

**PROPOSED RESIDENTIAL DEVELOPMENT
ON LAND AT DOVEHOUSE CLOSE
WHITEFIELDS, BURY M45 7PE**

MAY 2023

GEO-ENVIRONMENTAL DESK STUDY REPORT

2304/1921



DOCUMENT STATUS

Site Reference	LAND ADJACENT TO No 11 DOVEHOUSE CLOSE
Title	Geo-Environmental Desk Study Report
Client	Mr Khawaja
Project No.	2304/1921
Report Version	Final Issue
Date Issued	13th May 2023
Issue Notes	Issued for comment and approval.
Report Version	
Date Issued	
Issue Notes	
Report Version	
Date Issued	
Issue Notes	
Report Version	
Date Issued	
Issue Notes	
Report Version	
Date Issued	
Issue Notes	

TABLE OF CONTENTS

1.0 INTRODUCTION

- 1.1 Instructions
- 1.2 Object
- 1.3 Development Proposals

2.0 THE SITE

- 2.1 Location
- 2.2 Walkover Survey
- 2.3 Desk Study

3.0 REVIEW OF GEO-ENVIRONMENTAL RISK

- 3.1 Introduction
- 3.2 Potential Sources of Contamination
- 3.3 Pathway for Migration
- 3.4 Potential Receptors
- 3.5 Assessment of Plausible Pollutant Linkages

4.0 PRELIMINARY GEOTECHNICAL ASSESSMENT

- 4.1 Details of the Site
- 4.2 Geotechnical Hazards & Foundation Considerations
- 4.3 Drainage

5.0 PROPOSED GROUND INVESTIGATIONS

- 5.1 Ground Investigation

LIST OF TABLES

Table 1	Statutory Receptors & Pathways
Table 2	Preliminary Conceptual Model
Table 3	Anticipated Ground Conditions
Table 4	Summary of Potential Geotechnical Hazards

LIST OF DRAWINGS IN APPENDIX 1

21/082-6

LIST OF APPENDICES

Appendix 1	Proposed Site Layout Plan
Appendix 2	Photographs of the Site
Appendix 3	Geological Details of the Site
Appendix 4	Coal Mining Details of the Site
Appendix 5	Groundsure Report
Appendix 6	1- 2,500 Maps
Appendix 7	1/10,000 Maps

GEO-ENVIRONMENTAL DESK STUDY

Land at Dovehouse Close

Whitefields, Bury M45 7PE

1.0 INTRODUCTION

1.1 Instructions

- 1.1.1 We are instructed by Mr Khawaja, and the planning agent, Mr. Hildreth to undertake a geo-environmental desk study at a site located at Dovehouse Close, Whitefields, Bury M45 7PE. The client intends to develop the site by building a detached house. The site is located on the corner of the close and immediately to the north is a house and garden off Ringley Drive. To the east is a set of steps to Ringley Drive from Dovehouse Close which is a public footpath. Refer to the plans in appendix 1.
- 1.1.2 The Planning Authority have requested a contaminated land audit for the site and if contamination is deemed to exist on site, then a remediation strategy is to be prepared. From the site walkover and the research no contaminative use has been found on the land or in the vicinity of the site. The surrounding area has been developed for housing over the past 150 years with most of it being built over the past 50 years. There is a school to the east of the site, a park to the south and a place of worship to the east. The apartments and the place of worship have been built in the floor of the sand quarry that appears to have been worked from 1845 to 1932. Refer to the figures in this report which are of the historical maps and the photographs in appendix 2 and the Grounsure Report in appendices 5, 6 and 7.
- 1.1.3 The site was visited on the 1st May 2023 and a walkover has revealed that other than a few bricks and some plastic bags there is no other sign of contamination on the site. The site consists of the remnant face of an old sand quarry that has now become covered with soil and semi mature trees as the face has regenerated. Dovehouse Close is where the quarry has been developed for housing at the level of the quarry floor and the land rises to the level of Dove House that is shown on the 1845 map. The height difference is 8 metres.

