GEO-ENVIRONMENTAL PHASE 1 DESK STUDY

Greenside Mills

SAVILLE ROAD
SKELMANTHORPE
HUDDERSFIELD
HD8 9EE

Project ref: 163-11

Date: 4th May 2016

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We have prepared this report in our professional capacity using reasonable skill, care and diligence. The assessments, conclusions and recommendations within this report pertain to the study site (the extents of which are in Figure 1, below) and the immediate area in continuity with the Site. They are based on the historical uses, information available at the time of writing and the proposed use of the Site. Where any information supplied by the client or other sources have been utilised, it has been assumed that the information is correct. No responsibility can be accepted by Adeptus for inaccuracies in data supplied by any other party.

Any plans, diagrams, cross sections or images are for illustrative purposes only and should be checked for accuracy on-site. In the event of changes to the proposed end use of the Site, the desk study may require updating to reflect such changes.

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1.0 SCOPE AND OBJECTIVES

1.1 Introduction

Adeptus has been instructed to carry out a Geo-Environmental Phase 1 Desk Study on behalf of Paramount Retail Group Holdings Limited in respect of the proposed redevelopment of the Site for residential use.

The following information and data sources are utilised in compiling this report:

- Site Walkover Survey
- Groundsure environmental data report (Appendix A)
- Historical Ordnance Survey Maps
- British Geological Survey borehole logs
- Geological maps of the vicinity
- Environment Agency and Local Authority registers and permissions
- Web based archive material

1.2 Report Objectives and Structure

The aim of a Phase 1 Desk Study is to establish whether a site may be contaminated, and if so the potential nature and extent of any contamination, as well as receptors potentially at risk and the pathways by which they may be exposed to any contamination. This is achieved by gathering available information on the Site's environmental setting and previous usage, particularly with reference to potentially contaminative industries or processes that may have taken place on or immediately adjacent to the Site. Findings are then assessed in the context of the planned or ongoing use of the Site.

The report consists of seven main sections; below is an outline of their contents for ease of navigation.

- Section 1: Introduction (here).
- Section 2: Describes the Site, its surroundings and findings of the walkover.
- Section 3: Provides an assessment of available data and environmental constraints.
- Section 4: Reviews the sites historical background and identifies key features from Section 3.
- Section 5: Outlines the Preliminary Risk Assessment.
- Section 6: Site Conceptual Model.
- Section 7: Summarises the Site risks and provides recommendations.

2.0 THE SITE

2.0 Location and Description

The Site is a former industrial/mill complex at the northeastern edge of the village of Skelmanthorpe. Occupying an irregular shaped parcel of land with an area of ca. 3.5ha (as shown in Figure 1), site levels decline from a high point at the north-west corner near Saville Road.

Redevelopment of the Site for residential use is proposed and it is thought that the site will accommodate around 50 dwellings.

National Grid Reference (NGR): 423421,410972. Approximate height AOD: 140M-150m.

