose a risk to human health, controlled waters, building infrastructure and the wider environment and identify any associated potential liabilities.

Part 2A of the Environmental Protection Act 1990 (“Part 2A”) provides the legislative framework for the contaminated land regime in England, Wales and Scotland. It

provides for contaminated land to be identified and dealt with in a risk-based manner. The *Contaminated Land (England) Regulations 2006* (SI 2006/1380) set out provisions for procedural matters under Part 2A. The 2006 regulations have recently been modified with the introduction of *The Contaminated Land (England) (Amendment) Regulations 2012*, which came into force on 6th April 2012. This includes an amendment to Regulation 3(c) to take account of the updated definition of “controlled waters” in Section 78A(9) of the *Environmental Protection Act 1990*. Section 78A(2) of Part 2A of the EPA 1990 defines contaminated land as “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:

- significant harm is being caused or there is a significant possibility of such harm being caused; or
- pollution of controlled waters is being, or is likely to be caused”.

Contaminated Land Statutory Guidance published in April 2012 provides for a new four category test which is intended to clarify when land does or does not need to be remediated, where Category 1 is deemed as being high risk and Category 4 as being low risk.

1.4 Previous Studies

Sutcliffe's are not aware any previous environmental or geotechnical investigations having been completed on site.

1.5 Objectives & Scope of Works

The Phase 1 PRA is required to assess the ground based environmental and geotechnical risks, development constraints and liabilities associated with the development of the site, required in support of an application for outline planning.

This report will inform the study of any potential contaminated land issues to be identified, assessed and actioned and has been designed to provide sufficient information to satisfy the requirements of National Planning Policy Framework (NPPF) in order to satisfy the aims and objectives of the project.

The report will culminate in the presentation of a Preliminary Conceptual Site Model (CSM) and will include clear robust recommendations for any additional works. These works will be designed to fully assess and mitigate risks, development constraints and abnormalities that may be required in support of a detailed planning application and design of detailed foundation options.

This report constitutes a preliminary investigation as defined in BS10175 and contains the following:

- Summary of the information obtained from an Envirocheck Report (*Report Reference: 196456292*), which is presented in *Appendix A*.
- A preliminary risk assessment of potential environmental risks associated with the proposed redevelopment of the site to identified receptors, following the methodology of CLR11 and their recommendations on contamination reports, i.e.:
 - *Department for Environment, Food and Rural Affairs and the Environment Agency, 2002. “Model procedures for the management of land contamination” (CLR11).*
 - *Environment Agency, March 2011, “Model Procedures for the Management of Land Contamination – GPLC3 – reporting Checklists”.*
- Recommendations for further investigation/actions if required.

The scope of works was to undertake a Phase I PRA using available information, and to place the site in its environmental context and has included the following:

- a review of available historic maps to determine the land-use history in the context of potentially contaminative activities;
- a review of environmental data relating to the site and its surroundings using a proprietary third-party environmental database;
- desk-based assessment of site geology, hydrogeology and hydrology from published mapping and web-based sources to determine the site’s environmental setting and sensitivity;
- a web-based search of the Environment Agency (EA) website and other freely available sources of information to identify any potential issues relating to the site and surrounding areas; and
- provision of a qualitative contaminated land risk assessment based on Source-Pathway-Receptor as per current best practice contained in CLR11¹.

A site inspection was undertaken by a Sutcliffe engineer – Alex Tosh, on the 20th March 2019. No sampling or testing of soils or waters will be undertaken as part of this environmental review. All other information in this report has been obtained via public sources.

¹ *Model Procedures for the Management of Contaminated Land*, Contaminated Land Report 11 (CLR11), EA, September 2004

2 Environmental Review

2.1 Introduction

The information presented within this chapter was compiled based on a site inspection, completed by a suitably qualified Sutcliffe Engineer, and a review of an Envirocheck Report (*Report Reference 196456292*), presented in *Appendix A*.