1.2 Object

- 1.2.1 This environmental and contamination desk top assessment has been carried out in accordance with principle recommendations of BS10175 : 2011 + A2 : 2017 'Investigation of potentially contaminated sites' with regard to the consideration of potential soil and ground water contamination along with the generation and migration of toxic and explosive gases. It is intended that the report be submitted to the local planning authority with a preliminary risk assessment in support of a planning application to build the house at the above address. This report has been prepared to document the following:
- Review of readily available published data which can provide information on the current status of ground conditions and site history;
 - Findings of preliminary contaminated land risk assessment;
 - Findings of preliminary geo technical risk assessment.
- 1.2.2 The desk top report has looked at the geology of the site, the past coal mining from Agecroft Colliery, the boreholes to ascertain the thickness of the superficial deposits over

the bedrock and assess the risk of contamination and geotechnical instability on the site. The bedrock is covered with 78 metres of sand and gravel so there are no shallow workings in the area so the site should not be in a high risk referral area.

1.3 Development Proposals

1.3.1 The undersigned engineer visited the above property on the 1st of May 2023 and we understand that it is the client's intention to build a house on the land that is vacant adjacent to the public footpath and the road. The property is a detached house that will require the sand face to be excavated in sections and the footpath steps, and land to the north where the public footpath runs to Ringley Drive, to be supported by a retaining wall that will be between 4 and 8 metres high.

2.0 THE SITE

2.1 Location

2.1.1 The site is roughly square in shape with the northwest corner cut off and is situated on the northern side of Dovehouse Close. The site is situated at approximate National Grid Reference SD 79973 05523 within a predominantly residential area. The site location is shown in figure 1 below.



Figure 2023-1 Site Location

2.2 Walkover Survey

- 2.2.1 As part of the Geo-Environmental Desk Study the undersigned engineer visited the site to conduct a walkover survey. This walkover survey included the site area, the substation land, the garden area of the neighbouring house, the boundaries of the site, the surrounding properties and roads and an inspection of the surrounding housing stock. The walkover has confirmed that the site comprises of remnant quarry face with a single residential property with a large garden area to the north with a drive to Ringley Drive and minor landscaped and hard standing areas at the front. The land falls gently from the roadside to the rear boundary fence of the neighbouring house. Dove House is also present on the earliest map and the footpath used to form the path from the house to Sand Hole and Park Lane along the northern boundary of the sand pit. This has enabled location of the application site to be confirmed with Dove House as a land mark on the maps. Refer to the photographs in appendix 2.
- 2.2.2 During the site walkover no visual signs of olfactory contamination were identified. Semi mature trees have been identified within the site and adjacent to the southern boundary. The face is 8 metres high from Dovehouse Close and is the remnant of the sand pit worked between 1840 and 1932.
- 2.2.3 There is no evidence of contamination on site and the ground is sand and gravel. The Groundsure report in appendix 5 has confirmed that there is no industrial use near the site other the historical use of the area as a sand pit.

2.3 Desk Study

- 2.3.1 We have undertaken an appraisal of the history of the site and its immediate vicinity. Details of the historical records are shown in figures 2 – 4 below which are a summary of the Groundsure Report, reference number GS-IA3-819-QIG-QWV in appendices 5 to 7 that provide details on the land use over the past 170 years.