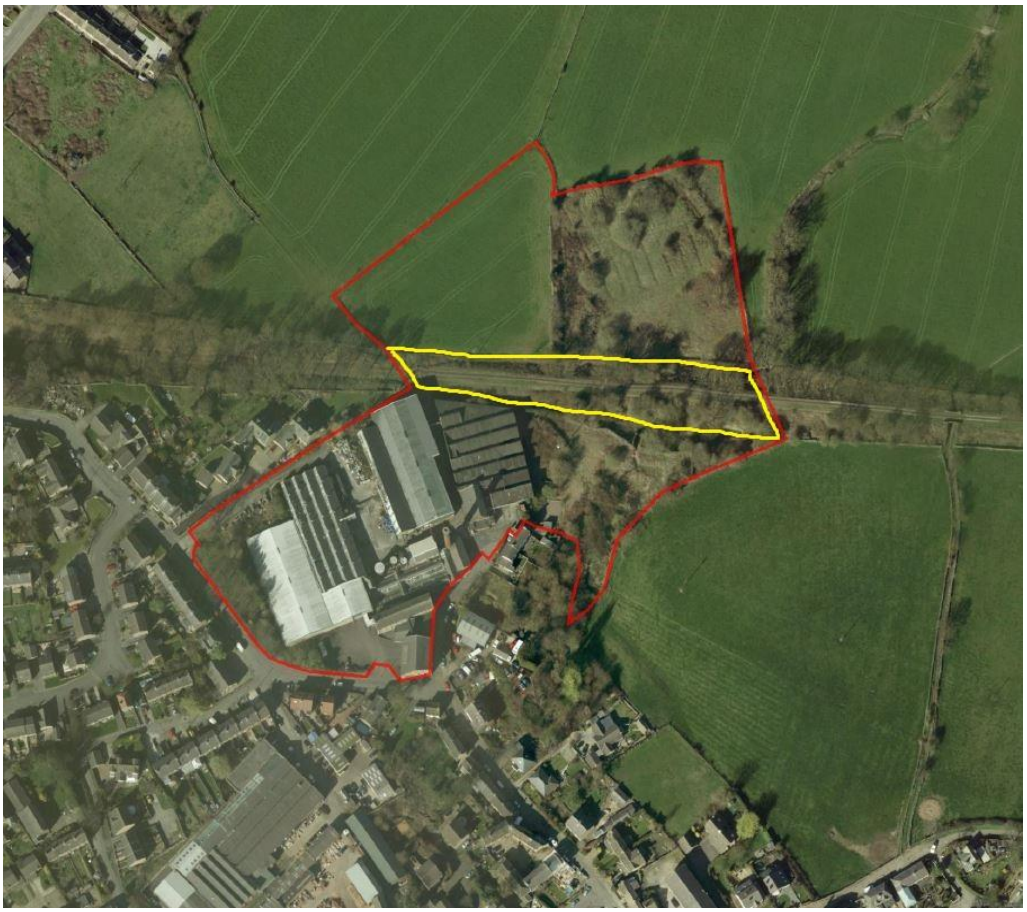

Figure 1: Site Plan (based on the plan in Appendix B)

The Site is dissected by the Kiklees Light Railway (highlighted yellow); to the north of the railway are two distinct open-fields, and to the south is the main Site. Current development on the main Site encompasses a complex of largely single-level traditional mill buildings with north-light style roofs, and two more modern large portal framed steel buildings. A three-storey stone building sits between the two main points of access to the site, at the junction of Saville Road and Marsden Street.

There is a large brick chimney and associated boiler house, with storage tanks/silos positioned adjacent.

A small mill pond sits east of the main complex at the edge of open scrub land belonging to the main Site, which is transversed by overhead telephone lines that extend across the western corner of the north Site.

The Site is largely bounded by residential properties, with a relatively recent residential development at Laurel Bank, to the north west. To the south east there is further housing on Marsden Street, with a vehicle repair garage and MOT station within the row. Open land forming the northern and easterly parts of the site is bounded by further open land.

2.1 Site Walkover Survey

A walkover survey was carried out on the 21st of April 2016 to further understanding of the site's usage and geo-environmental setting, and identify potential contaminant sources.

Limited background information was also available via a representative of the current owner. It is understood that the site has functioned primarily as a textile works for the duration of its existence.

Numbered site-walkover photos are referenced in Table 1, below, and attached in Appendix C.

Table 1: Site Walkover Observations

Photo No.	Site Area	Observations and potential sources
1.	Junction of Saville Rd., Marsden St.	Assumed office building. Visible site incline.
2.	Marsden St.	Motor vehicle repair garage on lower ground than the adjacent site building.
3.	Marsden St.	Gas supply/main.
4.	End of Marsden St.	Electricity substation. No sign of seepage/spillage observed.
5, 6, 7.	As above.	Double-bunded tank. No sign of seepage/spillage observed within outer brick bund. Close proximity of pipe coupling to surface water drainage.
8,9.	Former gas works/gas holder site, Marsden St.	The only remaining above ground infrastructure appears to be a small brick building, but other structures may be hidden by vegetation.
10.	Site road beyond Marsden St.	Surface water drainage and cable/pipe duct.
11a, 11b.	North site. Railway corridor.	Open fields beyond Railway corridor. Kirklees Light Railway replaces the original heavy lines. Vegetation appears healthy.
12, 13.	Saville Rd. entrance.	Buildings - 1861 date stone.
14, 15, 16, 17.	Yard and embankment off Saville Rd.	Shipping container. Sloping embankment parallel to Saville Rd, giving way to a substantial, modern retaining wall. Suggests significant excavation and backfilling – made ground.

