DUNELM
GEOTECHNICAL & ENVIRONMENTAL

REPORT NO: D9128

GEOENVIRONMENTAL APPRAISAL FOR LAND AT

SHOTTON COMMUNITY CENTRE

PREPARED FOR:

SHOTTON PARISH COUNCIL




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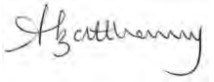
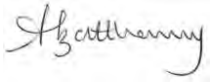
		Signature			

SHOTTON COMMUNITY CENTRE – EXECUTIVE SUMMARY

SUMMARY OF GEOENVIRONMENTAL ISSUES

Issue	Remarks
Grid Reference	439522, 540536
Proposed Development	New community centre.
Former Uses	Football ground, community centre and public open space.
Present Uses	Community centre, MUGA sports area and public open space.
Made Ground	Made ground, including reworked topsoil, encountered in all three boreholes drilled to between 0.7 and 1.6m bgl.
Natural Ground	Initially a soft slightly gravelly slightly clay (possibly a relict topsoil) to 2.0m bgl underlain by an initially soft, becoming firm and stiff, slightly sandy slightly gravelly clay.
Contamination	No significant chemical contamination identified during this investigation. However, ashy made ground has been identified and found to be potentially combustible.
Hazardous Gas	Not considered to be a significant risk from ground gas to the proposed development.
Mining & Quarrying	The site is not considered to be at risk of potential instability from shallow mineworkings underlying the site. No evidence has been found to suggest that the site has been affected by quarrying.
Foundation Solution	Trenchfill foundations.
Groundwater & Excavations	No major groundwater flows encountered. No buried obstructions were encountered during the works, however, the site has been developed previously and buried obstructions may be present elsewhere on the site.
Remediation and Preparatory Works	Where buried services representing a potential heat source may come into contact with potentially combustible materials, they should be placed in oversized trenches backfilled with clean, inert material. Within proposed areas of soft landscaping a cover layer of 1.0m comprising topsoil and subsoil should be placed to break any pathways between potential surface heat sources and the potentially combustible ashy made ground. Remedial measures are not normally required beneath areas of hardstanding or new buildings.
Recommendations for Further SI Works	None identified.

The executive summary is intended as a synopsis only. Further detail and limitations of the assessment is provided within the main body of the Report

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APPENDIX G - Dunelm Conditions of Offer, Notes on Limitations & Basis for Contract

1 INTRODUCTION

1.1 SCOPE OF INVESTIGATION

Dunelm Geotechnical and Environmental Limited (Dunelm) were instructed by d3 Associates Ltd, on behalf of Shotton Parish Council, to undertake a Geoenvironmental Appraisal of land at Shotton Community Centre in Shotton Colliery, County Durham.

It is proposed to develop the site with a new community centre.

Dunelm have previously produced a Geoenvironmental Appraisal for neighbouring land at Shotton Community Centre (ref. D6742, dated 15th April 2015). Desk study information contained within this report has been reviewed as part of these works and is included in Appendix C to this report.

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

- To determine the land use history of the site from an inspection of available Ordnance Survey (OS) plans for neighbouring land included in a previous Geoenvironmental Appraisal report.
- To determine the environmental setting of the site from available sources.
- To determine whether past mining may have had an influence on the site.
- To assess risks from ground contamination.
- To provide recommendations for foundations.

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 G and should be read in conjunction with this report.

2 SITE RECONNAISSANCE

2.1 GENERAL

The site is located at Ordnance Survey Grid Reference 439522, 540536. The site is located to the north of Bridge Road in Shotton Colliery, County Durham, approximately 12km to the east of Durham city centre. The site location is shown on Drawing No. D9128/01 in Appendix A to this report.

A site inspection was undertaken on 19th November 2018 and site photographs are presented in Appendix B. Existing site features are shown on Drawing No. D9128/02 presented in Appendix A to this report.

2.2 TOPOGRAPHY AND SITE FEATURES

The site is currently an open area of land adjacent to the existing Shotton Colliery Community Centre and a MUGA sports area.