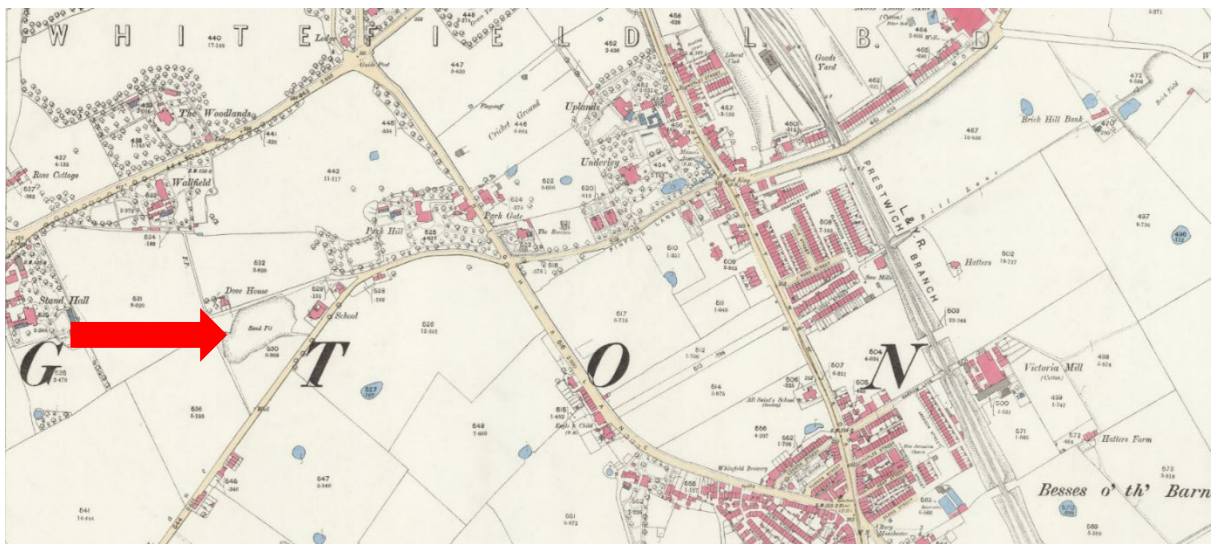


Figure 2 – 1888 – 1913

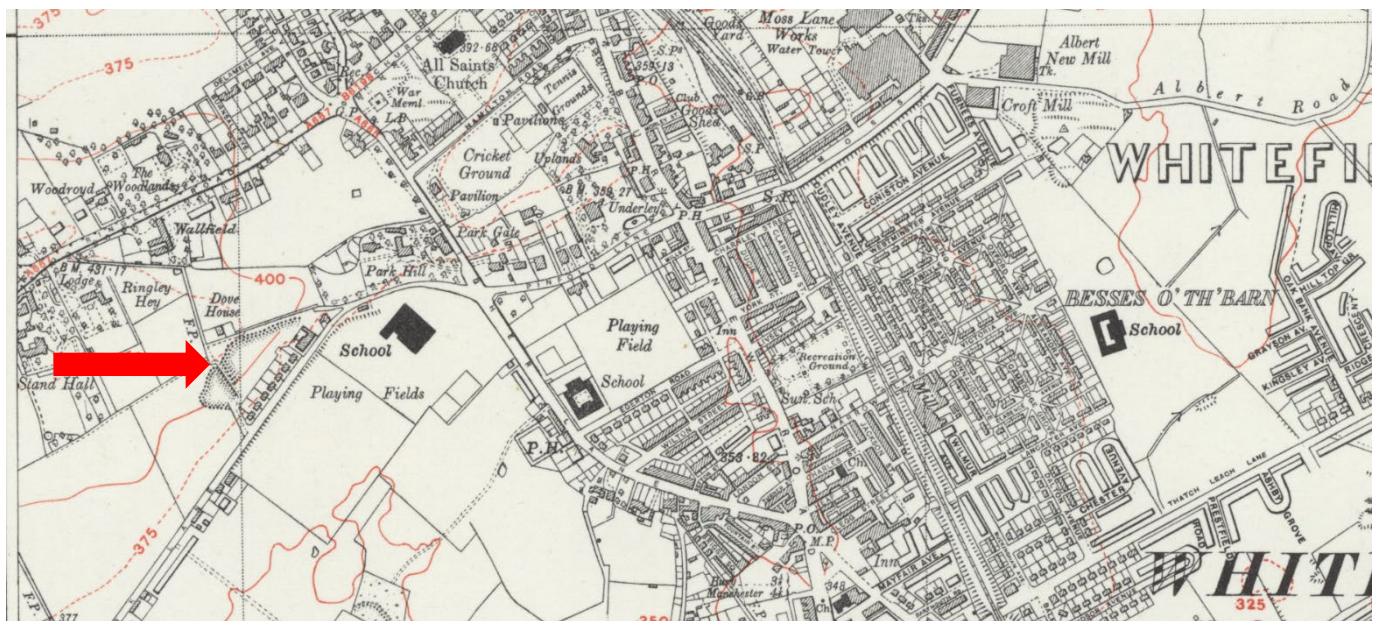
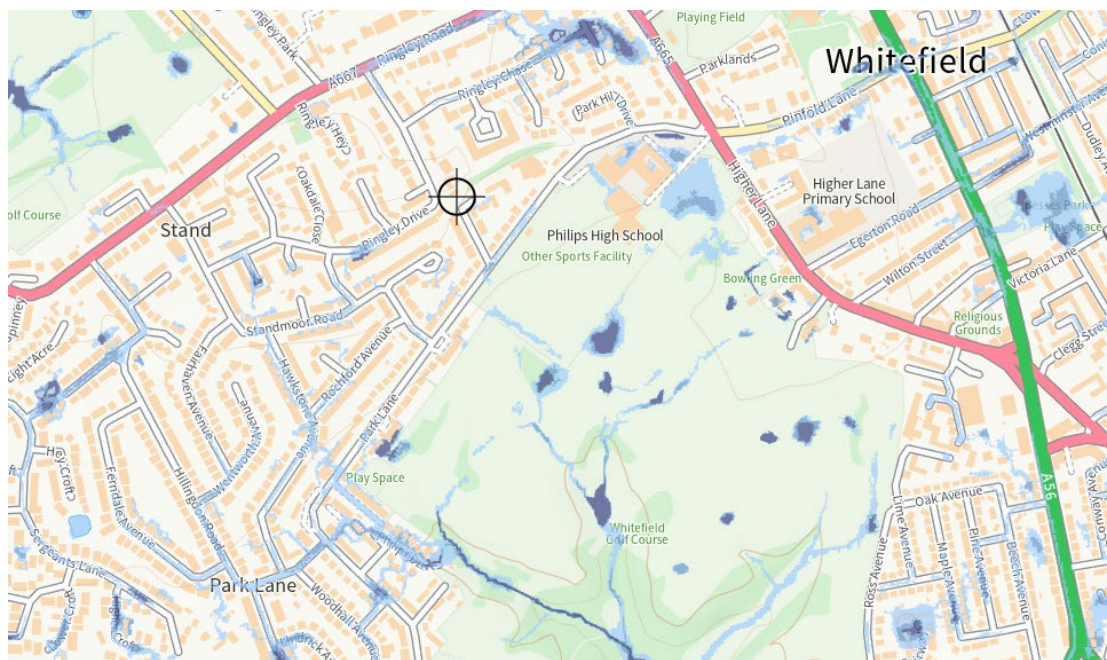


