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Appendix A

Table A Risk Assessment/Conceptual Model

Location Plan

Photographs

GroundSure Report

GeolInsight

EnviroInsight

Historical Plans

Coal Authority Report

Appendix B

Location of Trial Pits and Boreholes

Trial Pit Logs

Borehole Log

Chemical Analysis Data

Assessment Criteria – Open Space and Parks

Table 3 Revised of Table A

Phase 1 – Desktop Investigation

1 Introduction

- 1.1 The site is situated 3 kilometres west of the centre of Oldham and north of Middleton Road (A669). Approximate grid reference is SD 888 063.
- 1.2 The proposed development is a single storey entrance building.

2 Documents on File

- 2.1 Geological Plan – 1:63,360 No 85 Solid and Drift
- 2.2 Groundsure Report – Ref EMS 262521 – dated 5 August 2014.
- 2.3 Coal Authority Mining Report Ref 51000605498001 dated 5 August 2014.
- 2.4 Planning Consent AA/335465/14 dated 29 July 2014.

3 Site Geology

- 3.1 Published geological plans of the area show superficial deposits consisting of glacio fluvial deposits overlying sandstones, shales and productive coal seams of the Lower Coal Measures.
- 3.2 The thickness of the superficial deposit is not recorded.
- 3.3 The Coal Authority Coal Mining Report states that ‘the property is not within the zone of likely physical influence on the surface from past underground workings.’

4 History of Site

4.1 The following is a summary of the history of the site based on the enclosed historical maps.

Date	Scale	Observations
1851	1:10,560	The site is in a rural setting to the east of the Lancashire and Yorkshire Railway line embankment. The River Irk runs west to east just to the north and the Rochdale Canal crosses Middleton Road (West) to the south east of the site.
1891 1893	1: 10,560 1:2,500	No changes apparent
1907 1909	1:10,560 1:2,500	No changes apparent within the site but an area of landfill is shown to the SE between the site and the canal
1916 1923 1922	1:10,560 1:10,560 1:2,500	An L shaped building is shown just to the south of the site and a terrace of seven houses have been built on Middleton Road. The land to the south of the site and north of Middleton Road is now shown to be a refuse heap by reference to the map legend. It is encroaching onto the site.
1932 1938 1932	1:10,560 1:10,560 1:2,500	Some additional buildings to the south of the site and the 'refuse heap' has spread onto the western half of the site and to the north of the site.
1959 1953/54	1:10,560 1:2,500	The 'refuse heap' has now spread onto the eastern part of the site. A line of electricity pylons is now shown running north/south along the eastern boundary of the site.
1967/75	1:10,560	The 'refuse heap' is now shown to cover the whole of the site and to the north of it
1982 1989	1:10,560 1:1,250	No significant changes shown with the site but the land between the site and the terraced houses on Middleton Road is now shown to be Allotment Gardens
2002	1:10,000	The site is now marked as a Depot.
2010 2014	1:10,000 1:10,000	Two buildings now shown within the site

5 Environmental Setting

5.1 The following is a summary of observations made on data from the GroundSure report and elsewhere.

Subject	Observations	Risk
Air Pollution Controls	None within 250m of the site	Low
Contaminated Land Register under Part IIA EPA 1990	None within 500m of the site	Low
Licensed Discharge Consents	None within 500m of the site	Low
Enforcement and Prohibition Notices	None within 50m of the site	Low
Intergrated Pollution Control (IPC)	None within 450m of the site	Low
Nearest Surface Water Feature	The River irk runs West to East just north of the site	Low
Pollution Incidents to Controlled Waters	None within 500m of the site	Low
Registered Radioactive Substances	None within 500m of the site	Low
Water Abstractions	None within 300m of the site	Low
Groundwater Vulnerability	Secondary (A) Aquifer beneath the site	Moderate
Floodplain	The site is not within a flood plain	Low
Registered Landfill sites	On site – operator Chadderton UDC	Low
Licensed Waste Management Facility	None within 1000m of the site	Low
Planning Hazardous Substance Consents	None within 500m of the site	Low
Radon	No structural precautions are necessary to counter the effect of Radon gas	Low
Subject	Observations	Risk

Coal Mining	See Sction3 of this report	Low
Artificial Ground	Registered landfill within the site	Low
Landslips	Natural hazard to the north of the site	High
Surface workings	None recorded	Low
Borehole record	All to the north of the River Irk	
Environmentally Sensitive sites	The site is within a Nitrate Vulnerable Zone and the Rochdale Canal is classed locally as a Site of Special Scientific Interest and a Conservation Area	Low

6 Risk Assessment

- 6.1 The historical plans of the area and the data summarised in Chapter 5 Environmental Settings suggests that the site is in a potentially contaminated setting.
- 6.2 There is evidence of imported made ground at the site dating from the early 1900s.
- 6.3 An intrusive ground investigation is necessary to determine the nature of the imported made ground at the site and its extent.
- 6.3 In Table A we have tabulated an assessment/conceptual model based on our knowledge of the site history.