18.	As above.	Concrete staircase to ground level from foot of retaining wall.
19, 20, 21.	Rear access lane from Saville Rd.	Small scale storage and burning of waste evident. Possible fly tipping.
22, 23.	Land adjacent to Saville Rd.	Top of embankment and fill behind retaining wall. Grassy scrub; clumpy, uneven surface.
24, 25, 26, 27.	Rear storage area; accessed from Saville Rd.	Storage of discarded equipment: racking; white goods and numerous 1000L bulk chemical containers labelled as acetic acid.
28.	As above.	Mains gas distribution.
29, 30, 31, 32, 33, 34.	Tanks close to chimney/ boilerhouse.	Silos identified in the environmental data report appear to be tanks. No visual or olfactory evidence of gross contamination was observed, and we are advised that these contained water for fire suppression.
35, 36, 37, 38.	As above.	25L container labelled flammable and corrosive. Numerous plastic and metal drums containing rainwater with signs of chemical residues. Blue drums labelled Turpex ACV New. Forklift batteries.
39.	Base of chimney.	As above.
40, 41.	Low level sheds.	Vegetation internally. Discarded drums/containers.
42, 43, 44.	Store-room close to chimney.	Numerous boxes; inks, dyes or similar. Trade names include: Terasil; Avocryl; Astrazon. Some Labelled *hazardous*.
45, 46, 47, 48.	Boilerhouse.	Large tank – possible fuel-oil for boiler. Gas cylinders; small oil containers. A small patch of oily residue was observed in front of the boiler.
48.	As above.	Probable asbestos insulation board ceiling.
49, 50.	West gate.	High point: entrance at far west of Site. View south along Saville Rd.

2.2 Summary of Walkover Findings

Across the site there are a number of both surface drainage features and service ducts that might act as conduits for free-phase contaminants if released previously or during future construction works. The site is largely tarmac surfaced and it is not known whether the tarmac is coal tar or bitumen based.

It is not clear where surface-water drainage discharges to, but it would be expected to be into the pond noted in section 1 and then into the watercourse that crosses the lower-lying open land to the east of the site. This could not be confirmed as there was no access to this area. Lack of access also precluded inspection of other features in this area such as site levels, any indications of made ground or waste, and water quality in the pond. A number of the larger buildings on site were not accessed also.

There were no signs of leakage from the tank and electricity substation at the head of Marsden St.

The motor repair garage and former gasworks (see section 3.2) to its rear are both situated on land topographically lower than buildings on the Site. However, the vegetated area close to the railway is lower than these and so more vulnerable to the impacts of any historical contamination if present.

Enquiries were made with the local authority environmental department, but no knowledge of the former gas works or the circumstances of its removal was forthcoming.

Infill material behind the large retaining structure against Saville Road may consist of reinstated natural material, but equally, may contain potentially contaminated materials deriving from on-site demolition works or imported from elsewhere.

No visual or olfactory evidence of gross contamination was observed on-site. However, numerous open drums/containers were seen to have been overflowing with rainwater. These were mainly blue drums of the type labelled Turpex ACV New, and also 200-litre steel barrels of the kind typically used for fuels/oils/lubricants.

A large number of empty 1000L stillage tanks remain on the Site and appear to have contained acetic acid (80%), although these are largely sealed and were not seen to be filling with rainwater.

The four large tanks identified as silos in section 4.5 are thought to be water tanks associated with the factory's fire suppression system and/or boiler, and appeared free from staining around their concrete bases. Within the boilerhouse a large tank potentially contains oil, but the floor slab appeared free from signs of spillage or staining. Some gas cylinders and smaller oil containers also remain, with minor staining of the slab in places. In front of the boiler itself a small patch of viscous black oily residue was noted.

It is probable that the internal liner board to the roof of the roof in this area is asbestos insulation board (AIB) (the identification of asbestos within buildings is beyond the scope of this report).

Relatively small quantities of chemicals including dyes remain in the stores next to the boilerhouse; some are labelled harmful to the environment.

The railway corridor appears to support healthy vegetation and exhibits no obvious signs of contamination.

3.0 SITE HISTORY

3.0 Historical Maps

Historical Ordnance (OS) Survey map extracts have been examined in order to establish the history and previous usage of the site and surrounding areas. Any evidence of industries or processes taking place on the site, and changes in surface features are noted.

3.0.1 1854 map

The first available map in the OS County Series is dated 1854 and appears to precede the railway line, showing the majority of the present say site as continuous open fields. There would appear to be two small buildings in the area where Marsden Street branches from Saville Road, with the larger of the two in a location that is today hardstanding.

Due to its low resolution, not much more can be discerned from this map image.

3.0.2 1893 map

By 1893, the site is identified as 'Green Side Mills (Fancy Shawls & c.)' and is dissected by the railway corridor. To the south site there are now a range of buildings extending west from Marsden Street, and a linear building approximately central to the site extends toward the railway embankment. The large brick chimney also appears to be depicted in its current location.

'Gas Works' are identified to the east of Marsden Street, with two round objects that appear to be gas holders.

Tenter Croft Mills can also be seen to have appeared around 100m south of the site.

3.0.3 1906 map

This map describes a more extensive Green Side Mills complex, with the main addition being a second large building to the centre of the south site.

A large, roughly triangular 'Reservoir' is also shown to the east of the south site, north of the gas works. Empty space to the north west of the site is used to house the map label indicating the name of the mill (as with the 1893 version). Shading to the outline of this undeveloped area of the site potentially indicates a change (depression) in surface levels.