Figure 3 – 1937 – 1961



Figure 4 – 2017

- 2.3.2 Reference to the historical Ordnance Survey maps in appendix 7 from 1852 to 1967 have indicated that the site has remained as agricultural land and a sand pit up until the early 1930's, and once the quarry was worked out in the 1930's the base of the quarry has been used for development of apartments on Dovehouse Close, refer to figure 1.
- 2.3.3 Careful examination of the surrounding features indicated upon the historical maps has identified any significant features which may represent an important or potentially hazardous environmental impact upon the current site or its future residential redevelopment. There have been no contaminative uses near to the property.
- 2.3.4 Reference to the Environment Agency website confirms that there are no recorded landfill sites lying within a buffer zone of 250m. The site is not considered to be at risk of migrating toxic and explosive gases generated from nearby landfills. The nearest landfill to the site is 3.8 kilometres to the north east at Pilsworth on the eastside of the M66 and is operated by Viridor.
- 2.3.5 The Environment Agency website has confirmed the site is not located within 250m of any flood warning area, ground water source protection zones or any pollution incidents.

**Figure 5 – flood risk from surface water**

- 2.3.6 The geology of the site is presented by the British Geological Survey on the sheet for Manchester which is number 85. The superficial and bedrock maps have been examined and the maps indicate that the superficial deposits within this area comprise of glacial deposits of sand and gravel which consist of predominately glacio fluvial deposits that between 116,000 and 11,000 years old. The bedrock material below the site is indicated to comprise of Pennine Middle coal measures which consist of alternating mudstone, siltstones, sandstones and thin coal seams. There are two sandstone beds, the Newton Heath sandstone and the Nob End Rock. Refer to the information in appendix 3 and pages 69 and 70 of the Groundsure report in appendix 5.