2.2 Site Location and Setting

The site address is located at Dinting Road, Glossop, SK13 7UU at National Grid Reference (NGR) 401950, 394980 (*Figure 1*).

The site is approximately 1.62km north west from the centre of Glossop and is surrounded on by residential properties to the north, a railway line to the east and agricultural/industrial development to the south/west. Location plans of varying scales are presented as *Figures 1 & 2* and an Aerial Photograph is presented as *Figure 3*.

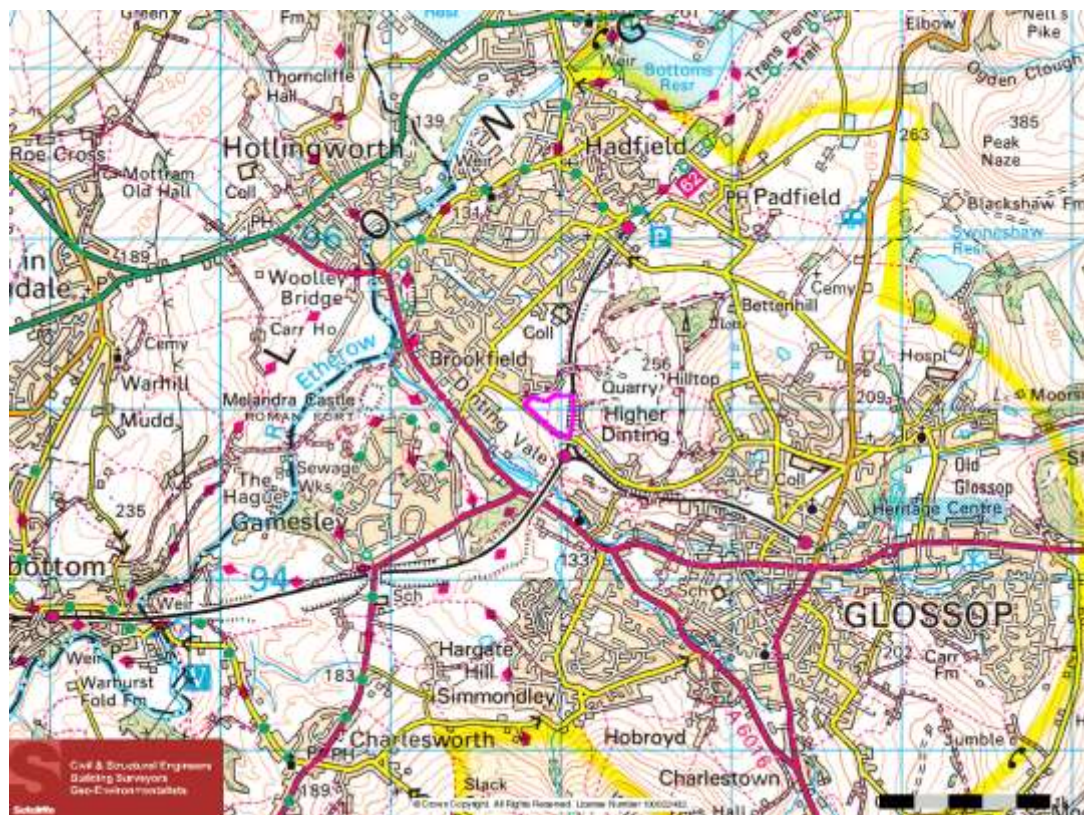


Figure 1: General Location of Site

2.3 Site Description and Walkover

The site is triangular in shape, and can be accessed via Dinting Road to the south of the site. The site comprises 100% vegetation cover, with a number of trees across the site and a public footpath striking north to south through the centre of the site. The site slopes from east to west and also from north to south, with a raised section along the eastern boundary and a dip located to the north of the site. A small wire fence borders the site at the south and vegetation to the north. The site is currently undeveloped. A photographic log of the site is presented as *Appendix B*.



