

GEOENVIRONMENTAL APPRAISAL
of land at
Park Avenue, Cleadon, South Shields
Client: **Bellway Homes.**

REPORT NO. D6135/1
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APPENDICES

Appendix A - Drawings

Drawing Number	Drawing Title
D6135/01	Site Location Plan
D6135/02	Exploratory Hole Location Plan
D6135/03	Conceptual Site Model

Appendix B - Photographs

Appendix C - Desk Study Information

Appendix D - Exploratory Hole Records

Appendix E - Chemical Testing Results

Appendix F - Geotechnical Testing Results

Appendix G - Gas Risk Assessment

Appendix H - Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract

1 INTRODUCTION

1.1 Scope of Investigation

Dunelm Geotechnical and Environmental Limited (Dunelm) carried out a Geoenvironmental Appraisal of land at Park Avenue, Cleadon, South Shields on behalf of Bellway Homes NE.

It is proposed to develop the site with residential properties.

Dunelm have previously produced a Preliminary Geoenvironmental Appraisal Report (Ref D3319/1) dated March 2011 for land located to the west of the site.

The objectives of this exploratory phase of investigation were as follows:

- To determine the land use history of the site
- To determine the environmental setting of the site
- To determine whether past mining may have had an influence on the site based on information from the previous investigation
- To assess risks from ground contamination
- To provide recommendations for foundations
- To assess the ground gas regime at the site from previous investigation data

This report may be regarded as providing a Preliminary Risk Assessment and Generic Quantitative Risk Assessment in accordance with the Environment Agency's guidance document Model Procedures for the Management of Land Contamination (Contaminated Land Report 11, 2004).

Conditions of offer and notes on limitations relevant to all Dunelm geoenvironmental investigations are described in Appendix H and should be read in conjunction with this report.

2 SITE RECONNAISSANCE

2.1 General

The centre of the site is located at OS Grid Ref 437913, 563904. The site is situated approximately 3km south of South Shields town centre. The site location is shown in Drawing Number D6135/01 in Appendix A to this report.

The preliminary site inspection was undertaken during March 2014 and site photographs are presented in Appendix B.

2.2 Topography and Site Features

The site is a relatively flat parcel of land located off Park Avenue previously used for housing. The site is currently disused and is covered with rough grass and tarmac hardstanding. A number of trees are present around the site.

3 SITE HISTORY

Extracts from historical Ordnance Survey (OS) plans have been examined in order to determine the history of the site; copies of these plans are provided in Appendix C.

A summary of the history of the on-site and off-site features is presented below. It is not the intention of this report to describe in detail all the changes that have occurred on or adjacent to the site, only those pertinent to the site.

Summary of Historical Information

OS Map Edition	On-site Features	Off-site Features
1855	Site is an undeveloped field.	Old quarry and Cleadon Quarry mapped 300m east of the site. Old quarry mapped 375m south east of the site.
1857	No significant change.	Site is surrounded by undeveloped fields. Cleadon Park and associated pond located 100m northeast of the site.
1895	No significant change.	Cleadon pumping station and reservoir 700m south east of the site.
1896 - 1897	No significant change.	No significant change.
1914 - 1915	No significant change.	No significant change.
1921	No significant change.	Cleadon quarry to east now shown to be disused, old quarry to east no longer mapped.
1938	No significant change.	Various residential developments surrounding the site.
1942	Residential properties located on northern part site.	Residential developments surrounding the site to north south and west. School and associated playing fields to the east of the site.
1950	No significant change.	Cleadon quarry now shown as Cleadon Park.
1955 - 1958	Several small buildings shown in the south west of the site.	No significant change.
1967 - 1968	No significant change.	No significant change.
1968	No significant change.	No significant change.
1974	No significant change.	Pumping works and reservoir to the south east no longer shown.
1985	Buildings shown to occupy the entire site.	No significant change.
2002	No significant change.	School replaced by housing.
2012	Buildings in the north of the site no longer shown. Building (nursery) in the south of the site – now no longer on site.	No significant change.

4 ENVIRONMENTAL SETTING

4.1 Information Sources

The environmental setting of the site was determined through reference to the following:

- British Geological Survey (BGS) 1: 50,000 scale sheet No 21 Sunderland
- British Geological Survey (BGS) 1: 10,000 scale sheet NZ36SE
- BRE Publication BR211 Radon: Guidance on Protective Measures for New Dwellings

The following were referenced from the previous investigation (D2428/1)

- Coal Mining Report from David Bellis Associates (based on data obtained from the Coal Authority)
- GroundSure Report (including historical map extracts)

4.2 Geology

The site is underlain by glacial clay.

The solid geology underlying the site comprises Lower Magnesian Limestone.

The geological plan shows the Usworth seam present to the west of the site's eastern boundary. The Hebburn Fell seam is also located west of the site. Both seams dip to the west away from the site. Information from the geological plan indicates a dip of 3°.

An area of made ground is shown on the geological plan approximately 450m west of the site.

No faults are shown in the vicinity of the site.

No significant ground hazards have been identified by the British Geological Survey as reported in the GroundSure Report.

4.3 Mining & Quarrying

The mining report indicates that land directly north of the site may be underlain by workings in six coal seams, the shallowest being the Yard Seam at a depth of approximately 298m below ground level. Based on the geological plan, it is expected that the worked seams also underlie this site.

Based on the geological plans of the site, the shallowest coal seam is expected to be the Ryhope Five Quarter seam. This seam is likely to be present below the site at a depth of >100m. In view of the, unrecorded workings within this seam would not be considered to pose a significant risk.

The mining report for the site to the north indicates that there are no recorded mine entries within 20m of the land located directly north of the site. No collieries or mine entries are known of on this site, from an inspection of historical plans.

No evidence has been found to suggest that the site has been affected by quarrying.

4.4 Hydrology

There are no surface water features in the vicinity of the site.

There are no surface water abstractions within 750m of the site.

There are no recorded discharge consents within 200m of the site.

There are no recorded pollution incidents within 100m of the site.

The site is not recorded as being situated within a zone of flooding.

4.5 Hydrogeology

Using the Environment Agency's Policy and Practice for the Protection of Groundwater the solid geology beneath the site is classified as a Principal Aquifer. Principal aquifers are highly permeable formations that are able to support large abstractions for public supply and other purposes.

The site lies within a Zone 2 source protection zone.

There are no recorded groundwater abstractions within 750m of the site.

4.6 Landfills and other Potential Gas Sources

The GroundSure Report indicates that there are a number of recorded landfill sites in the vicinity of the site as listed below:

- Temple Memorial Park 1 - 354m west of the site (437000, 563700). License: 05.10.77 – 31.03.94. Waste types include inert, industrial, commercial and household.
- Temple Park 2 – 354m west of the site (437000, 563700). License: 23.02.83 – 31.03.94. Waste types include inert, industrial and commercial.
- Cleadon Park Quarry, Cleadon 442m east of the site (438500, 563900). Waste types include inert, industrial, and commercial.

Requests have been made to the Local Authority (South Tyneside Council) for further information relating to the landfill 350m west of the site. A gas risk assessment of the landfill was provided for review (Ref C2621/4093/APC/APC dated 23rd June 2010). The assessment included gas monitoring results from monitoring wells located within the landfill. The following results were recorded for the exploratory holes nearest to the site.

Monitoring points	Gas concentrations recorded (% v/v)		Flow rates recorded (litre/hour)
	Methane	Carbon Dioxide	
Temple Memorial Park Landfill	ND – 74.0	ND – 27.0	ND – 6.7

As shown, elevated carbon dioxide and methane were detected within the landfill. Gas monitoring along the boundary of the landfill adjacent to the road separating the landfill from the site indicates elevated methane above 0.5% in two of the six positions. Raised carbon dioxide levels were recorded in all of the positions with flow rates generally absent.

4.7 Radon Gas

In accordance with the procedure described in BRE Publication BR211 *Radon: Guidance on Protective Measures for New Dwellings*, no radon protection measures are required for new buildings on the site.

5 PREVIOUS INVESTIGATION

Dunelm have examined the following reports: Geoenvironmental Appraisal Report D3319 March 2011, ref D3319. A summary of the works undertaken is shown in the Table below together with the main findings.

Item	Scope of works	Main findings
Review of desk study information	Historical plans / Groundsure Report	Significant points: former residential housing on site. Landfill to west of site.
Trial pits	Total number:18 Depths: 2.7m bgl	Made ground: 0.25-1.3 – Predominantly cohesive Natural ground: Firm and Stiff clays
Window sample boreholes	Total number:2 Depths: 3.35m bgl	Made ground: 0.25-1.3 – Predominantly cohesive Natural ground: Firm and Stiff clays
Monitoring wells	Number:2 In BHs	Response zones in: made ground / natural
Gas Monitoring	Monitoring period: 6 visits over 5 months Atmospheric pressure range: 1006 to 1033mb.	Max. CO ₂ value:1.1 Max. methane value: <0.1 Max gas flow: 1.0
Chemical testing	Inorganic / organics	Topsoil contains elevated lead, phytotoxic zinc and localised PAH.

Gas monitoring data from the above has been incorporated in to this report.

6 SITE WORKS AND LABORATORY TESTING

6.1 Conceptual Site Model

A preliminary conceptual site model, including an assessment of potential pollutant linkages, has been determined based on the desk study information presented above.

The site has been occupied previously and it is possible that contamination is present associated with the site's previous use however, no specific potential contaminants have been identified associated with the former uses. The main receptors include future site residents and the underlying Principal Aquifer.

6.2 Summary of Investigation

The exploratory holes listed below were advanced during March 2014. Records for each of the exploratory holes noted are included in Appendix D and the locations are shown on Drawing Number D6139/02 in Appendix A.

- Trial pits TP1 to TP11

6.3 Chemical Testing

Appropriate samples were delivered to a suitably accredited laboratory with a schedule of testing drawn up

by Dunelm. The laboratory test results are presented in Appendix E to this report and discussed in Section 7.

6.4 Geotechnical Testing

Samples of natural soil were delivered to a geotechnical laboratory with a schedule of testing drawn up by Dunelm. The geotechnical laboratory test results are presented in Appendix F to this report. Material properties assessed using the results are considered further in the following Section.

7 GROUND CONDITIONS & MATERIAL PROPERTIES

7.1 General

Strata encountered were generally similar beneath all parts of the site and, are similar to ground conditions encountered during the previous investigation of the adjacent site to the west. Ground conditions are described in the following sections.

7.2 Topsoil

Topsoil was encountered within several of the exploratory holes, predominantly in the south of the site. The topsoil ranged from 0.25m to 0.4m bgl and contained plastic, brick, ceramics, metal and glass.

7.3 Made Ground

Made ground was encountered in all exploratory positions to depths of between 0.3m and 0.8m bgl. The made ground generally comprised sandy gravelly clay with brick, clinker, tile, glass, metal and plastic.

Granular made ground was encountered within TP1 to a depth of 0.65m and included concrete, brick, glass and metal.

7.4 Natural Soils

The natural soils at the site consisted of firm and stiff clays encountered to depths between 2.50m and in excess of 3.40m. Discontinuous clayey sands were encountered within TP4, TP5, TP8 and TP11.

Moisture content testing within the clay recorded values between 14% and 20% with plasticity indices ranging from 16 to 23 indicating low to intermediate plasticity clay with low to medium volume change potential.

7.5 Rock Head

Rockhead was not encountered during this investigation.

7.6 Excavation Stability

During excavation of the trial pits, the side walls were observed to be generally stable.

7.7 Groundwater

Groundwater was encountered as seepages within four of the exploratory holes at depths of between 0.55m and 1.0m.

7.8 Hydrocarbon Contamination

A slight organic odour was noted in TP3 at 0.5mbgl.

7.9 Concrete in Aggressive Ground

To enable buried concrete to be designed to resist sulfate attack, samples of made ground and natural strata from depths corresponding to the anticipated foundation depth have been tested for water-soluble sulfate and pH.

The test results (with the exception of TP4) indicate the maximum water-soluble sulfate concentration is

240mg/l and the lowest recorded pH value is 7.9.

Based on the above results, Design Sulfate Class DS-1 and ACEC Classification AC-1 would be appropriate for buried concrete at the site. However, a raised sulphate level of 1700mg/l was recorded within TP4 in the made ground and a higher concrete classification of Design Sulfate Class DS-3 and ACEC Classification AC-3 would be appropriate for concrete in contact with this material.

7.10 Soakaway Tests

In view of the underlying geology, on site soakaway tests were not undertaken due to the relatively impermeable nature of the clay.

8 CHEMICAL TESTING RESULTS

8.1 Selection of Chemical Testing

This section represents the 'Hazard Identification' process required in accordance with CLR11. Laboratory test certificates are presented in Appendix E to this report. The test results are presented in the following sections.

8.2 Generic Assessment Criteria for Inorganic Contamination

Generic Assessment Criteria (GAC) appropriate to current UK practice for the assessment of inorganic contamination are shown in the table below. These criteria are dependent on the nature of the proposed development. In addition, some contaminants depend on other soil parameters as shown.

Generic Assessment Criteria for Human Health

<i>All values in mg/kg</i>	Residential (based on 1% SOM)	Residential (based on 6% SOM)	Residential without homegrown produce (both 1%&6% SOM)	Commercial (both 1%&6% SOM)
Arsenic (inorganic)	32	32	35	640
Cadmium	10	10	83.6	230
Chromium VI	14.2	14.5	38.2	330
Copper	3970	4020	8370	109000
Lead	276	342	383	6490
Mercury	170	170	238	3600
Nickel	130	130	130	1,800
Selenium	350	350	595	13,000
Zinc	16900	17200	46800	<1000000

Soil Screening Values in *italic* are from Atkins ATRISKSOIL database, all other figures are Environment Agency Soil Guideline Values

Generic Assessment Criteria for Phytotoxic Effects on Plants

Contaminant	Maximum Permissible Concentration from MAFF <i>The Soil Code</i> (1998) (mg/kg)
Copper (soil pH 5.5-6.0)	100
Copper (soil pH 6.0-7.0)	135
Zinc (soil pH 5.0-7.0)	200
Zinc (soil pH >7.0 & CaCO ₃ > 5%)	300

8.3 Topsoil

A summary of the results of inorganic testing on topsoil samples is shown in the table below.

Inorganic Test Results - Topsoil

Contaminant	Units	No. of topsoil samples tested	No. of samples exceeding GAC	Generic Assessment Criteria	Max concentration
pH	-	2	0	pH <5	Min pH 7.8
Arsenic	mg/kg	2	0	32	15
Cadmium	mg/kg	2	0	10	1.2
Chromium (Total)	mg/kg	2	2	14.7	64
Chromium (VI)	mg/kg	2	0	14.7	<1.0
Lead	mg/kg	2	0	276	190
Mercury	mg/kg	2	0	170	0.24
Nickel	mg/kg	2	0	130	49
Selenium	mg/kg	2	0	350	0.7
Copper (GAC from MAFF)	mg/kg	2	2	135	240
Zinc (GAC from MAFF)	mg/kg	2	1	300	660
Asbestos	-	2	0	Present	None Detected

* The values in the Atkins ATRISKSIL database

An initial assessment based on the above results indicated that the topsoil contained elevated concentrations of total chromium in both of the samples.

DEFRA Publication *Contaminants in Soil: Collation of Toxicological Data and Intake Values for Humans – Chromium* (2002) states (section 5.18) that:

‘it is expected that much of the chromium present in the soil will be as Cr(III) rather than Cr(VI). Therefore, in applying this health criteria value to land contamination it is important to obtain information on the oxidation state of chromium in the soil’. The report also notes that it can be difficult to determine whether chromium present in the soil will be as Cr(III) rather than Cr(VI).

Additional testing has been carried out on all samples to determine the concentration of chromium VI. The results show that no concentrations of chromium (VI) in excess of the detection limit (1 mg/kg) were recorded. It is therefore concluded that the total chromium concentration determined for the soil is likely to represent chromium III.

The topsoil also contained elevated levels of phytotoxic copper and zinc however, it should be noted that this is only elevated in relation to plant growth and is not a risk to human health.

8.4 Made Ground (Inorganic Contaminants)

A summary of the results of inorganic testing on made ground samples is shown in the table below.

Inorganic Test Results – Made Ground

Contaminant	Units	No. of made ground samples tested	No. of samples exceeding GAC	Generic Assessment Criteria	Max concentration
pH	-	3	0	<5	Min pH 7.9
Arsenic	mg/kg	3	0	32	11
Cadmium	mg/kg	3	0	10	1.1
Chromium (VI)	mg/kg	3	0	14.7	<0.1
Lead	mg/kg	3	0	276	210
Mercury	mg/kg	3	0	170	0.17
Nickel	mg/kg	3	0	130	30
Selenium	mg/kg	3	0	350	0.7
Copper	mg/kg	3	0	109000	68
Zinc	mg/kg	3	0	917000	260
Asbestos	-	3	0	Present	None Detected

All values from Atkins ATRISKSOIL database

All of the other samples tested fall below the relevant guideline values for a residential with plant uptake enduse.

8.5 Asbestos Testing

Asbestos was not detected in the samples where tested.

8.6 Organic Contamination

The selection of hydrocarbon (organic) testing was based on the conceptual model and the assessment of potential contamination sources presented in earlier sections of this report.

Analysis for organic determinands has been carried out in general accordance with the EA Report *The UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils* (2005). Consequently, one sample of made ground which exhibited an organic odour was tested for the following:

- 13 petroleum hydrocarbon fractions based on the methodology of the United States Total Petroleum Hydrocarbon Criteria Working Group (TPHCWG)

Results for the 13 petroleum hydrocarbon fractions are presented in the table below together with appropriate generic assessment criteria.

Summary of Results for Petroleum Hydrocarbon Fractions

EC bands	Aromatic fractions							Aliphatic fractions					
	5-7	7-8	8-10	10-12	12-16	16-21	21-35	5-6	6-8	8-10	10-12	12-16	16-35
GAC (resi with plants) mg/kg	65	120	27	69	140	250	890	30	73	19	93	740	45000
GAC (allot) mg/kg	13	22	8.6	13	23	46	370	740	2300	320	2200	11000	260000
GAC (comm) mg/kg	28000	59000	3700	17000	36000	28000	28000	3400	8300	2100	10000	61000	1600000
Sample location & depth (m bgl)	Recorded concentrations (mg/kg) - exceedances in bold												
TP3 0.50	<0.01	<0.01	<0.01	<0.9	<0.5	4.0	28	<0.01	<0.01	<0.01	<1.5	<1.2	23.7

All values from LQM/CIEH Generic Assessment Criteria 2nd Edition. Threshold based on 1% SOM

The above assessment of the 13 petroleum hydrocarbon fractions indicates that no significant TPH concentrations have been recorded during this investigation in the samples tested.

Samples of topsoil and made ground were tested for selected polynuclear aromatic hydrocarbon (PAH) compounds.

An assessment of selected PAH compounds is shown in the following table together with Generic Assessment Criteria (GAC) from the LQM guidance.

Summary of Results for Polynuclear Aromatic Hydrocarbons

Contaminant	Generic Assessment Criteria (mg/kg)			No. of samples tested	No. of samples with value greater than GAC	Max concentration mg/kg	Comments
	Resi with plant uptake	Allotments	Comm / industrial				
Acenaphthene	210	34	85000	5	0	0.4	-
Anthracene	2300	380	530000	5	0	0.3	-
Benz(a)anthracene	3.1	2.5	90	5	0	3.0	-
Benzo(a)pyrene	0.83	0.6	14	5	1	1.8	Topsoil TP4 @ 0.15mbgl
Benzo(b)fluoranthene	5.6	3.5	100	5	0	1.4	
Benzo(g,h,i)perylene	44	70	650	5	0	3.1	
Benzo(k)fluoranthene	8.5	6.8	140	5	0	0.6	
Chrysene	6.0	2.6	140	5	0	2.6	
Dibenz(a,h)anthracene	0.76	0.76	13	5	2	3.6	Topsoil TP4 @0.15mbgl and MG TP3 @0.45mbgl
Fluoranthene	260	52	23000	5	0	2.5	-
Fluorene	160	27	64000	5	0	0.3	-
Indeno(1,2,3,-cd)pyrene	3.2	1.8	60	5	1	3.5	Topsoil TP4 @0.15mbgl
Napthalene	1.5	4.1	200	5	0	<0.1	-
Pyrene	560	110	5400	5	0	2.6	-

All values from LQM/CIEH Generic Assessment Criteria 2nd Edition. Threshold based on 1% SOM

All samples tested fall below the relevant guideline values with the exception of several elevated PAH compounds within topsoil at TP4 0.15mbgl and within made ground at TP3 at 0.45mbgl.

9 ASSESSMENT OF CONTAMINATION RISKS

9.1 Summary of Contamination Sources

Topsoil

Topsoil was encountered within several of the exploratory holes, predominantly in the south of the site and ranged from 0.25m to 0.4m bgl. The topsoil contains elevated concentrations of phytotoxic zinc and copper. It should be noted that this is only elevated in relation to plant growth and is not a risk to human health.

Made Ground

Made ground was encountered across the majority of the site to depths between 0.3m and 0.8m bgl.

The made ground does not contain elevated inorganic determinands.

Hydrocarbon Contamination

Elevated concentrations of several PAH compounds were encountered in topsoil within TP4 at 0.15mbgl and within made ground within TP3 at 0.45mbgl.

9.2 Hazard Assessment

The results of the 'Hazard Identification' process for significant sources of contamination in accordance with CLR11 are summarised above. The following section describes the results of the 'Hazard Assessment' process in which unacceptable risks are identified. Pathways and receptors are considered below. Contamination sources and pollutant linkages are shown in the final Conceptual Site Model presented as Drawing No. D6135/03 in Appendix A.

Pathways

The proposed end use of the development is residential. Potential contaminant pathways to humans therefore include:

- ingestion of soil (outdoors) / dust (indoors)
- skin contact with soil (outdoors) / dust (indoors)
- inhalation of dust (outdoors and indoors)
- consumption of vegetables & soil attached to vegetables
- contamination via buried water pipes

In view of the presence of relatively impermeable clay across the majority of the site it is considered that no significant contaminant pathways to controlled water receptors are present.

Receptors

Significant potential receptors are as follows:

- end users of the site (residents)
- plants in gardens / landscaped areas
- Major Aquifer

Transient risks to construction workers will be addressed by the adoption of appropriate health and safety measures and consequently this receptor group has not been considered further.

Based on the revised Conceptual Site Model, unacceptable risks have been identified and further action will be required as discussed in the following section.

9.3 Preliminary Options Appraisal

This section identifies feasible remediation options for each relevant pollutant linkage; it does not represent a detailed evaluation of all possible remedial options. In practice, as noted in CLR11, "there may be a number of ways to reduce or control unacceptable risks, all of which have advantages and limitations in particular cases".

Topsoil

The topsoil contains elevated concentrations of phytotoxic zinc, copper and PAH, as well as debris including brick, glass and plastic therefore, it is recommended that the topsoil should be stockpiled, screened and retested prior to consideration for reuse. Alternatively, topsoil should be removed from site.

Inorganic Contamination - Made Ground

Made ground contains elevated PAH in one sample and, also contains occasional ash, brick, glass, tile and plastic. For this material to remain on site in garden areas it is recommended that it does not remain as near surface deposits in landscaped areas of the site. It may be possible to screen the material and reassess for its suitability however, this should be confirmed with the local authority prior to undertaking this task.

It is likely that a clean cover layer would be required in landscaped areas in order to ensure that unsuitable items do not remain within 600mm of the finished levels.

If during redevelopment works on site any noxious, brightly coloured, drummed, liquid, etc waste is encountered, works should cease in these areas and further advice should be sought from a suitably qualified consultant.

9.4 Remediation Strategy

A Remediation Strategy will be required by the regulatory authorities prior to site redevelopment. The Remediation Strategy document would describe the objectives of the proposed remedial works; a Method Statement is normally required from the Contractor undertaking the works, describing how these objectives are to be met. Validation of the remediation works should be undertaken by Dunelm.

10 HAZARDOUS GAS

10.1 Hazard Identification

As discussed in sections 4 and 5 above, Dunelm have undertaken previous site investigation works in vicinity of the current phase of works. The gas risk assessment for the previous phase of the works has been utilised and is included in Appendix G.

It should be noted that the current site is further away from the nearest recorded landfill (the previous sites are located in between the current site area and the nearest landfill).

Amber 1 gas protection measures are recommended for new developments, this is considered to be a conservative decision given that the current site area is further away from the potential source of gas than the previous site.

11 FOUNDATIONS AND GEOTECHNICAL ISSUES

11.1 Introduction

The proposed development is understood to consist of residential properties.

Ground conditions encountered during this investigation comprised made ground up to 0.8m. The underlying natural ground consisted of firm and stiff clays.

11.2 Mining

No evidence has been found to indicate that the site is underlain by coal workings at shallow depth.

No evidence has been found to indicate that the site has been affected by quarrying.

11.3 Foundations

Due to the heterogeneous nature of the made ground, unacceptable total and differential settlements may occur if foundations are placed on made ground. Therefore, foundations should be taken through made ground onto underlying natural ground of adequate bearing capacity.

It is considered that strip and trench fill foundations should be suitable for the proposed structures.

Based on the visual description and laboratory testing, a safe bearing capacity of 100kN/m² has been determined for strip foundations 0.6m wide founding on the natural firm and stiff clay or natural sands at depths of around 1.0m bgl. At this width of foundation and bearing pressure settlements should be less than 25mm.

Based on plasticity index results, all cohesive soils at the site should be regarded as being of low to medium volume change potential. Foundations should therefore be placed at a minimum depth of 0.9m below original or finished ground level, whichever is the lower.

Foundations near existing or proposed trees should be deepened and provided with appropriate heave precautions in accordance with NHBC Standards Chapter 4.2.

If the founding stratum is found to be variable, and particularly if it is found to consist both of clay and sand, the foundations should be reinforced to limit differential settlement. For a standard 600mm wide, 225mm thick footing, a suitable reinforcement would be one layer of A193 mesh placed 50mm above the base of the footing. For other footing dimensions advice should be sought from a qualified structural engineer.

In addition, relict foundations may be present in the vicinity of the former buildings. Foundations in areas of former structures may need to be deepened to found within suitable strata. Alternatively all existing backfill could be excavated and replaced with engineered fill of even thickness extending 1m beyond the footprint of the proposed development.

Overdeepened foundations should be stepped in accordance with NHBC Standards, Chapter 4.4.

Foundations should be taken below a line drawn up at 45° from the base of existing or proposed services or

foundations.

It should be recognised that clay rich soils can deteriorate fairly rapidly on exposure, particularly in periods of wet weather and frost. It would be prudent to protect all exposed soils in foundation excavations with a concrete blinding layer, particularly if they are likely to remain open for extended period of time.

Prior to placing foundation concrete, obvious soft or loose spots should be removed and replaced with suitably recompacted hardcore or lean mix concrete. In addition, all excavations should be inspected to ensure that they fully penetrate areas of disturbed ground.

Sub-surface concrete for the majority of the site should be Design Sulphate Class DS-1, with the site allocated an ACEC Classification of AC-1 however, the made ground in TP4 recorded elevated sulphate levels and a higher classification of DS-3 and AC-3 should be adopted in this area for concrete in contact with the made ground.

Further advice should be sought from Dunelm if unexpected ground conditions are encountered during redevelopment.

11.4 Floor Slabs

In accordance with NHBC guidelines, suspended floor slabs should be adopted where made ground exceeds 0.6m in thickness.

Alternatively, in order to utilise ground bearing slabs, made ground could be removed from beneath the footprint of the buildings and a blanket of compacted granular fill placed in accordance with an engineering specification.

11.5 Excavations

Observations made during the fieldwork indicate that no significant groundwater flows would be anticipated in shallow excavations. However, the rapid rate of advancement of the exploratory holes may mask minor seepages and it should be borne in mind that water levels fluctuate with a number of influences including season, rainfall, dewatering and pumping activities. Therefore, water levels significantly higher than those found during this investigation may be encountered.

Shallow excavations should remain stable in the short term but if left open for a significant period of time will require shoring. Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97.

It is recommended that an adequate drainage system for surface water be installed by a competent contractor in order to prevent surface water ponding or collecting during and post construction, which may in turn lead to deterioration of the founding stratum.

Based on the nature of the ground conditions encountered, excavations should be within the capacity of normal earthworks plant.

11.6 Road Pavement Design

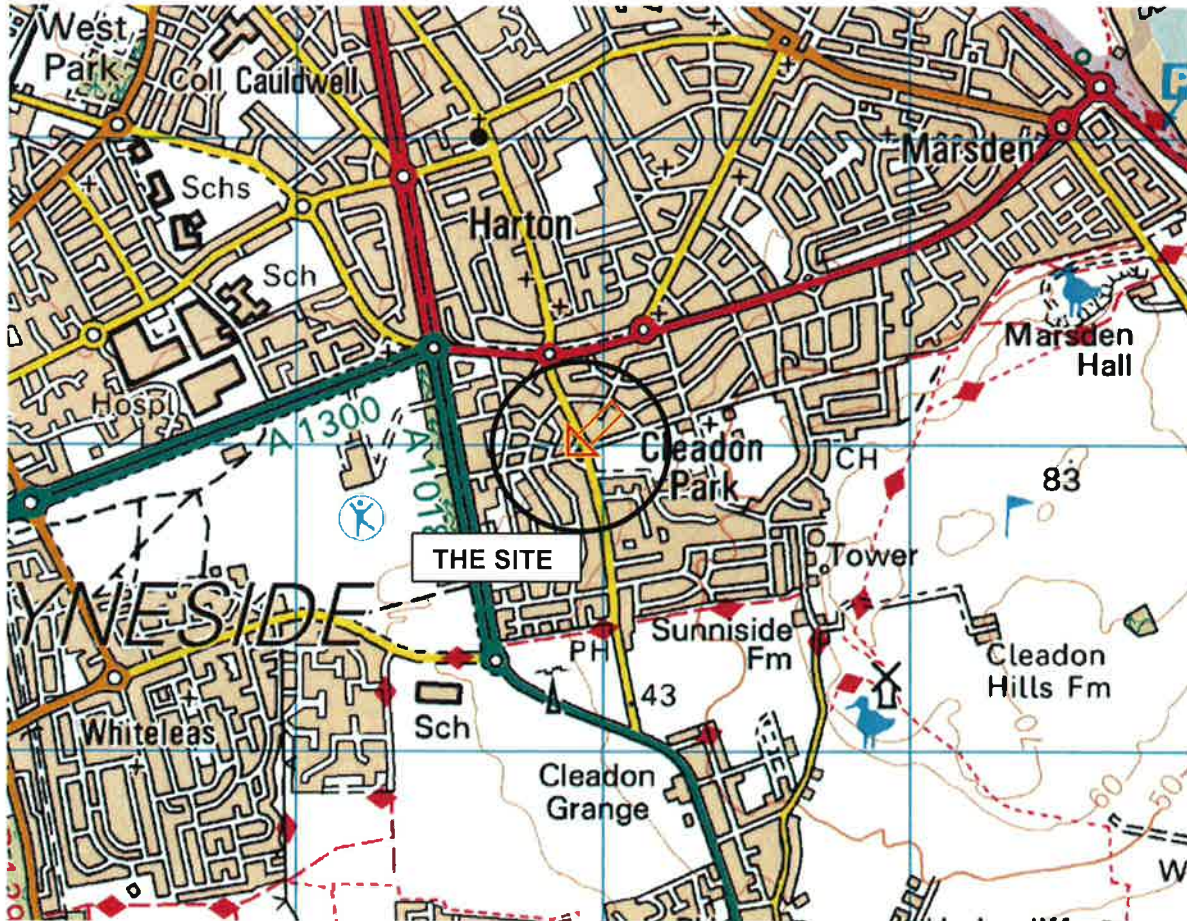
A CBR value of 3% should be assumed for highway construction within natural firm clays. This is based on visual inspection, insitu measurements using a Farnell Probe and the results of plasticity index testing.

A CBR value of <2% should be assumed within cohesive made ground deposits. This is based on the insitu CBR test results.


Where the granular made ground is re-engineered it is considered that a CBR value of 5% should be achievable, however, this should be verified by insitu CBR testing on site and confirmed with the adopting authority.

Appendix A


Drawings

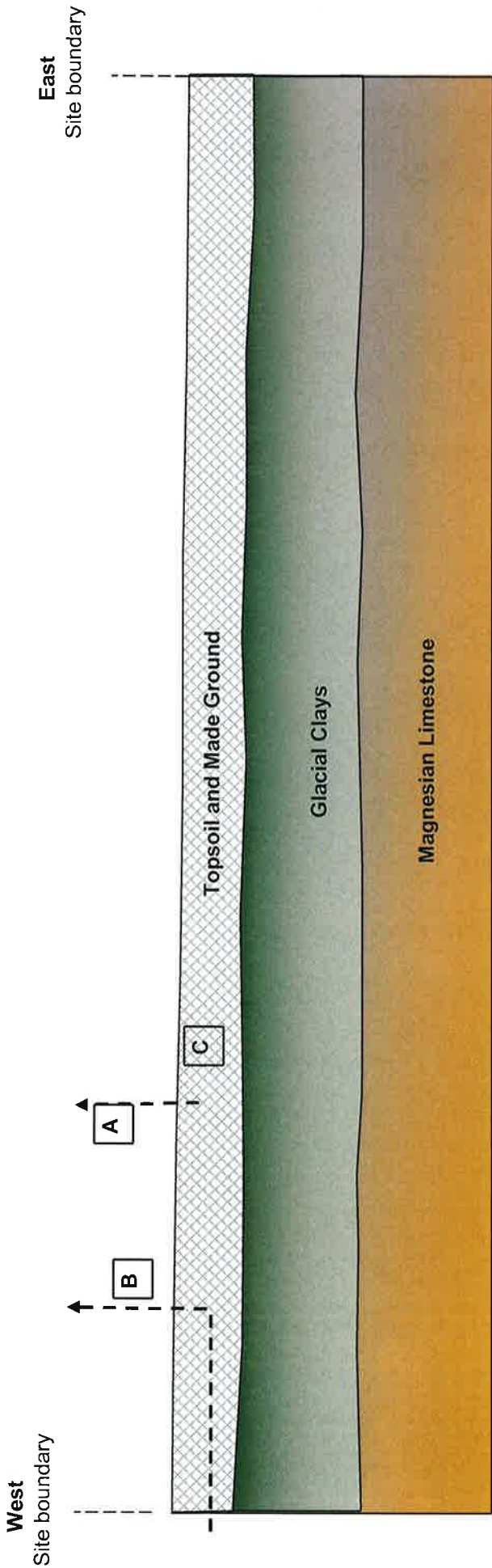


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	Contract: Park Avenue, Cleadon, South Shields		Contract No: D6135	
	Client: Bellway Homes			
TEL: 0191 378 3151 FAX: 0191 378 3157	Drawing Title: Site Location Plan			
Drawing No: D6135/01	Date: April 2014	Scale: NTS	Status: Final	Drawn by: JN



	Contract: Park Avenue, Cleadon, South Shields		Contract No: D6135	
	Client: Bellway Homes NE			
TEL: 0191 378 3151 FAX: 0191 378 3157	Drawing Title: Trial Pit Location Plan			
Drawing No: D6135/02	Date: April 2014	Scale: NTS	Status: Final	Drawn by: JN



Potential Contamination linkages:
 A – Ingestion / Inhalation / Dermal contact of determinants within topsoil & Made Ground
 B – Gas emissions migrating from off site. Eg: surrounding landfills and made ground.
 C – Aggressive ground conditions for building materials (concrete and underground services) and plants.