Off site, Emley Moor Collieries now appears ca. 200m north west of the site.

3.0.4 1913-1916 maps

By 1916, a third large building extends north from building that first appeared on the 1906 map, and the chimney appears to be clearly marked with the label 'Chy.'. The reservoir appearing on the 1906 map is now enlarged, extending in an irregular shape to the rear of the land previously identified as a gas works. The gas works, however, are no longer identified as such (or at all) – this may be due to the mapping dates overlapping with WW1.

Two rectangular features marked 'Resrs' would appear to be further reservoirs, and indeed the larger of the two remains visible today. There appears to be depicted pipe or duct of some kind running from the railway corridor, around the reservoir, south past the gas works and seemingly terminating at an area marked 'Laundry', off Saville Road.

3.0.5 1959 map

The 1959 map shows the enlarged reservoir still in place, with the two rectangular ponds now given the label 'Water'. The suspected pipe/duct shown in the earlier map now appears to have a section removed; a connection to the rectangular reservoirs also appears to be depicted.

Buildings to the centre of the site appear to have been replaced with a single, larger one occupying roughly the same footprint as those in place today. A further building is depicted in the area suspected to be represent a surface depression on earlier maps, with the shading indicative of a change in level now not shown.

A small block of buildings visible since the 1893 map is now depicted as numbers 9 and 11 Saville Road, which are not present today.

3.0.6 1969 map

The Electricity substation close to the end of Marsden Street appears with this edition of the map. A new, significantly larger building replaces the first of the buildings to appear at centre of the site in the 1893 map. This appears to correspond with the footprint of the 'North light' roofed building in place today.

3.0.7 1974, 1978 maps

The 1974 and 1978 maps are of variable quality and no significant changes from the 1969 version are apparent. The north site has not been reproduced on the map, so any possible development in this area is not documented.

3.0.8 1980 map

A tank is depicted at the end of the building close to the rectangular reservoirs. Further shading appears to denote changes in surface level in the area of the reservoirs and the western corner of the site, where previously noted.

The site of the gas works no longer shows any sign of the gas holders, and is labelled 'Gas Distribution Station'.

3.0.9 1987 map

The final large shed (seen with a white roof on modern satellite imagery) appears to be present on the site by 1987, and the properties indicated as numbers 9 and 11 Saville Road have been removed, enabling suitable access. Otherwise the general site layout is much the same as today.

The large irregular shaped reservoir is not shown on the 1987 map, and neither is the smaller of the rectangular ones, indicating these have been infilled; the larger of the square reservoirs remains visible. The previously noted pipe/duct appears to have been reinstated and may be the dike that is in place today.

The railway is clearly marked 'dismantled'.

3.0.10 1989-1990 map

No significant change can be seen on site, and the change of levels is still depicted west of the buildings.

Off site, Tenter Croft Mills is now identified as Skelmanthorpe Business Park.

3.0.11 1992, 1993, 1994, 1995 maps

No significant changes to site layout are evident, but the change of levels is no longer depicted west of buildings.

3.1 Site History Summary

A review of historical maps dating back to 1854 suggests the following:

Some relatively minor development had taken place close to the current site entrance prior to 1854. These largely fit with today's footprint in that area, so are likely to be those standing today.

Railway appears on1893 map, and is clearly marked 'dismantled' by 1987. The current Kirklees Light Railway website[1] confirms the original railway opened in 1879 and that the main traffic on the line was coal from local mines. Coal traffic ceased in 1979 and the railway closed in 1983, with the tracks being removed shortly after.

A gas works was constructed at the boundary of the site between 1854 and 1893. The new map label 'Gas Distribution Station' suggests the gas works was updated between 1978 and 1980, and the lack of the gas holders

[1] http://www.kirkleeslightrailway.com/index.php/about-klr/history

visible suggests these were also removed during this period. Enquiries were made with Kirklees Council during the course of this desktop study, but no information was available regarding the site or its surroundings.

Emley Moor Collieries opened between 1893 and 1906 and was around 200m north west of the site.

The first of the larger, more industrial type buildings and the chimney were constructed between 1854 and 1893, with similar large buildings appearing at intervals up until 1987. The final large 'shed' on the site appears to have been built between 1980 and 1987.

The first significant demolition works took place between 1916 and 1959, with buildings appearing to be replaced by those still in place today. Further demolition appears to have taken place between 1959 and 1969, with the disappearance and replacement of the industrial building that appeared at the centre of the site on the 1893 map.

A reservoir was apparently excavated between 1893 and 1906, then enlarged between 1906 and 1916. Two smaller rectangular reservoirs were also constructed between 1906 and 1916. Significantly, both the larger and the smallest of the three reservoirs appear to have been infilled at some time between 1980 and 1987.