Figure 2: General Site Layout of the Site



Figure 3: Aerial Photograph

2.4 Adjacent Land Uses

Table 2.1 summarises the adjacent land uses.

Table 2.1: Adjacent Land Uses

Direction	Adjacent Land Use
North	Residential
East	Railway line / agricultural land
South	Agricultural land
West	Industrial / commercial development

2.5 Services

Electric

No electricity assets are present on site.

Gas

No gas assets are recorded on site.

United Utilities

No water or sewer assets are recorded on site.

BT

A BT service line is noted across the north west corner of the site.

As received service plans will be presented in *Appendix C*.

2.6 Site History

Historical maps were obtained and reviewed by Sutcliffe Investigations to determine the historical development of the target site. These are presented in *Appendix A*. This enabled an assessment to be made of the potential for contamination associated with former activities, both on-site and in the surrounding areas.

Onsite

The earliest available historical map (1882) indicated that the site was largely under agricultural usage with no development noted and a public footpath was noted through the centre of the site. In 1898 a pond fed by a stream was noted to the north of the site, this was no longer recorded on site from 1938. Following this no significant changes were noted on site until present day (2019).

With the exception of potentially infilled land being present on site, no significant identifiable sources of environmental concern were identified. The potential for significant contamination to have arisen at the site as a result of the current and former usage on site is considered to be low. However, the possibility of contamination albeit likely to be localised cannot be discounted.

A detailed review of the historical development of the site is presented in *Appendix D*.

Offsite

The earliest historical map dated 1882 indicated that the surrounding area of the site was largely under agricultural usage with the following features noted in the surrounding area:

- Railway line – 0m E
- Clay / gravel pit – 60m NW
- Well – 60m W
- Reservoir – 115m W
- Several ponds – nearest = 2m SW
- Dinting Vale Printing Works – 360m SW

Later in 1898 a quarry was noted (175m NE), believed to be a stone quarry. From 1938 several ventilators are noted (175-250m S) in areas of infilled land.

From 1968-1971 a brick works is noted (120m NE) and an increase in residential is recorded (250m NW).

No further significant changes were noted in the surrounding area of the site, with the exception of further progressive development and an increase in residential properties.

A detailed review of the historical development of the surrounding land uses is presented in *Appendix D*.

2.7 Environmental Database

A commercial database search (provided by Envirocheck) was obtained to provide further information regarding the site and the surroundings. Relevant information and records are summarised below:

Contaminated Land Entries

The database has no contaminated land entries within 500m of the site.

Environmental Permitted Activities

According to the database the following current permitted activities are noted:

- 1 Integrated Pollution Prevention and Control – 296m W Carpenter Ltd.

- 1 Local Authority Integrated Pollution Prevention and Control – 400m W Tann UK Ltd.
- 6 Local Authority Pollution Prevention and Controls – 194m NE Wienerberger Ltd.

Hazardous Substances Sites

According to the database, there is:

- 1 COMAH-registered site within 500m of the located 296m west at Carpenter Ltd and
- 1 Planning Hazardous Substances Consents within 500m of the site located 287m west of the site also at Carpenter Ltd.
- No records of NIHHS sites within are noted 500m of the site.

Substantiated Pollution Incident Register

According to the database, there have been no substantiated pollution incidents within 500m of the site.

Landfill Sites

According to the Envirocheck Report there are;

- 4 Registered Landfill sites within 1000m of the site, the nearest located 23m north east of the site containing construction and demolition waste however the license is now cancelled.
- 5 Historic Landfill sites have been noted within 1000m of the site, the nearest being 5m north west of the site with deposited waste including inert waste type and relate to registered landfills identified above.
- No BGS/DoE Non-operational Landfill sites have been noted within 1000m of the site.
- 1 record of landfills from Local Authority and Historical mapping records have been noted with 1000m of the site, located 617m south of the site.

Infilled Land

Within the Envirocheck Report there are 4 records of potentially infilled land (non-water), the nearest is noted 52m north west of the site and refers to an infilled gravel / clay pit.