	Contract: Park Avenue, Cleadon, Sunderland			
	Client: Bellway Homes NE			
TEL: 0191 3783151 FAX: 0191 3783157	Drawing Title: Conceptual Site Model			
Drawing No: D6135/03	Date: April 2014	Scale: NTS	Status: Final	Drawn by: JN


Appendix B
Photographic Survey



Photograph 1: Site Entrance and adjacent housing .



Photograph 2: Containers on the central area of the site.


	Contract: Park Avenue, Cleadon	Contract No: D6135
	Client: Bellway Homes	
TEL: 0191 378 3151 FAX: 0191 378 3157	Site Photographs	Sheet 1 of 3



Photograph 3: Looking south east.



Photograph 4: Looking east from the centre of the site.


	Contract: Park Avenue, Cleadon	Contract No: D6135
	Client: Bellway Homes	
TEL: 0191 378 3151 FAX: 0191 378 3157	Site Photographs	Sheet 2 of 3



Photograph 5: TP1



Photograph 6: TP3 Spoil (not the gravel to the rear of shot)

 <p>TEL: 0191 378 3151 FAX: 0191 378 3157</p>	Contract: Park Avenue, Cleadon		Contract No: D6135
	Client: Bellway Homes		
	Site Photographs		Sheet 1 of 3

Appendix C

Desk Study Information



Dunelm Geotechnical & Environmental Ltd
FOUNDATION HOUSE , ST. JOHNS ROAD,
DURHAM/MEADOWFIELD INDUSTRIAL
ESTATE, DH7 8TZ

GroundSure Reference: GS-1394120
Your Reference: 3000AILD6135
Report Date: 11 Apr 2014
Report Delivery Method: Email - pdf

GroundSure EnviroInsight

Address: 77,PARK AVENUE,SOUTH SHIELDS, NE34 8QL

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Enviroinsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,

A handwritten signature in black ink, appearing to be "D. Kelly", followed by a small circle and a period.

Managing Director
Groundsure Limited

Enc.
GroundSure EnviroInsight



GroundSure Envirolnsight

Address: 77,PARK AVENUE,SOUTH SHIELDS, NE34 8QL
Date: 11 Apr 2014
Reference: GS-1394120
Client: Dunelm Geotechnical & Environmental Ltd



Aerial Photograph Capture date: 01-Jun-2009
Grid Reference: 437913,563904
Site Size: 0.43ha

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Overview of Findings

For further details on each dataset, please refer to each individual section in the main report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
---	---------	-------	--------	---------

1.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
1.1.1 Records of historic IPC Authorisations	0	0	0	0
1.1.2 Records of Part A(1) and IPPC Authorised Activities	0	0	0	0
1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer)	0	0	0	0
1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters)	0	0	0	0
1.1.5 Records of List 1 Dangerous Substances Inventory sites	0	0	0	0
1.1.6 Records of List 2 Dangerous Substances Inventory sites	0	0	0	0
1.1.7 Records of Part A(2) and Part B Activities and Enforcements	0	0	0	0
1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
1.1.9 Records of Licensed Discharge Consents	0	0	0	0
1.1.10 Records of Planning Hazardous Substance Consents and Enforcements	0	0	0	0
1.2 Records of COMAH and NIHHS sites	0	0	0	0
1.3 Environment Agency Recorded Pollution Incidents				
1.3.1 National Incidents Recording System, List 2	0	0	0	0
1.3.2 National Incidents Recording System, List 1	0	0	0	0
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 2: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-5000
---	---------	-------	--------	---------	----------	-----------

2.1 Landfill Sites						
2.1.1 Environment Agency Registered Landfill Sites	0	0	0	0	0	Not searched
2.1.2 Environment Agency Historic Landfill Sites	0	0	0	5	0	0
2.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	1	0
2.1.4 GroundSure Local Authority Landfill Sites Data	0	0	0	0	0	0
2.2 Landfill and Other Waste Sites Findings						
2.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
2.2.2 Environment Agency Licensed Waste Sites	0	0	0	0	0	5

Section 3: Current Land Use	On-site	0-50m	51-250	251-500
3.1 Current Industrial Sites Data	0	0	2	Not searched
3.2 Records of Petrol and Fuel Sites	0	0	0	0
3.3 Underground High Pressure Oil and Gas Pipelines	0	0	0	0

Section 4: Geology

4.1 Are there any records of Artificial Ground and Made Ground present beneath the study site?	No
4.2 Are there any records of Superficial Ground and Drift Geology present beneath the study site?	Yes
4.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section.	

Section 5: Hydrogeology and Hydrology

	0-500m
5.1 Are there any records of Strata Classification in the Superficial Geology within 500m of the study site?	Yes
5.2 Are there any records of Strata Classification in the Bedrock Geology within 500m of the study site?	Yes

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
5.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	0
5.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	0
5.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	0
5.6 Source Protection Zones (within 500m of the study site)	1	0	0	0	Not searched	Not searched

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
5.7 Is there any Environment Agency information on river quality within 1500m of the study site?	No	No	No	No	No	No
5.8 Detailed River Network entries within 500m of the site	0	0	0	0	Not searched	Not searched
5.9 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 6: Flooding

6.1 Are there any Environment Agency Zone 2 floodplains within 250m of the study site?	No
6.2 Are there any Environment Agency Zone 3 floodplains within 250m of the study site?	No
6.3 Are there any Flood Defences within 250m of the study site?	No
6.4 Are there any areas benefiting from Flood Defences within 250m of the study site?	No
6.5 Are there any areas used for Flood Storage within 250m of the study site?	No
6.6 What is the maximum BGS Groundwater Flooding susceptibility within 50m of the study site?	Potential below Surface
6.7 What is the BGS confidence rating for the Groundwater Flooding susceptibility areas?	Low

Section 7: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
7.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	1	1
7.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
7.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
7.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
7.5 Records of Ramsar sites	0	0	0	0	0	0
7.6 Records of Ancient Woodlands	0	0	0	0	0	0
7.7 Records of Local Nature Reserves (LNR)	0	0	0	0	1	3
7.8 Records of World Heritage Sites	0	0	0	0	0	0
7.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0
7.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
7.11 Records of National Parks	0	0	0	0	0	0
7.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
7.13 Records of Nitrate Vulnerable Zones	0	0	0	0	0	0

Section 8: Natural Hazards

8.1 What is the maximum risk of natural ground subsidence?

Very Low

Section 9: Mining

9.1 Are there any coal mining areas within 75m of the study site?

Yes

9.2 What is the risk of subsidence relating to shallow mining within 150m of the study site?

Negligible

9.3 Are there any brine affected areas within 75m of the study site?

No

Using this report

The following report is designed by Environmental Consultants for Environmental Professionals bringing together the most up-to-date market leading environmental data. This report is provided under and subject to the Terms & Conditions agreed between GroundSure and the Client. The document contains the following sections:

1. Environmental Permits, Incidents and Registers

Provides information on Regulated Industrial Activities and Pollution Incidents as recorded by Regulatory Authorities, and sites determined as Contaminated Land. This search is conducted using radii up to 500m.

2. Landfills and Other Waste Sites

Provides information on landfills and other waste sites that may pose a risk to the study site. This search is conducted using radii up to 1500m.

3. Current Land Uses

Provides information on current land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. These searches are conducted using radii of up to 500m. This includes information on potentially contaminative industrial sites, petrol stations and fuel sites as well as high pressure underground oil and gas pipelines.

4. Geology

Provides information on artificial and superficial deposits and bedrock beneath the study site.

5. Hydrogeology and Hydrology

Provides information on productive strata within the bedrock and superficial geological layers, abstraction licenses, Source Protection Zones (SPZs) and river quality. These searches are conducted using radii of up to 2000m.

6. Flooding

Provides information on surface water flooding, flood defences, flood storage areas and groundwater flood areas. This search is conducted using radii of up to 250m.

7. Designated Environmentally Sensitive Sites

Provides information on the Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Areas of Conservation (SAC), Special Protection Areas (SPA), Ramsar sites, Local Nature Reserves (LNR), Areas of Outstanding Natural Beauty (AONB), National Parks (NP), Environmentally Sensitive Areas, Nitrate Sensitive Areas, Nitrate Vulnerable Zones and World Heritage Sites and Scheduled Ancient Woodland. These searches are conducted using radii of up to 2000m.

8. Natural Hazards

Provides information on a range of natural hazards that may pose a risk to the study site. These factors include natural ground subsidence.

9. Mining

Provides information on areas of coal and shallow mining.

10. Contacts

This section of the report provides contact points for statutory bodies and data providers that may be able to provide further information on issues raised within this report. Alternatively, GroundSure provide a free Technical Helpline (08444 159000) for further information and guidance.

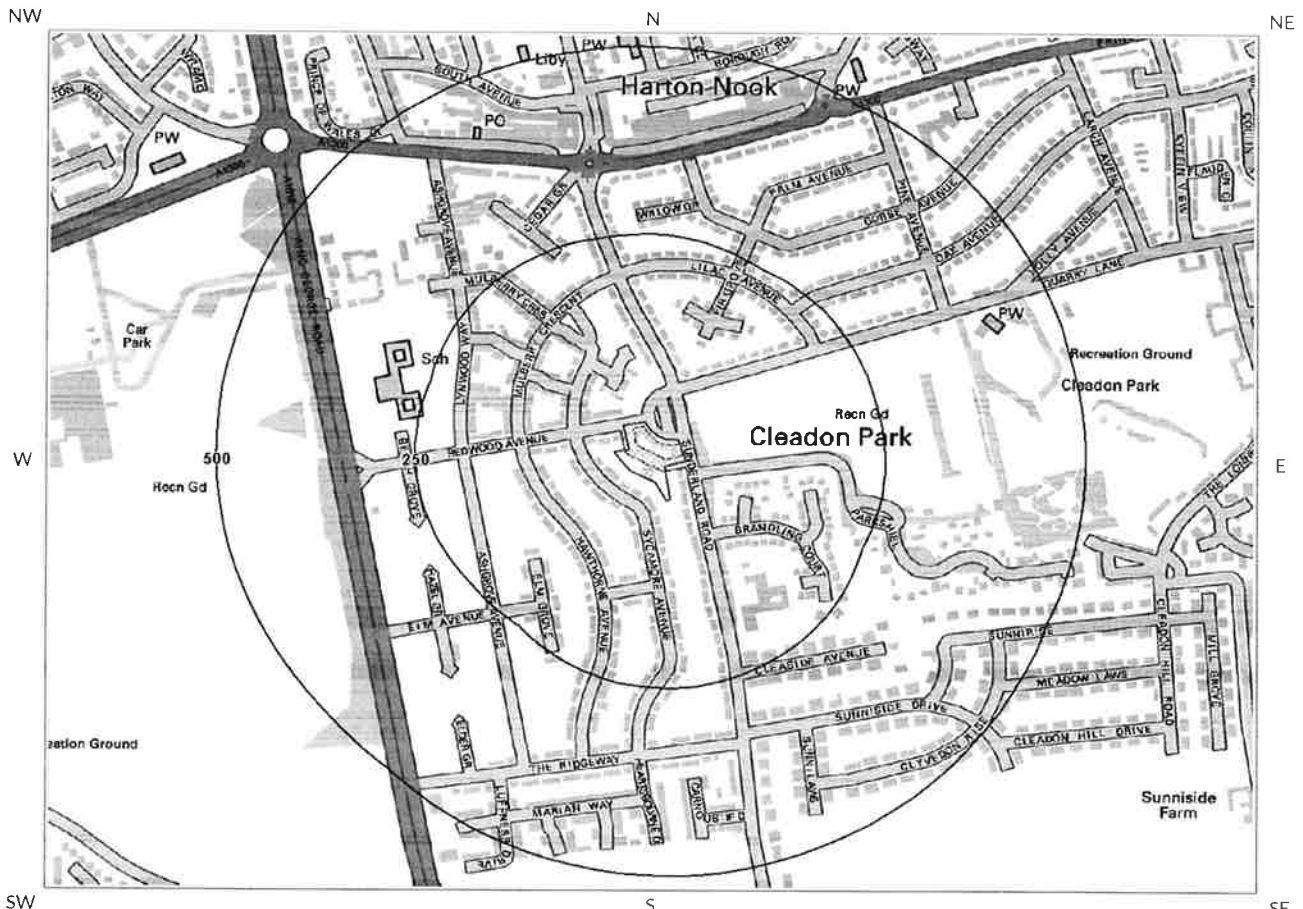
Note: Maps

Only certain features are placed on the maps within the report. All features represented on maps found within this search are given an identification number. This number identifies the feature on the mapping and correlates it to the additional information provided below. This identification number precedes all other information and takes the following format -Id: 1, Id: 2, etc. Where numerous features on the same map are in such close proximity that the numbers would obscure each other a letter identifier is used instead to represent the features. (e.g. Three features which overlap may be given the identifier "A" on the map and would be identified separately as features 1A, 3A, 10A on the data tables provided).

Where a feature is reported in the data tables to a distance greater than the map area, it is noted in the data table as "Not Shown".

All distances given in this report are in Metres (m). Directions are given as compass headings such as N: North, E: East, NE: North East from the nearest point of the study site boundary.




1. Environmental Permits, Incidents and Registers Map



Environmental Permits, Incidents and Registers Legend

Mapping sourced from  Ordnance Survey

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- | | | | | | |
|---|--------------------|---|-------------------------------|---|--|
|  | Site Outline | ★ | Recorded Pollution Incident | ▼ | RAS 3 & 4 Authorisations |
|  | 250 | ◆ | Dangerous Substances (List 1) | ▲ | Part A(1) Authorised Processes and Historic IPC Authorisations |
|  | 500 | ◇ | Dangerous Substances (List 2) | ▲ | Part A(2) and Part B Authorised Processes |
| | Search Buffers (m) | ■ | Water Industry Referrals | ⬜ | COMAH / NIHS Sites |
| | | ■ | Licensed Discharge Consents | ⬜ | Sites Determined as Contaminated Land |
| | | □ | Red List Discharge Consents | ⊛ | Hazardous Substance Consents and Enforcements |



1. Environmental Permits, Incidents and Registers

1.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency and Local Authorities reveal the following information:

1.1.1 Records of historic IPC Authorisations within 500m of the study site:

0

Database searched and no data found.

1.1.2 Records of Part A(1) and IPPC Authorised Activities within 500m of the study site:

0

Database searched and no data found.

1.1.3 Records of Water Industry Referrals (potentially harmful discharges to the public sewer) within 500m of the study site:

0

Database searched and no data found.

1.1.4 Records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the study site:

0

Database searched and no data found.

1.1.5 Records of List 1 Dangerous Substances Inventory Sites within 500m of the study site:

0

Database searched and no data found.

1.1.6 Records of List 2 Dangerous Substance Inventory Sites within 500m of the study site: 0

Database searched and no data found.

1.1.7 Records of Part A(2) and Part B Activities and Enforcements within 500m of the study site: 0

Database searched and no data found.

1.1.8 Records of Category 3 or 4 Radioactive Substances Authorisations: 0

Database searched and no data found.

1.1.9 Records of Licensed Discharge Consents within 500m of the study site: 0

Database searched and no data found.

1.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site: 0

Database searched and no data found.

1.2 Dangerous or Hazardous Sites

Records of COMAH & NIHHS sites within 500m of the study site: 0

Database searched and no data found.

1.3 Environment Agency Recorded Pollution Incidents

1.3.1 Records of National Incidents Recording System, List 2 within 500m of the study site: 0

Database searched and no data found.

1.3.2 Records of National Incidents Recording System, List 1 within 500m of the study site:

0

Database searched and no data found.

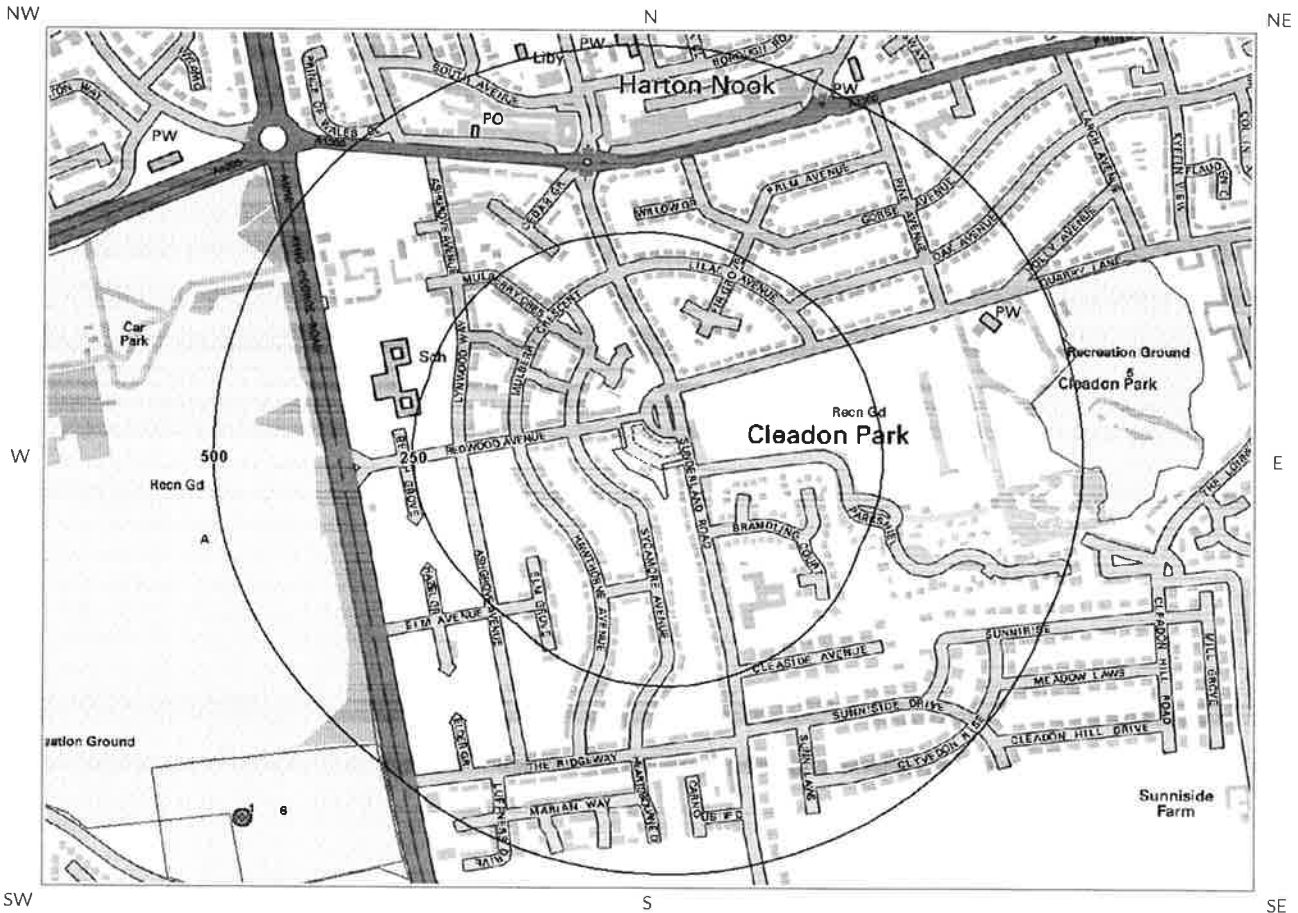
1.4 Sites Determined as Contaminated Land under Part 2A EPA 1990

How many records of sites determined as contaminated land under Section 78R of the Environmental Protection Act 1990 are there within 500m of the study site?

0

Database searched and no data found.









2. Landfill and Other Waste Sites Map



Landfill and Other Waste Sites Legend

Mapping sourced from  Ordnance Survey

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- | | | | | | |
|---|--------------------|---|--------------------------|---|----------------------------------|
|  | Site Outline |  | E.A. Active Landfill |  | Historic and Planned Waste Sites |
|  | Search Buffers (m) |  | E.A. Historic Landfill |  | E.A. Licensed Waste Site |
| | |  | Local Authority Landfill |  | BGS / DoE Survey Landfill |



2. Landfill and Other Waste Sites

2.1 Landfill Sites

2.1.1 Records from Environment Agency landfill data within 1000m of the study site:

0

Database searched and no data found.

2.1.2 Records of Environment Agency historic landfill sites within 1500m of the study site:

5

The following landfill records are represented as either points or polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
2A	354.0	W	437000 563700	Site Address: Temple Memorial Park No.1, John Reid Road, South Shield, Tyne and Wear Waste Licence: Yes Site Reference: TW 111 ST ST 039, TW 032 ST, ST 006 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: YO1/L/BOR004 Licence Issue: 05-Oct-1977 Licence Surrendered: 31-Mar-1994 Licence Hold Address: Central Library Buildings, Catherine Street, South Shields, Tyne and Wear Operator: -
3A	354.0	W	437000 563700	Site Address: Temple Park No.3, Nevinston Avenue, Whiteleas Waste Licence: - Site Reference: ST 019 Waste Type: Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -
4A	354.0	W	437000 563700	Site Address: Temple Park No.2, Temple Park, South Shield, Tyne and Wear Waste Licence: Yes Site Reference: TW 105 ST, TW 124 ST, ST 041, ST 037 Waste Type: Inert, Industrial, Commercial Environmental Permitting Regulations (Waste) Reference: YO1/L/BOR016 Licence Issue: 23-Feb-1983 Licence Surrendered: 31-Mar-1994 Licence Hold Address: Town Hall, South Shields, Tyne and Wear Operator: -
5	442.0	E	438500 563900	Site Address: Cleadon Park Quarry, Cleadon Park, South Tyneside Waste Licence: - Site Reference: ST 001 Waste Type: - Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: -

ID	Distance (m)	Direction	NGR	Details
6	484.0	SW	437400 563300	Site Address: Temple Memorial Park, King George Road, South Shields, Tyne and Wear Waste Licence: - Site Reference: - Waste Type: Inert, Industrial, Commercial Environmental Permitting Regulations (Waste) Reference: - Licence Issue: Licence Surrendered: Licence Hold Address: - Operator: South Shields County Borough Cleansing Department

2.1.3 Records of BGS/DoE non-operational landfill sites within 1500m of the study site:

1

The following landfill records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
1	670.0	SW	43740 0.0 56340 0.0	Address: Temple Mermaid Bank, King George Rd, S Shields, T&W BGS Number: 303.0 Risk: No risk to aquifer Waste Type: N/A

2.1.4 Records of Local Authority landfill sites within 1500m of the study site:

0

Database searched and no data found.

2.2 Other Waste Sites

2.2.1 Records of waste treatment, transfer or disposal sites within 500m of the study site:

0

Database searched and no data found.

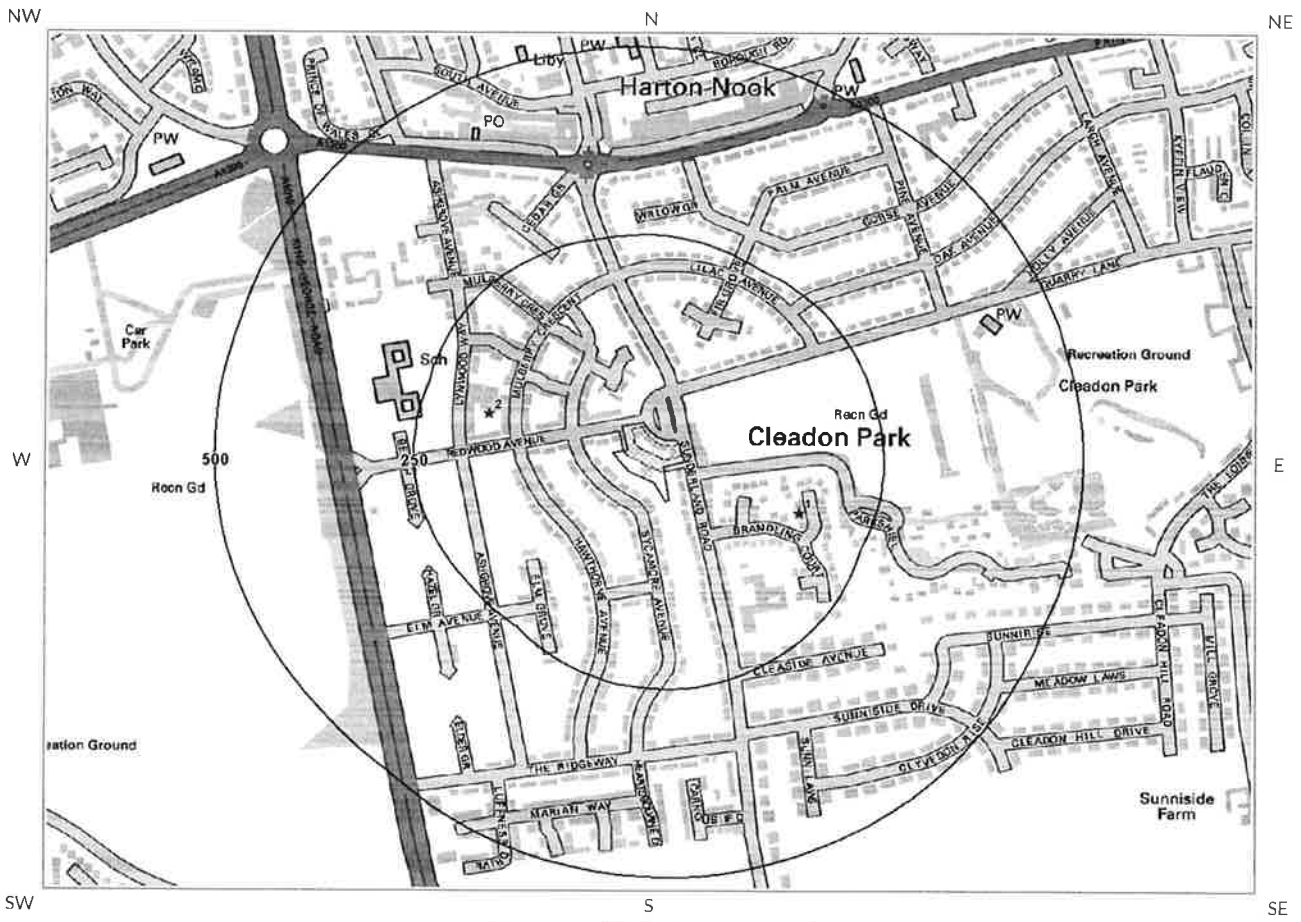
2.2.2 Records of Environment Agency licensed waste sites within 1500m of the study site:

5

The following waste treatment, transfer or disposal sites records are represented as points on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
Not shown	1079.0	W	436800 563700	<p>Site Address: Land On Temple Memorial Park, Adj To John Reid Road, South Shields, Tyne & Wear Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOR004 EPR reference: - Operator: Borough Of South Tyneside Waste Management licence No: 0 Annual Tonnage: 0.0</p> <p>Issue Date: 05/10/1977 Effective Date: - Modified: - Surrendered Date: 31/10/1978 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Temple Memorial Park Correspondence Address: -, Central Library Buildings, Catherine Street, South Shields, Tyne & Wear, NE33 2PE</p>
Not shown	1079.0	W	436800 563700	<p>Site Address: Land On Temple Memorial Park, Adj To John Reid Road, South Shields, Tyne & Wear Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOR004 EPR reference: EA/EPR/YP3898ES/S002 Operator: Borough Of South Tyneside Waste Management licence No: 64444 Annual Tonnage: 250000.0</p> <p>Issue Date: 05/10/1977 Effective Date: - Modified: - Surrendered Date: 31/10/1978 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Temple Memorial Park Correspondence Address: -, -</p>
Not shown	1079.0	W	436800 563700	<p>Site Address: Land On Temple Memorial Park, Adj To John Reid Road, South Shields, Tyne & Wear Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: BOR004 EPR reference: - Operator: Borough Of South Tyneside Waste Management licence No: 0 Annual Tonnage: 0.0</p> <p>Issue Date: 05/10/1977 Effective Date: - Modified: - Surrendered Date: 31/10/1978 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Temple Memorial Park Correspondence Address: -, Central Library Buildings, Catherine Street, South Shields, Tyne & Wear, NE33 2PE</p>
Not shown	1266.0	W	436700 564400	<p>Site Address: ., South Tyneside District Hospital, Harton Lane, South Shields, Tyne & Wear, NE34 OPL Type: Clinical Waste Transfer Station Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: SOU002 EPR reference: EA/EPR/DP3096ZX/S003 Operator: South Tyneside Health Care Trust Waste Management licence No: 67001 Annual Tonnage: 25000.0</p> <p>Issue Date: 30/09/1992 Effective Date: - Modified: 30/09/1992 Surrendered Date: 07/09/1999 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: South Tyneside District Hospital Correspondence Address: -, -</p>
Not shown	1341.0	SW	437200 562700	<p>Site Address: Plot A, Cleadon Lane Ind Est, East Boldon, Tyne & Wear Type: Transfer Station taking Non-Biodegradable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MAC001 EPR reference: EA/EPR/UP3393NF/S002 Operator: Mackings Gary Alan Waste Management licence No: 67607 Annual Tonnage: 6119.0</p> <p>Issue Date: 03/06/1996 Effective Date: - Modified: - Surrendered Date: 19/09/2001 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Mac Skip Hire Correspondence Address: -, -</p>

3. Current Land Use Map

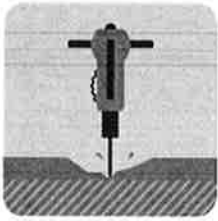


Current Land Use Legend



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-  Site Outline
-  Current Industrial Sites
-  Search Buffers (m)
-  Petrol & Fuel Sites
-  Underground High Pressure Oil & Fuel Pipelines



3. Current Land Uses

3.1 Current Industrial Data

Records of potentially contaminative industrial sites within 250m of the study site: 2

The following records are represented as points on the Current Land Uses map.

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	159.0	SE	Coachliners of Tyneside	438095 563810	16, Brandling Court, South Shields, NE34 8PA	Vehicle Hire and Rental	Hire Services
2	163.0	W	Electricity Sub Station	437707 563942	NE34	Electrical Features	Infrastructure and Facilities

3.2 Petrol and Fuel Sites

Records of petrol or fuel sites within 500m of the study site: 0

Database searched and no data found.

3.3 Underground High Pressure Oil and Gas Pipelines

Records of high pressure underground pipelines within 500m of the study site: 0

Database searched and no data found.



4. Geology

4.1 Artificial Ground and Made Ground

Database searched and no data found.

The database has been searched on site, including a 50m buffer.

4.2 Superficial Ground and Drift Geology

The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON

4.3 Bedrock and Solid Geology

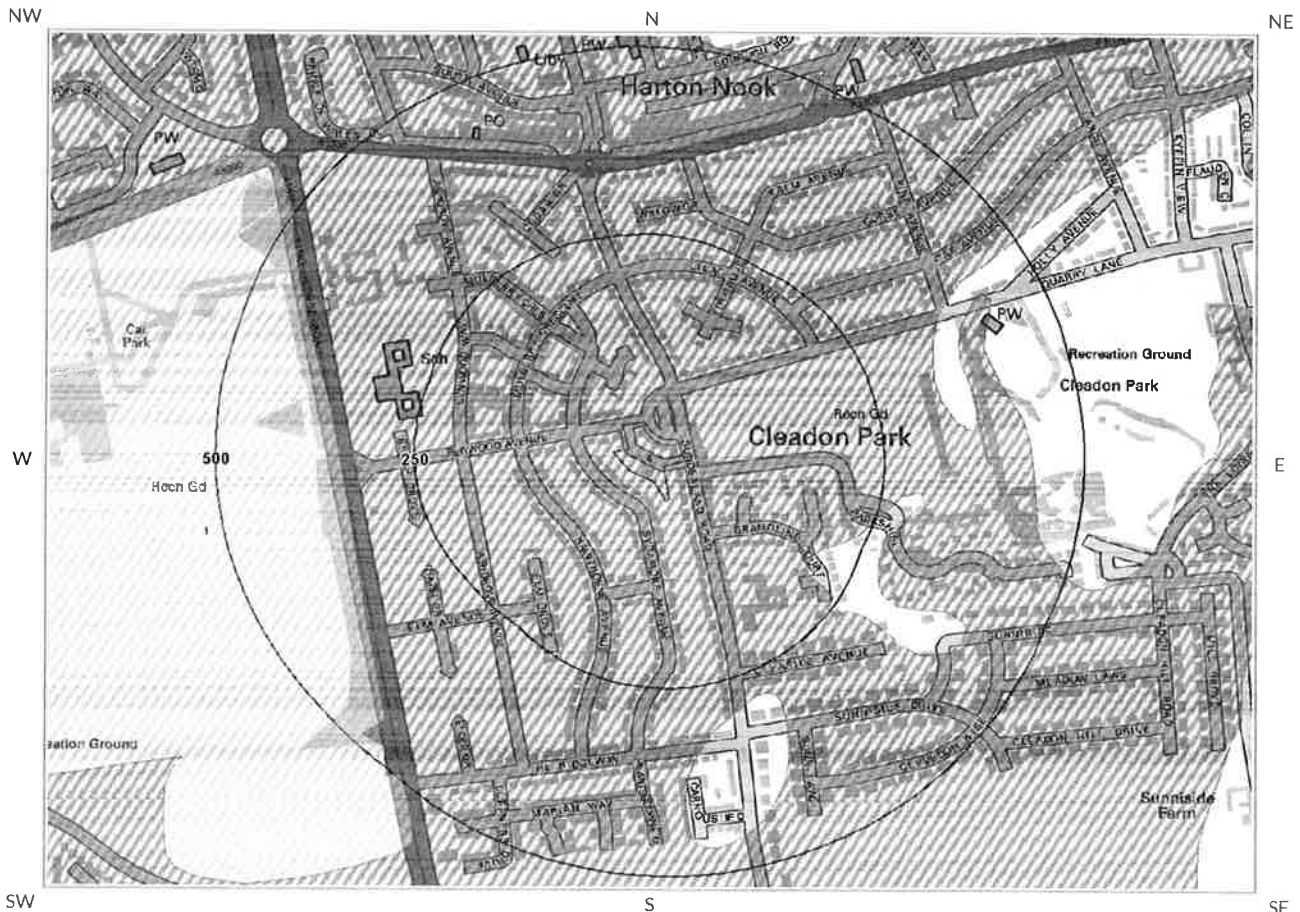
The database has been searched on site, including a 50m buffer.