The 1906 map appears to indicate a large area of differing (possibly lower) levels to the west of the site, with the lack of building in this area adding weight to this theory. However, as the site has been further developed, building has also taken place in this area, indicating that construction of the retaining wall and infill works may have taken place as recently as 1987.

There has been an electricity substation on site since at least 1969. A tank has been situated at the end of Marsden Street, close to the reservoirs since at least 1980.

No development appears to have taken place on the site north of the rail line, although this area is obscured on the 1969, 1974, 1978, 1980, 1993, 1995 maps.

4.0 GEO-ENVIRONMENTAL SETTING

4.0 Geology

There is no recorded data for superficial ground/drift geology within 50m buffer of site.

Geological maps indicate the underlying solid bedrock in the vicinity of the site consist of the Pennine Lower Coal Measures formation, typically comprising of mudstone, siltstone and sandstone.

Made Ground

Extensive potentially infilled land is identified to the north and west of the site, as well as within the railway corridor up to the site's boundary. The environmental data report contains seven entries for potentially infilled ponds and reservoirs on site. See Figure 2, below.

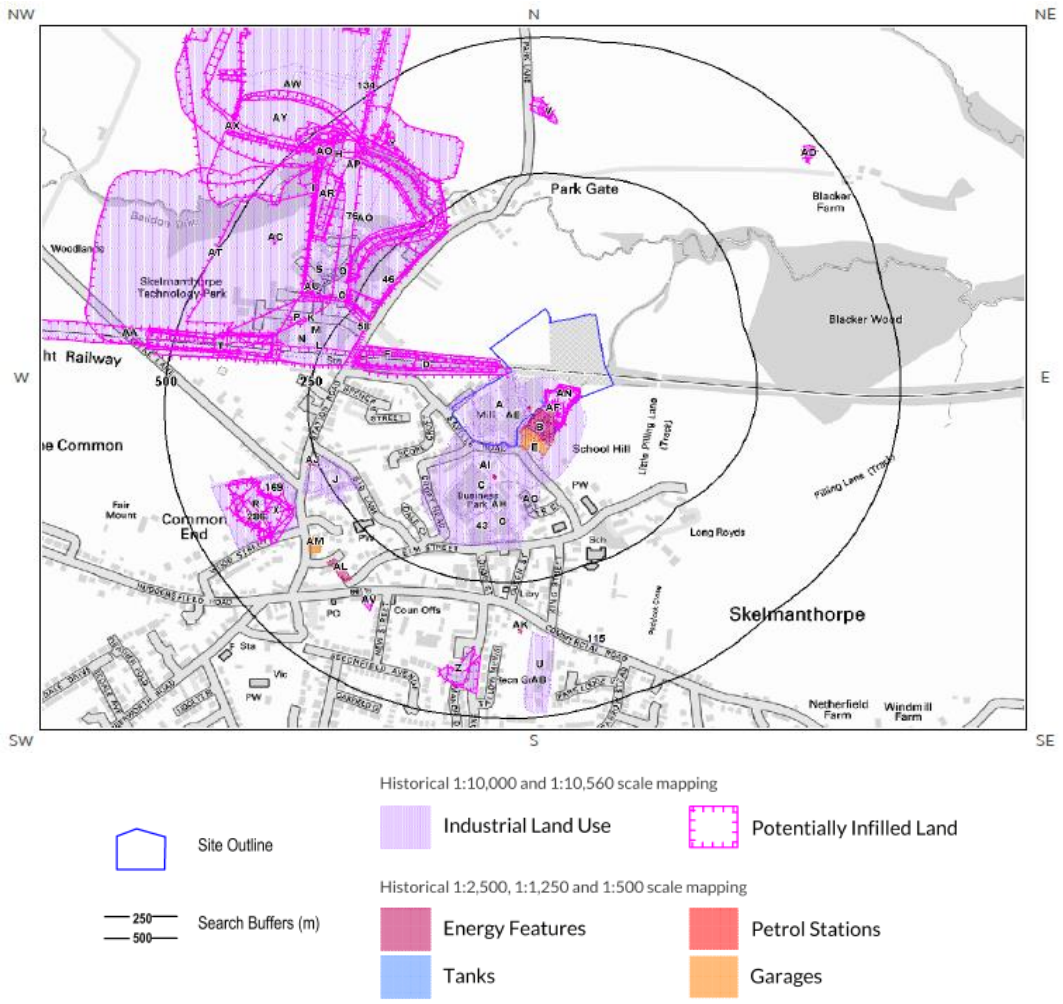

Figure 2: Historical Land Use (original in Appendix A)

Radon

The site is not in a Radon Affected Area. Less than one percent of properties is above the action level set by the Health Protection Agency.