There is also 3 records of potentially infilled land (water), the nearest is recorded as being on site relating to an infilled pond, however a site walkover confirmed that it does not appear infilled and is empty pond.

Waste Management Facilities

- The database has recorded no Registered Waste Transfer Sites and no Registered Waste Treatment or Disposal Sites within 500m of the site.
- The database has recorded no Licensed Waste Management within 500m of the site.

Radioactive Materials

According to the Envirocheck Report there are no authorisations for radioactive substances in the surrounding area.

Fuel Stations

According to the database there are no petrol or fuel station entries within 500m of the site.

Contemporary Industrial Land Uses

According to the database there are 1 entry located within 250m of the site, located 95m south and relates to a road haulage services.

Underground Pipelines and Transmission Assets

A search of the Linesearch database was undertaken on 7th March 2019. This database lists pipelines owned and/or operated by over 40 pipeline and transmission operators, but not all operators are registered.

According to the database, there are underground pipelines or transmission assets on the site or within a 25m search radius (*Appendix C*).

2.8 Historical Contamination Potential

Site

Historical maps have indicated that a pond has previously been noted on site and is confirmed to be empty. No other development has previously been noted on site, however a fault is noted through the site and the site levels indicate this.

With the exception of potentially infilled being present, the potential for significant contamination to have arisen at the site as a result of the current and former usage on site is considered to be low. However, the possibility of contamination albeit likely to be localised cannot be discounted.

Surrounding Area

With the exception of adjacent railway line and nearby infilled land, no identifiable significant potentially contaminative activities were identified as having taken place in the immediate surrounding area.

Therefore, the potential for off-site sources of contamination to impact the site is considered low-moderate.

3 Environmental Setting

3.1 Introduction

Desk-based research of the local geology, hydrogeology, hydrology and ecology was carried out in order to establish the potential for migration of contamination onto or away from the site, and to assess the surface water and groundwater sensitivity of the surrounding area. Information was obtained from a number of sources, namely:

- *inspection of the British Geological Survey (BGS) Geology of Britain Viewer²;*
- *examination of the EA's on-line aquifer classification³;*
- *inspection of the MAGIC interactive map service⁴;*
- *a review of online web-based information searches;*
- *review of previous site investigation reports pertaining to the site; and*
- *a review of publicly available information.*

3.2 Geology & Soils

Soils Chemistry – Rural

The environmental database also presents an estimation of the rural background soil chemistry within the site area.

- Arsenic - <15mg/kg
- Cadmium - <1.8mg/kg
- Chromium – 60-90mg/kg
- Lead - <100mg/kg
- Nickel – 15-30mg/kg

Reference to the data presented suggests that the majority of metals concentrations are generally anticipated to be below current tier 1 assessment criteria in relation to human health effects.

² <http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html>

³ <http://maps.Environment-agency.gov.uk/wiyby/wiybyController>

⁴ <http://magic.defra.gov.uk/>

Artificial Ground

There are no records of any artificial ground onsite however there are 9 records of artificial ground within 500m of the site the nearest of which is 81m west of the site and is noted as Infilled Ground.

Superficial Deposits

The superficial deposits for the site are noted as Devensian Till.

Solid Geology

According to the BGS Geology of Britain Viewer and the relevant British Geological Survey (BGS) Solid and Drift Sheets 086 Glossop (2012) at a scale of 1:50,000 the following geological succession has been identified (*Appendix A*).

Table 3.1: Geology

Strata	Description	Age	Rock Type
Solid Geology	Marsden Formation	Namurian	Mudstone & Siltstone
Solid Geology	Huddersfield White Rock	Namurian	Sandstone

Faults

A fault is noted on site striking north to south down the eastern portion of the site.

British Geological Society (BGS) Logs / Records

- The BGS have recorded 14 surface mineral workings within a 1km radius of the site, the closest of which was 130m north west of the site, however these workings have ceased.
- No BGS borehole logs are noted on site or within 250m of the site.