- 2.3.7 The site is located just outside or on the boundary of the Coal Authority High Risk Referral reporting area and therefore a report has been prepared for the coal mining risk assessment for this site. The Coal Authority Interactive map has indicated the potential for potential shallow coal mine workings below the site. The borehole records for the site have been examined and there is 30 metres of glacial deposits for a water borehole for the golf club located to the north of the site. In the park to the south a borehole was drilled to prove coal reserves for Agecroft Colliery in 1968 and 252 feet, 78 metres of drift was found lying over the coal measures. There is no risk of mining subsidence from the past workings at Agecroft Colliery due to there being 78 metres of superficial sand and clay covering the bedrock. Refer to borehole reference SE70 NE 70. There is also no risk of unrecorded shallow working in the outcrops of coal in the bedrock as the depth is over 30 metres. Refer to the information in appendix 4.
- 2.3.8 The conclusion of the research is that there has been coal mining beneath the subject land and as there is a significant depth of drift there is no risk of mining subsidence in the future and therefore there **will not** be a requirement to carry out intrusive investigations to determine the presence or absence of shallow coal mine workings below the site.

3.0 REVIEW OF GEO-ENVIRONMENTAL RISK

3.1 Introduction

- 3.1.1 This section of the report is aimed at identifying possible risks, if any, arising from substances used or deposited on site or from other sources of land contamination. Both past and current potentially contaminative land uses have been considered.
- 3.1.2 The risk assessment uses a source-pathway-receptor methodology for assessing whether a source of contamination could potentially lead to harmful consequences. This requires that there be a pollutant linkage from source to receptor for harm to be caused. The source-pathway-receptor methodology relationship allows an assessment of the environmental risk to be determined based upon the nature of the source, the degree of exposure of the receptor of the source and the sensitivity of the receptor.

Table 1 : Statutory Receptors & Pathways

Target (Receptor)	Potential Source – Pathway Linkage
Site Users / Residents	Inhalation of soil gas, odours or dust. Ingestion of, and skin contact with, contaminated soil. Ingestion of contaminants in vegetables etc. or in soils adhering to vegetable etc.
Construction / Maintenance Workers	Inhalation of soil gas, odours or dust. Ingestion of, and skin contact with, contaminated soil.
Plants	Adverse effects on growth caused by presence of contaminants in soil.
Buildings & Structures	Flow of ground gas into buildings. Asphyxiation, toxicity, explosion & fire hazards. Sulphate attack of foundations. Hydrocarbons penetration plastic water supply pipes.
Groundwater	Migration of soluble contaminants into groundwater on/off site. Migration of oils into groundwater on/off site.
Surface water	Migration of soluble contaminants and/or direct run off of contaminants. Migration of oils into groundwater on/off site.

- 3.1.3 A conceptual model of plausible pollutant linkages has been formulated for the site in accordance with the risk assessment approach applied to contaminated land assessment.

3.2 Potential Sources of Contamination

- 3.2.1 The historical Ordnance Survey maps have not indicated any significant features or sources of contamination within the site, the previous land use of the site being a sand pit before the land was built on, the agricultural land around the site that was eventually built on and golf course has not indicated any further potentially contaminative influences. Refer to appendices 6 and 7.
- 3.2.2 Further afield it is clear the land was used for a sand pit until the 1930's and then housing from 1930 with the development alongside Park Lane as ribbon development and then the base of the quarry was developed with the apartments on Dovehouse Close.
- 3.2.3 To the south the land has been used for a park since the 1930's and farmland before that. The likelihood of widespread soil contamination is expected to be very low due to previous mineral extraction, agricultural land usage and residential development since the 1930's.
- 3.2.4 The developer will be careful with the excavation of the sand from the site and will assess the material within the site as it could have been used to tip construction waste when the apartment blocks on Dovehouse Close were built.
- 3.2.5 The desk study information has not identified any viable sources of ground gases within the site from coal mining or landfill nor have there being such uses within close proximity of the site. It is considered that there is no requirement for a programme of ground gas monitoring so no boreholes are required on site.
- 3.2.6 There is no source of contamination on site, and it can only be introduced through building the property. As most of the materials are for construction then the properties are inert or not a risk to human health so it is unlikely that contamination will be introduced to the site.