Lex Code	Description	Rock Type
RML-DOST	RAISBY FORMATION	DOLOSTONE

(Derived from the BGS 1:50,000 Digital Geological Map of Great Britain)

5. Hydrogeology and Hydrology

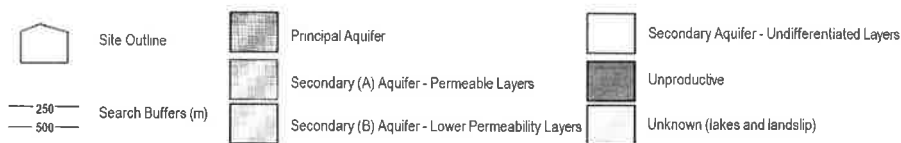
5a. Aquifer Within Superficial Geology



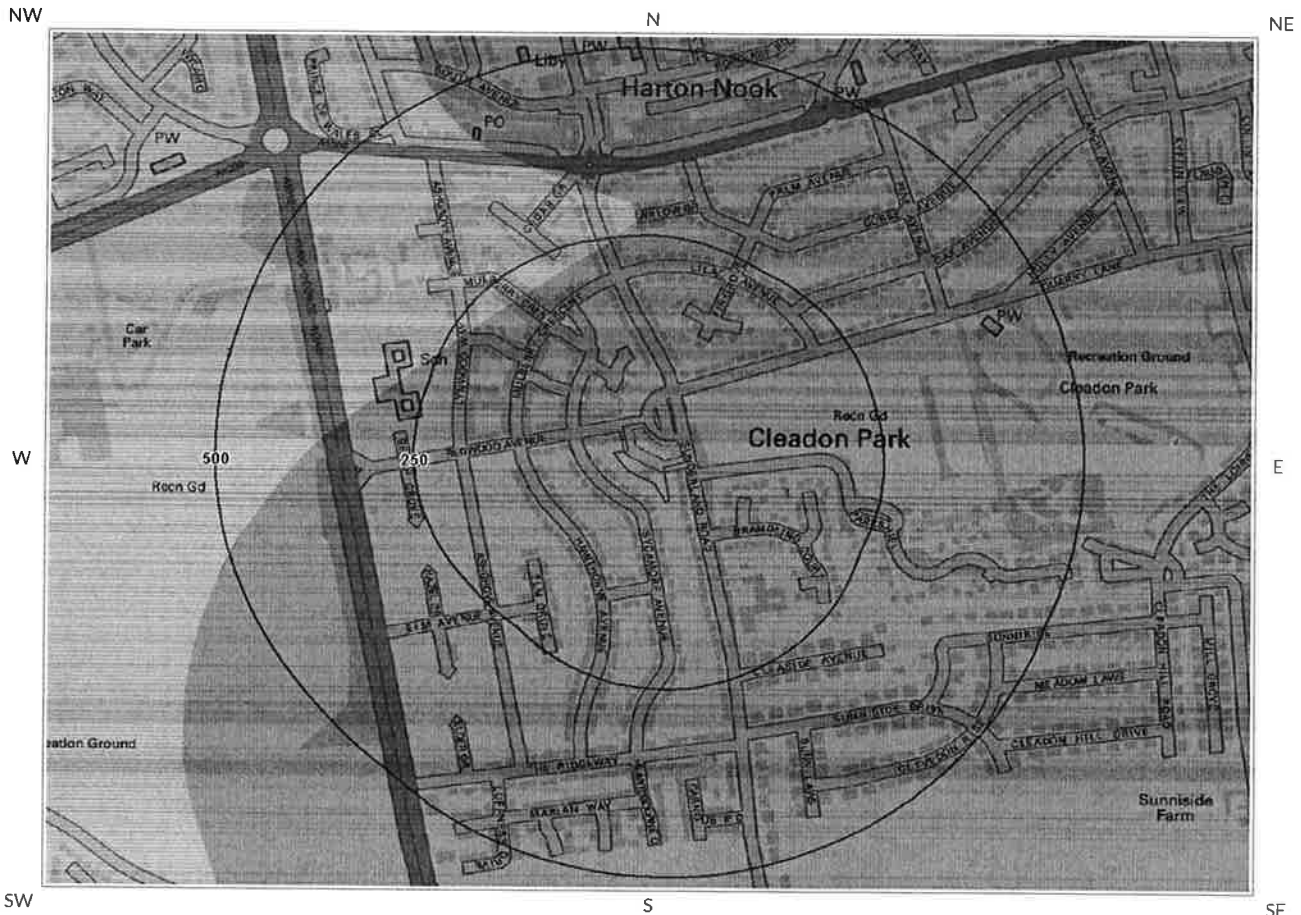
Map Legend



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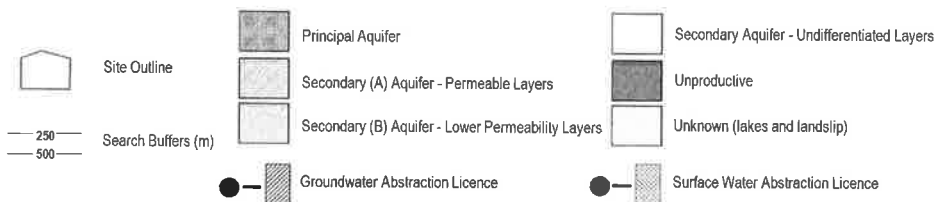
5b. Aquifer Within Bedrock Geology and Abstraction Licenses



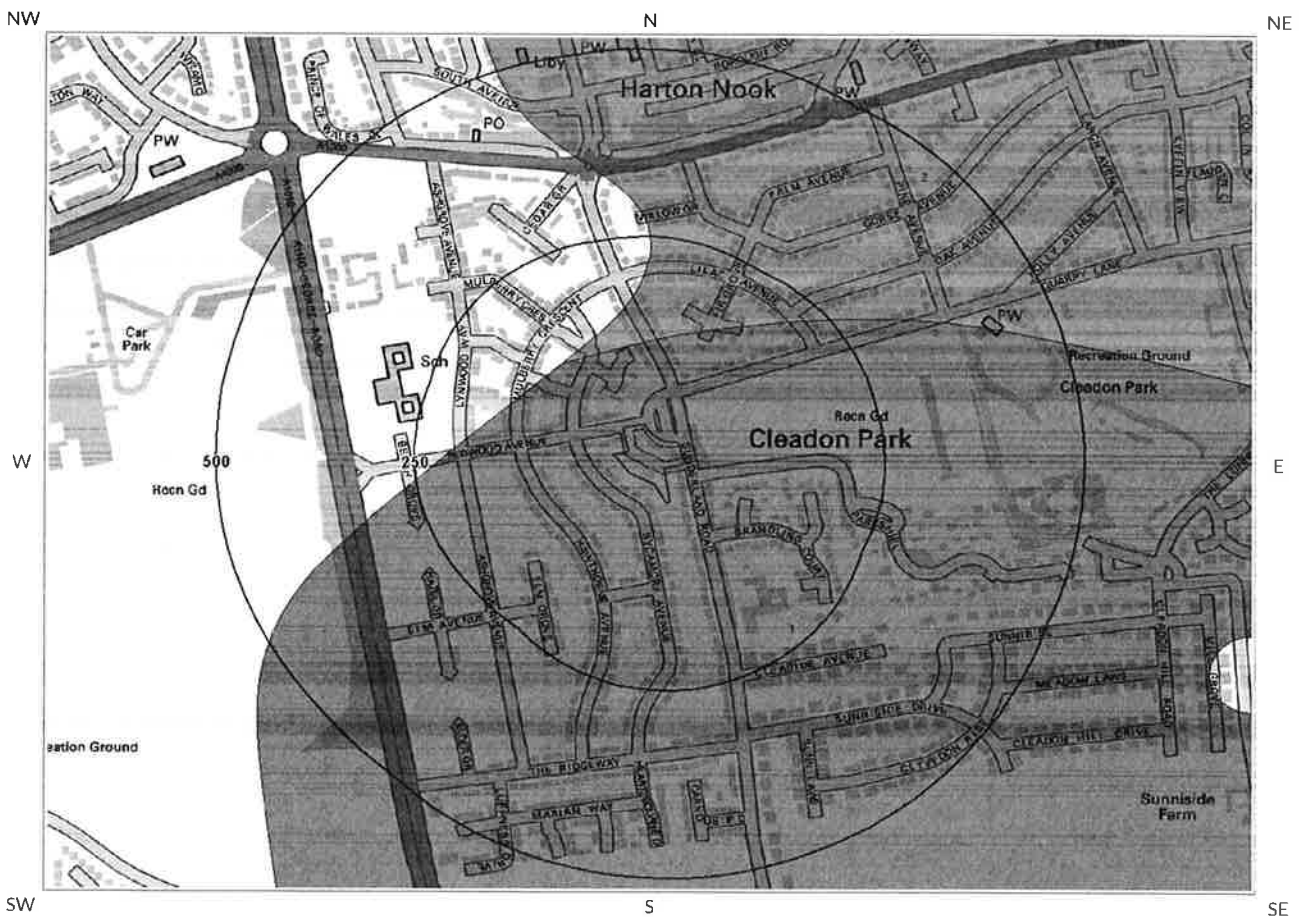
Map Legend

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




5c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses




Map Legend

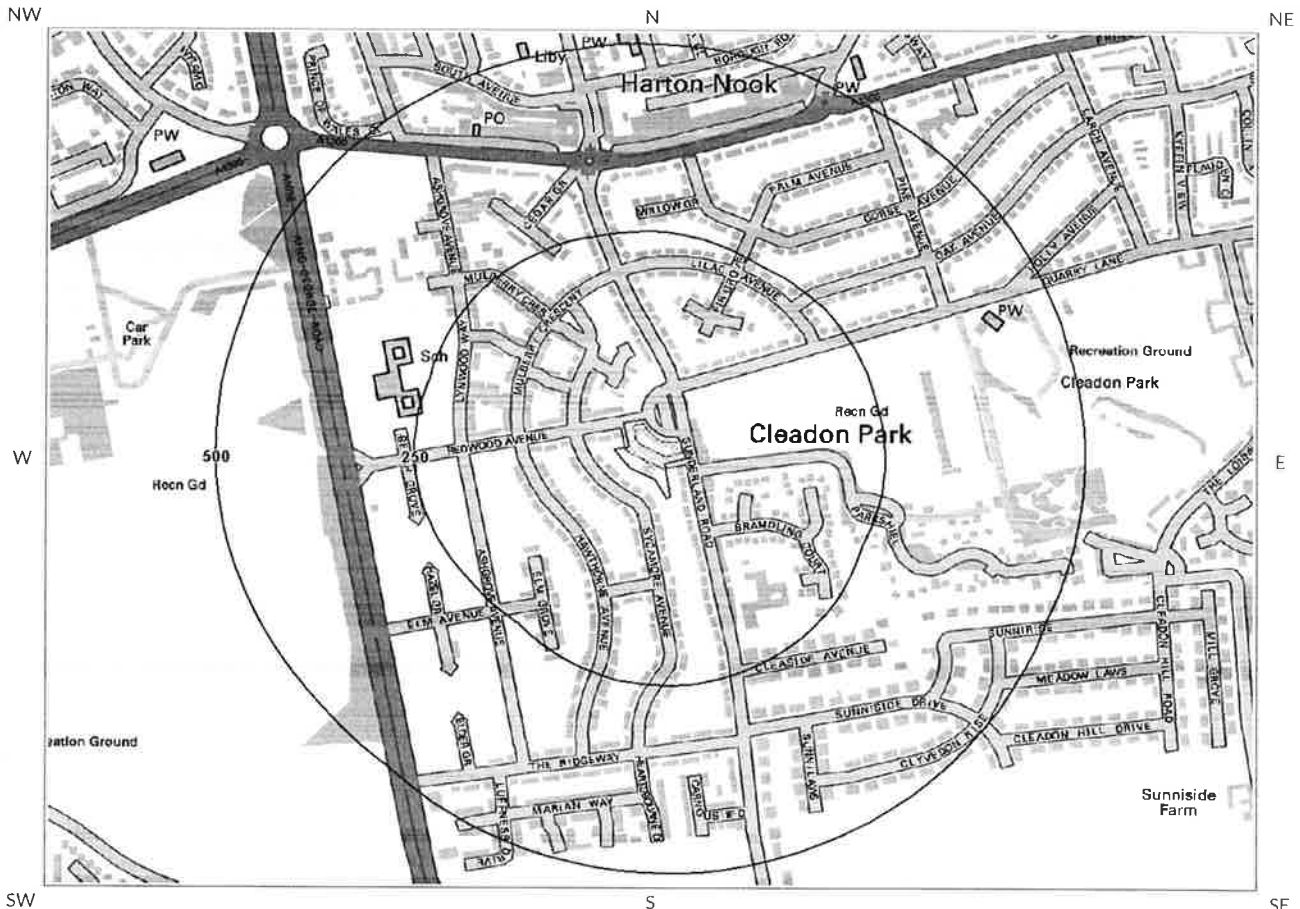


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-  Site Outline
-  Search Buffers (m)
-  Source Protection Zone 1 - Inner Catchment
-  Source Protection Zone 2 - Outer Catchment
-  Source Protection Zone 3 - Total Catchment
-  Source Protection Zone 4 - Zone of Special Interest

 Potable Water Abstraction Licence

















5d. Hydrology – Detailed River Network and River Quality



Map Legend

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- | | | | | | |
|---|--------------------|---|---------------------------------------|--|-------------------------------------|
|  | Site Outline |  | Primary River |  | Canal |
|  | 250 |  | Secondary River |  | Canal Tunnel |
|  | 500 |  | Tertiary River |  | Culvert |
| | Search Buffers (m) |  | Lake/Reservoir |  | Multiple Channel Culvert |
| | |  | Underground River (inferred) |  | Underground River (Potential Sewer) |
| | |  | General Quality Assessment: Biology |  | Underground River (local knowledge) |
| | |  | General Quality Assessment: Chemistry | | |



5. Hydrogeology and Hydrology

5.1 Aquifer within Superficial Deposits

Are there records of strata classification within the superficial geology at or in proximity to the property? **Yes**

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (5a):

ID	Distance (m)	Direction	Designation	Description
4	0.0	On Site	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
1	341.0	W	Unknown	Unknown

5.2 Aquifer within Bedrock Deposits

Are there records of strata classification within the bedrock geology at or in proximity to the property? **Yes**

From 1 April 2010, the Environment Agency's Groundwater Protection Policy has been using aquifer designations consistent with the Water Framework Directive. For further details on the designation and interpretation of this information, please refer to the GroundSure Enviroinsight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	Designation	Description
1	0.0	On Site	Principal	Geology of high intergranular and/or fracture permeability, usually providing a high level of water storage and may support water supply/river base flow on a strategic scale. Generally principal aquifers were previously major aquifers
2	214.0	NW	Secondary A	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 formerly classified as minor aquifers

5.3 Groundwater Abstraction Licences

Are there any Groundwater Abstraction Licences within 2000m of the study site? Yes

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (5b):

ID	Distance (m)	Direction	NGR	Details
Not shown	824.0	E	438720 563580	Licence No: 1/23/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Borehole - Magnesian Limestone - Cleadon Data Type: Point Annual Volume (m ³): 1241058 Max Daily Volume (m ³): 5773.55 Original Application No: 014/23/05 Original Start Date: 7/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 8/4/1968 Version End Date:
Not shown	824.0	E	438720 563580	Licence No: 1/23/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Cleadon (magnesian Limestone) Data Type: Point Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 014/23/05 Original Start Date: 7/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 8/4/1968 Version End Date:

5.4 Surface Water Abstraction Licences

Are there any Surface Water Abstraction Licences within 2000m of the study site? No

Database searched and no data found.

5.5 Potable Water Abstraction Licences

Are there any Potable Water Abstraction Licences within 2000m of the study site? Yes

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (5c):

ID	Distance (m)	Direction	NGR	Details
Not shown	824.0	E	438720 563580	Licence No: 1/23/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Cleadon (magnesian Limestone) Data Type: Point Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 014/23/05 Original Start Date: 7/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	824.0	E	438720 563580	Licence No: 1/23/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Borehole - Magnesian Limestone - Cleadon Data Type: Point	Annual Volume (m ³): 1241058 Max Daily Volume (m ³): 5773.55 Original Application No: 014/23/05 Original Start Date: 7/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

5.6 Source Protection Zones

Are there any Source Protection Zones within 500m of the study site? Yes

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (5c):

ID	Distance (m)	Direction	Type	Description
1	0.0	On Site	2	Outer Catchment
2	103.0	N	3	Total Catchment

5.7 River Quality

Is there any Environment Agency information on river quality within 1500m of the study site? No

5.7.1 Biological Quality:

Database searched and no data found.

5.7.2 Chemical Quality:

Database searched and no data found.

5.8 Detailed River Network

Are there any Detailed River Network entries within 500m of the study site? No

Database searched and no data found.

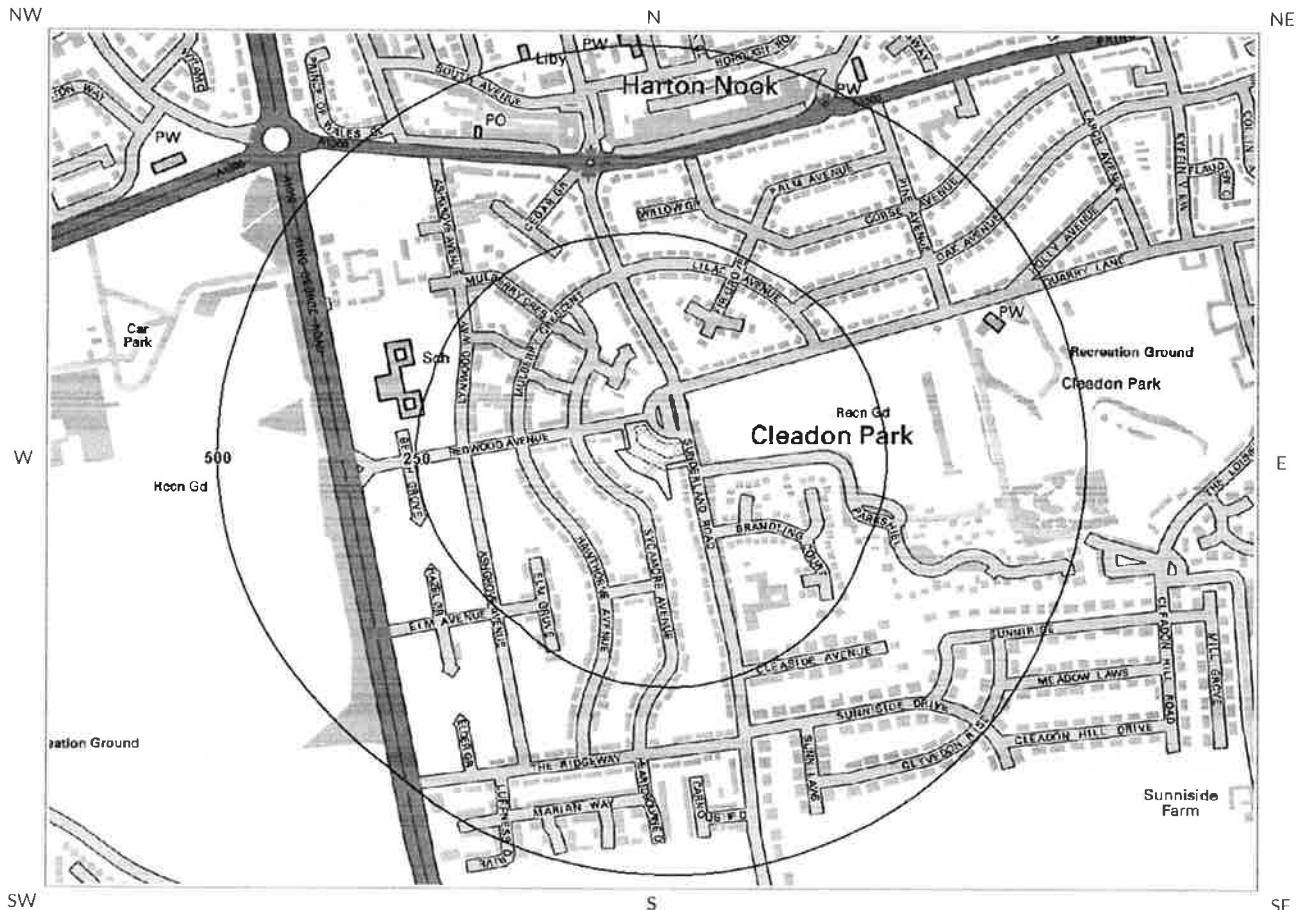
5.9 Surface Water Features

Are there any surface water features within 250m of the study site?

No

Database searched and no data found.








6. Environment Agency Flood Map for planning (from rivers and the sea)



Map Legend

Mapping sourced from  Ordnance Survey

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- | | | | |
|---|--------------------|---|-------------------------------------|
|  | Site Outline |  | Zone 2 Floodplain |
|  | Search Buffers (m) |  | Zone 3 Floodplain |
| | |  | Flood Storage Area |
| | |  | Area Benefiting from Flood Defences |
| | |  | Flood Defences |



6. Flooding

6.1 Zone 2 Flooding

Environment Agency Zone 2 floodplains estimate the annual probability of flooding as between 1 in 1000 (0.1%) and 1 in 100 (1%) from rivers and between 1 in 1000 (0.1%) and 1 in 200 (0.5%) from the sea. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning:

Is the site within 250m of an Environment Agency Zone 2 floodplain? No

Database searched and no data found.

6.2 Zone 3 Flooding

Zone 3 shows the extent of a river flood with a 1 in 100 (1%) or greater chance of occurring in any year or a sea flood with a 1 in 200 (0.5%) or greater chance of occurring in any year. Any relevant data is represented on Map 1 – Environment Agency Flood Map for Planning.

Is the site within 250m of an Environment Agency Zone 3 floodplain? No

Database searched and no data found.

6.3 Flood Defences

Are there any Flood Defences within 250m of the study site? No

Database searched and no data found.

6.4 Areas benefiting from Flood Defences

Are there any areas benefiting from Flood Defences within 250m of the study site? No

6.5 Areas benefiting from Flood Storage

Are there any areas used for Flood Storage within 250m of the study site? No

6.6 Groundwater Flooding Susceptibility Areas

6.6.1 Are there any British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site?

Yes

Does this relate to Clearwater Flooding or Superficial Deposits Flooding?

Clearwater Flooding

Notes: Groundwater flooding may either be associated with shallow unconsolidated sedimentary aquifers which overlie unproductive aquifers (Superficial Deposits Flooding), or with unconfined aquifers (Clearwater Flooding).

6.6.2 What is the highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions?

Potential below Surface

Where potential for groundwater flooding of property situated below ground level is indicated, this means that given the geological conditions there may be a groundwater flooding hazard to basements and other below surface infrastructure. Unless other relevant information, e.g. records of previous flooding, suggests groundwater flooding has occurred before in this area you need take no further action in relation to groundwater flooding hazard. If there are records of previous incidences of groundwater flooding, then is recommended that other information e.g. rainfall history, property type, and land drainage information in addition to previous records of flooding be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

6.7 Groundwater Flooding Confidence Areas

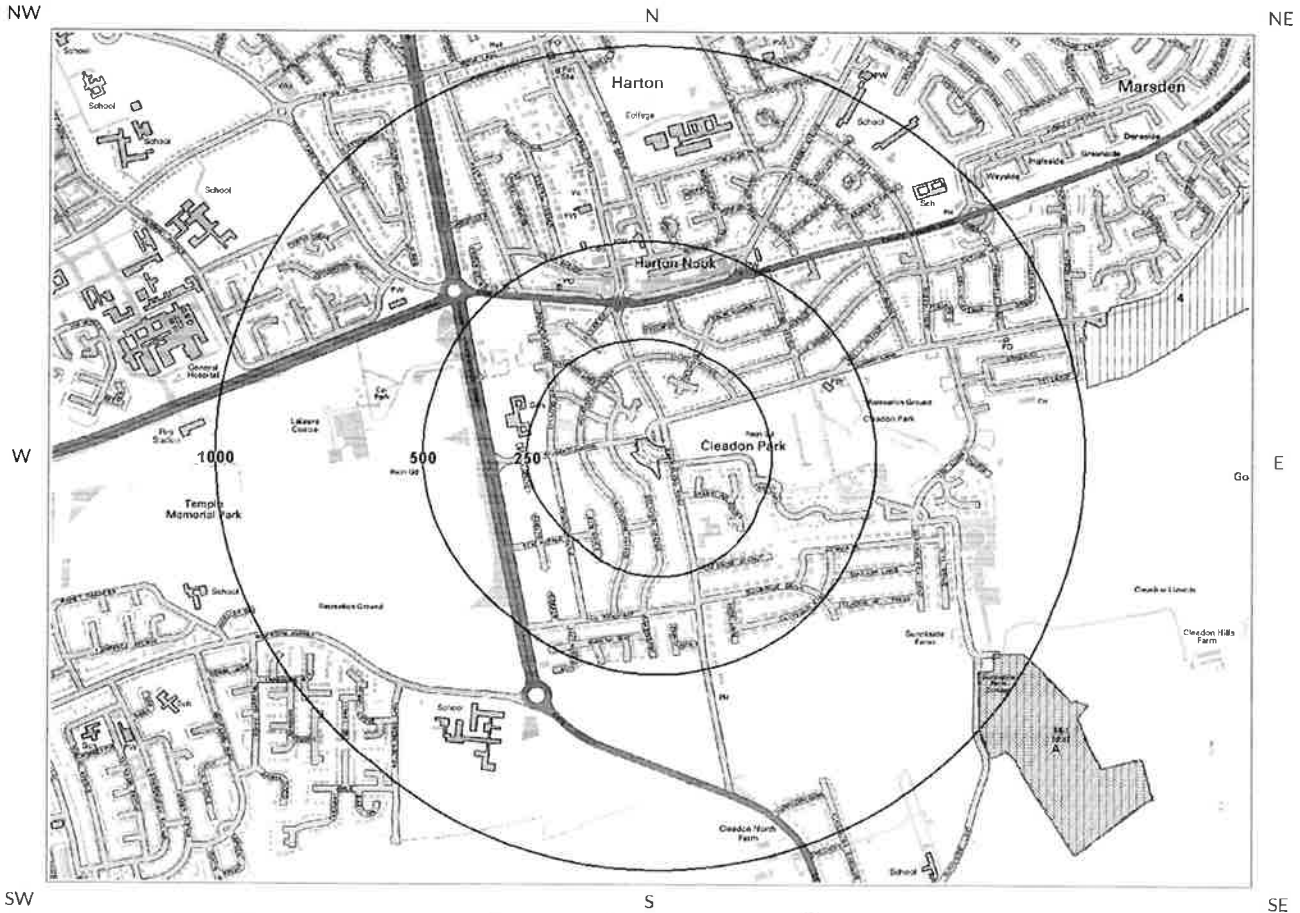
What is the British Geological Survey confidence rating in this result?

Low

Notes: Groundwater flooding is defined as the emergence of groundwater at the ground surface or the rising of groundwater into man-made ground under conditions where the normal range of groundwater levels is exceeded.

The confidence rating is on a threefold scale - Low, Moderate and High. This provides a relative indication of the BGS confidence in the accuracy of the susceptibility result for groundwater flooding. This is based on the amount and precision of the information used in the assessment. In areas with a relatively lower level of confidence the susceptibility result should be treated with more caution. In other areas with higher levels of confidence the susceptibility result can be used with more confidence.















7. Designated Environmentally Sensitive Sites Map



Map Legend

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- | | | | | |
|---|--|---|---|---|
|  Site Outline |  SAC |  SSSI |  NNR |  World Heritage Sites |
|  Areas of Outstanding Natural Beauty |  SPA |  Ramsar |  LNR |  Environmentally Sensitive Areas |
| |  Nitrate Vulnerable Zones |  Nitrate Sensitive Areas |  National Parks |  Ancient Woodlands |



7. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site? No

7.1 Records of Sites of Special Scientific Interest (SSSI) within 2000m of the study site: 2

The following Site of Special Scientific Interest (SSSI) records provided by Natural England/Countryside Council for Wales and Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	SSSI Name	Data Source
1A	910.0	SE	Cleadon Hill	Natural England
Not shown	1895.0	NE	Harton Down Hill	Natural England

7.2 Records of National Nature Reserves (NNR) within 2000m of the study site: 0

Database searched and no data found.

7.3 Records of Special Areas of Conservation (SAC) within 2000m of the study site: 0

Database searched and no data found.

7.4 Records of Special Protection Areas (SPA) within 2000m of the study site: 0

Database searched and no data found.

7.5 Records of Ramsar sites within 2000m of the study site: 0

Database searched and no data found.

7.6 Records of Ancient Woodland within 2000m of the study site:

0

Database searched and no data found.

7.7 Records of Local Nature Reserves (LNR) within 2000m of the study site:

4

The following Local Nature Reserve (LNR) records provided by Natural England/Countryside Council for Wales and Scottish Natural Heritage are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
3A	910.0	SE	Cleadon Hills	Natural England
4	1022.0	E	Marsden Old Quarry	Natural England
Not shown	1895.0	NE	Harton Down Hill	Natural England
Not shown	1991.0	SW	Tilsheds	Natural England

7.8 Records of World Heritage Sites within 2000m of the study site:

0

Database searched and no data found.

7.9 Records of Environmentally Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.10 Records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the study site:

0

Database searched and no data found.

7.11 Records of National Parks (NP) within 2000m of the study site:

0

Database searched and no data found.

7.12 Records of Nitrate Sensitive Areas within 2000m of the study site:

0

Database searched and no data found.

7.13 Records of Nitrate Vulnerable Zones within 2000m of the study site:

0

Database searched and no data found.



8. Natural Hazards Findings

8.1 Detailed BGS GeoSure Data

BGS GeoSure Data has been searched to 50m. The data is included in tabular format. If you require further information on geology and ground stability, please obtain a GroundSure Geolnsight, available from our website. The following information has been found:

8.1.1 Shrink Swell

What is the maximum Shrink-Swell* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

8.1.2 Landslides

What is the maximum Landslide* hazard rating identified on the study site? Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

* This indicates an automatically generated 50m buffer and site.

8.1.3 Soluble Rocks

What is the maximum Soluble Rocks* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

8.1.4 Compressible Ground

What is the maximum Compressible Ground* hazard rating identified on the study site?

Negligible

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

8.1.5 Collapsible Rocks

What is the maximum Collapsible Rocks* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

8.1.6 Running Sand

What is the maximum Running Sand* hazard rating identified on the study site?

Very Low

The following natural subsidence information provided by the British Geological Survey is not represented on mapping:

Hazard

Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.

* This indicates an automatically generated 50m buffer and site.



9. Mining

9.1 Coal Mining

Are there any coal mining areas within 75m of the study site? Yes

The following coal mining information provided by the Coal Authority is not represented on Mapping:

Distance	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

9.2 Shallow Mining

What is the subsidence hazard relating to shallow mining on-site*? Negligible

*Please note this data is searched with a 150m buffer.

9.3 Brine Affected Areas

Are there any brine affected areas within 75m of the study site? No

Guidance: No Guidance Required.

Contact Details

GroundSure Helpline
Telephone: 08444 159 000
info@groundsure.com



British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk



BGS Geological Hazards Reports and general geological enquiries

Environment Agency

National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 08708 506 506
Web: www.environment-agency.gov.uk
Email: enquiries@environment-agency.gov.uk



Public Health England

Public information access office
Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



The Coal Authority

200 Lichfield Lane
Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



Ordnance Survey

Adanac Drive, Southampton
SO16 0AS
Tel: 08456 050505



Local Authority

Authority: South Tyneside Metropolitan Borough Council
Phone: 0191 427 7000
Web: www.southtyneside.info
Address: Town Hall and Civic Offices, Westoe Road, South Shields, Tyne and Wear. NE33 2RL
Gemapping PLC

Virginia Villas, High Street, Hartley Witney,
Hampshire RG27 8NW
Tel: 01252 845444



Acknowledgements: Site of Special Scientific Interest, National Nature Reserve, Ramsar Site, Special Protection Area, Special Area of Conservation data is provided by, and used with the permission of, English Nature who retain the Copyright and Intellectual Property Rights for the data. PointX © Database Right/Copyright, Thomson Directories Limited © Copyright Link Interchange Network Limited © Database Right/Copyright and Ordnance Survey © Crown Copyright and/or Database Right. All Rights Reserved. Licence Number [03421028].

This report has been prepared in accordance with the GroundSure Ltd standard Terms and Conditions of business for work of this nature.

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions

implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (i) the Beneficiary,
- (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
- (iv) the first purchaser or first tenant of the Site, and
- (v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

(i) full payment of all relevant Fees and

(ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death

or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

(i) loss of profits;

(ii) loss of business;

(iii) depletion of goodwill and/or similar losses;

(iv) loss of anticipated savings;

(v) loss of goods;

(vi) loss of contract;

(vii) loss of use;

(viii) loss or corruption of data or information;

(ix) business interruption;

(x) any kind of special, indirect, consequential or pure economic loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30 days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are

(a) supplied to the Client's specification(s) and in any event

(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in

GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly given if delivered by hand or sent by first class post, facsimile or by email to the address, facsimile number or email address of the relevant party as may have been notified by each party to the other for such purpose or in the absence of such notification the last known address.

12.9 Such notice shall be deemed to have been received on the day of delivery if delivered by hand, facsimile or email (save to the extent such day is not a working day where it shall be deemed to have been delivered on the next working day) and on the second working day after the day of posting if sent by first class post.

12.10 The Contract constitutes the entire agreement between the parties and shall supersede all previous arrangements between the parties relating to the subject matter hereof.

12.11 Each of the provisions of the Contract is severable and distinct from the others and if one or more provisions is or should become invalid, illegal or unenforceable, the validity and enforceability of the remaining provisions shall not in any way be tainted or impaired.

12.12 This Contract shall be governed by and construed in accordance with English

law and any proceedings arising out of or connected with this Contract shall be subject to the exclusive jurisdiction of the English courts.

12.13 GroundSure is an executive member of the Council of Property Search Organisation (CoPSO) and has signed up to the Search Code administered by the Property Codes Compliance Board (PCCB). All Risk Screening Reports shall be supplied in accordance with the provisions of the Search Code.

12.14 If the Client or Beneficiary has a complaint about the Services, written notice should be given to the Compliance Officer at GroundSure who will respond in a timely manner.