7 Ground Investigation

- 7.1 Two trial pits (TP1 and TP2) were excavated using a mechanical excavator. Tirial pit logs are appended.

- 7.2 TP1 proved ash to a depth in excess of 2.4metres.

TP2 proved made ground consisting of clay and ash with setts, pieces of concrete and sandstone blocks.

These findings are consistent with the historical records that up until 1970s the site was a Council Depot with an associated landfill operation.

- 7.3 A percussion borehole (BH1) was drilled near the centre of the footprint of the proposed building.

This borehole has proved a 7.8m of made ground (loose to medium/dense mixture of ash, setts, concrete and sandstone pieces with clayey zones).

From 7.8m to 13.0m the borehole proved a dry medium/dense and dense sand and gravel stratum (Glacial Gravel).

- 7.3 The borehole was converted into a gas monitoring well with a response zone from 2m to 8m below ground level.

8 Recommendations for Foundation Design

- 8.1 The made ground proved at the site could be very variable and consequently there is a risk of structural damage to the proposed building if it is supported on conventional foundations placed at shallow depth below ground level.

We therefore recommend that one of the following options be considered as a foundation solution.

- 8.1.1 Use vibrocompaction techniques to improve the physical properties of the made ground at the site.

Contractors who specialise in this technique should be consulted to determine whether their particular system is suitable for the ground conditions proved at the site.

If vibro techniques can be adopted then the structure can be supported on conventional pad or strip footings founded in the improved made ground. The made ground may also support the ground floor without the need to suspend the floor using reinforced concrete.

- 8.1.2 Support the structure on reinforced concrete ground beams that are, in turn, supported on piled foundations founded in the medium/dense glacial sand and gravel.

Either bored or driven piles can be adopted and specialist piling contractors should be consulted to determine whether their particular piling system is suitable for the ground conditions at this site.

- 8.2 We recommend that the made ground be assigned to a Design Sulphate Class of DS-1 for the insitu concrete specification.

9 Chemical Tests and Interpretation of Data

- 9.1 The proposed developments in an Open Space or Park setting with no planned areas of soft landscape. The external area if a car park or an access road. As the Assessment Criteria for Parks reflects a move sensitive land use we have opted to use the assessment criteria for Parks for this exercise. In addition we have addressed the potential phytotoxicity of the made ground – the risk of harm to plants.

Proposed Park Use

- 9.2 Two of the four samples gave elevated criteria are appended (Table 1)
- 9.3 Three samples gave elevated concentration of benzo (a) pyrene 46-140 mg/kg compared to the Assessment Value f 3.5 mg/kg. None of the samples gave elevated concentrations for other PAH's.

Phytotoxicity

- 9.4 Three samples elevated concentrations of Copper, Lead and Zinc when compared to the phytotoxicity assessment levels.

This has no direct relevance at this site as no soft landscape areas are planned for this scheme.

10 Recommendations for Foundation Design

10.1 Human Health

The made ground at the site contains some elevated concentrations of metals and benzo (a) pyrene. There are no proposed areas of soft landscape for this scheme. Outside the building the hard surfaces are hard standing, car parking and access roads. We consider this to be sufficient to mitigate any potential risk to staff and visitors to the site.

Ground workers at the site should take what is now considered to be good proactice and refrain from smoking, wash their hands and face before eating and drinking and must wear gloves when handling soil.

10.2 Plant

There is no soft landscape at the site.

If in future soft landscape is to be adopted then we recommend that the made ground be replaced with imported growing medium to a depth of 600mm for shrubs and a 1000mm cube for any small trees. The imported material should be topsoil with a certified conformity to BS 3882:2007.

10.3 **Ground Gases**

To be confirmed

Signed



Aled Owen
Director