4.1 Hydrogeology & Hydrology

There is no recorded data for superficial (drift) geology in proximity to the site.

Geological records suggest the underlying bedrock deposits are considered to be a Secondary A aquifer (formerly minor aquifer), which are potentially capable of supporting water supplies at a local (rather than strategic) scale, and in some cases an important source of base flow to rivers.

Groundwater Vulnerability and Soil Leaching Potential

Environment Agency data indicate three Soil Vulnerability Categories present on site, as follows:

- HU – Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
- H3 - Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
- L - Soils in which pollutants are unlikely to penetrate the soil layer because either water movement is largely horizontal, or they have the ability to attenuate diffuse pollutants.

Abstraction Licenses and Source Protection Zones

- Three active (and 22 historical) Groundwater Abstraction Licenses within 2000m of the site (Farming & Domestic use); the closest active one being some 1809m away
- One Potable Water Abstraction License ca. 260m south of the site
- No Surface Water Abstraction Licenses within 2000m of the site
- No Source Protection Zones indicated within 500m of the site

Surface Waters

A surface water course designated a Tertiary River runs from the vicinity of the main Site entrance at Saville Road, along the edge of the site, though the open scrub land toward the rail line. The culverted section of the watercourse beneath the rail line is designated a Secondary River. This merges with Baildon Dike (designated a Primary River) at ca. 100m north east of the site boundary.

The mill pond noted in section1 is likely to be in connectivity and overflow into the stream/ditch noted above.

No Environment Agency river quality data are available for within 1500m of the site.

Flooding

The site does not lie in the fluvial or tidal indicative floodplain of any local rivers. As indicated by the Environment Agency's Risk of Flooding from Rivers and the Sea (RoFRaS) database, the site is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

The site is within 50m of BGS groundwater flooding susceptibility areas, with potential susceptibility to Clearwater Flooding (associated with unconfined aquifers) at the land's surface indicated. Based on the amount and precision of information used in this assessment, relative confidence in the susceptibility result is given as Low.

4.2 Ecology & Designated Environmentally Sensitive Sites

The majority of the site is hardstanding, but the limited areas of vegetation appear healthy.

There are no Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Ancient Woodlands, Records of Local Nature Reserves (LNR), World Heritage Sites, Environmentally Sensitive Areas, Areas of Outstanding Natural Beauty (AONB), National Parks (NPs), or Nitrate Sensitive Areas are recorded within 2000m of the Site.

There are two recorded Nitrate Vulnerable Zones on the Site.

4.3 Local Authority Information & Hazardous Substances

Current Environmental Permits recorded within 500m of the site:

- Small waste oil burner permit held by Nick Ryden Motor Engineers, 87m south of the site. No enforcements notified.

Current Licensed Discharge Consents recorded within 500m of the site:

- Sewer storm overflow (sewage discharges) held by water company.

Environment Agency Recorded Pollution Incidents within 1500m of the site:

- Eight incidents recorded between June 2001 – March 2002. All are recorded as Impact Category 3 (Minor) for Water, and Impact Category 4 (No Impact) for both Land and Air.

  Of these, incidents 4B and 5B are recorded as occurring 236m north west of the site and describe contaminated mine water.

Environment Agency landfill data within 1500m of the study site:

- Six recorded, all as waste type *inert commercial* or *inert commercial, industrial*
- Two of these are within 500m, but more than 250m south west of the site
- One is at 989m south west of the site
- The remaining three are at more than 1300m from the Site.

Records of potentially contaminative industrial sites within 250m of the study site:

- Vehicle repair and servicing recorded as ‘on site’ (close to the site’s boundary with Marsden Street)
- On site silo at NGR 423361, 410924 with the recorded category Farming
- On site electricity Sub Station at NGR 423411, 410941 (at the head of Marsden Street)
- Gas distribution station at NGR 423437, 410906 (on Marsden Street, partially encircled by the site)
- Electricity Sub Station at NGR 423345, 410824 (51m from the site)
- Vehicle repair and servicing at Skelmanthorpe Business Park (87 m from the site)
- Further general industrial/commercial (99m or more from the site)

5.0 PRELIMINARY RISK ASSESSMENT

5.0 Source - Pathway - Receptor Methodology

The preceding information is assessed in terms of whether a viable pathway exists by which a receptor may be exposed to or come into contact with any contaminant sources that are potentially on or around the Site. This preliminary risk assessment (PRA) is based on the proposed residential end use of the site.