12.15 The Client agrees that it shall, and shall procure that each Beneficiary shall, treat in confidence all Confidential Information and shall not, and shall procure that each Beneficiary shall not (i) disclose any Confidential Information to any third party other than in accordance with the terms of this Contract; and (ii) use Confidential Information for a purpose other than the exercise of its rights and obligations under this Contract. Subject to clause 6.6, nothing shall prevent the Client or any Beneficiary from disclosing Confidential Information to the extent required by law. © GroundSure Limited June 2013



Dunelm Geotechnical & Environmental Ltd
FOUNDATION HOUSE , ST. JOHNS ROAD,
DURHAM/MEADOWFIELD INDUSTRIAL
ESTATE, DH7 8TZ

GroundSure Reference: GS-1394121
Your Reference: 3000AILD6135
Report Date 11 Apr 2014
Report Delivery Method: Email - pdf

GroundSure Geosight

Address: 77,PARK AVENUE,SOUTH SHIELDS, NE34 8QL

Dear Sir/ Madam,

Thank you for placing your order with GroundSure. Please find enclosed the **GroundSure Geolnsight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 08444 159000 quoting the above GroundSure reference number.

Yours faithfully,

A handwritten signature in black ink, appearing to be "D. J. O.", written in a cursive style.

Managing Director
Groundsure Limited

Enc.
GroundSure Geolnsight



GroundSure GeoInsight

Address: 77, PARK AVENUE, SOUTH SHIELDS, NE34 8QL
Date: 11 Apr 2014
Reference: GS-1394121
Client: Dunelm Geotechnical & Environmental Ltd

NW

N

NE



W

E

SW

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SE

Aerial Photograph Capture date: 01-Jun-2009
Grid Reference: 437913,563904
Site Size: 0.43ha

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Overview of Findings

The GroundSure Geolnsight provides high quality geo-environmental information that allows geo-environmental professionals and their clients to make informed decisions and be forewarned of potential ground instability problems that may affect the ground investigation, foundation design and possibly remediation options that could lead to possible additional costs.

The report is based on the BGS 1:50,000 Digital Geological Map of Great Britain, BGS Geosure data; BRITPITS database; Shallow Mining data and Borehole Records, Coal Authority data including brine extraction areas, PBA non-coal mining and natural cavities database, Johnson Poole and Bloomer mining data and GroundSure's unique database including historical surface ground and underground workings.

For further details on each dataset, please refer to each individual section in the report as listed. Where the database has been searched a numerical result will be recorded. Where the database has not been searched '-' will be recorded.

Section 1: Geology		
1.1 Artificial Ground	1.1.1 Is there any Artificial Ground/ Made Ground present beneath the study site?	No
	1.1.2 Are there any records relating to permeability of artificial ground within the study site* boundary?	No
1.2 Superficial Geology and Landslips	1.2.1 Is there any Superficial Ground/Drift Geology present beneath the study site?	Yes
	1.2.2 Are there any records relating to permeability of superficial geology within the study site boundary?	Yes
	1.2.3 Are there any records of landslip within 500m of the study site boundary?	No
	1.2.4 Are there any records relating to permeability of landslips within the study site boundary?	No
1.3 Bedrock, Solid Geology & Faults	1.3.1 For records of Bedrock and Solid Geology beneath the study site* see the detailed findings section.	
	1.3.2 Are there any records relating to permeability of bedrock within the study site boundary?	Yes
	1.3.3 Are there any records of faults within 500m of the study site boundary?	Yes
1.4 Radon data	1.4.1 Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level?	The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level
	1.4.2 Is the property in an area where Radon Protection Measures are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment?	No radon protective measures are necessary

Section 2: Ground Workings	On-site	0-50m	51-250	251-500	501-1000
2.1 Historical Surface Ground Working Features from Small Scale Mapping	0	0	3	Not Searched	Not Searched
2.2 Historical Underground Workings from Small Scale Mapping	0	0	0	0	0
2.3 Current Ground Workings	0	0	0	4	3

Section 3: Mining, Extraction & Natural Cavities	On-site	0-50m	51-250	251-500	501-1000
3.1 Historical Mining	0	0	0	0	0
3.2 Coal Mining	1	0	0	0	0
3.3 Johnson Poole and Bloomer Mining Area	0	0	0	0	0
3.4 Non-Coal Mining	0	0	0	0	0
3.5 Non-Coal Mining Cavities	0	0	0	0	0
3.6 Natural Cavities	0	0	0	0	0
3.7 Brine Extraction	0	0	0	0	0
3.8 Gypsum Extraction	0	0	0	0	0
3.9 Tin Mining	0	0	0	0	0
3.10 Clay Mining	0	0	0	0	0

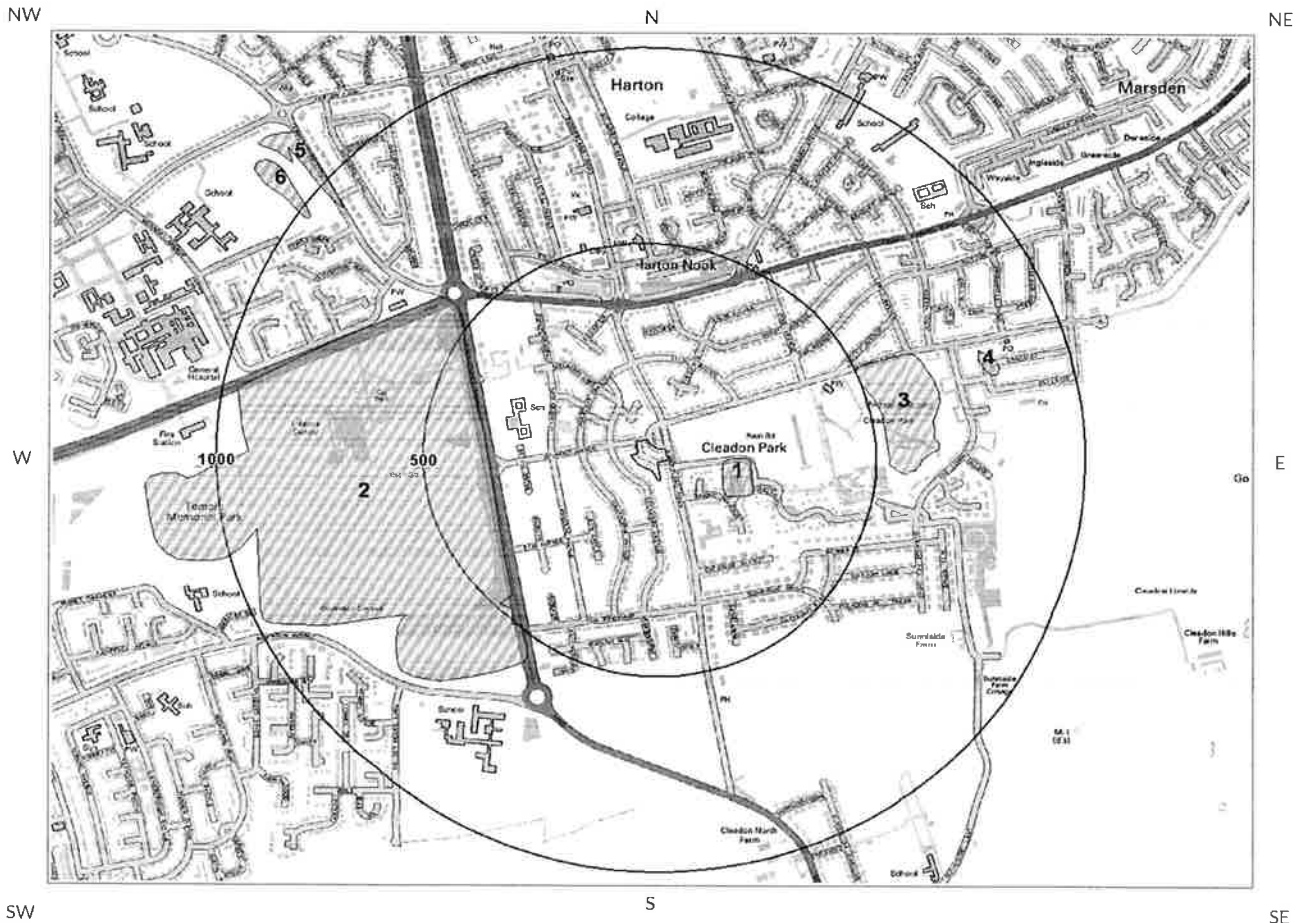
Section 4: Natural Ground Subsidence	On-site
4.1 Shrink Swell Clay	Very Low
4.2 Landslides	Very Low
4.3 Ground Dissolution of Soluble Rocks	Very Low
4.4 Compressible Deposits	Negligible
4.5 Collapsible Deposits	Very Low
4.6 Running Sand	Very Low

Section 5: Borehole Records	On-site	0-50m	51-250
5 BGS Recorded Boreholes	0	0	1

Section 6: Estimated Background Soil Chemistry	On-site	0-50m	51-250
6 Records of Background Soil Chemistry	1	1	15

1 Geology




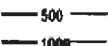




1.1 Artificial Ground Map



Artificial Ground Legend

Mapping sourced from  Ordnance Survey

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Ordnance Survey license 100035207.

- | | | | | | |
|---|--------------------|---|---------------------------|---|-------------------------------|
|  | Site Outline |  | Made Ground (undivided) |  | Disturbed Ground (undivided) |
|  | Search Buffers (m) |  | Worked Ground (undivided) |  | Landscaped Ground (undivided) |
| | |  | Infilled Ground |  | Reclaimed Ground |



1 Geology

1.1 Artificial Ground

1.1.1 Artificial/ Made Ground

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:021

Are there any records of Artificial/Made Ground within 500m of the study site boundary? Yes

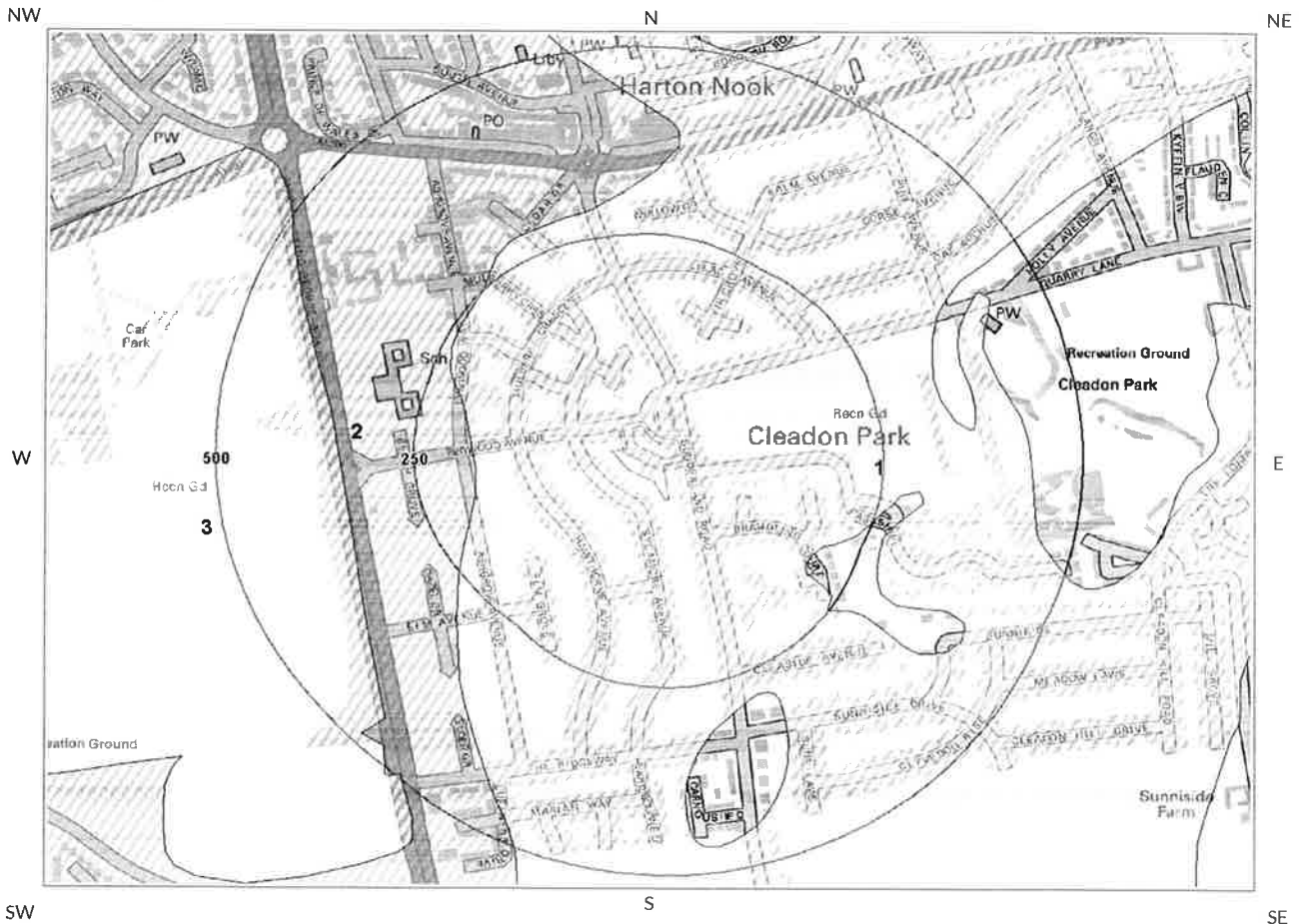
ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	129.0	E	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
2	341.0	W	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
3	498.0	NE	MGR-MGRD	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

1.1.2 Permeability of Artificial Ground

Are there any records relating to permeability of artificial ground within the study site boundary? No

Database searched and no data found.

1.2 Superficial Deposits and Landslips Map



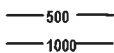
Superficial Deposits and Landslips Legend



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Site Outline



Search Buffers (m)

1.2 Superficial Deposits and Landslips

1.2.1 Superficial Deposits/ Drift Geology

Are there any records of Superficial Deposits/ Drift Geology within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	LEX Code	Description	Rock Description
1	0.0	On Site	TILLD-DMTN	TILL, DEVENSIAN	DIAMICTON
2	174.0	W	PELC-CLAY	PELAW CLAY MEMBER	CLAY
3	341.0	W	SUPNM-UNKN	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	UNKNOWN/UNCLASSIFIED ENTRY

1.2.2 Permeability of Superficial Ground

Are there any records relating to permeability of superficial ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Mixed	High	Low

1.2.3 Landslip

Are there any records of Landslip within 500m of the study site boundary? No

Database searched and no data found.

This Geology shows the main components as discrete layers, these are: Artificial / Made Ground, Superficial / Drift Geology and Landslips. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

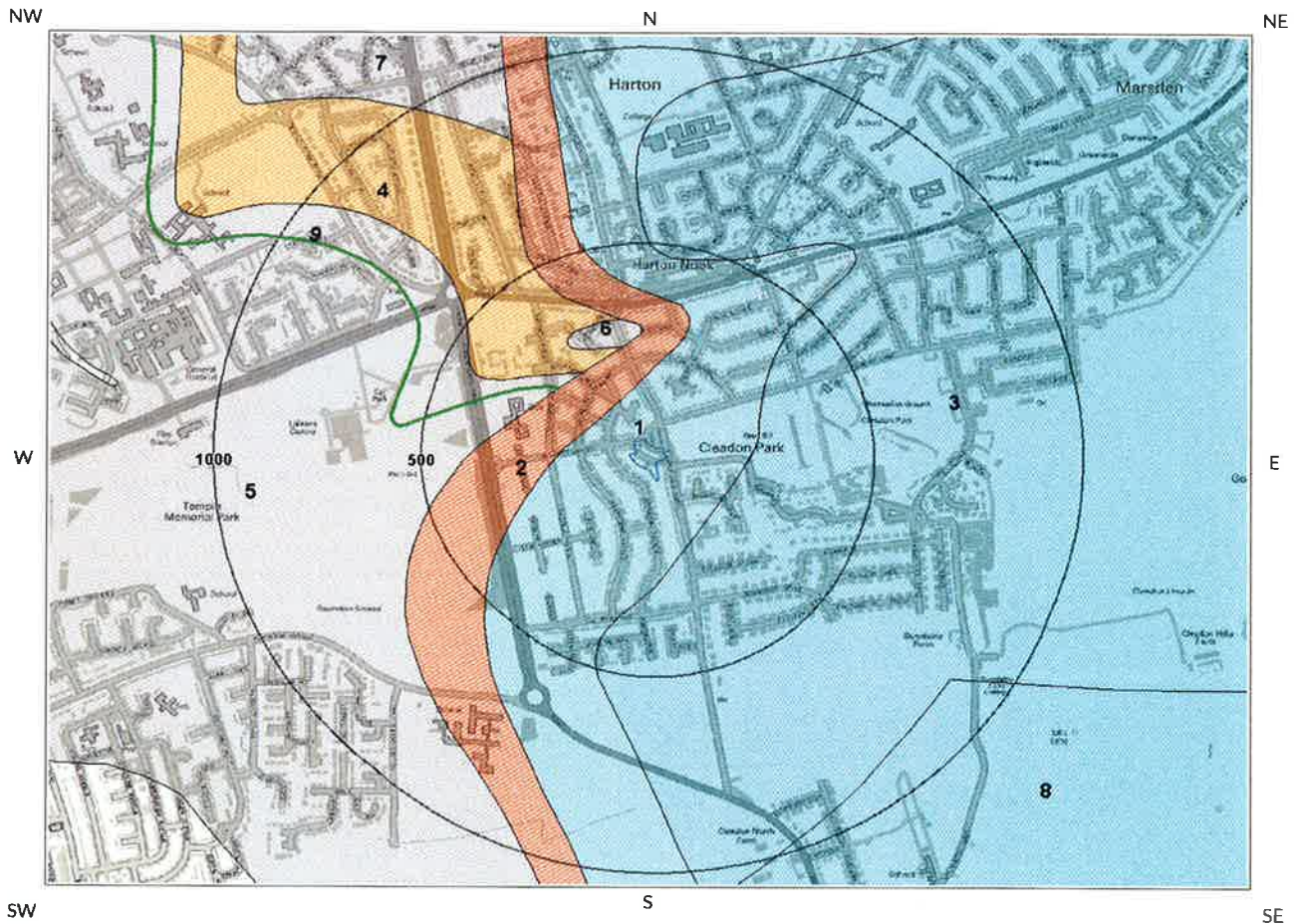
1.2.4 Landslip Permeability

Are there any records relating to permeability of landslips within the study site* boundary? No

Database searched and no data found.

* This includes an automatically generated 50m buffer zone around the site

1.3 Bedrock and Faults Map



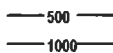
Bedrock and Faults Legend



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Site Outline



Search Buffers (m)

1.3 Bedrock, Solid Geology & Faults

The following geological information represented on the mapping is derived from 1:50,000 scale BGS Geological mapping, Sheet No:021

1.3.1 Bedrock/ Solid Geology

Records of Bedrock/ Solid Geology within 500m of the study site boundary:

ID	Distance (m)	Direction	LEX Code	Description	Rock Age
1	0.0	On Site	RML-DOST	Raisby Formation - Dolostone	Late Permian
2	99.0	NW	YWS-SDST	Yellow Sands Formation - Sandstone	Early Permian
3	155.0	SE	ROD-DOLO	Roker Formation - Dolostone	Late Permian
4	214.0	NW	GNP-SDST	Grindstone Post Member - Sandstone	Bolsovia (westphalian C)
5	214.0	NW	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovia (westphalian C) / Duckmantian (westphalian B)
6	241.0	N	PMCM-MDSS	Pennine Middle Coal Measures Formation - Mudstone, Siltstone And Sandstone	Bolsovia (westphalian C) / Duckmantian (westphalian B)

1.3.2 Permeability of Bedrock Ground

Are there any records relating to permeability of bedrock ground within the study site boundary? Yes

Distance (m)	Direction	Flow Type	Maximum Permeability	Minimum Permeability
0.0	On Site	Fracture	Very High	High

1.3.3 Faults

Are there any records of Faults within 500m of the study site boundary? Yes

ID	Distance (m)	Direction	Category Description	Feature Description
9	226.0	NW	ROCK	Coal seam, inferred

The geology map for the site and surrounding area are extracted from the BGS Digital Geological Map of Great Britain at 1:50,000 scale.

This Geology shows the main components as discrete layers, these are: Bedrock/ Solid Geology and linear features such as Faults. These are all displayed with the BGS Lexicon code for the rock unit and BGS sheet number. Not all of the main geological components have nationwide coverage.

* This includes an automatically generated 50m buffer zone around the site

1.4 Radon Data

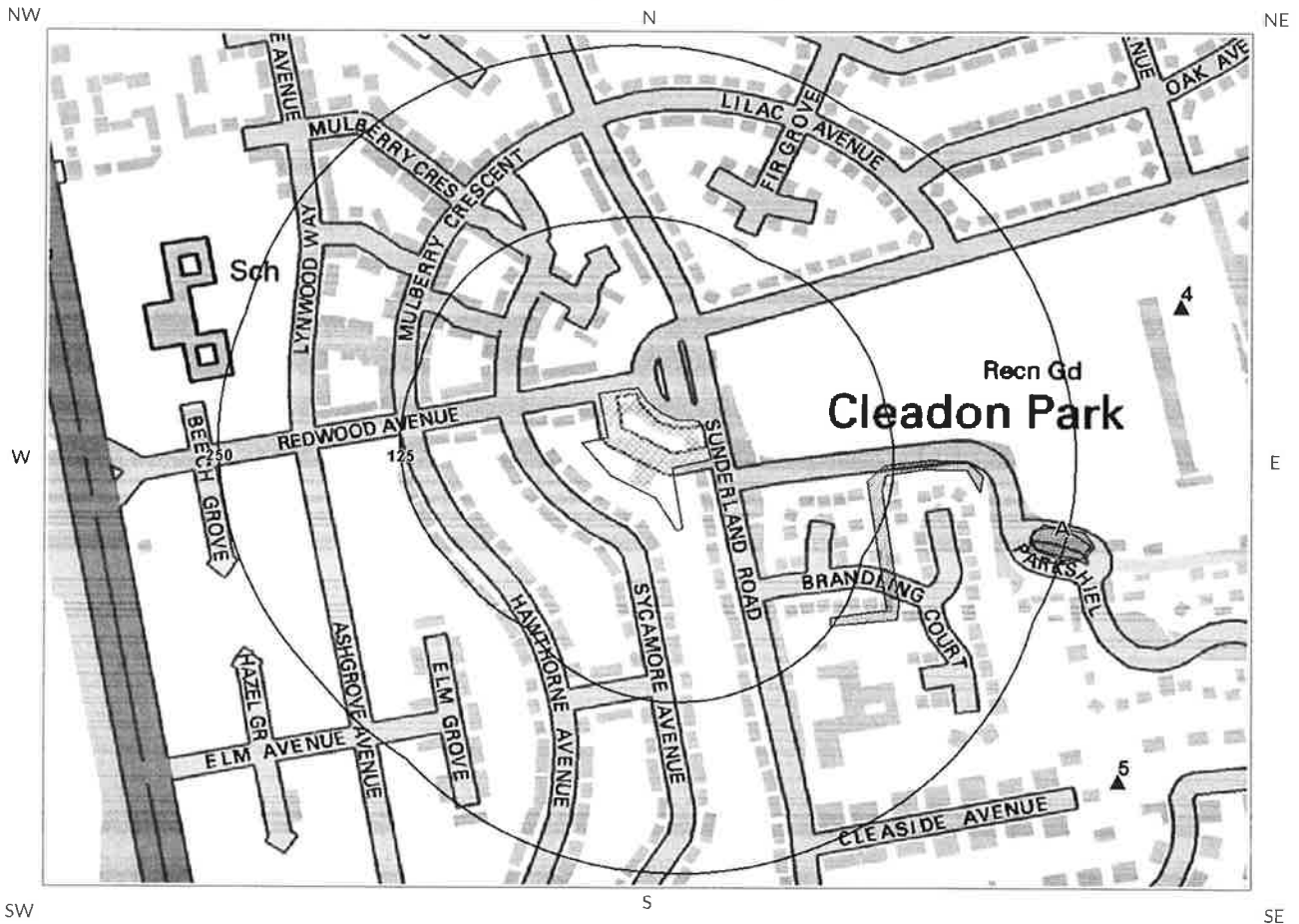
1.4.1 Radon Affected Areas

Is the property in a Radon Affected Area as defined by the Health Protection Agency (HPA) and if so what percentage of homes are above the Action Level? The property is not in a Radon Affected Area, as less than 1% of properties are above the Action Level

1.4.2 Radon Protection

Is the property in an area where Radon Protection are required for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment? No radon protective measures are necessary


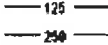



2 Ground Workings Map



Ground Workings Legend



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-  Site Outline
-  Search Buffers (m)
-  Historic Surface Ground Workings
-  Historic Underground Workings
-  Current Ground Workings



2 Ground Workings

2.1 Historical Surface Ground Working Features derived from Historical Mapping

This dataset is based on GroundSure's unique Historical Land Use Database derived from 1:10,560 and 1:10,000 scale historical mapping.

Are there any Historical Surface Ground Working Features within 250m of the study site boundary? Yes

The following Historical Surface Ground Working Features are provided by GroundSure:

ID	Distance (m)	Direction	NGR	Use	Date
1	108.0	E	438070 563817	Unspecified Ground Workings	1940
2A	225.0	E	438193 563818	Unspecified Heap	1974
3A	226.0	E	438191 563815	Unspecified Heap	1968

2.2 Historical Underground Working Features derived from Historical Mapping

This data is derived from the GroundSure unique Historical Land Use Database. It contains data derived from 1:10,000 and 1:10,560 historical Ordnance Survey Mapping and includes some natural topographical features (Shake Holes for example) as well as manmade features that may have implications for ground stability. Underground and mining features have been identified from surface features such as shafts. The distance that these extend underground is not shown.

Are there any Historical Underground Working Features within 1000m of the study site boundary? No

Database searched and no data found.

2.3 Current Ground Workings

This dataset is derived from the BGS BRITPITS database covering active; inactive mines; quarries; oil wells; gas wells and mineral wharves; and rail deposits throughout the British Isles.

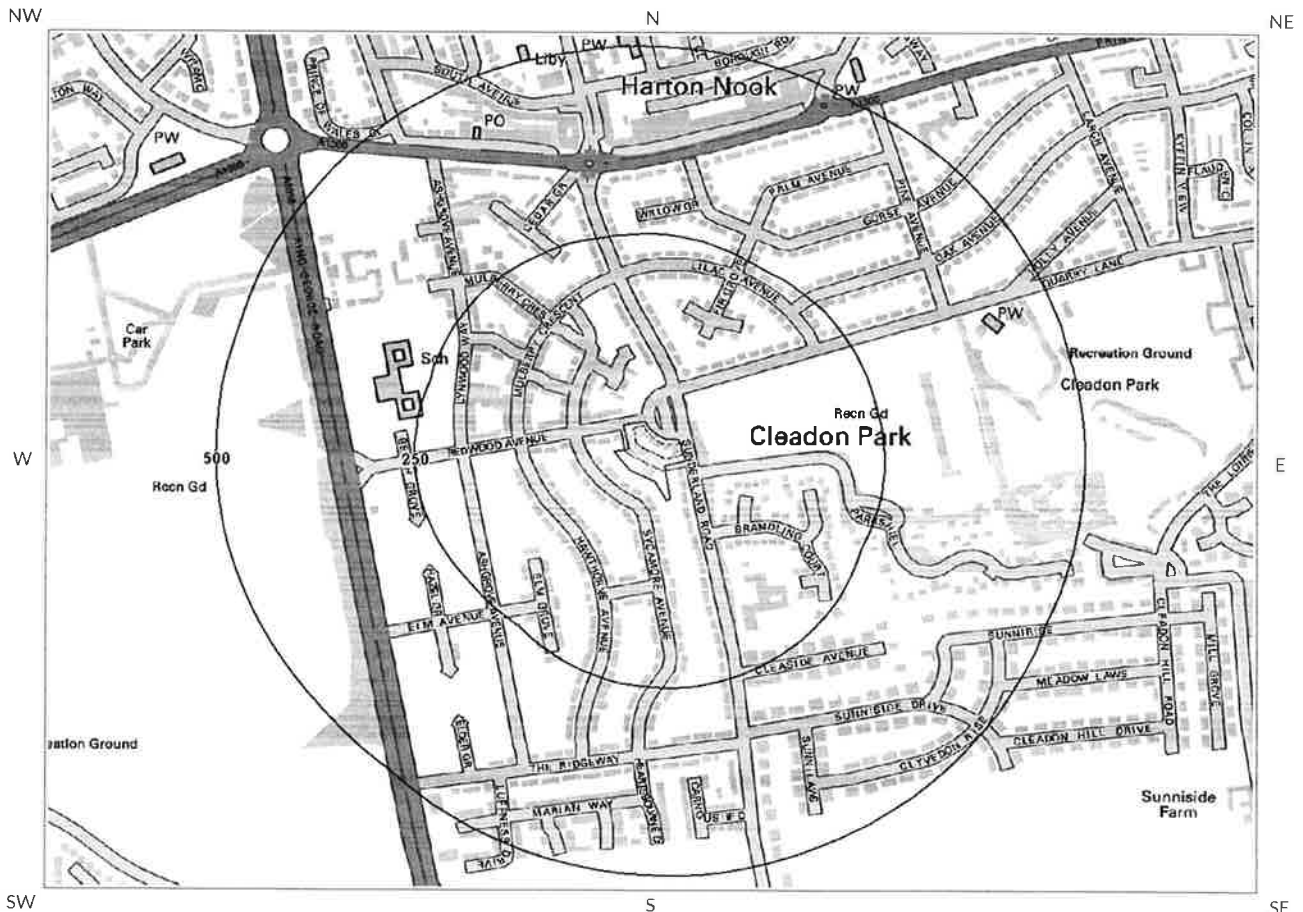
Are there any BGS Current Ground Workings within 1000m of the study site boundary? Yes

The following Current Ground Workings information is provided by British Geological Survey:

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
4	339.0	E	438274 563990	Dolomite	Cleadon Park	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
5	351.0	SE	438231 563644	Dolomite	Cleadon Park	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

ID	Distance (m)	Direction	NGR	Commodity Produced	Pit Name	Type of working	Status
Not shown	373.0	S	437989 563458	Dolomite	Cleadon Laws	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	488.0	NE	438380 564125	Dolomite	Cleadon Park	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	553.0	E	438500 563950	Dolomite	Cleadon	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	780.0	E	438699 564105	Dolomite	Cleadon Park	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased
Not shown	829.0	E	438771 564007	Dolomite	Cleadon Park	A surface mineral working. It may be termed Quarry, Sand Pit, Clay Pit or Opencast Coal Site	Ceased

3 Mining, Extraction & Natural Cavities Map



Mining, Extraction and Natural Cavities Legend

Mapping sourced from  Ordnance Survey

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- | | | | | | |
|---|--------------------|---|--------------------------|--|-----------------|
|  | Site Outline |  | Historical Mining |  | Highly likely |
|  | Search Buffers (m) |  | Non-Coal Mining Cavities |  | Likely |
|  | |  | Natural Cavities |  | Unlikely |
| | | | |  | Highly unlikely |
| | | | |  | Rare |



3 Mining, Extraction & Natural Cavities

3.1 Historical Mining

This dataset is derived from GroundSure unique Historical Land-use Database that are indicative of mining or extraction activities.

Are there any Historical Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.2 Coal Mining

This dataset provides information as to whether the study site lies within a known coal mining affected area as defined by the coal authority.

Are there any Coal Mining areas within 1000m of the study site boundary? Yes

The following Coal Mining information provided by the Coal Authority is not represented on Mapping:

Distance (m)	Direction	Details
0.0	On Site	The study site is located within the specified search distance of an identified mining area. Further details concerning this can be obtained from the Coal Authority Helpline on 0845 762 6848.

3.3 Johnson Poole and Bloomer

This dataset provides information as to whether the study site lies within an area where JPB hold information relating to mining.

Are there any JPB Mining areas within 1000m of the study site boundary? No

The following information provided by JPB is not represented on mapping: Database searched and no data found.

3.4 Non-Coal Mining

This dataset provides information as to whether the study site lies within an area which may have been subject to non-coal historic mining.

Are there any Non-Coal Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.5 Non-Coal Mining Cavities

This dataset provides information from the Peter Brett Associates (PBA) mining cavities database (compiled for the national study entitled "Review of mining instability in Great Britain, 1990" PBA has also continued adding to this database) on mineral extraction by mining.

Are there any Non-Coal Mining cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.6 Natural Cavities

This dataset provides information based on Peter Brett Associates natural cavities database.

Are there any Natural Cavities within 1000m of the study site boundary? No

Database searched and no data found.

3.7 Brine Extraction

This dataset provides information from the Brine Compensation Board which has been discontinued and is now covered by the Coal Authority.

Are there any Brine Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.8 Gypsum Extraction

This dataset provides information on Gypsum extraction from British Gypsum records.

Are there any Gypsum Extraction areas within 1000m of the study site boundary? No

Database searched and no data found.

3.9 Tin Mining

This dataset provides information on tin mining areas and is derived from tin mining records. This search is based upon postcode information to a sector level.

Are there any Tin Mining areas within 1000m of the study site boundary? No

Database searched and no data found.

3.10 Clay Mining

This dataset provides information on Kaolin and Ball Clay mining from relevant mining records.