The site cover comprises tarmac hardstanding in and around the MUGA sports area, and grassed public open space areas surrounding this.

The site has no clear physical boundaries, however, the existing community centre lies to the east of the area investigated. Residential properties are present to the south of the proposed site. Public open space is present to the west, c.0.5m lower than the area investigated, and the MUGA sports area is present to the north.

Several mature trees and hedgerows are present immediately to the south of the site.

2.3 EVIDENCE OF PRESENT AND FORMER LAND USE

The site is presently part of a MUGA sports area, and grassed public open space area.

There was no evidence of fly-tipping at the time of the Dunelm investigation.

3 SITE HISTORY

In order to determine the history of the site, extracts from historical Ordnance Survey (OS) plans from the previous Geoenvironmental Appraisal undertaken by Dunelm in 2015 have been examined; copies of these plans are presented in Appendix C to this report.

A summary of the history of the on-site and off-site features is presented below for the Community Centre site. 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
1857	The site comprises agricultural fields.	Railway line extends north-south 50m to the west, with a branch line 100m to the south. A pond is mapped 200m to the east. Old clay pit present 480m to the east. Shotton Brick and Tile works present 550m to the east. Shotton Colliery Pit present 700m to the north.
1897	No significant change.	Shotton Wagonway extends east-west 95m to the south.
1919	A football ground is present in the northern area of the site, with a small group of buildings present in the southern area.	Residential housing developed 40m to the north. Shotton Colliery Brick works present 235m to the southeast.
1939	Football ground and buildings are no longer shown on the site.	Further residential development to the east and southeast of the site. Bridge Road developed to the south. Further residential development beyond the railway line to the west. Brick works and colliery to the south extended with abundant spoil heaps. Pond no longer mapped to the east.
1958	No significant change.	A row of terraced houses developed immediately to the south.
1966 - 1967	No significant change.	Colliery to the north appears to have been reclaimed. Areas of colliery and brick works to the south appear to have been reclaimed.
1974	Building present in the east in the location of the current Community Centre.	A depot is present to the northeast. Colliery and brick works no longer mapped to the south east. Railway to the south no longer mapped.
1981	Building in the east labelled as a Community Centre. Layout as per current layout. Rectangular feature present in the west (possibly a sports area).	Further general residential development in the areas surrounding the site. Railway to the west mapped as dismantled.
1985	Building in the east still labelled as a Community Centre.	Railway to the west no longer mapped.
1987	No significant change.	No significant change.
1993	No significant change.	No significant change.
2002	No significant change.	No significant change.
2010	No significant change.	No significant change.
2014	No significant change.	No significant change.

In summary, the site has remained unoccupied until c.1919 when a football ground and a group of small buildings were developed. These remained until c.1974 when the existing community centre was developed. The surrounding area has been predominantly residential, although a colliery and brickworks were present 235m to the south.

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. 27 Durham.
- British Geological Survey (BGS) 1: 10,560 scale sheet NZ34SE.
- Coal Mining Report from David Bellis Associates (based on data obtained from the Coal Authority).
- Previous Groundsure Report (including historical map extracts) dated 2015.
- BRE Publication BR211 *Radon: Guidance on Protective Measures for New Dwellings*.

4.2 GEOLOGY

The site is shown to be underlain by drift deposits comprising glacial clay.

The solid geology underlying the site comprises Permo-Triassic Middle Magnesian Limestone strata, overlying Carboniferous Middle Coal Measures strata.

The geological plans show the Bottom Ryhope Little coal seam to outcrop in the northern area of the site, however, this is recorded as thin and will be overlain by Magnesian Limestone strata, and therefore, potential unrecorded workings in this seam are not considered to pose a significant risk to the proposed development.

No faults are shown in the vicinity of the site.

There are no existing BGS borehole records located 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

A mining report commissioned for the investigation of neighbouring land by Dunelm in 2015 indicates that the site may be underlain by workings in six coal seams, the shallowest being the Main coal seam at a depth of approximately 222m below ground level.