5.1 Potential Contaminant Sources

Potential key contaminant sources identified during the above review:

On-Site

- Chemicals associated with textile works and dye works, including:
  - Metals and semi-metals: arsenic, cadmium, chromium, copper, mercury, zinc;
  - Inorganics: nitrates, sulfate, boron, asbestos, pH;
  - Organics: phenol, propanone, total petroleum hydrocarbons (TPHs), chlorinated aliphatic hydrocarbons, dieldrin, PCBs;
- Made ground in open land immediately south of the railway corridor, where much of the ground has been excavated for use as reservoirs and subsequently infilled again.
- The remaining reservoir may act as a settlement pond/interceptor for surface water and process water drainage from the site, and so may contain contaminated water and/or sediment. The same may be true of the now infilled reservoirs;
- Tarmac on-site could be coal-tar based and if so present a source of polycyclic aromatic hydrocarbons (PAHs).
- Any infill material behind the retaining structure is also of unknown origin, although these works may have been carried out as recently 1987;
- Hydrocarbon contamination within the vicinity of the boilerhouse, fuel storage and parking areas;
- Ash and clinker from original coal-fired boiler;
- Contamination from other unknown uses of the site.

Off-Site

- Significant areas of infilled ground identified to the north west of the site (where minor pollution incidents have been recorded) and along the railway corridor up to the site boundary;
- Historical landfills;
- Contaminants associated with railway sidings and the transport of coal, including:
  - PAHs, chlorinated aliphatic hydrocarbons, PCBs, arsenic, cadmium, chromium, copper, lead, nickel, vanadium, sulfate, asbestos;
- Former gas works site east of (and partly encircled by) the site;
- Industrial activities close to the site, such as motor vehicle repairs.

5.2 Potential Pathways

The following are identified as pathways by which potential contaminant sources could come into contact with receptors relevant to the proposed use of the site:

- Incidental ingestion of contaminated soil
- Consumption of home-grown vegetables and soil attached to vegetables
- Dermal uptake
- Inhalation and ingestion of dust
- Inhalation of vapours/gases
- Leaching/migration of soluble contaminants
- Migration and accumulation of potentially explosive gases in confined spaces
- Direct contact with buried structures and services

5.3 Relevant Receptors

- Human health
  - Site occupants
  - Construction workers
  - Adjoining site users and occupants
- Water environment
  - Groundwater
  - Surface waters
- Ecosystems
- Buildings/Infrastructure

6.0 SITE CONCEPTUAL MODEL

Potential contaminant sources, and relevant pathways and receptors are recorded and assessed within the preliminary site conceptual model (CM), below.

Table 2: Site Conceptual Model

Source	Pathway	Receptor	Consequence	Probability	Risk
Possible organic, inorganic and metal contaminants on and off-site associated with made ground, industrial and railway land-use	Particulate inhalation / dermal contact / ingestion / vapour inhalation	Site occupants, Users	Medium	Likely	Moderate Risk
		Construction workers	Medium	Likely	Moderate Risk
		Adjoining site users	Mild	Low likelihood	Low Risk
	Consumption of home-grown produce Infiltration of plastic potable water pipes	Site Occupants	Medium	Low likelihood	Moderate/Low Risk
Possible perched groundwater and leachable contaminants associated with made ground, industrial and railway land-use	Infiltration, surface runoff, leaching and lateral migration of contaminants	Groundwater (Secondary A Aquifer), Surface waters, Ecosystems	Medium	Likely	Moderate Risk
	From off-site	Site occupants, Users	Medium	Likely	Moderate Risk
Ground gas generation	Migration through strata or structures, subsequent inhalation/explosion	Site occupants, Users	Severe	Unlikely	Moderate/Low Risk
		Construction workers	Severe	Unlikely	Moderate/Low Risk
Sulphate impacted groundwater, pH	Contact with aggressive ground, chemical attack	Site buildings, services, concrete, iron and steel	Mild	Low likelihood	Low Risk
	Phytotoxicity, increased solubility/mobility of metals	Plants, Landscaped areas	Mild	Likely	Moderate/Low Risk

7.0 SUMMARY OF SITE RISKS AND RECOMMENDATIONS

7.0 Summary of Geo-Environmental Findings

Given the long term history of the site, its surrounds and the known areas of made ground, this preliminary risk assessment suggests there is significant potential for the existence of contamination which may affect receptors relevant to the proposed sensitive end use of the site (residential).

The site is thought to overlie a Secondary A aquifer, and there is a potable water abstraction licence 260m south east of the site. Soil leaching potential and groundwater vulnerability is thought to range from Low, to High.

7.1 Recommendations

A phase 2 intrusive ground contamination investigation should be carried out establish the levels of any contaminants. Quantitative risk assessment should be carried out based on the findings of the investigation in order to evaluate the potentially significant pollutant linkages identified in this report.

These findings should be considered together with those of the coal mining risk assessment commissioned separately by the client.