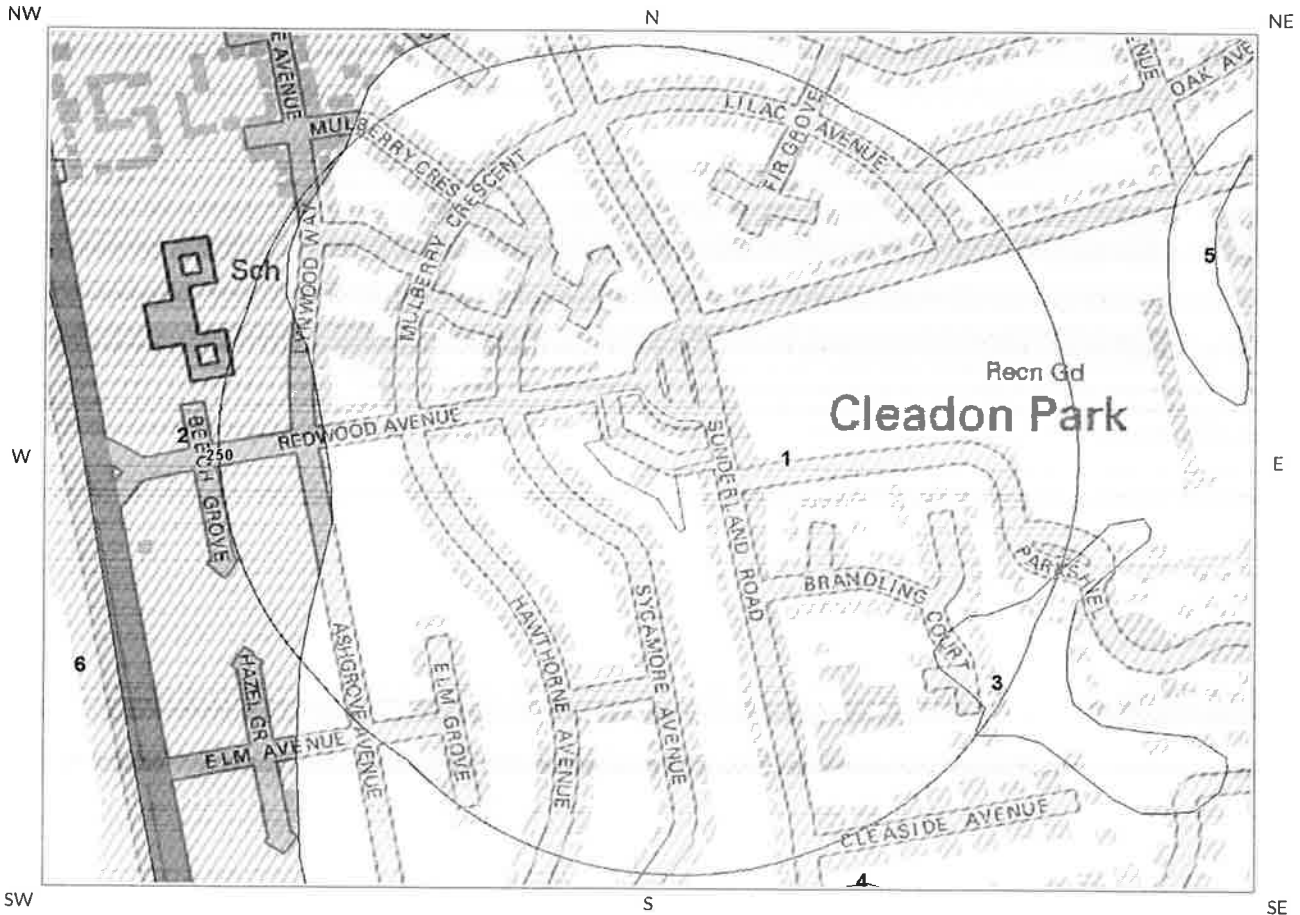
Are there any Clay Mining areas within 1000m of the study site boundary?

No

Database searched and no data found.

4 Natural Ground Subsidence



4.1 Shrink-Swell Clay Map






Shrink Swell Clay Legend

Mapping sourced from  Ordnance Survey

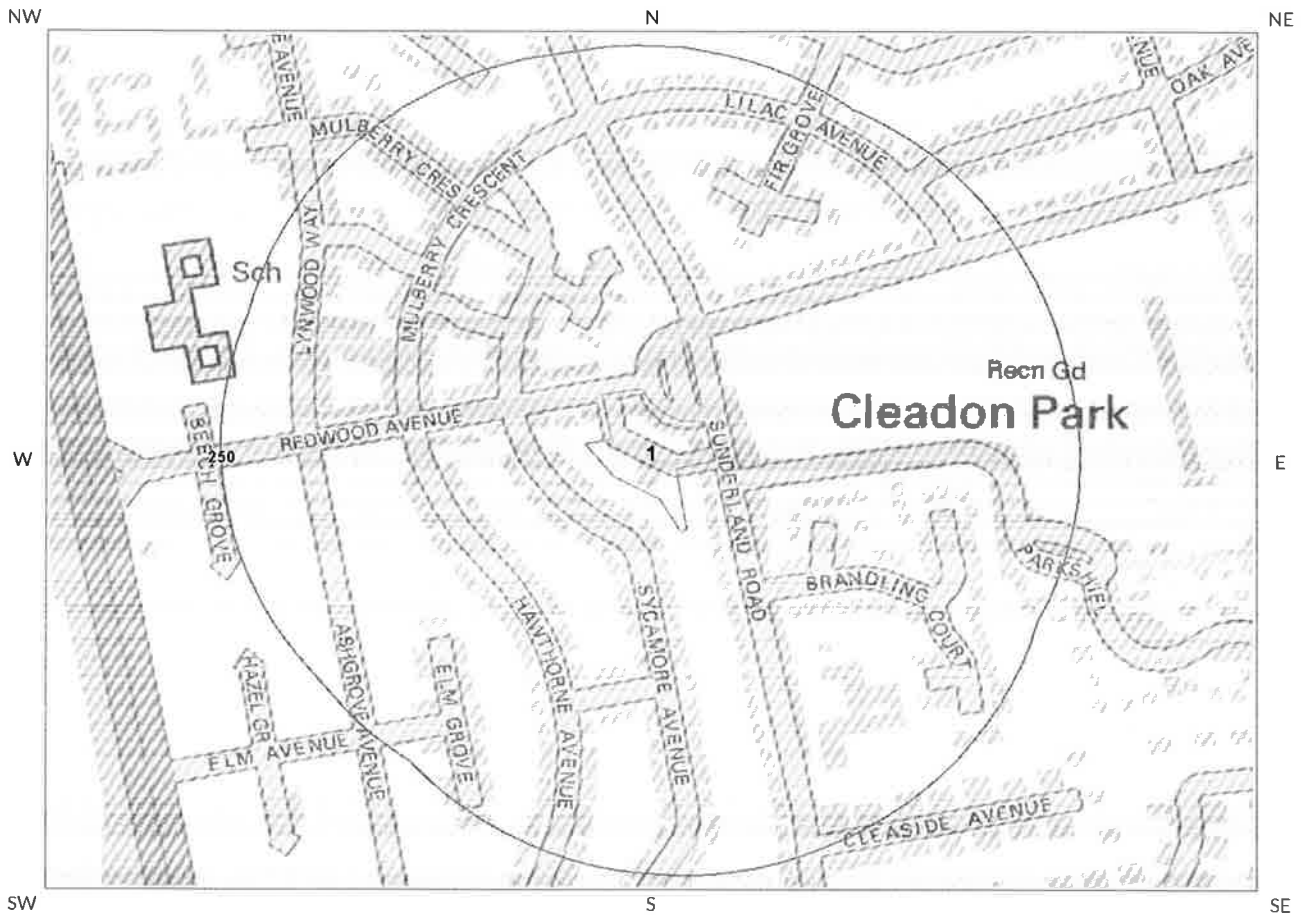
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 Site Outline
 Search Buffers (m)
 --- 125 ---
 --- 250 ---

 No Data / Null
 Negligible
 Very Low

 Low
 Moderate
 High

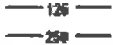
4.2 Landslides Map






Landslides Legend



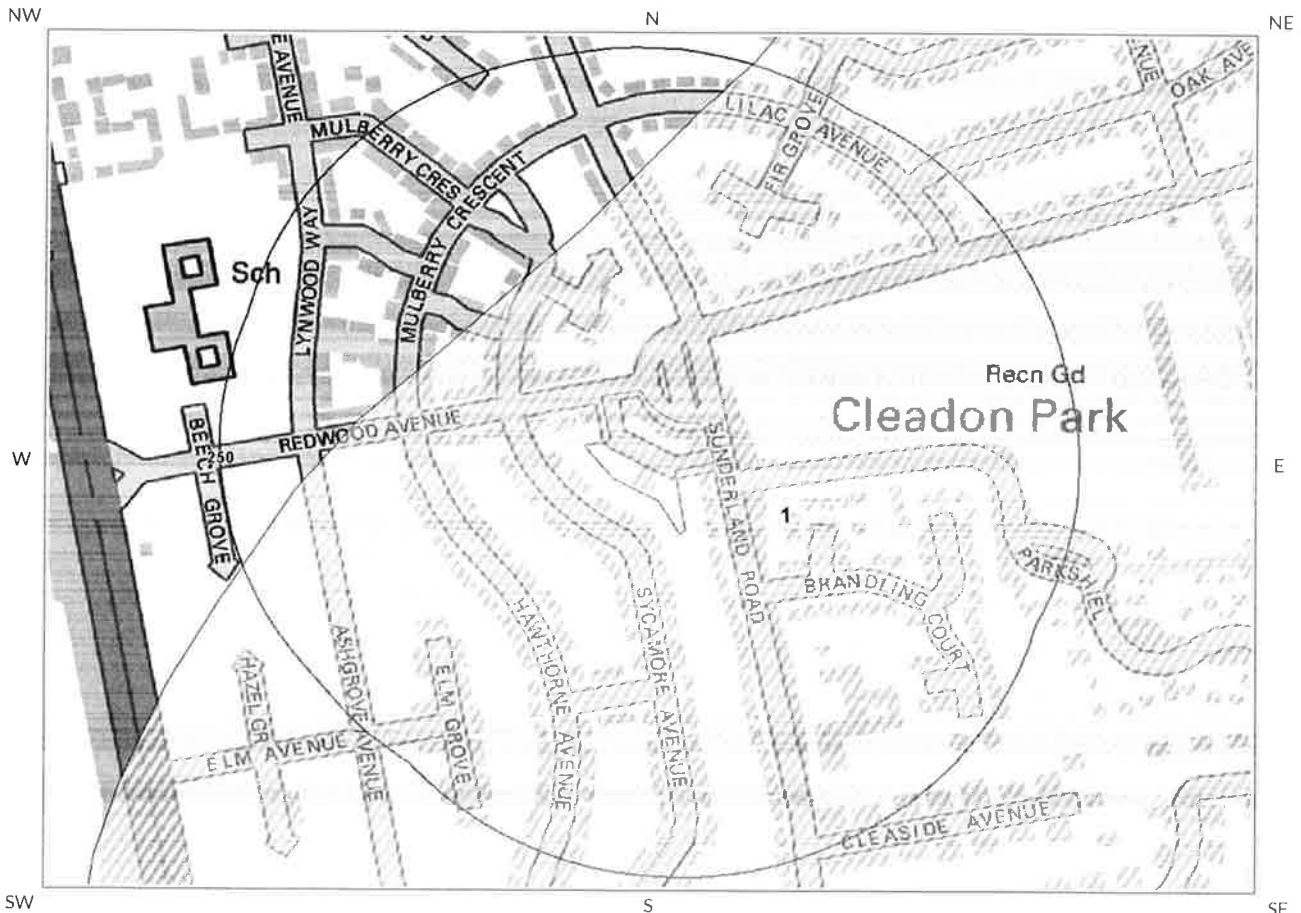
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-  Site Outline
-  Search Buffers (m)

-  No Data / Null
-  Negligible
-  Very Low

-  Low
-  Moderate
-  High










4.3 Ground Dissolution Soluble Rocks Map



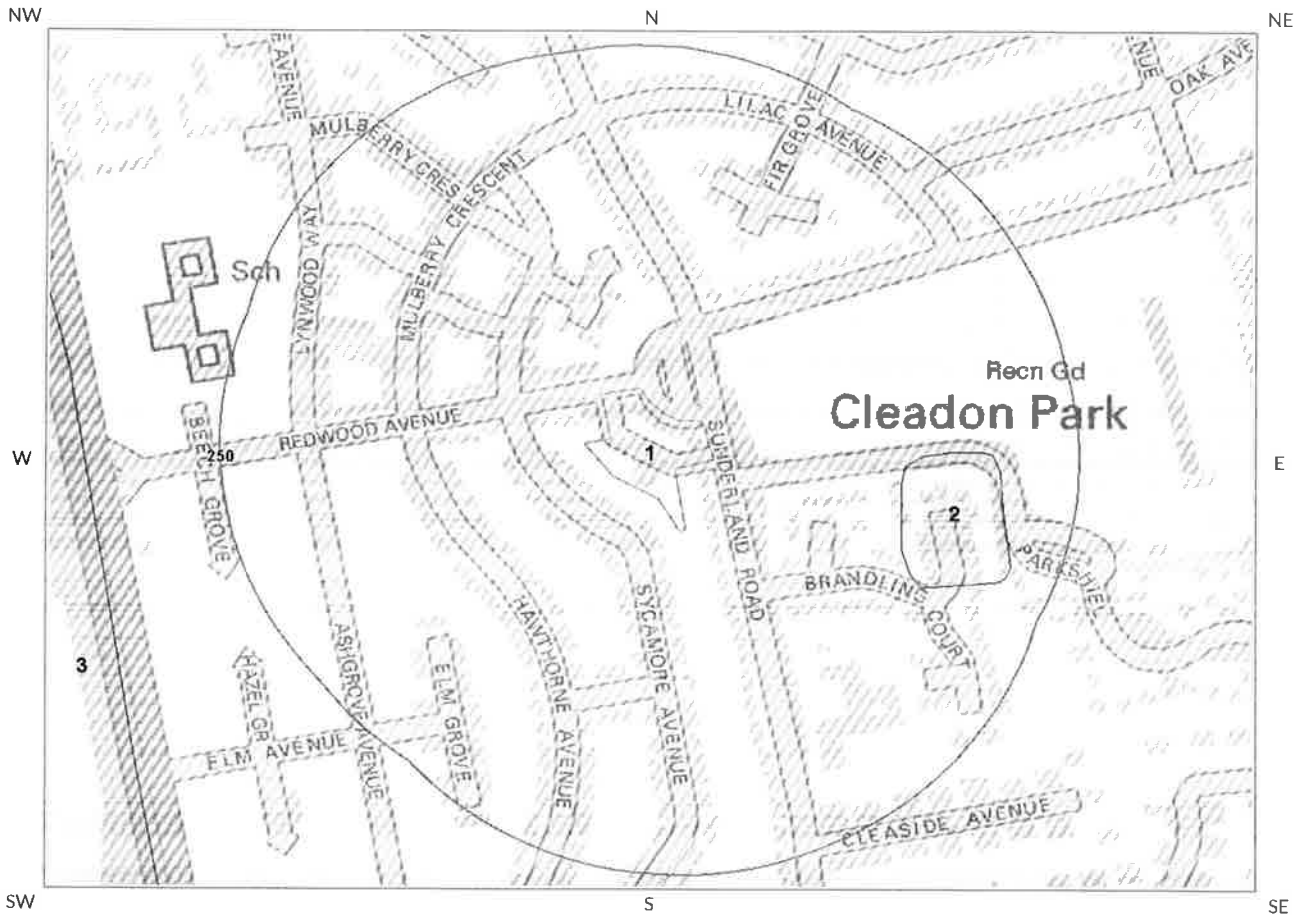
Ground Dissolution Soluble Rocks Legend



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- | | | | | | |
|---|--------------------|---|----------------|---|----------|
|  | Site Outline |  | No Data / Null |  | Low |
|  | Search Buffers (m) |  | Negligible |  | Moderate |
|  | |  | Very Low |  | High |

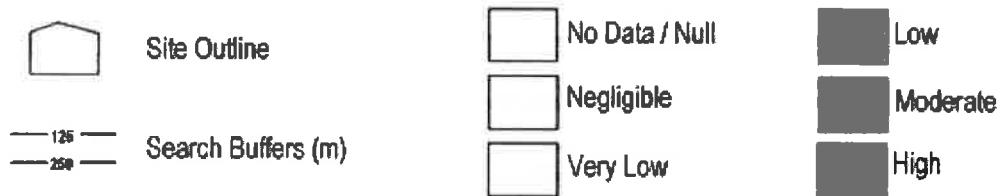
4.4 Compressible Deposits Map



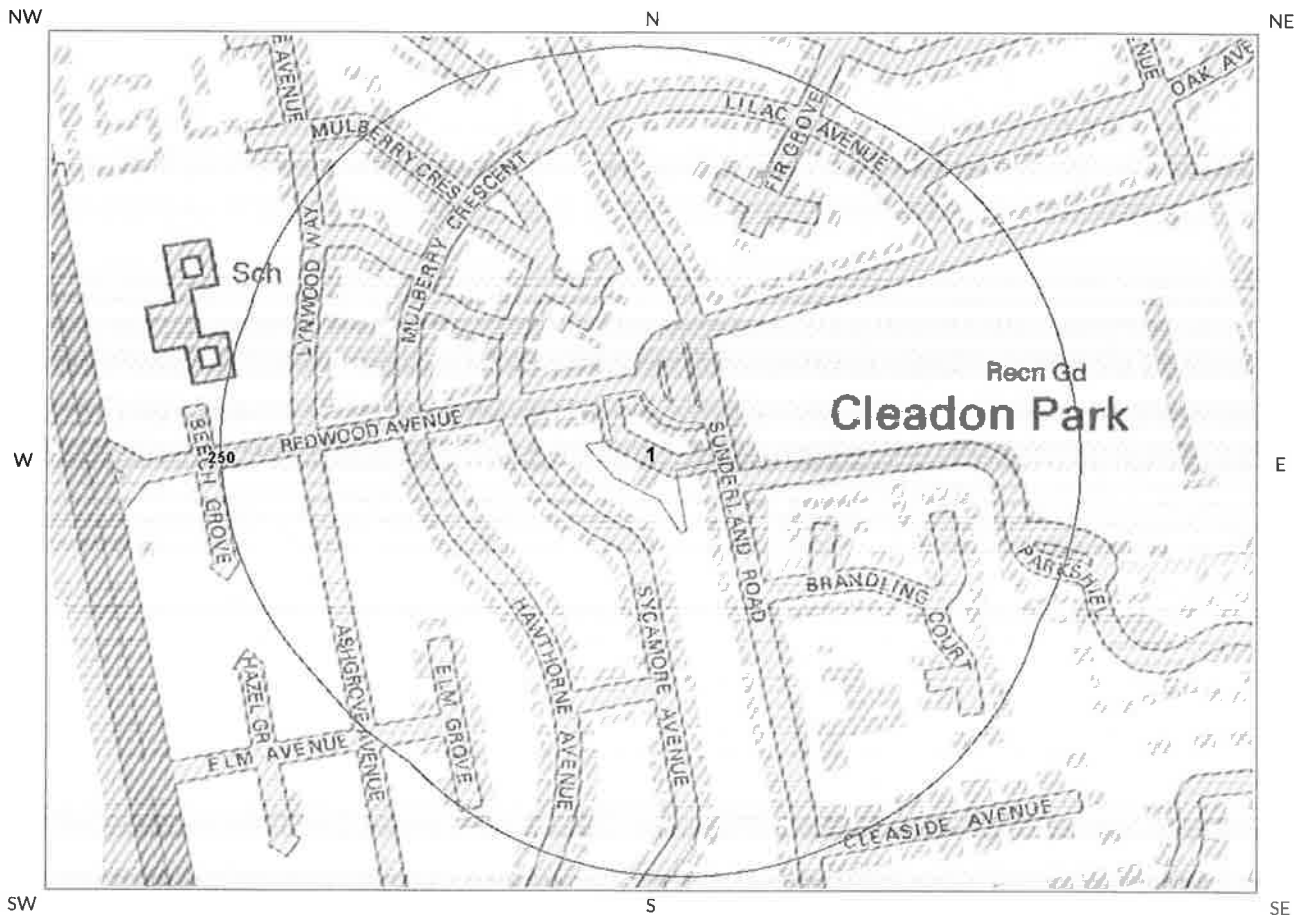
Compressible Deposits Legend



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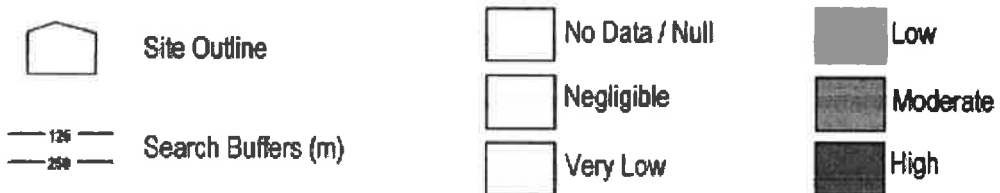
4.5 Collapsible Deposits Map



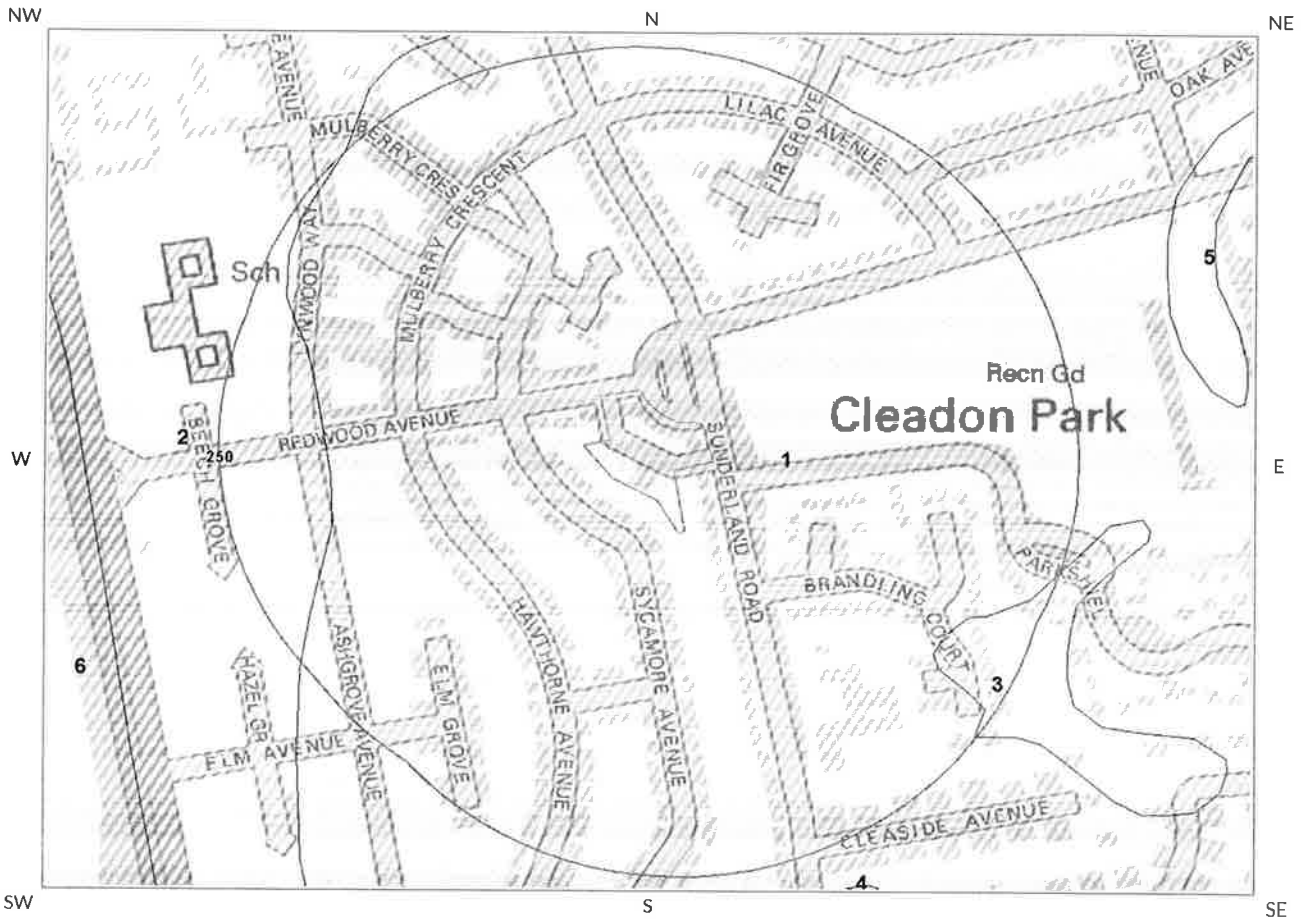
Collapsible Deposits Legend



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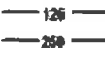




4.6 Running Sand Map



Running Sand Legend



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- | | | | | | |
|---|--------------------|---|----------------|---|----------|
|  | Site Outline |  | No Data / Null |  | Low |
|  | Search Buffers (m) |  | Negligible |  | Moderate |
| | |  | Very Low |  | High |



4 Natural Ground Subsidence

The National Ground Subsidence rating is obtained through the 6 natural ground stability hazard datasets, which are supplied by the British Geological Survey (BGS).

The following GeoSure data represented on the mapping is derived from the BGS Digital Geological map of Great Britain at 1:50,000 scale.

What is the maximum hazard rating of natural subsidence within the study site* boundary? Very Low

4.1 Shrink-Swell Clays

The following Shrink Swell information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Ground conditions predominantly low plasticity. No special actions required to avoid problems due to shrink-swell clays. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with shrink-swell clays.

4.2 Landslides

The following Landslides information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Slope instability problems are unlikely to be present. No special actions required to avoid problems due to landslides. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with landslides.

4.3 Ground Dissolution of Soluble Rocks

The following Ground Dissolution information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Significant soluble rocks are present. Problems unlikely except with considerable surface or subsurface water flow. No special actions required to avoid problems due to soluble rocks. No special ground investigation required or increased construction costs are likely. An increase in financial risk due to potential problems with soluble rocks is unlikely.

* This includes an automatically generated 50m buffer zone around the site

4.4 Compressible Deposits

The following Compressible Deposits information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Negligible	No indicators for compressible deposits identified. No special actions required to avoid problems due to compressible deposits. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with compressible deposits.

4.5 Collapsible Deposits

The following Collapsible Rocks information provided by the British Geological Survey:

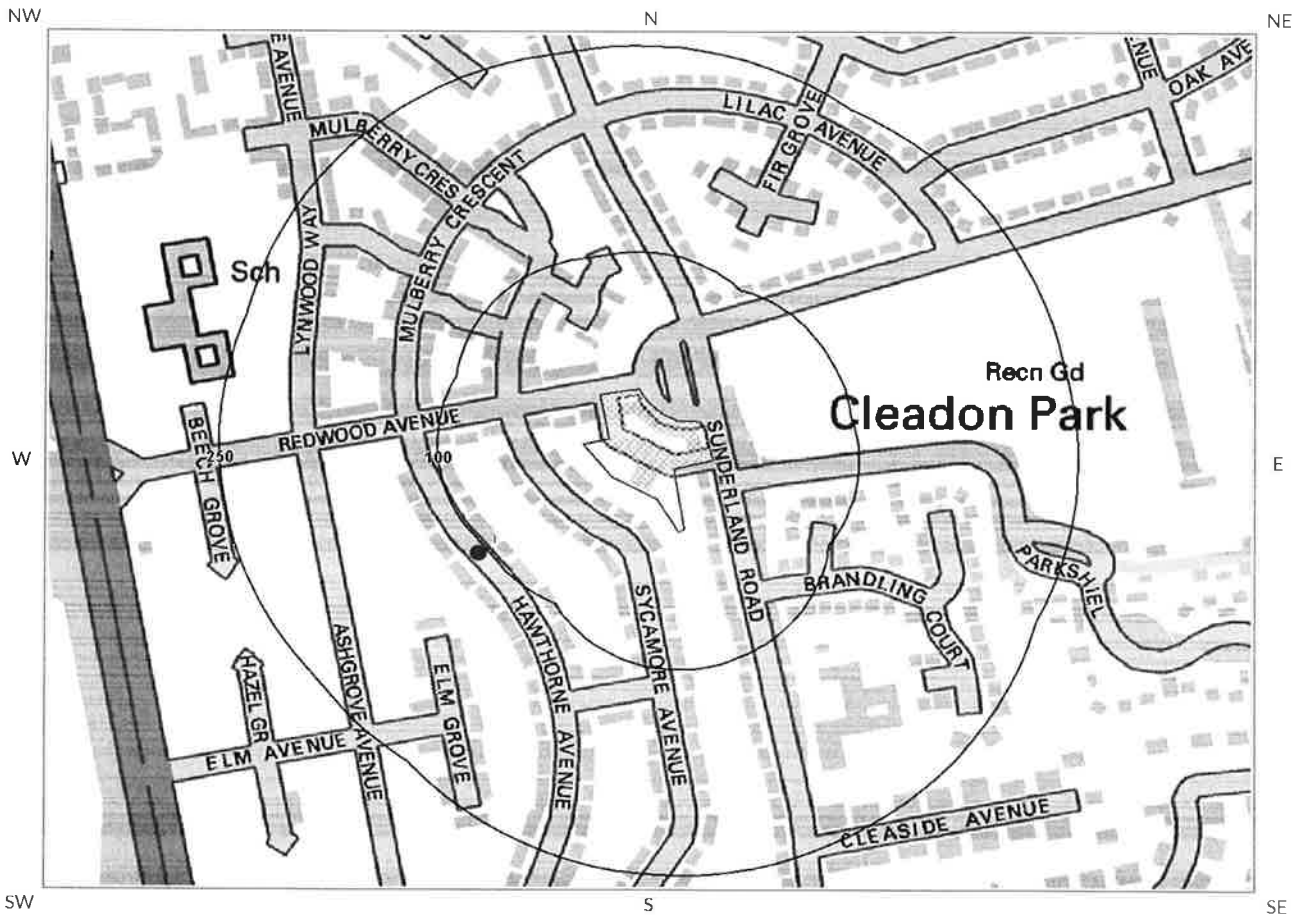
ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Deposits with potential to collapse when loaded and saturated are unlikely to be present. No special ground investigation required or increased construction costs or increased financial risk due to potential problems with collapsible deposits.

4.6 Running Sands

The following Running Sands information provided by the British Geological Survey:

ID	Distance (m)	Direction	Hazard Rating	Details
1	0.0	On Site	Very Low	Very low potential for running sand problems if water table rises or if sandy strata are exposed to water. No special actions required, to avoid problems due to running sand. No special ground investigation required, and increased construction costs or increased financial risks are unlikely due to potential problems with running sand.



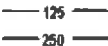
5 Borehole Records Map



Borehole Records Legend



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-  Site Outline
-  Borehole Locations
-  Search Buffers (m)



5 Borehole Records

The systematic analysis of data extracted from the BGS Borehole Records database provides the following information.

Records of boreholes within 250m of the study site boundary: 1

ID	Distance (m)	Direction	NGR	BGS Reference	Drilled Length	Borehole Name
1	107.0	SW	437790 563810	NZ36SE445	7.5	BAINBRIDGE AVENUE, SOUTH SHIELDS 2.

Additional online information is available for the following boreholes listed above:

#1: scans.bgs.ac.uk/sobi_scans/boreholes/18466515



6 Estimated Background Soil Chemistry

Records of background estimated soil chemistry within 250m of the study site boundary:

17

For further information on how this data is calculated and limitations upon its use, please see the GroundSure GeoInsight User Guide, available on request.

Distance (m)	Direction	Sample Type	Arsenic (As)	Cadmium (Cd)	Chromium (Cr)	Nickel (Ni)	Lead (Pb)
0.0	On Site	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
48.0	E	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
70.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
99.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<150 mg/kg
99.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<150 mg/kg
110.0	NE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
155.0	SE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
174.0	W	Sediment	15 - 25 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
176.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<150 mg/kg
184.0	SE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
192.0	SE	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
214.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg
214.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
228.0	W	Sediment	<15 mg/kg	<1.8 mg/kg	90 - 120 mg/kg	15 - 30 mg/kg	<150 mg/kg
239.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
241.0	N	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg	<150 mg/kg
248.0	NW	Sediment	<15 mg/kg	<1.8 mg/kg	60 - 90 mg/kg	30 - 45 mg/kg	<150 mg/kg

*As this data is based upon underlying 1:50,000 scale geological information, a 50m buffer has been added to the search radius.

Contact Details



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Telephone: 08444 159 000
info@groundsure.com



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Fax: 0115 936 3276.
Email: enquiries@bgs.ac.uk
Web: www.bgs.ac.uk



BGS Geological Hazards Reports and general geological enquiries

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British Gypsum Ltd
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Leicestershire
LE12 6HX



The Coal Authority
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Mansfield
Notts NG18 4RG
Tel: 0345 7626 848
DX 716176 Mansfield 5
www.coal.gov.uk



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Public Health England, Wellington House
133-155 Waterloo Road, London, SE1 8UG
<https://www.gov.uk/government/organisations/public-health-england>
Email: enquiries@phe.gov.uk
Main switchboard: 020 7654 8000



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Report Reference: GS-1394121
Client Reference: 3000AILD6135

Standard Terms and Conditions

1 Definitions

In these terms and conditions unless the context otherwise requires:

"Beneficiary" means the person or entity for whose benefit the Client has obtained the Services.

"Client" means the party or parties entering into a Contract with GroundSure.

"Commercial" means any building or property which is not Residential.

"Confidential Information" means the contents of this Contract and all information received from the Client as a result of, or in connection with, this Contract other than

(i) information which the Client can prove was rightfully in its possession prior to disclosure by GroundSure and

(ii) any information which is in the public domain (other than by virtue of a breach of this Contract).

"Support Services" means Support Services provided by GroundSure including, without limitation, interpreting third party and in-house environmental data, providing environmental support advice, undertaking environmental audits and assessments, Site investigation, Site monitoring and related items.

"Contract" means the contract between GroundSure and the Client for the provision of the Services, and which shall incorporate these terms and conditions, the Order, and the relevant User Guide.

"Third Party Data Provider" means any third party providing Third Party Content to GroundSure.

"Data Reports" means reports comprising factual data with no accompanying interpretation.

"Fees" has the meaning set out in clause 5.1.

"GroundSure" means GroundSure Limited, a company registered in England and Wales under number 03421028.

"GroundSure Materials" means all materials prepared by GroundSure and provided as part of the Services, including but not limited to Third Party Content, Data Reports, Mapping, and Risk Screening Reports.

"Intellectual Property" means any patent, copyright, design rights, trade or service mark, moral rights, data protection rights, know-how or trade mark in each case whether registered or not and including applications for the same or any other rights of a similar nature anywhere in the world.

"Mapping" means a map, map data or a combination of historical maps of various ages, time periods and scales.

"Order" means an electronic, written or other order form submitted by the Client requesting Services from GroundSure in respect of a specified Site.

"Ordnance Survey" means the Secretary of State for Business, Innovation and Skills, acting through Ordnance Survey, Adanac Drive, Southampton, SO16 0AS, UK.

"Order Website" means the online platform through which Orders may be placed by the Client and accepted by GroundSure.

"Report" means a Risk Screening Report or Data Report for Commercial or Residential property.

"Residential" means any building or property used as or intended to be used as a single dwelling.

"Risk Screening Report" means a risk screening report comprising factual data with an accompanying interpretation by GroundSure.

"Services" means any Report, Mapping and/or Support Services which GroundSure has agreed to provide by accepting an Order pursuant to clause 2.6.

"Site" means the area of land in respect of which the Client has requested GroundSure to provide the Services.

"Third Party Content" means data, database information or other information which is provided to GroundSure by a Third Party Data Provider.

"User Guide" means the user guide, as amended from time to time, available upon request from GroundSure and on the website (www.GroundSure.com) and forming part of this Contract.

2 Scope of Services, terms and conditions, requests for insurance and quotations

2.1 GroundSure agrees to provide the Services in accordance with the Contract.

2.2 GroundSure shall exercise reasonable skill and care in the provision of the Services.

2.3 Subject to clause 7.3 the Client acknowledges that it has not relied on any statement or representation made by or on behalf of GroundSure which is not set out and expressly agreed in writing in the Contract and all such statements and representations are hereby excluded to the fullest extent permitted by law.