The mining report indicates that the site may be affected by unrecorded workings, however, potential workings are likely to be at significant depth beneath the Magnesian Limestone, and if present, are not considered to pose a significant risk to the proposed development.

There are no recorded mine entries within 20m of the site.

No evidence has been found to suggest that the site itself has been affected by quarrying, although historical plans show that brick and tile works and a colliery have previously existed in the vicinity of the site.

4.4 HYDROLOGY

The nearest surface water feature is 56m west of the site; this is assumed to be an un-named drain associated with the historical railway line.

The Groundsure Report indicates that there are no licensed surface water abstractions within 2km of the site.

There are no recorded discharge consents within 500m of the site.

There are no recorded pollution incidents within 400m 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 Zone 3 (Total Catchment) of a groundwater Source Protection Zone.

There are no recorded groundwater abstractions within 2km of the site.

4.6 LANDFILLS & OTHER POTENTIAL GAS SOURCES

The Groundsure Report indicates that there are no recorded landfill sites located within 450m of the site.

Historical plans indicate that a pond located 200m to the east of the site was backfilled prior to 1939. Furthermore, a brickworks and colliery with associated areas of spoil was historically present within 250m of the site. Although these features represent potential sources of ground gas, the likelihood of the proposed development being affected by ground gas is considered to be low.

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 previously undertaken a geoenvironmental appraisal elsewhere on the Community Centre site in 2015, which comprised the drilling of 3No. mini percussion boreholes (MBH1 to MBH3) and the excavation of two trial pits (TPs 1 and 2).

The exploratory holes formed revealed variably cohesive and granular deposits with fragments of brick, glass and sandstone to depths of between 0.3 and 1.0m bgl, underlain by a firm, becoming stiff, sandy gravelly clay to depths of at least 5.45m bgl. Laboratory testing proved the clay to be of low and high plasticity, and of medium volume change potential.

Rock head was not encountered during the investigation in 2015.

Chemical testing undertaken on selected samples of made ground proved isolated significantly elevated concentrations of polycyclic aromatic hydrocarbons (PAHs; specifically benzo(a)pyrene) and asbestos to be present when compared against Generic Assessment Criteria (GAC) values for a Commercial end use.

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, although no specific potential contaminants have been identified associated with the former uses.

However, the site is located in an area that has been heavily industrialised in the past. Consequently, near-surface deposits may have been affected by slight contamination in the form of particulates emitted from chimneys or localised ash deposits from domestic coal fires.

The main receptors include future site users and the underlying Principal Aquifer.

6.2 SUMMARY OF INVESTIGATION

The exploratory holes listed below were advanced on 19th November 2018 at locations specified by d3 Associates Ltd. Records for each of the exploratory holes noted are included in Appendix D and the locations are shown on Drawing No. D9128/02 presented in Appendix A to this report.

- Mini percussion boreholes: MBH1 to MBH3.

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 8.

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 in the three boreholes drilled. Ground conditions are described in the following sections.

7.2 REWORKED TOPSOIL

Topsoil was encountered in MBH2 only, drilled in an area of soft landscaping, to a depth of 0.2m bgl, and was recorded as a dark brown slightly ashy slightly gravelly sandy topsoil, containing sandstone, coal and rare glass.

7.3 MADE GROUND

Made ground was encountered in all three boreholes drilled to depths of between 0.7 and 1.6m bgl.

In MBH1 and 3 drilled adjacent to the existing MUGA sports area, the made ground was recorded to be macadam hardstanding on a granular sub-base to 0.45m and 0.7m bgl respectively. This was underlain in MBH1 by a dark brown ashy slightly gravelly sand with sandstone, coal, frequent clinker, rare brick, ceramic, glass and rubber to 1.3m bgl.

The reworked topsoil identified in MBH2 was underlain by a dark brown ashy slightly gravelly sand with sandstone, coal, frequent clinker, rare brick, ceramic and glass to 1.6m bgl.