Ground Stability

Table 3.2 below summarises the natural hazards information presented in the Envirocheck Report.

Table 3.2: Potential Natural Hazards

Natural Hazard	Hazard Potential
Shrink - Swell Clays	Very Low
Landslides	Very Low
Soluble Rocks	No Hazard
Compressible Deposits	No Hazard
Collapsible Deposits	Very Low
Running Sands	Very Low

3.4 Coal Mining & Brine Subsidence

The site does fall within a coal mining area. Based on the Coal Mining Report (*Report Reference 51002047306001*) the following is of note:

- The site is not within the zone of likely physical influence from past present or future underground coal mining – however, reserves of coal exist in the area which could be worked at some time in the future.
- There are no known coal mining entries on or within 20m of the site.
- The site is not aware of any evidence of damage arising due to geological faults or other lines of weakness that have been affected by coal mining.
- The property is not within the boundary of an opencast site from which coal has been removed by opencast methods in the past, present or future.
- There is no record of mine gas emissions requiring action by the Coal Authority.

No further action is required in relation to coal mining features.

A full copy of the Coal Authority Mining Report can be found in *Appendix E*.

3.5 Radon

According to the Envirocheck Report, the site is not within a radon affected area, as <1% of homes are above the action level. No radon protection measures are necessary in the construction of new dwellings or extensions.

3.6 Hydrogeology

- The Bedrock is classified as a Secondary A Aquifer; these are defined 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. These are generally aquifers formally classified as minor aquifers”.
- The Superficial Deposits are classified as a Secondary (undifferentiated) Aquifer, which is defined as:
“has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type”.
- The third-party database and EA website indicate that the site is not located within a Groundwater Source Protection Zone (SPZ).
- There are 20 groundwater abstraction points listed in the Envirocheck Report within 2000m of the site. The closest is located 642m south east of the site at Plater Chemicals Ltd.

3.7 Hydrology

The following is of note:

- The nearest surface water feature is recorded 1m north of the site and refers to a water sinks.
- There are 53 recorded pollution incidents to controlled waters listed in the Envirocheck Report. The nearest is noted as being 81m south west of the site, the pollutant was oils-unknown with a water impact of category 3 (minor impact).
- There are 21 surface water abstractions listed within the Envirocheck Report within 2000m of the site, the nearest is located 441m south of the site and Chartdell Utilities Ltd are noted as the operator.
- There is one biological quality record noted 834m west of the site. This relates to the Glossop Brook. The biological grade from 2000 – 2009 is C (fairly good).
- There are two chemical quality records noted the nearest of which is 816m west of the site and relates to Glossop Brook and graded at A from 1994 – 2008 (very good).

3.8 Flood Risk

According to the Envirocheck Report the site is within 250m of an area at risk from extreme flooding from rivers or sea without defences.

3.9 Sensitive Land Uses

Ecological Receptors

The Envirocheck database was queried to locate Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, National Nature Reserves, Areas of Outstanding Natural Beauty (AONB), National Parks and Local Nature Reserves within 1km of the site.

- There is 1 record of Ancient Woodlands within 1000m of the site, located 405m south west of the site at Dinting Vale Wood.

Significance of Environmental Setting

The significance of the environmental setting is considered by Sutcliffe Investigations to be as follows:

- **Groundwater [LOW SENSITIVITY]** – The site is situated in an area of low sensitivity with respect to groundwater resources due to the presence of a Secondary A Aquifer beneath the site. However, this sensitivity is reduced by the absence of any abstractions (sensitive or otherwise) within the immediate vicinity of the site.
- **Surface Water [LOW-MODERATE SENSITIVITY]** – With respect to surface water resources, the site is considered to be located in a low sensitivity setting.
- **Flood Risk [MODERATE SENSITIVITY]** – The site is within 250m of an area at risk of extreme flooding from rivers or sea without defences.
- **Sensitive Land Uses [LOW SENSITIVITY]** – With respect to sensitive land uses such as protected habitats, protected sites, protected buildings and sensitive receptors, the site is considered to be located in a low sensitive setting.