2.4 The Client acknowledges that terms and conditions appearing on a Client's order form, printed stationery or other communication, or any terms or conditions implied by custom, practice or course of dealing shall be of no effect, and that this Contract shall prevail over all others in relation to the Order.

2.5 If the Client or Beneficiary requests insurance in conjunction with or as a result of the Services, GroundSure shall use reasonable endeavours to recommend such insurance, but makes no warranty that such insurance shall be available from insurers or that it will be offered on reasonable terms. Any insurance purchased by the Client or Beneficiary shall be subject solely to the terms of the policy issued by insurers and GroundSure will have no liability therefor. In addition you acknowledge and agree that GroundSure does not act as an agent or broker for any insurance providers. The Client should take (and ensure that the Beneficiary takes) independent advice to ensure that the insurance policy requested or offered is suitable for its requirements.

2.6 GroundSure's quotations or proposals are valid for a period of 30 days only unless an alternative period of time is explicitly stipulated by GroundSure. GroundSure reserves the right to withdraw any quotation or proposal at any time before an Order is accepted by GroundSure. GroundSure's acceptance of an Order

shall be binding only when made in writing and signed by GroundSure's authorised representative or when accepted through the Order Website.

3 The Client's obligations

3.1 The Client shall comply with the terms of this Contract and

(i) procure that the Beneficiary or any third party relying on the Services complies with and acts as if it is bound by the Contract and

(ii) be liable to GroundSure for the acts and omissions of the Beneficiary or any third party relying on the Services as if such acts and omissions were those of the Client.

3.2 The Client shall be solely responsible for ensuring that the Services are appropriate and suitable for its and/or the Beneficiary's needs.

3.3 The Client shall supply to GroundSure as soon as practicable and without charge all requisite information (and the Client warrants that such information is accurate, complete and appropriate), including without limitation any environmental information relating to the Site and shall give such assistance as GroundSure shall reasonably require in the provision of the Services including, without limitation, access to the Site, facilities and equipment.

3.4 Where the Client's approval or decision is required to enable GroundSure to carry out work in order to provide the Services, such approval or decision shall be given or procured in reasonable time and so as not to delay or disrupt the performance of the Services.

3.5 Save as expressly permitted by this Contract the Client shall not, and shall procure that the Beneficiary shall not, re-sell, alter, add to, or amend the GroundSure Materials, or use the GroundSure Materials in a manner for which they were not intended. The Client may make the GroundSure Materials available to a third party who is considering acquiring some or all of, or providing funding in relation to, the Site, but such third party cannot rely on the same unless expressly permitted under clause 4.

3.6 The Client is responsible for maintaining the confidentiality of its user name and password if using the Order Website and the Client acknowledges that GroundSure accepts no liability of any kind for any loss or damage suffered by the Client as a consequence of using the Order Website.

4 Reliance

4.1 The Client acknowledges that the Services provided by GroundSure consist of the presentation and analysis of Third Party Content and other content and that information obtained from a Third Party Data Provider cannot be guaranteed or warranted by GroundSure to be reliable.

4.2 In respect of Data Reports, Mapping and Risk Screening Reports, the following classes of person and no other are entitled to rely on their contents;

- (i) the Beneficiary,
- (ii) the Beneficiary's professional advisers, (iii) any person providing funding to the Beneficiary in relation to the Site (whether directly or as part of a lending syndicate),
- (iv) the first purchaser or first tenant of the Site, and
- (v) the professional advisers and lenders of the first purchaser or tenant of the Site.

4.3 In respect of Support Services, only the Client, Beneficiary and parties expressly named in a Report and no other parties are entitled to rely on its contents.

4.4 Save as set out in clauses 4.2 and 4.3 and unless otherwise expressly agreed in writing, no other person or entity of any kind is entitled to rely on any Services or Report issued or provided by GroundSure. Any party considering such Reports and Services does so at their own risk.

5 Fees and Disbursements

5.1 GroundSure shall charge and the Client shall pay fees at the rate and frequency specified in the written proposal, Order Website or Order acknowledgement form, plus (in the case of Support Services) all proper disbursements incurred by GroundSure. The Client shall in addition pay all value added tax or other tax payable on such fees and disbursements in relation to the provision of the Services (together "Fees").

5.2 The Client shall pay all outstanding Fees to GroundSure in full without deduction, counterclaim or set off within 30 days of the date of GroundSure's invoice or such other period as may be agreed in writing between GroundSure and the Client ("Payment Date"). Interest on late payments will accrue on a daily basis from the Payment Date until the date of payment (whether before or after judgment) at the rate of 8% per annum.

5.3 The Client shall be deemed to have agreed the amount of any invoice unless an objection is made in writing within 28 days of the date of the invoice. As soon as reasonably practicable after being notified of an objection, without prejudice to clause 5.2 a member of GroundSure's management team will contact the Client and the parties shall then use all reasonable endeavours to resolve the dispute within 15 days.

6 Intellectual Property and Confidentiality

6.1 Subject to

- (i) full payment of all relevant Fees and
- (ii) compliance with this Contract, the Client is granted (and is permitted to sub-licence to the Beneficiary) a royalty-free, worldwide, non-assignable and (save to the extent set out in this Contract) non-transferable licence to make use of the GroundSure Materials.

6.2 All Intellectual Property in the GroundSure Materials are and shall remain owned by GroundSure or GroundSure's licensors (including without limitation the Third Party Data Providers) the Client acknowledges, and shall procure acknowledgement by the Beneficiary of, such ownership. Nothing in this Contract purports to transfer or assign any rights to the Client or the Beneficiary in respect of such Intellectual Property.

6.3 Third Party Data Providers may enforce any breach of clauses 6.1 and 6.2 against the Client or Beneficiary.

6.4 The Client shall, and shall procure that any recipients of the GroundSure Materials shall:

(i) not remove, suppress or modify any trade mark, copyright or other proprietary marking belonging to GroundSure or any third party from the Services;

(ii) use the information obtained as part of the Services in respect of the subject Site only, and shall not store or reuse any information obtained as part of the Services provided in respect of adjacent or nearby sites;

(iii) not create any product or report which is derived directly or indirectly from the Services (save that those acting in a professional capacity to the Beneficiary may provide advice based upon the Services);

(iv) not combine the Services with or incorporate such Services into any other information data or service;

(v) not reformat or otherwise change (whether by modification, addition or enhancement), the Services (save that those acting for the Beneficiary in a professional capacity shall not be in breach of this clause 6.4(v) where such reformatting is in the normal course of providing advice based upon the Services);

(vi) where a Report and/or Mapping contains material belonging to Ordnance Survey, acknowledge and agree that such content is protected by Crown Copyright and shall not use such content for any purpose outside of receiving the Services; and

(vii) not copy in whole or in part by any means any map prints or run-on copies containing content belonging to Ordnance Survey (other than that contained within Ordnance Survey's OS Street Map) without first being in possession of a valid Paper Map Copying Licence from Ordnance Survey,

6.5 Notwithstanding clause 6.4, the Client may make reasonable use of the GroundSure Materials in order to advise the Beneficiary in a professional capacity. However, GroundSure shall have no liability in respect of any advice, opinion or report given or provided to Beneficiaries by the Client.

6.6 The Client shall procure that any person to whom the Services are made available shall notify GroundSure of any request or requirement to disclose, publish or disseminate any information contained in the Services in accordance with the Freedom of Information Act 2000, the Environmental Information Regulations 2004 or any associated legislation or regulations in force from time to time.

7. Liability: Particular Attention Should Be Paid To This Clause

7.1 This Clause 7 sets out the entire liability of GroundSure, including any liability for the acts or omissions of its employees, agents, consultants, subcontractors and Third Party Content, in respect of:

(i) any breach of contract, including any deliberate breach of the Contract by GroundSure or its employees, agents or subcontractors;

(ii) any use made of the Reports, Services, Materials or any part of them; and

(iii) any representation, statement or tortious act or omission (including negligence) arising under or in connection with the Contract.

7.2 All warranties, conditions and other terms implied by statute or common law are, to the fullest extent permitted by law, excluded from the Contract.

7.3 Nothing in the Contract limits or excludes the liability of the Supplier for death or personal injury resulting from negligence, or for any damage or liability incurred by the Client or Beneficiary as a result of fraud or fraudulent misrepresentation.

7.4 GroundSure shall not be liable for

- (i) loss of profits;
- (ii) loss of business;
- (iii) depletion of goodwill and/or similar losses;
- (iv) loss of anticipated savings;
- (v) loss of goods;
- (vi) loss of contract;
- (vii) loss of use;
- (viii) loss or corruption of data or information;
- (ix) business interruption;
- (x) any kind of special, indirect, consequential or pure economic

loss, costs, damages, charges or expenses;

(xi) loss or damage that arise as a result of the use of all or part of the GroundSure Materials in breach of the Contract;

(xii) loss or damage arising as a result of any error, omission or inaccuracy in any part of the GroundSure Materials where such error, omission or inaccuracy is caused by any Third Party Content or any reasonable interpretation of Third Party Content;

(xiii) loss or damage to a computer, software, modem, telephone or other property; and

(xiv) loss or damage caused by a delay or loss of use of GroundSure's internet ordering service.

7.5 GroundSure's total liability in relation to or under the Contract shall be limited to £10 million for any claim or claims.

7.6 GroundSure shall procure that the Beneficiary shall be bound by limitations and exclusions of liability in favour of GroundSure which accord with those detailed in clauses 7.4 and 7.5 (subject to clause 7.3) in respect of all claims which the Beneficiary may bring against GroundSure in relation to the Services or other matters arising pursuant to the Contract.

8 GroundSure's right to suspend or terminate

8.1 If GroundSure reasonably believes that the Client or Beneficiary has not provided the information or assistance required to enable the proper provision of the Services, GroundSure shall be entitled to suspend all further performance of the Services until such time as any such deficiency has been made good.

8.2 GroundSure shall be entitled to terminate the Contract immediately on written notice in the event that:

(i) the Client fails to pay any sum due to GroundSure within 30

days of the Payment Date; or

(ii) the Client (being an individual) has a bankruptcy order made against him or (being a company) shall enter into liquidation whether compulsory or voluntary or have an administration order made against it or if a receiver shall be appointed over the whole or any part of its property assets or undertaking or if the Client is struck off the Register of Companies or dissolved; or

(iii) the Client being a company is unable to pay its debts within the meaning of Section 123 of the Insolvency Act 1986 or being an individual appears unable to pay his debts within the meaning of Section 268 of the Insolvency Act 1986 or if the Client shall enter into a composition or arrangement with the Client's creditors or shall suffer distress or execution to be levied on his goods; or

(iv) the Client or the Beneficiary breaches any term of the Contract (including, but not limited to, the obligations in clause 4) which is incapable of remedy or if remediable, is not remedied within five days of notice of the breach.

9. Client's Right to Terminate and Suspend

9.1 Subject to clause 10.1, the Client may at any time upon written notice terminate or suspend the provision of all or any of the Services.

9.2 In any event, where the Client is a consumer (and not a business) he/she hereby expressly acknowledges and agrees that:

(i) the supply of Services under this Contract (and therefore the performance of this Contract) commences immediately upon GroundSure's acceptance of the Order; and

(ii) the Reports and/or Mapping provided under this Contract are
(a) supplied to the Client's specification(s) and in any event
(b) by their nature cannot be returned.

10 Consequences of Withdrawal, Termination or Suspension

10.1 Upon termination of the Contract:

(i) GroundSure shall take steps to bring to an end the Services in an orderly manner, vacate any Site with all reasonable speed and shall deliver to the Client and/or Beneficiary any property of the Client and/or Beneficiary in GroundSure's possession or control; and

(ii) the Client shall pay to GroundSure all and any Fees payable in respect of the performance of the Services up to the date of termination or suspension. In respect of any Support Services provided, the Client shall also pay GroundSure any additional costs incurred in relation to the termination or suspension of the Contract.

11 Anti-Bribery

11.1 The Client warrants that it shall:

(i) comply with all applicable laws, statutes and regulations relating to anti-bribery and anti-corruption including but not limited to the Bribery Act 2010;

(ii) comply with such of GroundSure's anti-bribery and anti-corruption policies as are notified to the Client from time to time; and

(iii) promptly report to GroundSure any request or demand for any undue financial or other advantage of any kind received by or on behalf of the Client in connection with the performance of this Contract.

11.2 Breach of this Clause 11 shall be deemed a material breach of this Contract.

12 General

12.1 The Mapping contained in the Services is protected by Crown copyright and must not be used for any purpose other than as part of the Services or as specifically provided in the Contract.

12.2 The Client shall be permitted to make one copy only of each Report or Mapping Order. Thereafter the Client shall be entitled to make unlimited copies of the Report or Mapping Order only in accordance with an Ordnance Survey paper map copy license available through GroundSure.

12.3 GroundSure reserves the right to amend or vary this Contract. No amendment or variation to this Contract shall be valid unless signed by an authorised representative of GroundSure.

12.4 No failure on the part of GroundSure to exercise, and no delay in exercising, any right, power or provision under this Contract shall operate as a waiver thereof.

12.5 Save as expressly provided in this Contract, no person other than the persons set out therein shall have any right under the Contract (Rights of Third Parties) Act 1999 to enforce any terms of the Contract.

12.6 The Secretary of State for Business, Innovation and Skills ("BIS") or BIS' successor body, as the case may be, acting through Ordnance Survey may enforce a breach of clause 6.4(vi) and clause 6.4(vii) of these terms and conditions against the Client in accordance with the provisions of the Contracts (Rights of Third Parties) Act 1999.

12.7 GroundSure shall not be liable to the Client if the provision of the Services is delayed or prevented by one or more of the following circumstances:

(i) the Client or Beneficiary's failure to provide facilities, access or information;

(ii) fire, storm, flood, tempest or epidemic;

(iii) Acts of God or the public enemy;

(iv) riot, civil commotion or war;

(v) strikes, labour disputes or industrial action;

(vi) acts or regulations of any governmental or other agency;

(vii) suspension or delay of services at public registries by Third Party Data Providers;

(viii) changes in law; or

(ix) any other reason beyond GroundSure's reasonable control.

In the event that GroundSure is prevented from performing the Services (or any part thereof) in accordance with this clause 12.6 for a period of not less than 30 days then GroundSure shall be entitled to terminate this Contract immediately on written notice to the Client.

12.8 Any notice provided shall be in writing and shall be deemed to be properly



GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

Map date: 2012

Scale: 1:10,000

Printed at: 1:10,000



Produced by
GroundSure Environmental Insight
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E: info@groundsure.com
W: www.groundsure.com

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Production date: 11 April 2014

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GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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ENVIRONMENTAL INSIGHT

Site Details:

77, PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

Map date: 1985

Scale: 1:10,000

Printed at: 1:10,000



Surveyed 1983
Revised 1985
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1984
Revised 1985
Edition N/A
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Site Details:
 77 PARK AVENUE SOUTH
 SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid
Map date: 1974
Scale: 1:10,000
Printed at: 1:10,000



Surveyed 1974
 Revised 1974
 Edition N/A
 Copyright N/A
 Levelled N/A

Surveyed 1974
 Revised 1974
 Edition N/A
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 Levelled N/A

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Site Details:

77 PARK AVENUE SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: Provisional

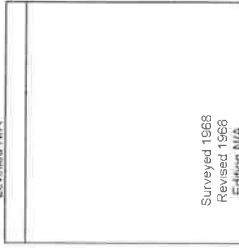
Map date: 1967-1968

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1967
Revised 1967
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1968
Revised 1966
Edition N/A
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Site Details:
 77 PARK AVENUE, SOUTH SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: Provisional
Map date: 1950
Scale: 1:10,560
Printed at: 1:10,560



Surveyed 1940
 Revised 1940
 Edition N/A
 Copyright N/A
 Licensed N/A

Surveyed 1940
 Revised 1940
 Edition N/A
 Copyright N/A
 Licensed N/A

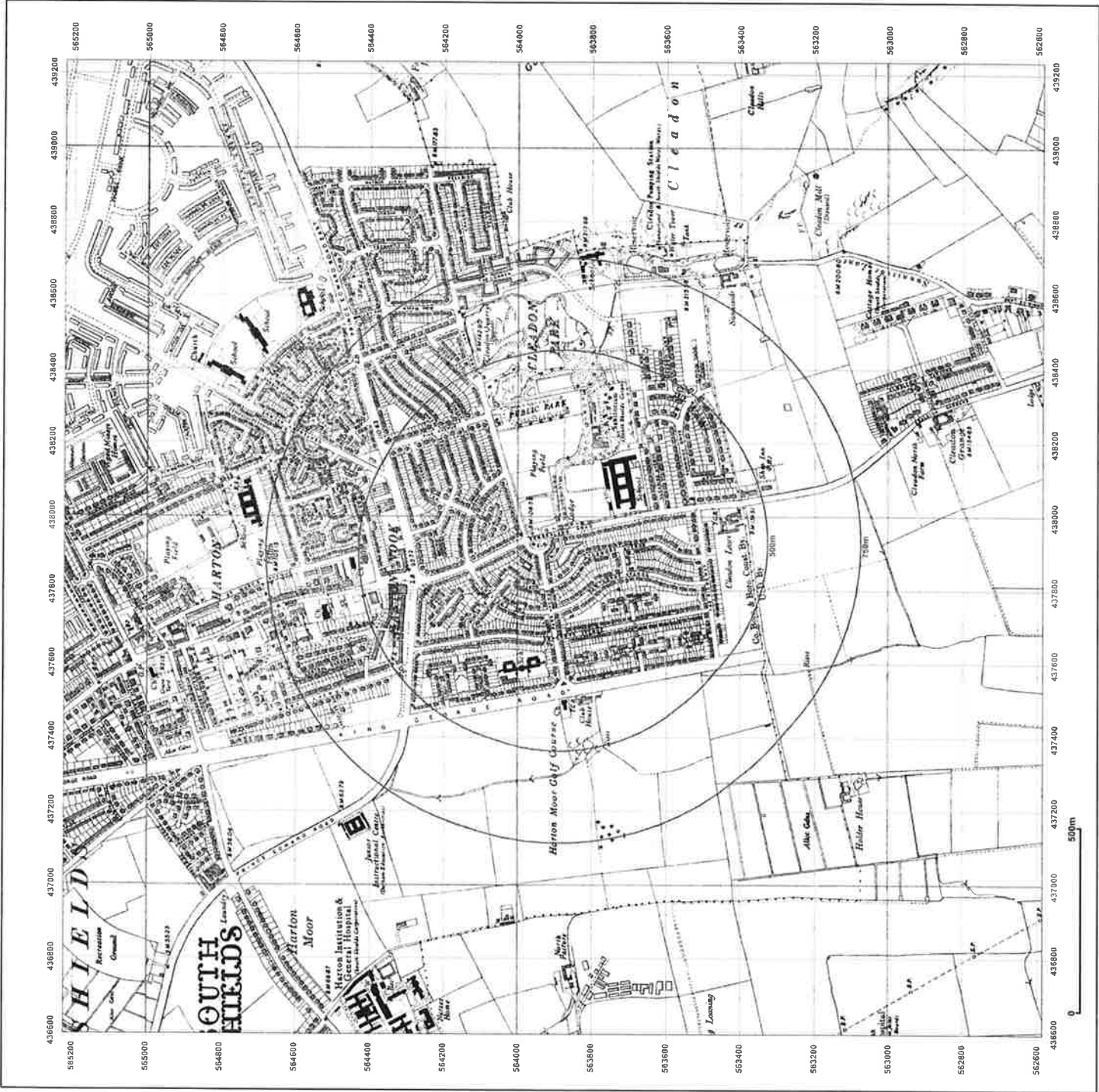
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Site Details:

77, PARK AVENUE, SOUTH SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1938

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1856
Revised 1938
Edition 1938
Copyright N/A
Levelled N/A

Surveyed 1855
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

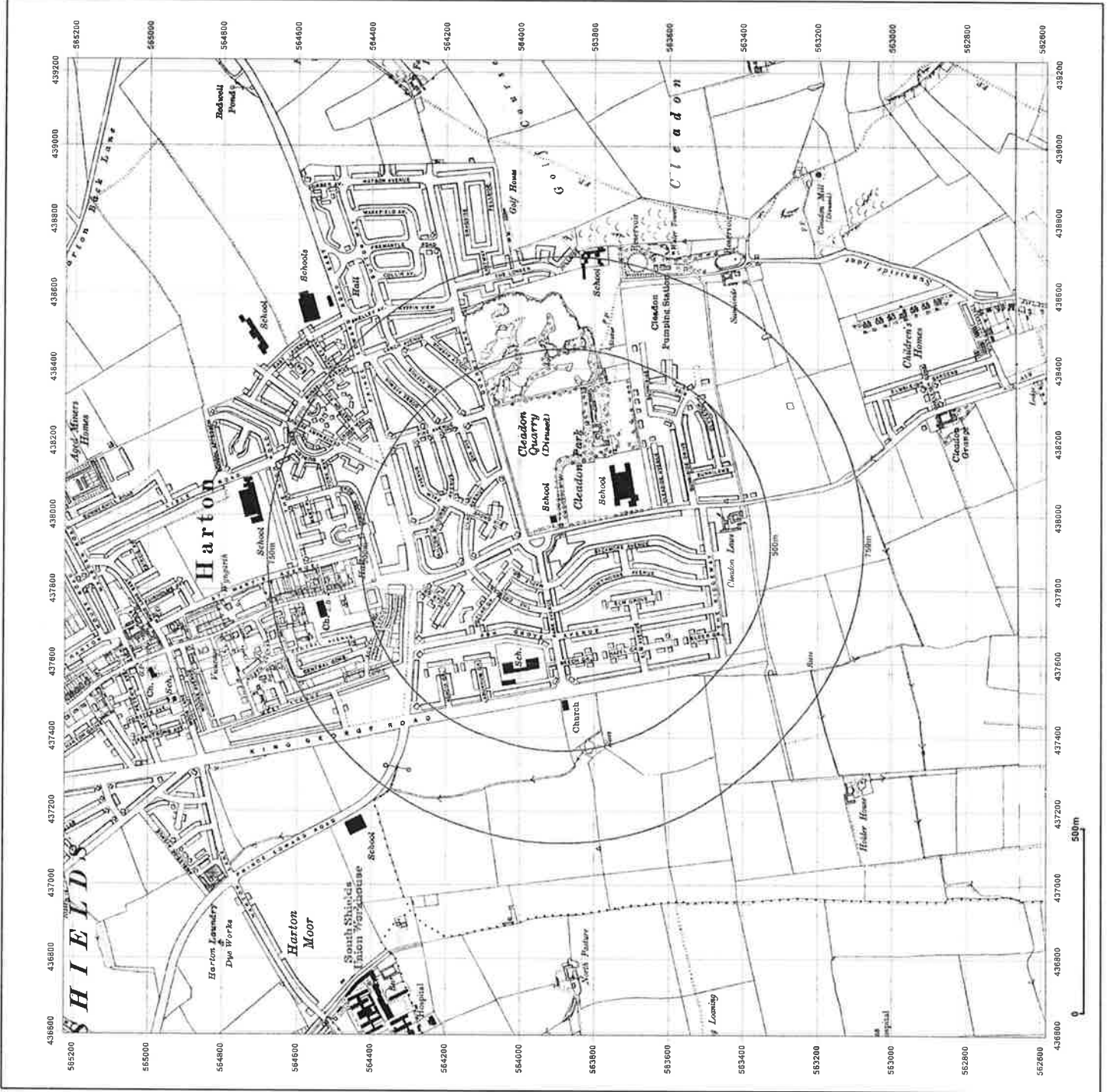


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Site Details:

77 PARK AVENUE, SOUTH SHIELDS, NE34 6QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

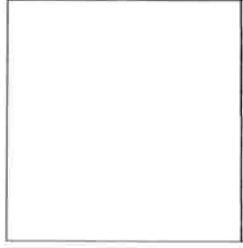
Map date: 1921

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1856
 Revised 1921
 Edition N/A
 Copyright N/A
 Levelled N/A



Surveyed 1857
 Revised 1921
 Edition N/A
 Copyright N/A
 Levelled N/A

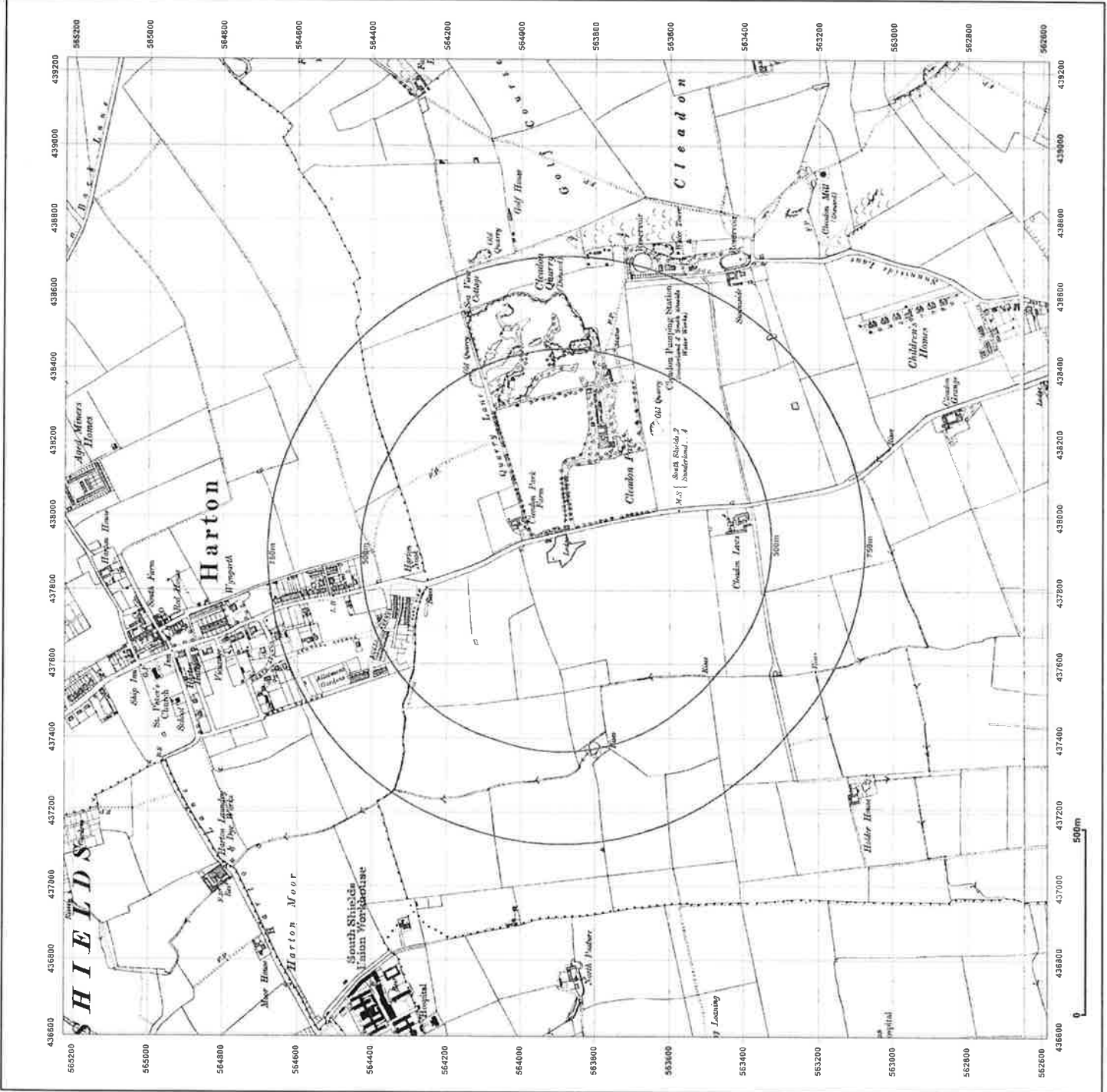


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GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1855
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1855
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

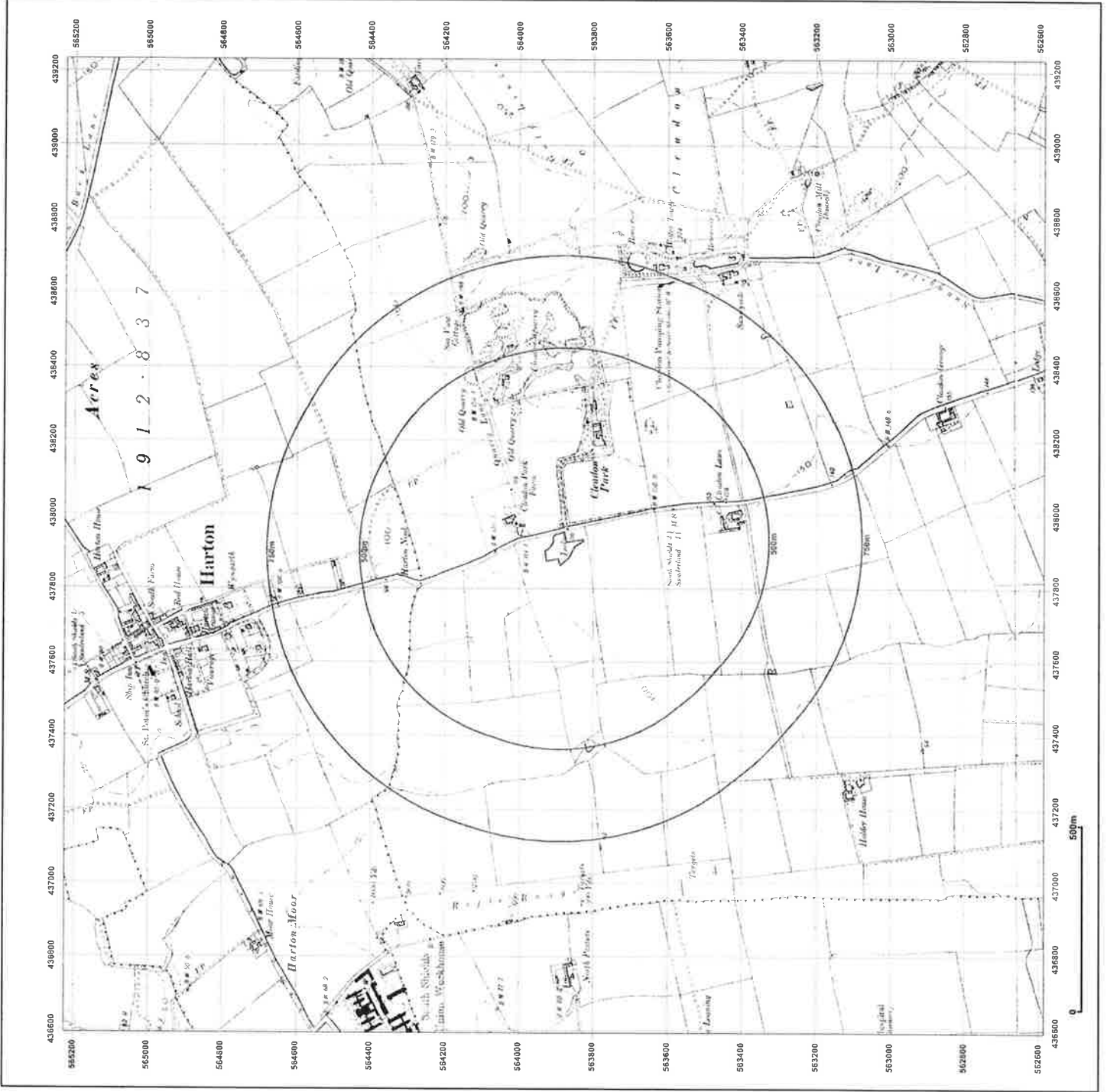


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GroundSure
ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

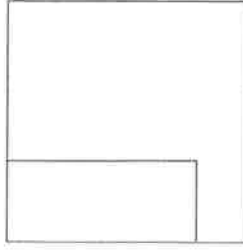
Map date: 1895

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1858
Revised 1895
Edition N/A
Copyright N/A
Levelled N/A

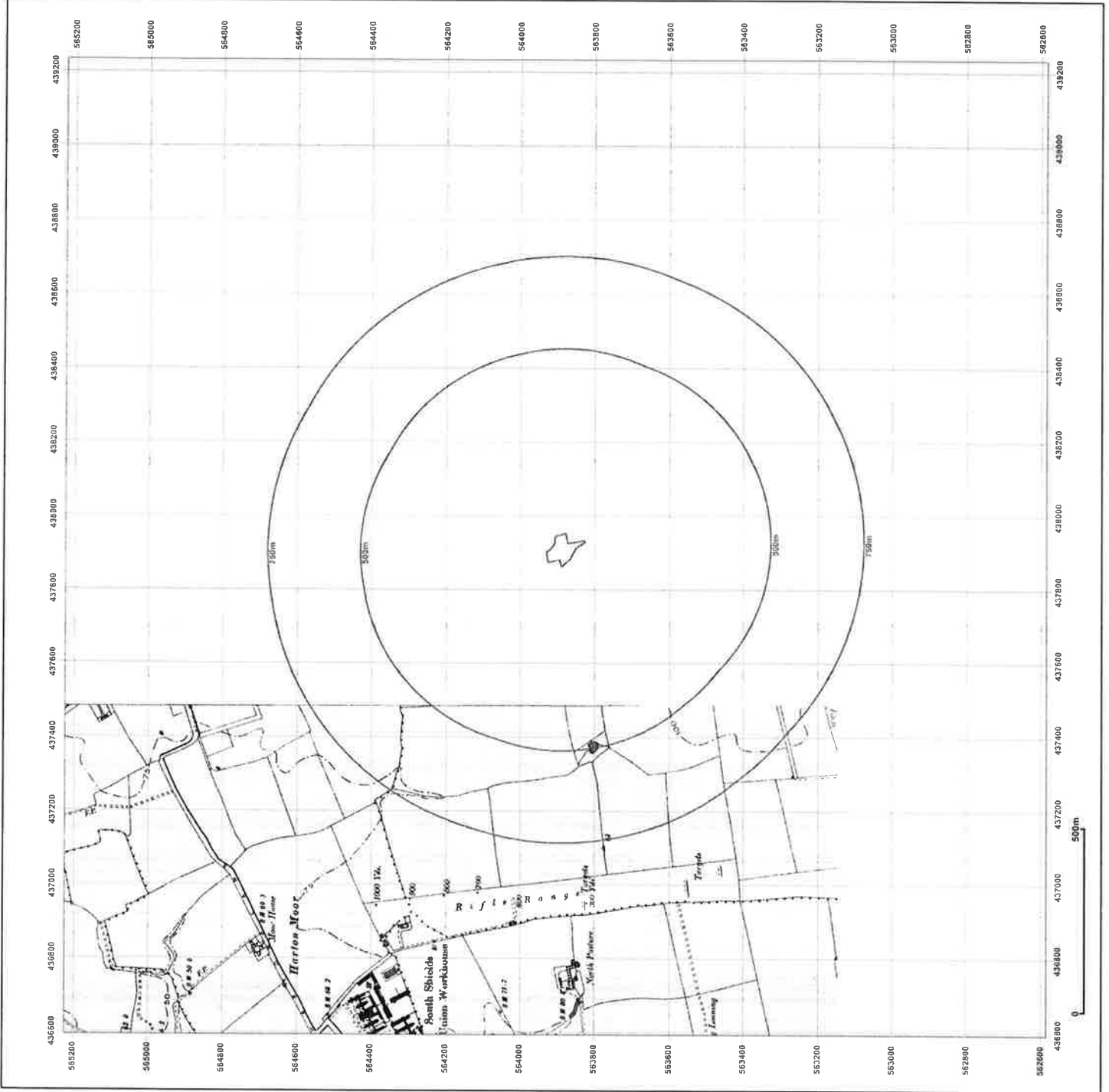


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ENVIRONMENTAL INSIGHT

Site Details:

77, PARK AVENUE, SOUTH SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1855

Scale: 1:10,560

Printed at: 1:10,560



Surveyed 1855
Revised 1855
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1855
Revised 1855
Edition N/A
Copyright N/A
Levelled N/A

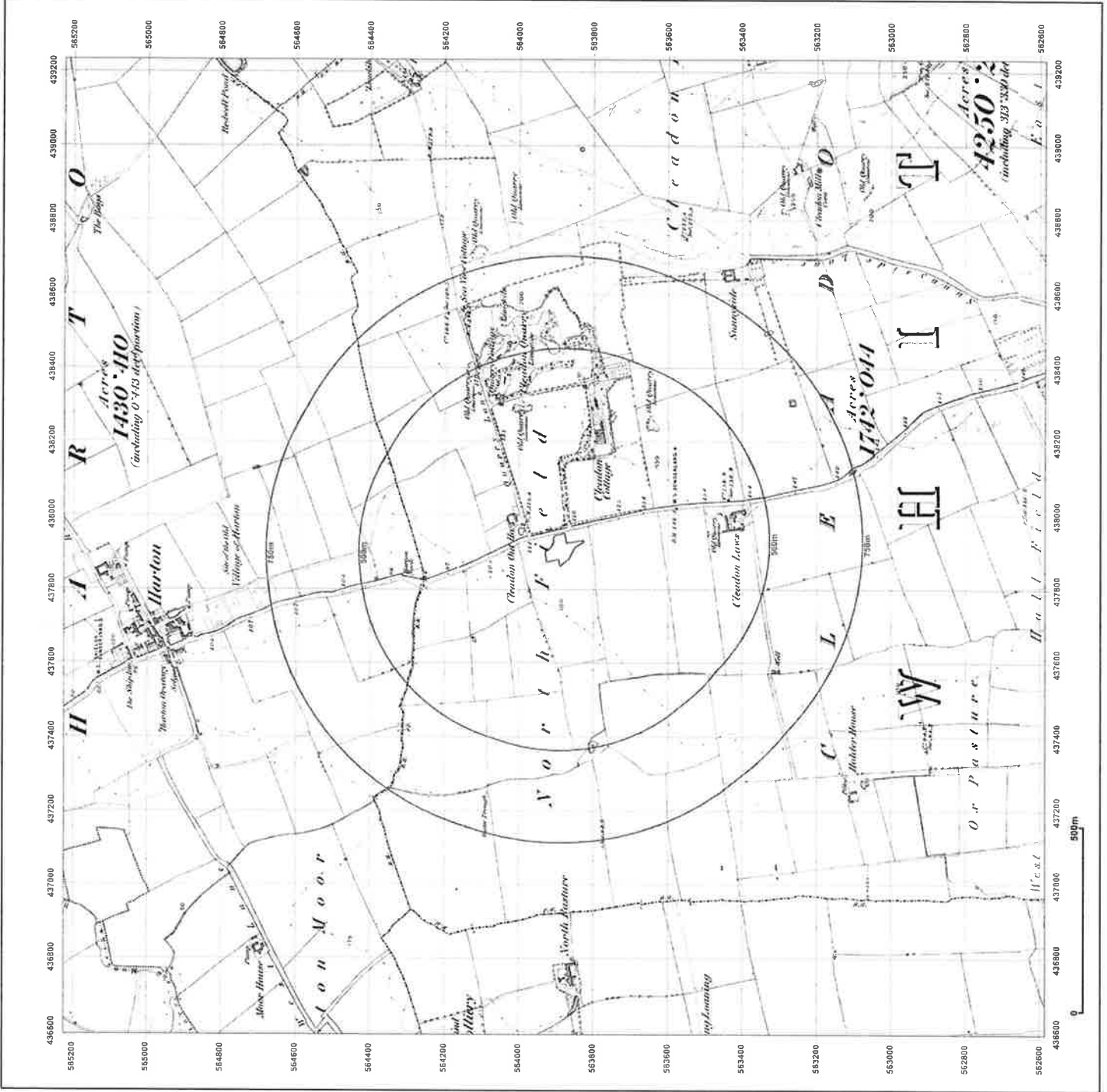


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ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: MasterMap

Map date: 2012

Scale: 1:1,250

Printed at: 1:2,500



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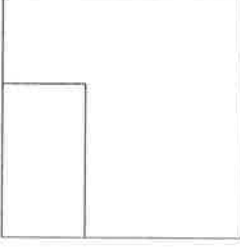


Site Details:
 77 PARK AVENUE, SOUTH
 SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid
Map date: 1994
Scale: 1:1,250
Printed at: 1:2,500

Surveyed N/A
 Revised N/A
 Edited N/A
 Copyright 1994
 Licensed N/A

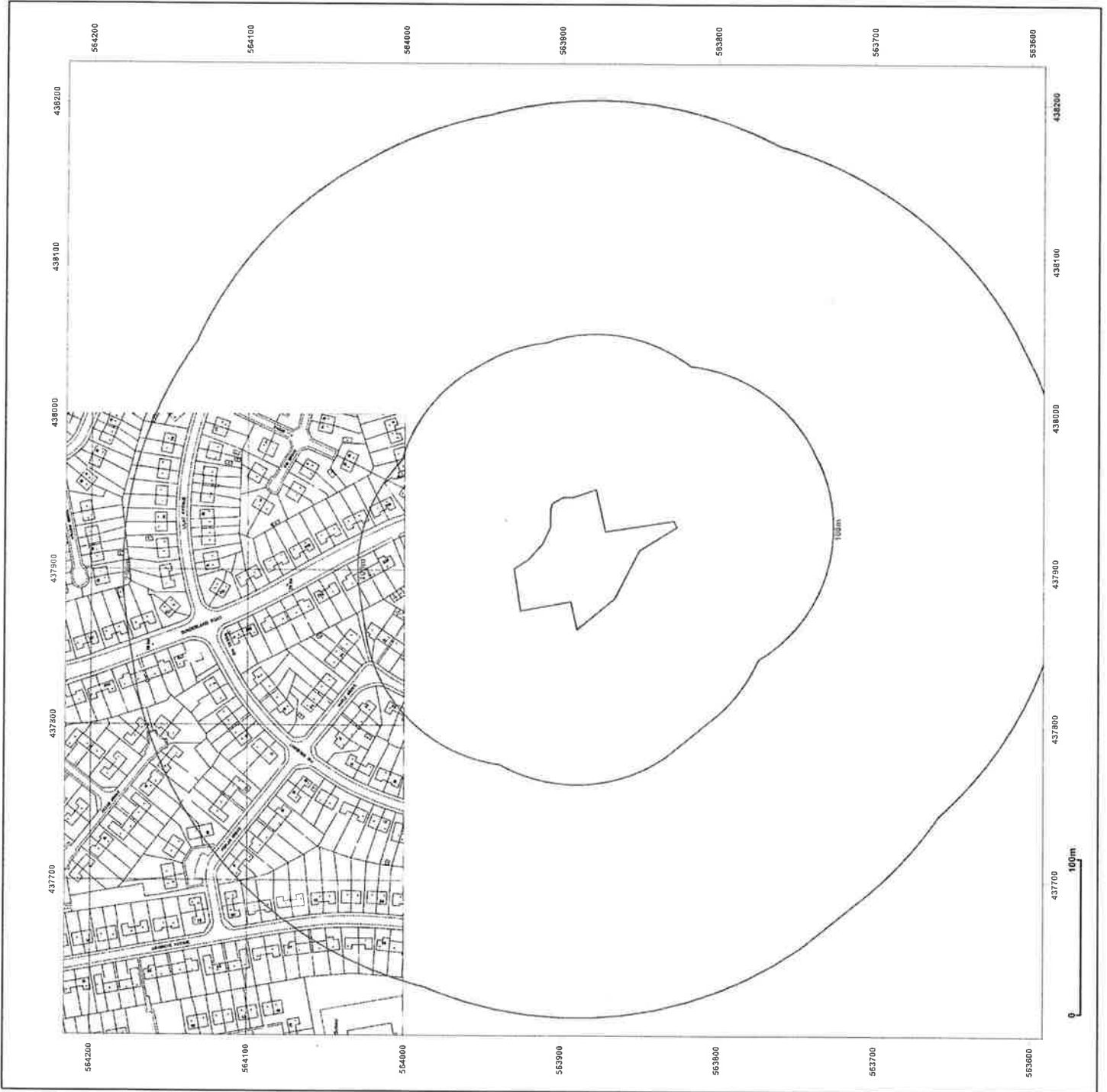
Produced by
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Production date: 11 April 2014

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ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE, SOUTH
SHIELDS, NE34 6QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

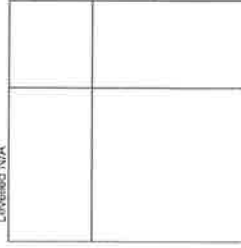
Map date: 1989-1993

Scale: 1:1,250

Printed at: 1:2,500



Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A



Surveyed 1957
Revised 1988
Edition N/A
Copyright 1989
Levelled N/A

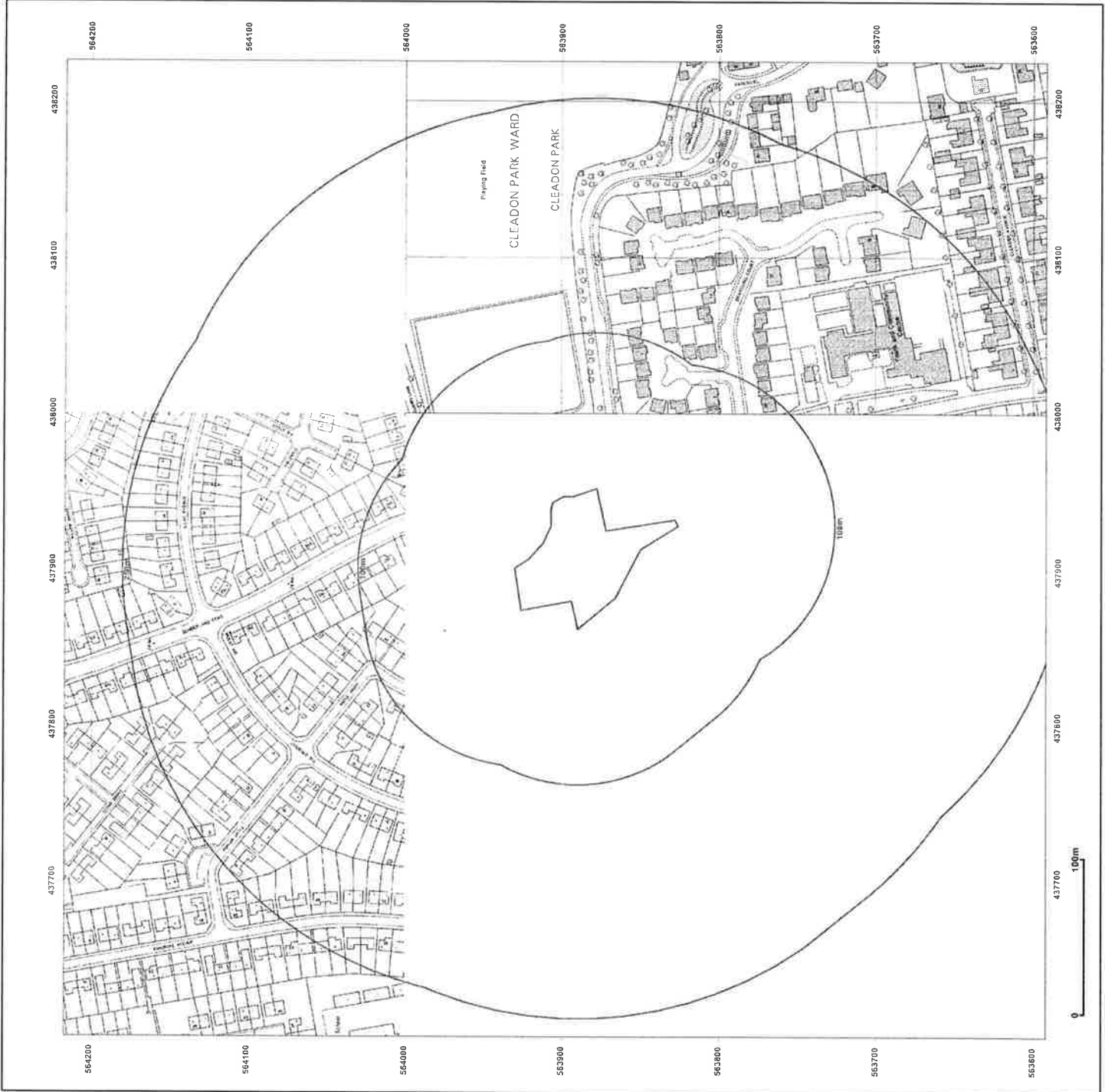


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ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE SOUTH
SHIELDS, NE34 6QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

Map date: 1985

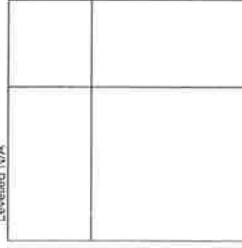
Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1985
Revised 1985
Edition N/A
Copyright 1985
Levelled N/A

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1963
Levelled 1963



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ENVIRONMENTAL INSIGHT

Site Details:

77, PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

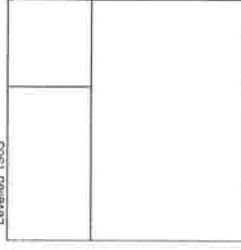
Map date: 1970-1972

Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1955
Revised 1970
Edition N/A
Copyright 1970
Levelled 1953



Surveyed 1955
Revised 1971
Edition N/A
Copyright 1972
Levelled 1953

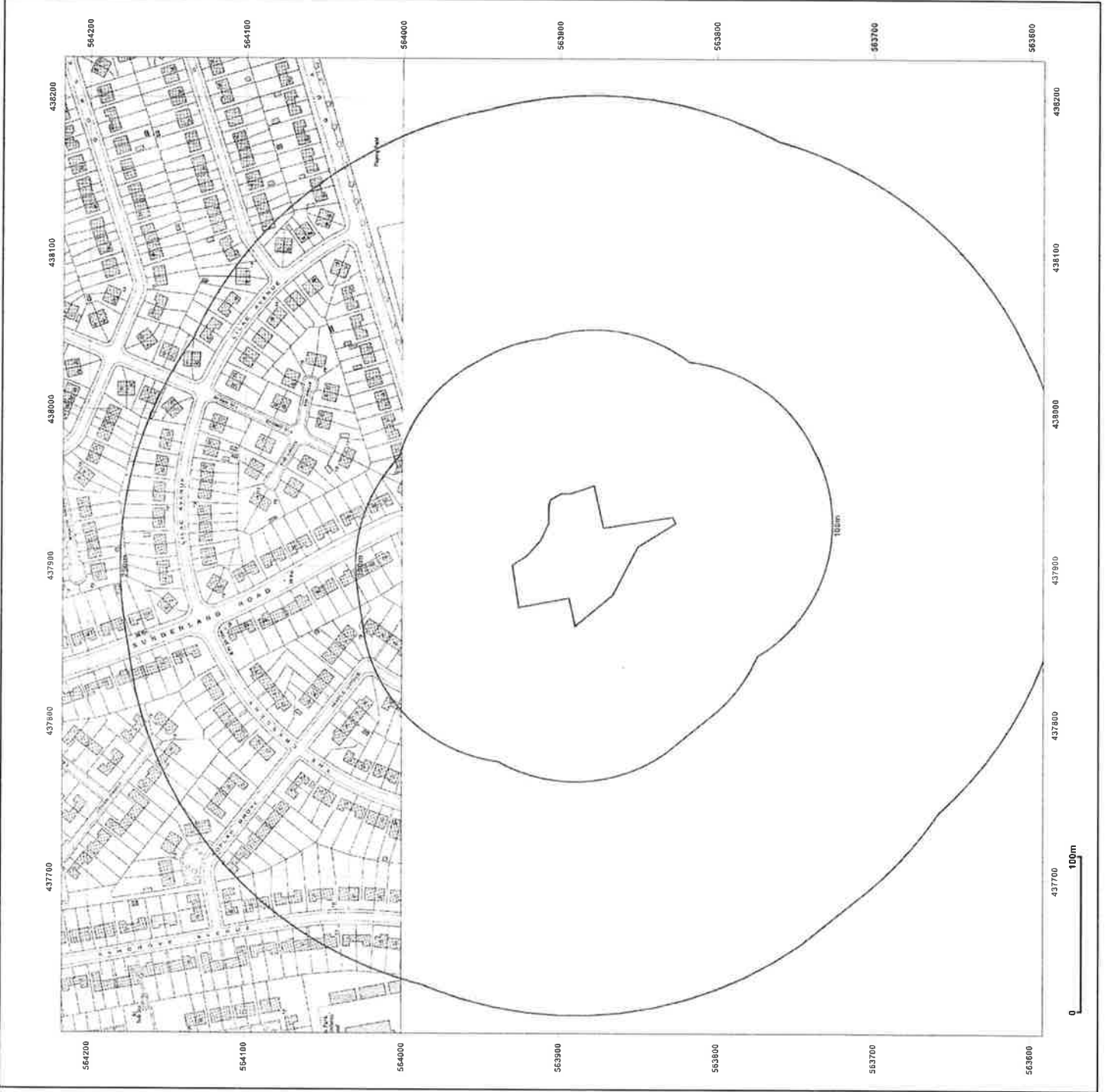


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ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

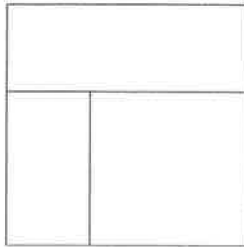
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Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

Map date: 1968

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1968
Revised 1968
Edition N/A
Copyright 1970
Levelled 1963

Surveyed 1968
Revised 1968
Edition N/A
Copyright 1970
Levelled N/A

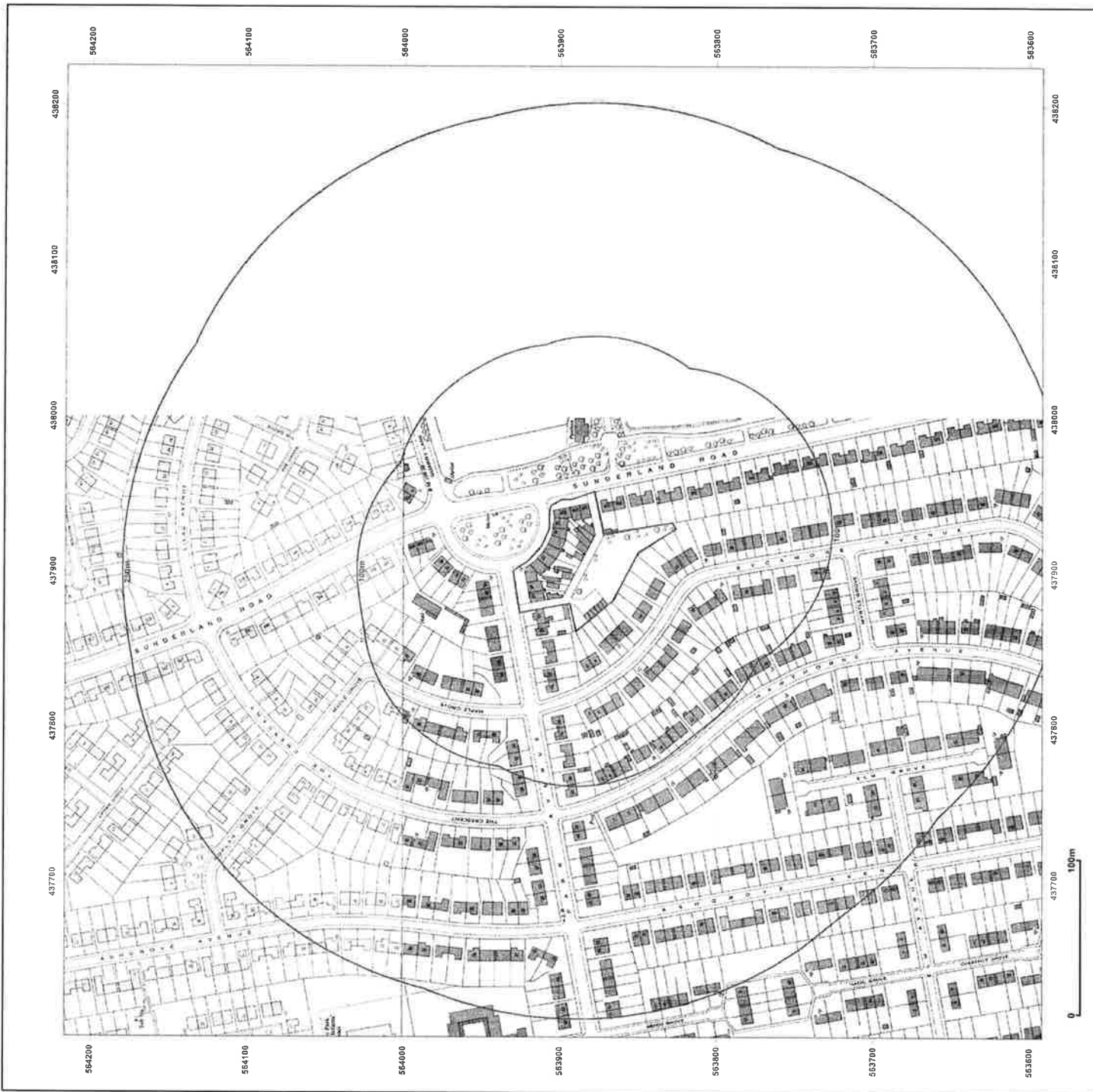


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Site Details:

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Client Ref: 3000ALD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

Map date: 1955-1958

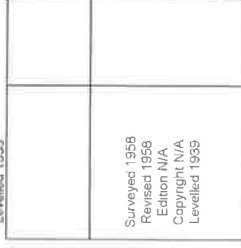
Scale: 1:1,250

Printed at: 1:2,500



Surveyed 1955
Revised 1955
Edition N/A
Copyright N/A
Levelled 1959

Surveyed 1957
Revised 1957
Edition N/A
Copyright N/A
Levelled 1959



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ENVIRONMENTAL INSIGHT

Site Details:

77 PARK AVENUE SOUTH
SHIELDS, NE34 8QL

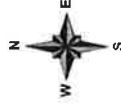
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Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: National Grid

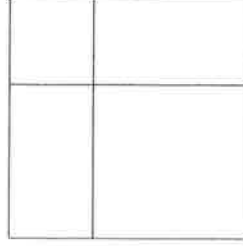
Map date: 1955-1958

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1955
Revised 1956
Edition N/A
Editor N/A
Copyright N/A
Levelled 1939



Surveyed 1956
Revised 1958
Edition 1959
Copyright 1959
Levelled 1939

Surveyed 1955
Revised 1955
Edition 1957
Editor N/A
Copyright N/A
Levelled 1939

Surveyed 1957
Revised 1957
Edition 1958
Copyright N/A
Levelled 1939



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ENVIRONMENTAL INSIGHT

Site Details:

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SHIELDS, NE34 8QL

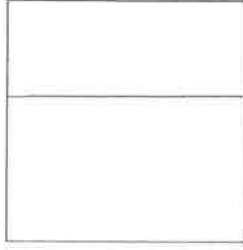
Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1942

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1942
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1942
Revised 1942
Edition N/A
Copyright N/A
Levelled N/A



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Site Details:

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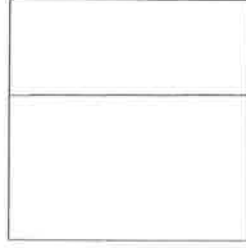
Client Ref: 3000ALD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1914-1915

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1915
Revised 1915
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1914
Revised 1914
Edition N/A
Copyright N/A
Levelled N/A

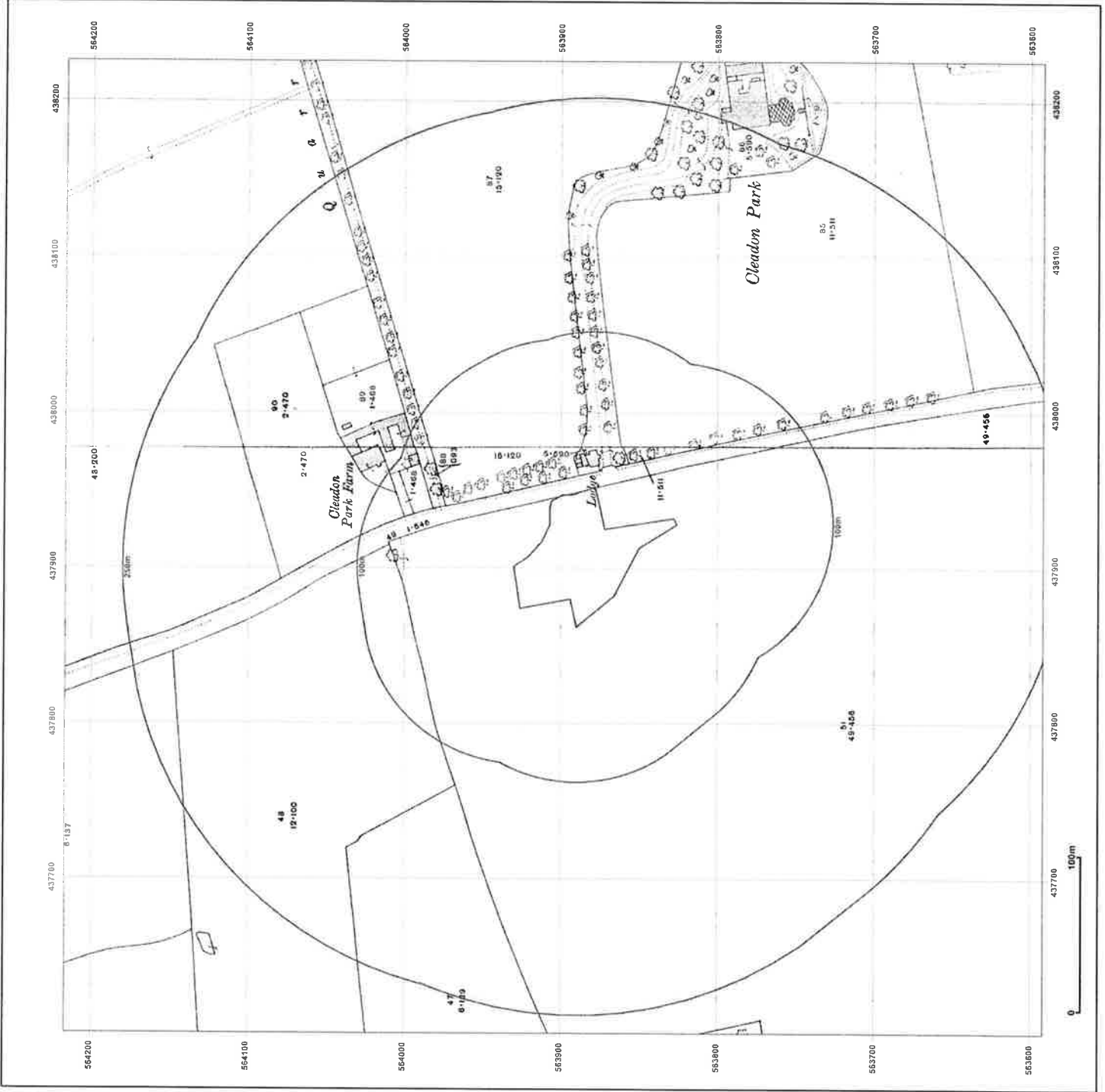


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Site Details:

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SHIELDS, NE34 8QL

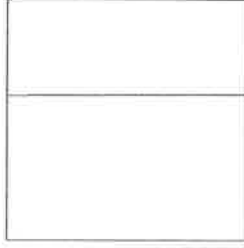
Client Ref: 3000ALD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1896-1897

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1897
Revised 1897
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1896
Revised 1896
Edition N/A
Copyright N/A
Levelled N/A

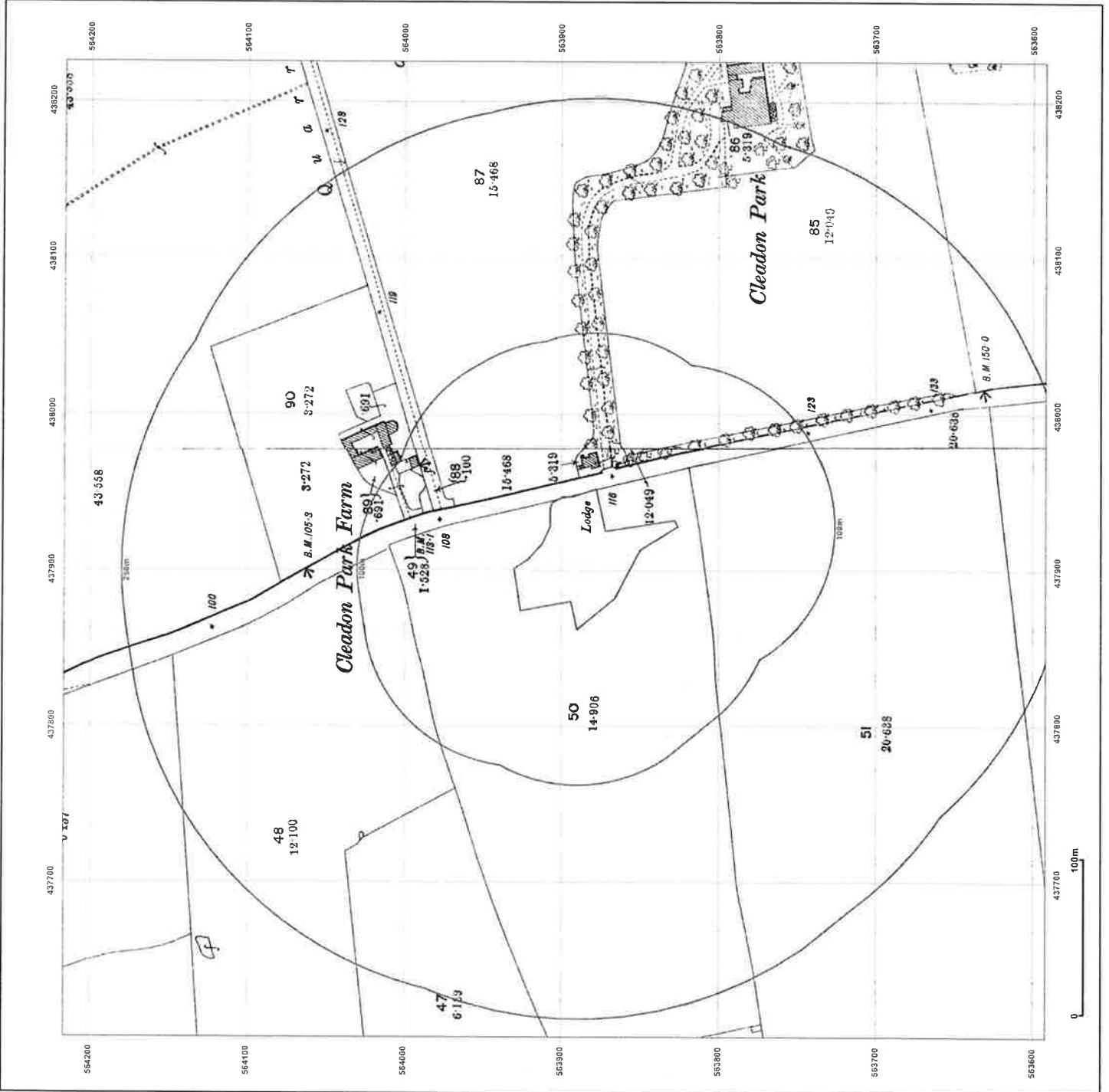


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ENVIRONMENTAL INSIGHT

Site Details:

77, PARK AVENUE, SOUTH
SHIELDS, NE34 8QL

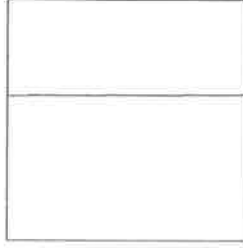
Client Ref: 3000AILD6135
Report Ref: GS-1394119
Grid Ref: 437913, 563904

Map Name: County Series

Map date: 1857

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1857
Revised 1857
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1857
Revised 1857
Edition N/A
Copyright N/A
Levelled N/A