7.4 BURIED OBSTRUCTIONS

No buried obstructions were encountered during drilling of the three boreholes, however, the site has been developed previously and buried obstructions may be present elsewhere on the site.

7.5 NATURAL SOILS

The natural soils at the site consisted of an initially soft slightly sandy slightly gravelly clay to 2.0m bgl, considered to possibly be a relict topsoil, underlain by a firm, becoming stiff with increasing depth, slightly sandy slightly gravelly clay to depths of at least 5.45m bgl.

Two SPT N values of 1 were recorded in the upper slightly sandy slightly gravelly clay, indicating them to be very soft in nature.

SPT N values of between 3 and 19 were recorded in the lower clay in the three boreholes drilled by Dunelm, indicating the soils to be initially very soft (possibly water softened), becoming firm and stiff in nature.

Geotechnical testing undertaken on six samples of the natural clay reported moisture contents of between 14% and 45%, and plasticity indices of between 15 and 33, indicating the natural clay to be variably low and intermediate, occasionally high, plasticity, and of typically low, occasionally moderate, volume change potential.

An assessment of the liquidity index for the six samples indicate the cohesive soils to be firm and stiff, locally soft, in nature.

7.6 ROCK HEAD

Rock head was not encountered in the three boreholes drilled during this investigation.

7.7 GROUNDWATER

Groundwater seepages were encountered in MBH1 and MBH2 at 1.2m bgl during this investigation.

7.8 HYDROCARBON CONTAMINATION

No visual or olfactory evidence of hydrocarbon contamination was noted during the investigation.

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 maximum water-soluble sulfate concentration is 670mg/l and the lowest recorded pH value is 6.7.

Based on the above results, Design Sulfate Class DS-2 and ACEC Classification AC-2 would be appropriate for buried concrete at the site.

8 CHEMICAL TESTING RESULTS

8.1 SELECTION OF CHEMICAL TESTING

This section represents the ‘Hazard Identification’ process required in accordance with CLR11.

The site’s former usage is not considered likely to have given rise to significant ground contamination.

Made ground has been recorded in the three boreholes drilled to depths of between 0.7and 1.6m bgl.

Appropriate chemical testing has been undertaken taking into account potential contaminants identified and evidence of contamination recorded during the ground investigation.

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

All values in mg/kg	Residential (based on 6% SOM)	Residential without homegrown produce (based on 6% SOM)	Commercial (based on 6% SOM)	Allotments (based on 6% SOM)	Public Open space (resi) (based on 6% SOM)
Arsenic	37	40	**640**	43	79
Cadmium	11	85	**190**	1.9	120
Chromium (Total)	910	910	**8,600**	18,000	1,500
Chromium (VI)	6	6	**33**	1.8	7.7
Copper	2,400	7,100	**68,000**	520	12,000
Lead	200*	310*	**2,330***	80*	No SSV
Mercury	40	56	**1,100**	19	120
Nickel	130	180	**980**	53	230
Selenium	250	430	**12,000**	88	1,100
Zinc	3,700	40,000	**730,000**	620	81,000

Soil Screening Values from The LQM/CIEH S4ULs for human Health Risk Assessment (2015). *taken from DEFRA C4SL database.

8.3 MADE GROUND (INORGANIC CONTAMINANTS)

A summary of the results of inorganic testing on three 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 and >9	7.0 to 9.0
Arsenic	mg/kg	3	0	640	55
Cadmium	mg/kg	3	0	190	1.1
Chromium (Total)	mg/kg	3	0	8,600	19
Chromium VI	mg/kg	3	0	33	<0.5
Lead*	mg/kg	3	0	2,330	220
Mercury	mg/kg	3	0	1,100	0.24
Nickel	mg/kg	3	0	980	52
Selenium	mg/kg	3	0	12,000	1.8
Copper	mg/kg	3	0	68,000	140
Zinc	mg/kg	3	0	730,000	260
Asbestos	-	3	0	Present	NAD

Soil Screening Values from The LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for a commercial end use. *Taken from DEFRA C4SL database.