4 Preliminary Qualitative Risk Assessment

4.1 Conceptual Site Model (CSM)

A conceptual model is an essential element of any site-specific environmental risk assessment. In this context, they are often simple representations of the hypothesised relationships between sources, pathways and receptors. For the purpose of this report, a basic conceptual model has been developed based on the principles of CLR11 and interpretation of information gathered during the Phase I review. Thus, this allows the identification of potential contaminant linkages and whether these linkages have the potential to comprise significant harm and/or pollution of controlled waters in relation to the site. Based on this interpretation, the implications for potential liability associated with soil or water contamination at the site can be evaluated.

- **SOURCES** – the identification of contaminants within the soils and groundwater that represent potential pollution sources;
- **PATHWAYS** – the identification of the potential exposure mechanisms and migration pathways from the potential sources; and
- **RECEPTORS** – the identification of the potential receptors that could be sensitive to harm if exposed to these pollution sources.

Collectively, each of these scenarios would be considered a potential pollutant linkage that may require further assessment.

A preliminary conceptual model is presented below (*Table 4.5*) in accordance with the guidance outlined within CLR11.

Identification of Potential Sources

Based on the information from the desk study, historical maps, published information, and a site walkover a summary of potential contaminant sources is provided in *Table 4.1*.

Table 4.1: Potential Sources

Reference	Potential Sources (Onsite)	Potential Contaminants
S1 – Onsite	Potentially infilled land	All metals, fuel, hydrocarbons and oils, asbestos and localised ground gas.
S2 – Off Site	Adjacent railway line	All metals, fuel, hydrocarbons and oils and localised ground gas.
S3 – Off Site	Infilled land x8	Localised ground gas.

Potential Exposure Pathways

Exposure pathways are the potential routes and mechanisms by which potential on-site sources could be linked to the identified potential receptors and thereby expose them to potential harm. **Only plausible pathways need be considered.**

The following potential exposure pathways have been identified at the site:

Table 4.2: Potential Pathway

Ref	Pathway	Description
P1	Direct contact with potential contaminants.	Dermal absorption, ingestion and inhalation of contaminants via direct contact.
P2	Ingestion of potential contaminants.	Construction workers may come into contact during the site works, however this will be for a short time and therefore limited exposure will occur. PPE can be used and worn as a precaution to reduce the risk.
P3	Inhalation of potential contaminants.	
P4	Leaching and migration of contaminants.	Leaching of possible contaminants could migrate into the underlying Secondary A Aquifer via shallow groundwater. On site drainage is also at risk from shallow contamination, if present.
P5	Vertical and lateral migration of ground gases / vapours.	There is the potential for contaminants to be present on the site, which could generate ground gas & vapours on site.

Potential Receptors

Based on the site's environmental setting and the proposed future end use of the area following redevelopment, the following potential receptors have been identified:

Table 4.3: Potential Receptors

Ref	Receptor	Description
R1	Current & future site users	Site users; personnel, general workers and maintenance workers,
R2	Construction Workers	Contractors working on the development of the site. Construction workers, maintenance workers or other personnel who may be directly exposed to contaminated materials in the course of their activities).
R3	Controlled Waters	Secondary A Aquifers and on site drainage.
R4	Adjacent Site Users	Adjacent site users. Third-party land (i.e. the possibility of contamination migrating off-site onto third party land via contaminated groundwater, surface water run-off).
R5	Infrastructure / Buried services	Proposed buildings and buried services

NOTE: ground workers (i.e. If the site was redeveloped, any associated activities may bring site personnel and construction workers into contact with potentially contaminative materials, however, it is considered that the risks to workers will be short term and could be controlled by safe working procedures.