3.3 Pathway for Migration

- 3.3.1 It is recognised that the migration pathways could change during the development of the site. These pathways are summarised below:-
- Migration of contamination (if present) via the un/saturated zones;
 - Migration of contamination (if present) via buried services and foundations;
 - Run-off from adjacent site areas;
 - Migration of ground gas via soil pores;
 - Direct contact with contaminated materials.
- 3.3.2 It is plausible that there are pathways associated with the presence of both on site and off site contamination. The above list recognises that the new development may not affect certain migration pathways such as migration in the saturated zone from an offsite source but could create new pathways such as the presence of services and foundations.
- 3.3.3 It is anticipated that, if a potential risk is identified, it can be reduced to an acceptable level by using a combination of mitigation measures during construction and in the building design. Site workers may be exposed to bare ground and existing building

fabrics when clearing and redeveloping this site. Precautions should be taken to reduce the risks associated with these pathways including the adoption of personnel protective equipment (PPE), being rigorous in matters of personnel hygiene and adopting safe practices for workers entering enclosed underground cavities. Environmental management practices should be implemented to prevent potential impact associated with dust generation and dispersion and surface water run-off for example.

3.4 Potential Receptors

3.4.1 The principal receptors are considered to be as follows:-

- Humans – future site users;
- Humans – construction and maintenance workers;
- Controlled waters;
- Building structures and services.

3.5 Assessment of Plausible Pollutant Linkages

3.5.1 The overall risk associated with future site users of the house and garden is considered to be negligible to very low as no source of contamination has been identified.

3.5.2 Contamination is not expected at this site, nevertheless site workers should adopt a precautionary approach in respect of potential land contamination. On the basis of the current assessment that there is no contamination and recommendations from the investigation of the source pathway receptor, the overall risk to site workers is considered to be low.

3.5.3 The nearest water course is the River Irwell which is 1.3 kilometres to the north which is fed by the overflows from the reservoirs and run off from the Pennines. The overall risk associated with the water environment is considered to be low on surface water flow in this area. The road gullies and surface water runoff from the existing housing stock will be to a combined sewer. The property can be connected to the combined sewer for the foul water and to a sustainable drain for rainwater disposal from site. The presence of permeable glacial sand and gravel and clay till deposits overlying coal measures mudstone beneath the property suggests a low potential risk to groundwater from the past use or the proposal.

3.5.4 Careful assessment of all currently available information has enabled a preliminary conceptual model to be prepared and this is detailed in table 2 below:

Table 2 : Preliminary Conceptual Model

Potential Source	Potential Receptor	Possible Pathway	Probability	Consequence	Risk	Mitigation / Investigation
Contaminated Soils	Site personnel during construction	Direct contact of soils	Lw	Mi	Low	Soil sampling during intrusive investigations.
		Inhalation or ingestion of soil / dust				
	Future site users	Direct contact of soils	Lw	Mr	Very Low	
		Inhalation or ingestion of soil / dust				
	Surface water in the vicinity of the site	Leaching of contaminants through drainage system	Lw	Mi	Low	

	Ground water in aquifer	Leaching of contaminants to ground water	UI	Md	Low	Laboratory analysis of samples
	Future site users	Vapour migration from soils	Lw	Mr	Very Low	
	Proposed buildings and services	Direct contact with contaminated soils	Lw	Mi	Low	
	Plants in gardens and soft landscaping	Direct contact	Lw	Mi	Low	
Contaminated ground water	Site personnel during construction	Water entering excavations	Lw	Mi	Low	Sampling of ground water (where encountered)
	Future site Users	Retained surface water	Lw	Mi	Low	
Toxic and explosive gasses	Proposed buildings and occupiers	Ground gas migration into buildings	UI	Md	Low	CS1 (NHBC Green)
Shallow Coal Mine Workings	Proposed buildings and occupiers	Minor ground movements	UI	Md	Low	No shallow coal mine workings investigations not required
Key: Sv = Severe, Md = Medium, Mi = Mild, Mr = Minor Hi = High, Li = Likely, Lw = Low Likelihood, UI = Unlikely						