End of report.

APPENDIX A – GROUNDSURE ENVIRONMENTAL DATA REPORT

Attached with email.

APPENDIX B – LAND REGISTRY TITLE PLAN

APPENDIX C – WALKOVER SURVEY PHOTOS

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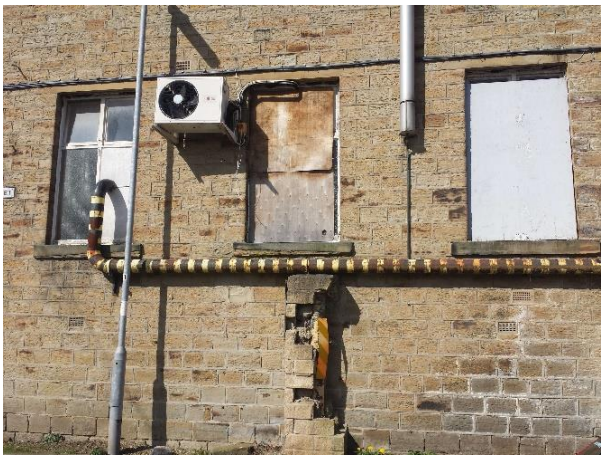

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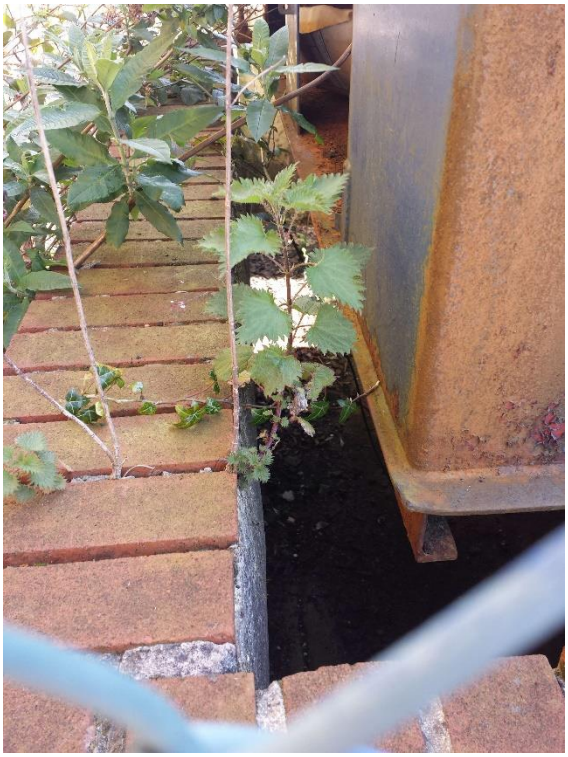

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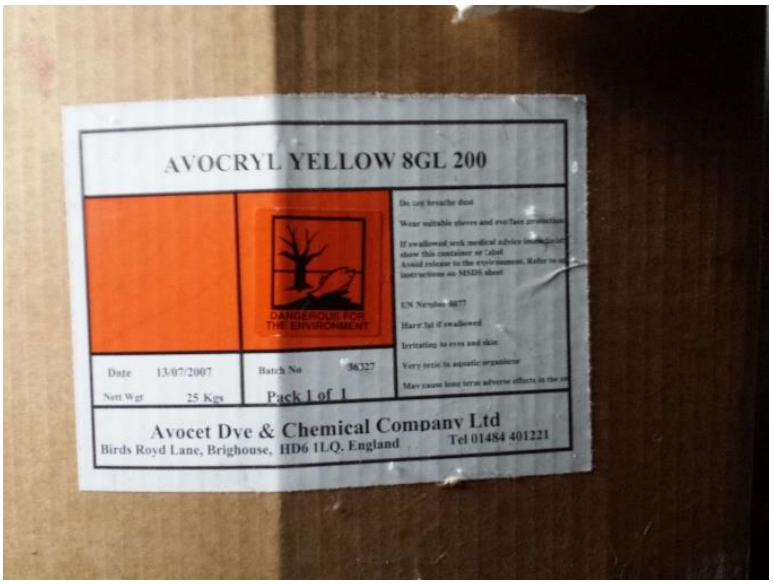
AVOCRYL YELLOW 8GL 200
DANGEROUS FOR THE ENVIRONMENT
Date 13/07/2007
Batch No 36327
Nett Wgt 25 Kgs
Pack 1 of 1
Avocet Dye & Chemical Company Ltd
Birds Royd Lane, Brighouse, HD6 1LQ. England
Tel 01484 401221

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Astrazon® Yellow 7GLL 200%
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Astrazon® Giallo 7GLL 200%
01802910
PE50153
30
kg

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