Potential Contaminant Linkages

In order for there to be a plausible contaminant linkage there must be a source, receptor and pathway and a feasible linkage between them (a contaminant linkage). Consequently, even where a contaminant is identified, if there is no pathway for the contamination to reach a receptor, or no receptor then there can be no significant risk and remedial actions are not required. Central to this risk assessment process is the development of a 'conceptual model'. This is a descriptive and/or pictorial representation of the area of potential contamination, the surrounding environment and the processes acting on the contaminants by which they can move and come into contact with receptors (e.g. by leaching and migration into groundwater).

Production of a conceptual model requires an assessment of risk to be made. Risk is a combination of the likelihood of an event occurring and the magnitude of its

consequences. Therefore, in order to assess risk both the likelihood and the consequences of an event must be taken into account. This report adopts the methodology for risk evaluation presented in CIRIA report C552 'Contaminated Land Risk Assessment – A Guide to Good Practice', 2001. The method is qualitative and involves the classification of the following:

- the magnitude of the potential severity or consequence of the risk occurring;
- the magnitude of the likelihood or probability of the risk occurring; and
- once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned using *Table 4.4*

		Table 4.4: Risk Assessment Matrix			
		Consequence			
		Severe	Medium	Mild	Minor
Likelihood of Occurrence	High	Very High	High	Moderate	Moderate/Low
	Likely	High	Moderate	Moderate/Low	Low
	Low	Moderate	Moderate/Low	Low	Very Low
	Unlikely	Moderate/Low	Low	Very Low	Very Low

Sutcliffe has devised a conceptual model based on the information obtained to date through the desk-based study and future residential usage of the site. This is detailed in tabular format in *Table 4.5* and pictorially in *Figure 4*.

Table 4.5: Preliminary Conceptual Site Model

1. Hazard Identification		2. Hazard Assessment				3. Risk Estimation		4. Risk Evaluation	5. Managing the Risk
Contaminant Source		Pathway		Receptor		Consequence of risk being realised	Probability of risk being realised	Classification	Action required
S1	Potentially contaminated soil - on site	P1	Dermal contact	R1/2	Site users	Medium	Low	Moderate / Low	It is possible that harm could arise to a designated receptor from an identified hazard. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
		P2	Ingestion of soil / soil dust	R1/2	Site users	Medium	Low	Moderate / Low	
		P3	Inhalation of vapours / soil gas	R1/2	Site users	Severe	Unlikely	Moderate / Low	
		P4	Leaching and migration of contaminants	R3/5	Principal aquifer	Medium	Low	Moderate / Low	
		P5	Lateral migration of soil gas / vapours	R1	Site users	Severe	Unlikely	Moderate / Low	
				R4	Property	Severe	Unlikely	Moderate / Low	
Contaminant Source		Pathway		Receptor		Consequence of risk being realised	Probability of risk being realised	Classification	Action required
S2	Adjacent railway line – off site	P1	Dermal contact	R1/2	Site users	Medium	Low	Moderate / Low	It is possible that harm could arise to a designated receptor from an identified hazard. Investigation is normally required to clarify the risk
		P2	Ingestion of soil / soil dust	R1/2	Site users	Medium	Low	Moderate / Low	
		P3	Inhalation of vapours / soil gas	R1/2	Site users	Severe	Unlikely	Moderate / Low	