3.5.6 In this qualitative risk assessment a low risk implies that remedial action is unlikely to be necessary at the site in relation to ground contamination. No site investigation for coal mine workings is required due to the underlying drift glacio fluvial deposits beneath the property. There are no shallow workings and the coal mining was undertaken at depth from Agecroft Colliery that closed in 1992 after having been reopened by the NCB in 1951.

4.0 **PRELIMINARY GEOTECHNICAL ASSESSMENT**

4.1 **Details of the Site**

4.1.1 The site is currently neighbouring land that is in residential use and has previously been used as a sand pit until exhausted in the 1930's. It is clear the site is unlikely to contain any areas of made ground and the natural strata is likely to be immediately underlying the surface topsoil on the slope and behind the stone wall. The only made ground will be from the building of the apartments if the material was placed adjacent to the public footpath. The apartments appear to have been built in 1987.

4.1.2 It is likely that the rebuilding of the house will require the following stages:-

- Provision of foundations typically extending to depths of some 0.9m below ground level onto competent ground.
- Construction of drainage and highways;
- Construction of the residential property;
- Preparation of soft landscaped areas, flagged area and the drive;
- Possible boundary walls at the entrance to the site;
- Localised reprofiling of the topography in the footprint to facilitate the development.

4.2 **Geotechnical Hazards & Foundation Considerations**

4.2.1 Based upon the information available to this desk study the anticipated ground conditions present within this site are outlined in table 3 below:-

Table 3: Anticipated Ground Conditions

Ground Material	Anticipated Condition
Made Ground	Localised areas of made ground present below the existing quarry floor level.
Glacial Till deposits	Deposits comprising of sand and gravel with interspersed lenses and bands of silt and clay in the sand and gravel.
Bedrock	Lower Pennine Coal Measures comprising of alternating sandstones, siltstones, mudstones and coal seams. Potential shallow coal mine workings have been discounted after examination of the land use as there is 78 metres of drift glacial deposits.
Groundwater	Natural groundwater is expected to lie at depth within the drift as there are extractions of water for the golf club nearby. Excavations and low lying areas are likely to be subject to surface water retention due to the possible low permeability of soils within the glacio fluvial deposits.

It is not deemed to be essential for intrusive ground investigation works to be undertaken to confirm that the anticipated ground conditions are an accurate reflection of the true ground conditions which they have proven to be from the development of the apartment blocks on the floor of the sand pit.

4.2.2 A summary of potential geo-technical hazards is detailed within table 4 below:-

Table 4 : Summary of Potential Geotechnical Hazards

<i>Hazard Category (excluding contamination issues)</i>	<i>Hazard Status</i>	<i>Engineering Considerations</i>
Highly compressible / low bearing capacity soils (including peat / soft clays)	Possible	• Cohesive deposits
Ground subject to or at risk of landslides	Likely	• No significant slopes identified within the site but they will be formed when the property is developed
High ground water table	Unlikely	• Unproductive superficial deposits and groundwater table is below the site level.
Surface water retention	Likely	• Impermeable superficial deposits around Park Lane but the site is free draining
Surface water run off	Likely	• Permeable surface so rainwater can go to soakaway.
Mining	Unlikely	• Intrusive investigations are not required as there are no coal mine workings that are considered to be shallow.
Volume change potential of soils	Unlikely	• Gravel and sand as superficial deposits
Adverse ground chemistry	Unlikely	• Localised made ground below the existing site is unlikely as the site is a quarry face.
Live services	Present	• Private services associated with the existing residential properties but not within the site. Substation nearby.