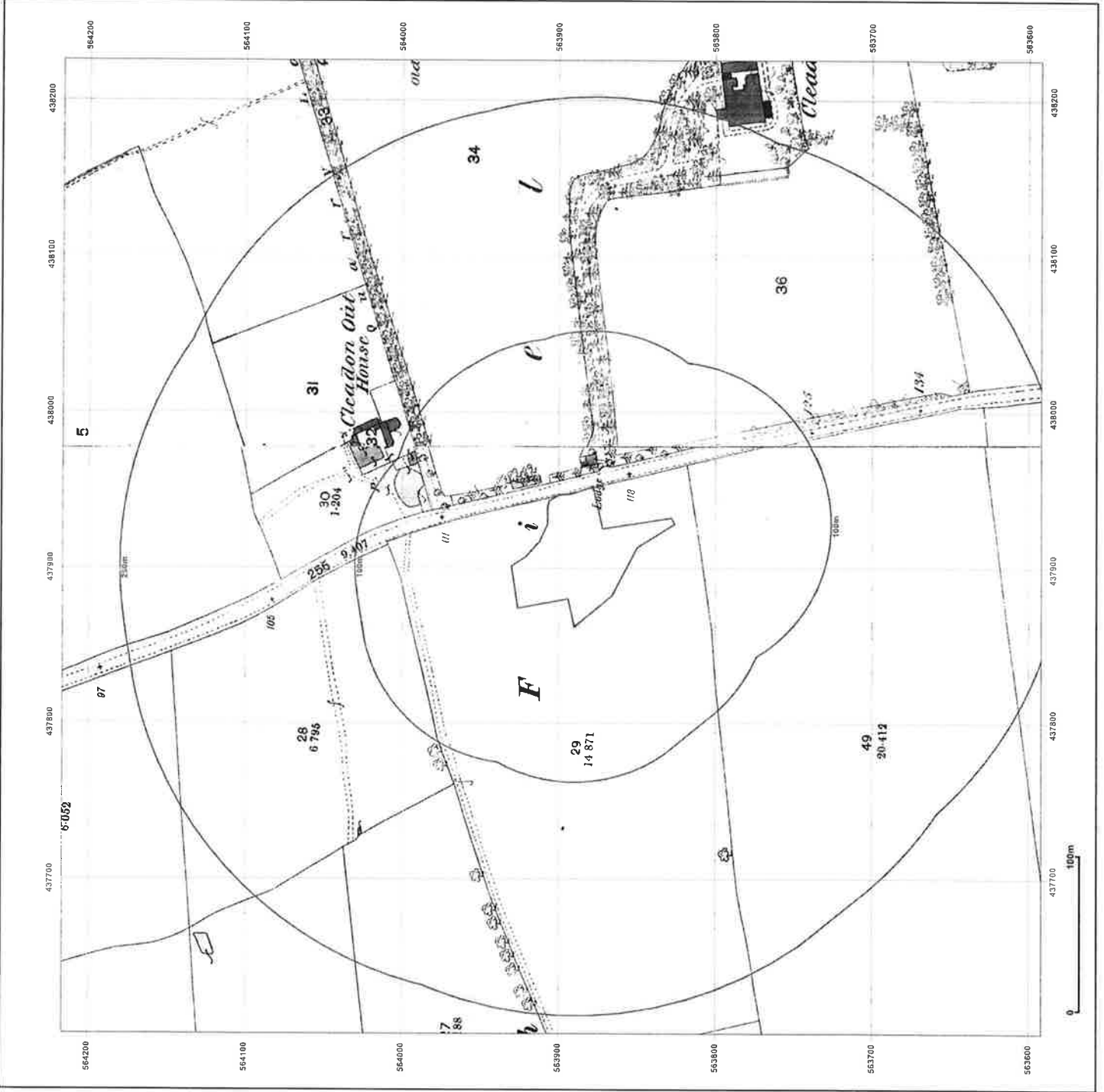


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Appendix D
Exploratory Hole Records



TRIAL PIT RECORD

TP No. TP1

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 - -
 Easting: Northing:
 - -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN			
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill
J	0.15m			MADE GROUND: Grey fine to medium angular gravel of dolerite.				0.05			
J	0.50m			MADE GROUND: Brown sandy gravel. Gravel is angular to subangular, fine to coarse of sandstone, brick, dolerite and concrete.				0.40			
D	0.75m			MADE GROUND: Black gravelly sand. Sand is fine to coarse with ash. Gravel is angular to subangular, fine to coarse of brick, concrete, dolerite, ceramic, glass and metal.				0.65			
D	1.20m			Firm brown very sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.				1.10			
D	1.80m			Firm brown slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.							
D	2.50m			Stiff brown slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, coal and limestone. Sandstone cobbles noted.				2.35			
D	3.00m			End of Trial Pit at 3.20 m				3.20			

Remarks

1. No groundwater encountered.

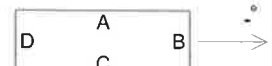
Ground Water (m)

Depth Struck	Behaviour

Excavation Details

Dimensions: 2.00m x 0.70m
 Stability: Stable
 Weather: Sunny
 Remarks:

Orientation





TRIAL PIT RECORD

TP No. TP2

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25

Easting: Northing:

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN	
Type	Depth From - To(m)	Vane Results kN/m ²		Description	Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill	Checked By:
J	0.20m			MADE GROUND: Black bituminous macadam.	0.02				
				MADE GROUND: Grey concrete.	0.15				
D	0.50m			MADE GROUND: Grey sandy gravel. Gravel is angular to subangular, fine to coarse of brick, sandstone and limestone.	0.35				
			▽	Firm brown slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles and boulders noted.					
D	1.10m			Firm brown very sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sand band noted.	1.00				
D	1.50m			Firm brown sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.	1.30				
D	1.90m			Stiff brown grey sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles and boulders noted.	1.80				
D	2.50m								
				End of Trial Pit at 3.00 m	3.00				

Remarks

1. Groundwater encountered at 1.0mbgl.

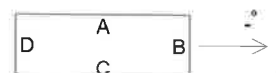
Ground Water (m)

Depth Struck	Behaviour
1.00	-

Excavation Details

Dimensions: 2.00m x 0.70m
Stability: Stable
Weather: Sunny
Remarks:

Orientation





TRIAL PIT RECORD

TP No. TP3

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 Easting: Northing:

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

Logged By: IN

Checked By:

SAMPLE DETAILS			Groundwater	STRATA RECORD			
Type	Depth From - To(m)	Vane Results kN/m ²		Description			
J	0.10m		▽	MADE GROUND: Grey fine to coarse angular gravel of dolerite.			
J	0.45m			MADE GROUND: Black slightly sandy very gravelly clay. Gravel is angular to subangular, fine to coarse of brick, concrete, plastic and glass. Organic odour noted.			
D	0.60m						
D	1.00m			Firm brown slightly sandy very gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.			
D	1.60m			Stiff brown grey slightly sandy very gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, coal and limestone. Sandstone cobbles/boulders noted.			
D	2.20m			Stiff brown slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal.			
D	3.00m			Stiff grey slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles/boulders noted.			
				End of Trial Pit at 3.40 m			

Remarks 1. Groundwater encountered at 0.55mbgl.	Ground Water (m)		Excavation Details		Orientation	
	Depth Struck	Behaviour	Dimensions: 2.00m x 0.70m			
	0.55	-	Stability: Stable			
			Weather: Sunny			
			Remarks:			



TRIAL PIT RECORD

TP No. TP4

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 Easting: Northing:

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN	
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:	
			Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill			
J	0.15m		▽	MADE GROUND: Brown sandy slightly gravelly topsoil. Gravel is angular to subangular, fine to coarse of sandstone, coal, brick, glass, ceramics and metal. Roots noted.				0.30	
J	0.50m			MADE GROUND: Brown sandy slightly gravelly clay. Gravel is angular to subangular, fine to coarse of brick, tile, sandstone, limestone and coal.				0.70	
D	0.80m			Brown slightly clayey gravelly SAND. Gravel is angular to subangular, fine to coarse of sandstone and limestone.				1.10	
D	1.20m			Firm brown slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Cobbles and boulders of sandstone noted.				1.80	
D	2.00m			Stiff grey brown slightly sandy gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, coal and limestone. Sandstone cobbles and boulders noted.				3.30	
D	2.70m								
			End of Trial Pit at 3.30 m						

Remarks

1. Groundwater encountered at 0.7mbgl.

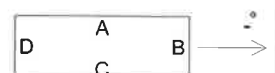
Ground Water (m)

Depth Struck	Behaviour
0.70	-

Excavation Details

Dimensions: 2.00m x 0.70m
Stability: Stable
Weather: Sunny
Remarks:

Orientation





TRIAL PIT RECORD

TP No. TP5

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 - -
 Easting: Northing:
 - -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN			
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:			
							Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill	
J	0.10m		▽	MADE GROUND: Brown black slightly sandy gravelly topsoil. Gravel is angular to subangular, fine to coarse of brick, sandstone and ceramics. Rootlets noted.				0.25		[Cross-hatch pattern]	
J	0.35m			MADE GROUND: Slightly sandy gravelly clay. Gravel is angular to subangular, fine to coarse of sandstone and brick. Geotextile pieces at 0.55m in south of pit.							
D	0.90m			Orange brown slightly clayey slightly gravelly SAND. Gravel is angular to subangular, fine to medium of sandstone and limestone.				0.80		[Dotted pattern]	
D	1.50m			Firm brown very sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.				1.40		[Horizontal line pattern]	
D	2.00m			Stiff brown grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, coal and limestone. Sandstone cobbles noted.				1.80		[Vertical line pattern]	
D	3.00m										
				End of Trial Pit at 3.40 m				3.40			

Remarks 1. Groundwater encountered at 0.55mbgl.	Ground Water (m)		Excavation Details		Orientation	
	Depth Struck	Behaviour	Dimensions: 2.00m x 0.70m			
	0.55	-	Stability: Stable			
			Weather: Sunny			
		Remarks:				



TRIAL PIT RECORD

TP No. TP6

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 Easting: Northing:

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN	
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:	
			Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill			
J	0.15m								
D	0.50m			0.40					
D	1.00m			0.95					
D	1.50m								
D	2.20m			2.00					
D	3.00m								
				3.40					

Remarks 1. No groundwater encountered.	Ground Water (m)		Excavation Details		Orientation	
	Depth Struck	Behaviour	Dimensions: 2.00m x 0.70m			
			Stability: Stable			
			Weather: Sunny			
			Remarks:			



TRIAL PIT RECORD

TP No. TP7

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
-
Easting: Northing:
- -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN	
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:	
			Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill			
J	0.20m								
D	0.50m			0.40					
D	1.00m								
D	2.00m			1.70					
D	3.00m			3.00					

Remarks 1. No groundwater encountered.	Ground Water (m)		Excavation Details		Orientation	
	Depth Struck	Behaviour	Dimensions: 2.00m x 0.70m			
			Stability: Stable			
			Weather: Sunny			
			Remarks:			



TRIAL PIT RECORD

TP No. TP8

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 -
 Easting: Northing:
 -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN				
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:				
							Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill		
J	0.10m		MADE GROUND: Brown sandy slightly gravelly topsoil. Gravel is angular to subangular, fine to coarse of brick, coal, sandstone and limestone.									
D	0.40m		Firm brown sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.				0.30					
D	1.20m		Brown slightly gravelly SAND. Gravel is angular to subangular, fine to coarse of sandstone and limestone.				0.90					
D	1.90m		Stiff brown grey slightly sandy slightly gravelly CLAY. Gravel is angular to subangular, fine to coarse of limestone, sandstone and coal. Sandstone cobbles noted.				1.80					
D	2.50m											
			End of Trial Pit at 3.00 m				3.00					

Remarks

1. No groundwater encountered.

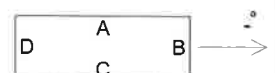
Ground Water (m)

Depth Struck	Behaviour

Excavation Details

Dimensions: 0.00m x 0.00m
Stability: Stable
Weather: Sunny
Remarks:

Orientation





TRIAL PIT RECORD

TP No. TP9

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
 -
 Easting: Northing:
 -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN				
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:				
							Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill		
J	0.15m		MADE GROUND: Brown slightly sandy gravelly clay. Gravel is angular to subangular, fine to coarse of sandstone, limestone, brick, tile and concrete.									
D	0.45m		MADE GROUND: Brown sandy slightly gravelly clay. Gravel is angular to subangular, fine to coarse of sandstone, limestone and brick. Concrete block noted - 0.30x0.20x0.10. Drain noted at 0.60m.				0.35					
D	0.80m		Stiff brown slightly sandy very gravelly CLAY. Gravel is angular to subangular, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.				0.70					
D	1.30m		1.50m-2.00m: sand bands noted, under 100mm.									
D	2.30m		Stiff brown slightly sandy gravelly CLAY. Gravel is angular to subrounded, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.				2.10					
			End of Trial Pit at 2.70 m				2.70					

Remarks

1. No groundwater encountered.

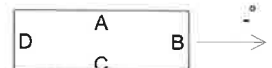
Ground Water (m)

Depth Struck	Behaviour

Excavation Details

Dimensions: 2.00m x 0.70m
 Stability: Stable
 Weather: Sunny
 Remarks:

Orientation





TRIAL PIT RECORD

TP No. TP10

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
-
Easting: Northing:
- -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD				Logged By: IN				
Type	Depth From - To(m)	Vane Results kN/m ²		Description				Checked By:				
							Depth (m)	Level (mAOD) PID (ppm)	Legend	Backfill		
J	0.10m		MADE GROUND: Brown sandy slightly gravelly clay. Gravel is angular to subangular, fine to coarse of brick, sandstone, glass and ceramics.				0.30		[Cross-hatch pattern]			
D	0.40m											
D	1.00m		Stiff brown grey slightly sandy slightly gravelly CLAY. Gravel is angular to subrounded, fine to coarse of sandstone, limestone and coal. Sandstone cobbles noted.				1.70		[Dotted pattern]			
D	2.50m											

Remarks 1. No groundwater encountered.	Ground Water (m)		Excavation Details		Orientation	
	Depth Struck	Behaviour	Dimensions: 2.00m x 0.70m			
			Stability: Stable			
			Weather: Sunny			
		Remarks:				



TRIAL PIT RECORD

TP No. TP11

Contract No. D6135

Site : Sunderland Road

GL (m AOD) Scale: 1:25
-
Easting: Northing:
- -

Client : Bellway Homes NE

Sheet: 1 of 1

Method : JCB 3CX

Dates: 13/03/2014

SAMPLE DETAILS			Groundwater	STRATA RECORD			
Type	Depth From - To(m)	Vane Results kN/m ²		Description			
			Depth (m)	Level (mAOD) PID (perm)	Legend	Backfill	
J	0.10m						
D	0.50m		0.30				
D	0.80m		0.60				
D	1.20m		1.00				
D	1.80m		1.70				
D	2.30m		2.50				
			End of Trial Pit at 2.50 m				

Remarks 1. No groundwater encountered.	Ground Water (m)		Excavation Details		Orientation <div style="border: 1px solid black; padding: 5px; display: inline-block;"> D A B C → </div>
	Depth Struck	Behaviour	Dimensions: 2.00m x 0.70m		
			Stability: Stable		
			Weather: Sunny		
		Remarks:			

Appendix E
Chemical Testing Results



Certificate of Analysis

Certificate Number 14-01813

28-Mar-14

Client Dunelm Geotechnical & Environmental Ltd
Foundation House
St. John's Road
Meadowfield
Durham
DH7 8TZ

Our Reference 14-01813

Client Reference D6135

Contract Title Sunderland Rd, Cleadon

Description 5 Soil samples.

Date Received 20-Mar-14

Date Started 20-Mar-14

Date Completed 28-Mar-14

Test Procedures Identified by prefix DETSn (details on request), Asbestos Analysis DETSC 1101.

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager



Summary of Chemical Analysis Soil Samples

Our Ref 14-01813

Client Ref D6135

Contract Title Sunderland Rd, Cleadon

Lab No	623340	623341	623342	623343	623344
Sample ID	TP1	TP3	TP4	TP6	TP10
Depth	0.15	0.45	0.15	0.15	0.10
Other ID					
Sample Type	J	J	J	J	J
Sampling Date	13/03/14	13/03/14	13/03/14	13/03/14	13/03/14
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Metals								
Arsenic	DETSC2301#	0.2	mg/kg	5.2	11	8.3	15	6.8
Cadmium	DETSC2301#	0.1	mg/kg	1.1	1.0	1.0	1.2	0.6
Chromium	DETSC2301#	0.15	mg/kg	4.8	39	64	37	26
Hexavalent Chromium	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC2301#	0.2	mg/kg	5.7	68	240	210	19
Lead	DETSC2301#	0.3	mg/kg	17	210	180	190	35
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.17	0.24	0.24	< 0.05
Nickel	DETSC2301#	1	mg/kg	8.9	30	32	49	22
Selenium	DETSC2301#	0.5	mg/kg	0.7	< 0.5	< 0.5	0.7	< 0.5
Zinc	DETSC2301#	1	mg/kg	160	260	660	230	55
Inorganics								
pH	DETSC 2008#			8.6	7.9	9.2	7.8	8.2
Organic matter	DETSC 2002#	0.1	%	0.8	6.0	9.8	6.2	1.8
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	27	240	1700	76	70
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg		< 0.01			
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg		< 0.01			
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01			
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg		< 1.5			
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg		< 1.2			
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg		1.7			
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg		22			
Aliphatic C5-C35	DETSC 3072*	10	mg/kg		23			
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg		< 0.01			
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg		< 0.01			
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg		< 0.01			
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg		< 0.9			
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg		< 0.5			
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg		4.0			
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg		28			
Aromatic C5-C35	DETSC 3072*	10	mg/kg		32			
TPH Ali/Aro	DETSC 3072*	10	mg/kg		55			

Summary of Chemical Analysis Soil Samples

Our Ref 14-01813

Client Ref D6135

Contract Title Sunderland Rd, Cleadon

Lab No	623340	623341	623342	623343	623344
Sample ID	TP1	TP3	TP4	TP6	TP10
Depth	0.15	0.45	0.15	0.15	0.10
Other ID					
Sample Type	J	J	J	J	J
Sampling Date	13/03/14	13/03/14	13/03/14	13/03/14	13/03/14
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
PAHs								
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.1	0.2	< 0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.3	< 0.1	< 0.1
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.9	3.0	< 0.1	< 0.1
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	0.8	1.8	0.8	< 0.1
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.9	1.4	0.2	< 0.1
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	0.4	0.6	< 0.1	< 0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	< 0.1	0.6	3.1	0.4	< 0.1
Chrysene	DETSC 3301	0.1	mg/kg	< 0.1	0.9	2.6	< 0.1	< 0.1
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	< 0.1	1.3	3.6	0.6	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	2.0	2.5	0.7	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.3	< 0.1	< 0.1
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	2.1	3.5	0.6	< 0.1
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	< 0.1	1.1	1.8	0.4	< 0.1
Pyrene	DETSC 3301	0.1	mg/kg	< 0.1	2.6	2.4	0.8	< 0.1
PAH	DETSC 3301	1.6	mg/kg	< 1.6	14	27	4.7	< 1.6

Summary of Asbestos Analysis Soil Samples

Our Ref 14-01813

Client Ref D6135

Contract Title Sunderland Rd, Cleadon

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
623340	TP1 0.15	SOIL	NAD	none	Colin Patrick
623342	TP4 0.15	SOIL	NAD	none	Colin Patrick
623343	TP6 0.15	SOIL	NAD	none	Colin Patrick
623344	TP10 0.10	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 14-01813
 Client Ref D6135
 Contract Sunderland Rd, Cleadon

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
623340	TP1 0.15 SOIL	13/03/14	GJ 1L (1L)		
623341	TP3 0.45 SOIL	13/03/14	GJ 1L (1L)		BTEX
623342	TP4 0.15 SOIL	13/03/14	GJ 1L (1L)		
623343	TP6 0.15 SOIL	13/03/14	GJ 1L (1L)		
623344	TP10 0.10 SOIL	13/03/14	GJ 1L (1L)		

Key: G-Glass J-Jar

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time and/or inappropriate containers are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months

Appendix F
Geotechnical Testing Results

SOLMEK Laboratory Report

Contract Number: D6135

Report Date: 10/04/14

Client's Reference:

Client Name: Dunelm Geotechnical & Environmental
Foundation House
St Johns Road
Meadowfield
Durham
DH7 8TZ

For the attention of: James Nairn

Contract Title: Sunderland Road, Cleadon

Date Received: 18/03/2014

Date Commenced: 25/03/2014

Date Complete: 10/04/2014

Notes:

Samples will be held at the laboratory for a period of 6 weeks after the report date. After the **22/04/2014** all samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Checked and Approved Signatories:



I Nicholson
(Lab Manager)



H Mullett-Merrick
(Assistant Lab Manager)

R Woods
(Office Manager)

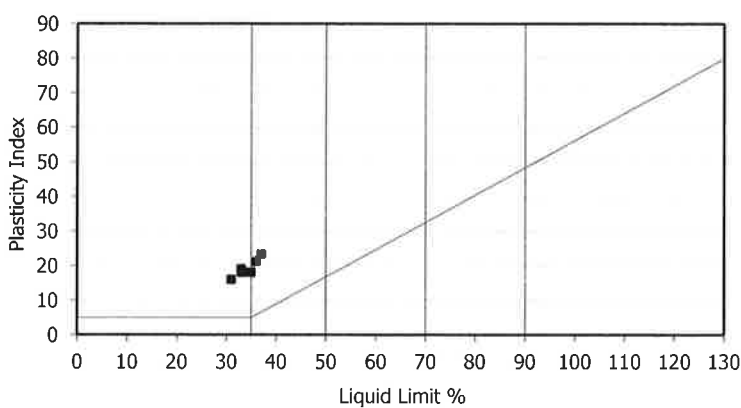
12 Yarm Road
Stockton on Tees
TS18 3NA
Tel: 01642 607083
Fax: 01642 612355
e-mail: lab@solmek.com

SUMMARY OF SOIL CLASSIFICATION TESTS
(BS1377-2:1990+A1:1996)

Sunderland Road, Cleadon
SD6135



Hole	Depth m	Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	Plasticity	% Passing 425µm	pH	SO ₄ Content mg/L	Chloride Content mg/L	Lab Shear Vane kPa
TP1	0.75	D	17	37	14	23	CI	77.0	8.0	28		
TP1	1.20	D	14	33	15	18	CL	73.8	8.3	40		
TP3	1.00	D	18	33	14	19	CL	85.6	8.4	120		
TP4	0.80	D	20	34	16	18	CL	79.7	8.4	27		
TP5	1.50	D	19	31	15	16	CL	81.5	8.3	96		
TP7	1.00	D	18	35	17	18	CI	88.6	8.3	40		
TP8	0.40	D	15	36	15	21	CI	75.2	8.4	28		



		Liquid Limit
CE	Extremely high plasticity CLAY	>90%
ME	Extremely high plasticity SILT	
CV	Very high plasticity CLAY	70 - 90%
MV	Very high plasticity SILT	
CH	High plasticity CLAY	50 - 70%
MH	High plasticity SILT	
CI	Intermediate plasticity CLAY	35 - 50%
MI	Intermediate plasticity SILT	
CL	Low plasticity CLAY	<35%
ML	Low plasticity SILT	

Comments

Prepared: *[Signature]* Date: 10/04/2014
 Checked: *I. Nelson* Date: 10/04/2014
 Approved: *I. Nelson* Date: 10/04/2014

Appendix G
Gas Risk Assessment

Our Ref: D3319

Paul Temple
Bellway House
Kings Park
Kingsway North
Gateshead
Tyne and Wear
NE11 0JH

Date: 9th August 2012

GAS RISK ASSESSMENT – PHASES 4 and 5, CLEADON PARK, SOUTH SHIELDS

Please find enclosed the data from the completed gas monitoring for the above site. Our comments on the data are presented below.

It is proposed to develop the above site with residential properties. This letter presents recommendations for gas protection measures for the proposed development based on the data collected by Dunelm.

Dunelm Geotechnical & Environmental (Dunelm) carried out a geoenvironmental investigation of the site and the findings are detailed in the following report:

- *Geoenvironmental Appraisal of land at Elm Avenue, Cleadon Park. Report No. D3319/1, March 2011.*
- *Geoenvironmental Appraisal of land at King George Road, Cleadon Park. Report No. D2428/1, July 2009*

Reference should be made to the above reports for details of the site's history and environmental setting, the ground conditions encountered, and the results of contamination analysis.

Gas risk assessment has been carried out in accordance with the following publications:

- CIRIA Report C665 *Assessing risks posed by hazardous ground gases to buildings*, 2007
- BS8485:2007 *Code of Practice for the characterization and remediation from ground gas in affected developments*
- NHBC *Guidance on evaluation of development proposals on sites where methane and carbon dioxide are present*, 2007.

In order to assess the potential risks associated with gas at this site, a number of factors have been considered. These are discussed below.

Potential Gas Sources

A radon assessment has been carried out as part of the geoenvironmental investigation. The assessment indicated that no radon protective measures are required.

Potential sources of methane and carbon dioxide gas identified from the geoenvironmental appraisal are summarised in the table below. The table also gives an indication of the likely gas generation potential and the risk of gas generation increasing in the future.

Source	Details	Generation potential of source	Risk of gas generation increasing in future
Landfill site within 250m	<p>Temple Memorial Park 1 - 35m west of the site (437000, 563700). License: 05.10.77 – 31.03.94. Waste types include inert, industrial, commercial and household.</p> <p>Temple Park 2 – 35m west of the site (437000, 563700). License: 23.02.83 – 31.03.94. Waste types include inert, industrial and commercial.</p> <p>Temple Memorial Park, King George Road 35m west of the site (437400, 563300). Waste types include inert, industrial, and commercial.</p>	High	Moderate
Deep made ground	<p>The geological plan indicates an area of made ground approximately 20m west of the site. The nature of infill material is unknown however, this area corresponds with the above landfills.</p> <p>Historical plans indicate that a pond 150m to the west of the site was backfilled prior to 1958. Consequently there may be made ground at this location together with organic sediments that could represent a potential source of gas.</p>	Low-moderate	Low-moderate

Requests were made to the Local Authority (South Tyneside Council) for further information relating to the landfill 35m west of the site. A gas risk assessment of the landfill was provided for review (Ref C2621/4093/APC/APC dated 23rd June 2010). The assessment included gas monitoring results from monitoring wells located within the landfill. The following results were recorded for the exploratory holes nearest to the site.

Monitoring points	Gas concentrations recorded (% v/v)		Flow rates recorded (litre/hour)
	Methane	Carbon Dioxide	
Temple Memorial Park Landfill	ND – 74.0	ND – 27.0	ND – 6.7

As shown, elevated carbon dioxide and methane were detected within the landfill. However, gas monitoring along the boundary of the landfill adjacent to the road separating the landfill from the site indicates elevated methane above 0.5% in only two of the six positions. Raised carbon dioxide levels were recorded in all of the positions with flow rates generally absent. The following discussion and recommendations take account of the ground and gas conditions encountered during the Dunelm investigations on site and those of the Local Authority on the adjacent landfill.

Gas Pathways

The geoenvironmental investigation indicated that the whole site is underlain by natural clays. It is likely that the clays would have low gas permeability and consequently gas migration to surface should be limited.

Gas Monitoring

Gas monitoring wells were installed in four boreholes. Details of the monitoring wells are shown in the Geoenvironmental Appraisal reports noted above.

The most recent guidance on gas risk assessment (CIRIA C665) includes recommendations for periods and frequencies for monitoring visits. These recommendations take into account the nature of the proposed development and the likely generation potential of the source and are shown in the table below.

		Generation potential of source				
		Very low	Low	Moderate	High	Very high
		e.g. inert made ground	e.g. alluvium or dock silt	e.g. landfill site pre-1960s	e.g. shallow mine workings	e.g. domestic landfill site post-1960s
Sensitivity of development	High (residential with gardens)	6/3	9/6	12/6	24/12	24/24
	Moderate (flats)	6/2	6/3	9/6	12/12	24/24
	Low (commercial)	4/1	6/2	6/3	12/6	12/12
6/3 indicates six readings over 3 months. At least 2 readings should be during periods of low and falling atmospheric pressure						

The proposed development comprises residential properties with gardens. It is considered that the generation potential of the gas source (taking into account the likelihood of future increases in gas generation) would be best classified as moderate.

Gas monitoring at the site has been carried out on six occasions (area 5) and three occasions (Area 4) over a total period of seventeen months. Seven monitoring visits were carried out during a period of falling atmospheric pressure. Gas monitoring was carried out in accordance with current guidance and the results are attached. A summary of the monitoring results is shown in the table below.

Monitoring point	Range of gas concentrations recorded (% v/v)		Flow rates recorded (litre/hour)
	Methane	Carbon Dioxide	
Area 4			
MBH1	ND	0.3 – 0.9	ND
MBH3	ND	0.2 – 0.7	ND – 1.0
Area 5			
MBH1	ND	0.1 – 0.5	ND – 1.0
MBH2	ND	ND – 1.1	ND – 1.0

ND: None detected

An assessment of the gas regime has been provided below.

Further Gas Monitoring undertaken on adjacent Site

A development located immediately to the north of the site was subject to gas monitoring in 2005/2006 for Bellway Homes. Bellway Homes have given permission for this information to be used within the gas risk assessment. The monitoring results and associated borehole plan are attached to this letter report.

Gas monitoring at the site was carried out on twelve occasions over a total period of three months. Three monitoring visits were carried out when atmospheric pressure was below 1000mb. (See attached).

A summary the monitoring results is shown in the table below.

Monitoring point	Gas concentrations recorded (% v/v)		Flow rates recorded (litre/hour)
	Methane	Carbon Dioxide	
BH2	ND	ND – 3.7	ND
BH3	ND	ND – 0.4	ND
BH4	ND	ND – 1.9	ND – 1.6
BH5	ND	0.4 – 3.3	ND – 0.7

Site Gas Regime

Where flow rates are shown as 'none detected', a default value of 0.1 litres/hour has been used in the assessment, representing the limit of detection of the measuring equipment.

To assess the gas regime of the site the results of the existing site and the northern Bellway site have been considered, copies of all the results are attached.

The nineteen sets of monitoring results show that no methane was detected in the boreholes. Gas screening values for carbon dioxide have been calculated based on the maximum readings obtained from the boreholes outside of the landfill as shown in the table below.

The gas screening values are shown in the table below together with the maximum gas concentration.

Maximum gas screening value - carbon dioxide (litre/hour)	Max. concentration (carbon dioxide)
0.0592	Max. 3.7%

Since the proposed development comprises low rise traditional housing, the NHBC Traffic light system (shown in CIRIA C665 as Table 8.7) has been used to assess the gas regime. Using the above gas screening values the site would be classified as Green indicating no special gas precautions are required however, in view of the source of hazardous gases it is recommended that gas protection measures are increased or further monitoring is undertaken to confirm this.

The monitoring results on site and at the adjacent sites suggest that gas migration is limited as there is a large contrast in hazardous gas concentrations between the site and the landfill site (possibly due to the significant depths of clay present beneath the entire site).

As an additional check gas monitoring was undertaken within the vented subcroft beneath a number of houses on two occasions at the northern Bellway site. The monitoring was undertaken during falling pressure on one of the occasions; no carbon dioxide, methane, carbon monoxide or hydrogen sulphide was detected.

In view of the above it is considered that Amber 1 protection measures would be appropriate for the proposed development however, this should be confirmed with the regulatory authorities.

We trust that the enclosed are sufficient for your present needs, however, please do not hesitate to get in touch should you require further information.

Yours sincerely,

Ann Izatt-Lowry
On behalf of Dunelm Geotechnical and Environmental Ltd

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Appendix H

Conditions of Offer, Notes on Limitations & Basis for Contracts

Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract

These conditions accompany our tender and supercede any previous conditions issued. The firm will prepare a report solely for the use of the Client (the party invoiced) and its agent(s). No reliance should be placed on the contents of this report, in whole or in part by 3rd parties. The report, its content and format and associated data are copyright, and the property of the firm. Photocopying of part or all of the contents, transfer or reproduction of any kind is forbidden without written permission from the firm. A charge may be levied against such approval, the same to be made at the discretion of the firm.

Site investigation is a process of sampling. The scope and size of an investigation may be considered proportional to levels of confidence regarding the ground and groundwater conditions. The exploratory holes undertaken investigate only a small volume of the ground in relation to the overall size of the site, and can only provide a general indication of site conditions. The opinions provided and recommendations given in this report are based on the ground conditions as encountered within each of the exploratory holes. There may be different ground conditions elsewhere on the site which have not been identified by this investigation and which therefore have not been taken into account in this report. Reports are generally subject to the comments of the local authority and Environment Agency. The comments made on groundwater conditions are based on observations made at the time that site work was carried out. It should be noted that mobile contamination, soil gas levels and groundwater levels may vary owing to seasonal, tidal and/or weather related effects. Unrecorded ancient mining may occur anywhere where seams that have been worked and influence the rock and soil above. Dissolution cavities can occur where gypsum or chalk is present. Rotary drilling is the recommended technique to prove the integrity of the rock.

Where the scope of the investigation is limited via access to information, time constraints, equipment limitations, testing, interpretation or by the client or his agents budgetary constraints, elements not set out in the proposal and excluded from the report are deemed to be omitted from the scope of the investigation.

The firm cannot be held liable and do not warrant, or otherwise guarantee the validity of information provided by third parties and subsequently used in our reports. The firm are not responsible for the action negligent or otherwise of subcontractors or third parties.

Desk studies are generally prepared in accordance with RICS guidelines. Environmental site investigations are generally undertaken as 'exploratory investigations' in accordance with the definitions provided in paragraph 5.4 of BS 10175:2001 in order to confirm the conceptual assumptions. You are advised to familiarize yourself with the typical scope of such an investigation. No pumping of water will be undertaken unless a licence or facilities/equipment have been arranged by others.

Where the type, number or/and depth of exploratory hole is specified by others, the firm cannot and will not be responsible for any subsequent shortfall or inadequacy in data, and any consequent shortfall in interpretation of environmental and geotechnical aspects which may be required at a later date in order to facilitate the design of permanent or temporary works.

All information acquired by the firm in the course of investigation is the property of the firm, and, only also becomes the joint property of the Client only on the complete settlement of all invoices relating to the project. The firm reserves the right to use the information in commercial tendering and marketing, unless the Client expressly wishes otherwise in writing. The quoted rates do not include VAT, and payment terms are 30 days from dispatch of invoice from our offices. Quotes are subject to a site visit.

We have allowed for 1 mobilisation and normal working hours unless otherwise stated. The scope of the investigation may be reviewed following the desk study and/or fieldwork. We have not allowed for acquiring services information, and cannot be responsible for damage to underground services or pipes not shown to us or not clearly shown on plans. Costs incurred will be passed on to you, and in commissioning the firm, you understand and accept that you/your agent have a contractual relationship with the firm & you accept this. Our rates assume unobstructed, reasonably level and firm access to the exploratory positions and adequate clear working areas and headroom. We have priced on the basis that you or your client have the necessary permissions, wayleaves and approvals to access land. All boreholes and pits are backfilled with arisings except where gas monitoring pipes are installed with stopcock covers. Dunelm are not responsible for any uneven surfaces as a result of siteworks and rutting and backfilled excavations may require re-levelling and/or making good by others after fieldwork is complete. Dunelm have not allowed for subsequent reinstatement as a result of settlement. No price has been provided or requested for a return visit to remove pipework and covers. Hourly rates apply to consultancy only and do not include expenses unless otherwise shown. If warranties are required, legal costs incurred will be passed on to you assuming the firm agree to complete such warranties, modified or otherwise and you understand and agree to pay all costs.

We advise you/your client that we may elect to pursue our statutory rights under late payment legislation, and will apply 8% to the base rate for unreasonably late payments. We will also apply the right to claim any associated legal costs incurred with recovery of late payments. The firm is exempt from the CIS Scheme. The firm offer to undertake work only in strict accordance with conditions covered by our current insurances, which are available for inspection. The company are not responsible for acts, negligent or otherwise of subcontractors and as a matter of policy cannot indemnify any other parties. Professional indemnity Insurance is limited to ten times the invoice net total except where stated otherwise by the firm, and we give notice that consequential loss as a direct or indirect result of the firms activities or omission of the same are excluded.