Table 4.5: Preliminary Conceptual Site Model

		P4	Leaching and migration of contaminants	R3/5	Principal aquifer	Medium	Low	Moderate / Low	and to determine the potential liability. Some remedial works may be required in the longer term.
		P5	Lateral migration of soil gas / vapours	R1	Site users	Severe	Unlikely	Moderate / Low	
				R4	Property	Severe	Unlikely	Moderate / Low	
Contaminant Source		Pathway		Receptor		Consequence of risk being realised	Probability of risk being realised	Classification	Action required
S3	Infilled land x8 – off site	P1	Dermal contact	R1/2	Site users	Medium	Low	Moderate / Low	It is possible that harm could arise to a designated receptor from an identified hazard. Investigation is normally required to clarify the risk and to determine the potential liability. Some remedial works may be required in the longer term.
		P2	Ingestion of soil / soil dust	R1/2	Site users	Medium	Low	Moderate / Low	
		P3	Inhalation of vapours / soil gas	R1/2	Site users	Severe	Unlikely	Moderate / Low	
		P4	Leaching and migration of contaminants	R3/5	Principal aquifer	Medium	Low	Moderate / Low	
		P5	Lateral migration of soil gas / vapours	R1	Site users	Severe	Low	Moderate	
				R4	Property	Severe	Low	Moderate	

Potential contaminant linkages that have been identified as moderate or higher will need to be assessed further. This can be in the form of additional research into the actual plausibility of the contaminant linkage or by the actual site measurements. This can be in the form of soil sampling and vapour monitoring to assess the actual conditions.

5 Conclusions and Recommendations

5.1 Introduction

Sutcliffe Investigations were instructed Halton Housing & OSUK Ltd, to provide a Phase I PRA report. The purpose of the report is to generate preliminary environmental assessment data for submission with an outline planning application for redevelopment of the site.

This comprised a review of the Phase I PRA data, collection of environmental information and reports undertaken on the site.

5.2 Environmental Risk Assessment Findings

The site currently consists of an undeveloped piece of land. The development history of the site has not identified a significant source of environmental concern, and information contained within the environmental database has not highlighted any major concerns. The site is underlain by a Secondary A Aquifer for the bedrock and the superficial deposits.

Taking the above into account, it is considered that there is a low potential for significant contamination to be present, however it is considered that localised contamination that may represent a risk to long term human health and also with the potential for leaching of contaminants into controlled waters may be present. Consequently the environmental risk setting for the site is considered to be low.

5.3 Classification and Land Use Risk

The site can be accessed via Dinting Road to the south of the site. The site slopes from north to south and east to west with a ridge located along the eastern edge of the site where a fault line is present. Vegetation is noted across most of the site, with some areas of trees and a public footpath.

Historical maps initially indicate that off-site the surrounding land comprised fields, railway lines, ponds, quarries, reservoirs with a number of other industrial uses. Over time the surrounding land was increasingly built up with residential properties in all surrounding areas of the site.

The classification of risk is as follows:

- Class 1 Area: Potential for High levels of contamination and migration of contamination off the site;
- Class 2 Area: Potential for Medium levels of contamination and migration of contamination off site;

- Class 3 Area: Potential for Low levels of contamination and migration of contamination off site; and
- Class 4 Area: Potential for limited contamination.

However, the Phase I PRA has not highlighted significant areas of concern and therefore, the site is deemed to be Class 3 – Low Risk.

5.3 Geotechnical Uncertainty

The site has not been subject to previous development; however the potential for infilled land or obstructions cannot be discounted.

5.4 Conclusions and Recommendations

Based on the findings of the Phase I PRA review, Sutcliffe Investigations do not consider there to be any identifiable significant environmental issues regarding the site. However, there is limited information of the ground for geotechnical properties and as such we would therefore recommend the following sequential works are undertaken:

- Submission of this Phase I PRA Report for the benefit of validating the outline planning application.
- Commission a Phase II Ground Investigation designed to discharge any contaminated land conditions that may be assigned to the site and allow the design of economic foundation solutions. This should include investigation into the potentially infilled pond area for ground gas assessment and investigation of the fault line noted for foundation design.
- Commission a Flood Risk Assessment

Drawing No: SJ.002A – Proposed Site Plan

Appendix A: Envirocheck Report (*Report Reference: 196456292*)

Appendix B: Photographic Log

Appendix C: Linesearch and Services

Appendix D: Detailed Site Historical Review

Appendix E: Coal Mining Report (Report Reference 51002047306001)

Figure 4: Preliminary Conceptual Site Model