- 4.2.3 It is anticipated that the ground conditions present within this site may be conducive to the adoption of a shallow spread type foundation to residential structures constructed within this footprint area. It is possible that increased foundation depths and specialist precautions may be required in those areas where existing trees are present or where neighbouring trees lie in close proximity to the proposed structure. The engineering properties of the strata within the site should be assessed during the intrusive phase of investigations when digging foundations. The property is being built within the footprint of the quarry face and can use strip foundation and oversite concrete floors.
- 4.2.4 Whilst the presence of significant thicknesses of made ground is not anticipated to be present within this site, the slope of the remnant face will have to be cut back to a steep angle whilst the retaining wall is built. The retaining wall can be built in sections as the sand is removed. The floors for the house can be floated concrete with insulation and underfloor heating if so required contained within the structural walls.
- 4.2.5 A Coal Authority report has identified the potential for shallow coal mine workings below the site but has not considered the considerable thickness of the drift deposits in the area. Further investigation of the mining history of Agecroft Colliery has found that it is extremely unlikely that any coal mining at depth within the proximity of the application will cause a risk of mining subsidence as the last working was in 1966. The 78 metres of sand and gravel will protect the infrastructure, houses and land in the Whitefields Area of Bury and Manchester.

4.3 Drainage

- 4.3.1 The geological information relating to this site suggests that the superficial strata is sand and gravel deposits which comprise of beds of fluvial formations and are considered effectively permeable. Based upon the currently available information it is considered possible that ground conditions present within this site are conducive to the adoption of a ground infiltration method of surface water disposal. The site does have a connection

to the sewers in Dovehouse Close and the house will be connected into the same system as the apartments.

5.0 PROPOSED GROUND INVESTIGATIONS

5.1 Ground Investigation

- 5.1.1 Following the assessment of the site and Desk Study information we have not identified any significant source of contamination from previous land uses and from reviewing the surrounding land uses there is no source of contamination or risk of migration. The site was initially used as agricultural land up to 1840, then as a sand pit for the local area and market until 1930. The site was redeveloped in the early 1930's on the side of Park Lane and in the 1970's for the place of worship and the apartments. The site has remained as a remnant face near to residential use in a similar layout until the present date. The site walkover has not identified any visual sources or signs of contamination.
- 5.1.2 It is not anticipated that deposits of made ground may be present below the existing quarry floor and the site will be covered by the proposed residential development and therefore it is considered that there is no potential pathways for contamination for long term end users of the site. There is no source of contamination therefore we consider that there is no requirement for intrusive investigations within the development in relation to contamination.
- 5.1.3 During the investigation no suspicious or contaminated ground has been identified and if it is during the stripping of vegetation and the excavation of the sand the appropriate regulatory authority will be notified. All construction workers adopt appropriate PPE and maintain personal hygiene. The excavation of the sand will be assessed in the same way any excavation is investigated whether in a quarry or a civil engineering project.
- 5.1.4 The desk study information identified the potential for shallow coal mine workings below the site as the referral area is just to the south of the application area. and Further investigation to determine the presence or absence of shallow coal mine workings has been undertaken and there is no shallow coal mine workings or bedrock as the superficial deposits are 78 metres thick below the site.

Signed for and on behalf of
CROMWELL WOOD ESTATE COMPANY LIMITED



John Carlton B.Eng(Hons) C.Eng, C.Env, MRICS, MIMMM, MCInstCES

LIMITS OF LIABILITY

Cromwell Wood Estate Company Limited has produced this report on Dovehouse Close solely for the use of the client and his professional advisor on matters appertaining to the design of a single detached dwelling and submission to the planning authority for planning permission. Both the findings and opinions expressed within the report are relevant to the period of site visit and data supplied; they therefore should not be relied upon at a later date exceeding 12 months from the date of this report unless discussed with the engineer who has signed the report below. No part of report may re-produced or relied upon by any third party who may subsequently advise the client or undertake his own investigation without the prior written consent of the Cromwell Wood Estate Company Limited. It is recommended that any other potential interested party consult with the writer of this report prior to undertaking work or obtain their own report as the contents of this report cannot be relied upon for any other use of the property as it is for the client's use named on the front of the report.