The results of the testing indicated no exceedances of inorganic determinands when compared to the relevant assessment criteria in the three samples of made ground analysed.

8.4 CALORIFIC VALUE TESTING

Results from Calorific Value (CV) testing on two samples of ashy made ground tested were reported to be 9.5 and 17MJ/kg. ICRCL Document 61/84 *Notes on the fire hazards of contaminated land* (July 1986) comments as follows: "materials whose CVs exceed 10 MJ/kg are almost certainly combustible, while those with values below 2 MJ/kg are unlikely to burn".

Given these values, the ashy made ground is considered to be potentially combustible.

8.5 ASBESTOS TESTING

Asbestos was not detected in the three samples of made ground 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, two samples of made ground were tested for the following:

- Polycyclic aromatic hydrocarbon (PAH) compounds.

Appropriate samples were tested for Fraction of Organic Carbon and the results were 52% and 78%.

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 POLYCYCLIC AROMATIC HYDROCARBONS

Contaminant	Generic Assessment Criteria (mg/kg)					No. of samples tested	No. of samples with value greater than GAC	Max concentration (mg/kg)
	Resi with plant uptake	Residential without home grown produce	Allot ments	Comm / industrial	Public Open Space			
Naphthalene	13	13	24	**1,100**	4,900	2	0	0.54
Acenaphthylene	920	6,000	160	**100,000**	15,000	2	0	0.76
Acenaphthene	1,100	6,000	200	**100,000**	15,000	2	0	2.4
Fluorene	860	4,500	160	**71,000**	9,900	2	0	2.6
Phenanthrene	440	1,500	90	**23,000**	3,100	2	0	15
Anthracene	11,000	37,000	2,200	**540,000**	74,000	2	0	3.6
Fluoranthene	890	1,600	290	**23,000**	3,100	2	0	23
Pyrene	2,000	3,800	620	**54,000**	7,400	2	0	20
Benzo(a)anthracene	13	15	13	**180**	29	2	0	8.6
Chrysene	27	32	19	**350**	57	2	0	12
Benzo(b)fluoranthene	3.7	4	3.9	**45**	7.2	2	0	9.5
Benzo(k)fluoranthene	100	110	130	**1,200**	190	2	0	4.2
Benzo(a)pyrene	3	3.2	3.5	**36**	5.7	2	0	6.4
Indeno(1,2,3,-cd)pyrene	41	46	39	**510**	82	2	0	4.9
Dibenz(a,h)anthracene	0.3	0.32	0.43	**3.6**	0.58	2	0	2.1
Benzo(g,h,i)perylene	350	360	640	**4,000**	640	2	0	4.8

Soil Screening Values from the LQM/CIEH S4ULs for Human Health Risk Assessment (2015) for 6% SOM soil, for a commercial end use.

The results of the testing indicated no exceedances of PAHs when compared to the relevant assessment criteria in the two samples of made ground analysed.

9 ASSESSMENT OF CONTAMINATION RISKS

9.1 SUMMARY OF CONTAMINATION SOURCES

TOPSOIL

Reworked topsoil was locally present in MBH2 only to 0.2m bgl.

MADE GROUND

The site is underlain by a layer of granular made ground to a maximum depth of 1.6m bgl.

Testing has indicated that this made ground does not contain elevated concentrations of inorganic contaminants. However, the made ground is considered to be potentially combustible due to the presence of ash within the soil matrix.

HYDROCARBON CONTAMINATION

No significant hydrocarbon contamination was encountered during this investigation.

9.2 HAZARD ASSESSMENT

No sources of contamination have been encountered during this investigation and consequently no unacceptable risks have been identified.

However, the ashy made ground is considered to be potentially combustible. Where buried services representing a potential heat source may come into contact with combustible materials, they should be placed in oversized trenches backfilled with clean, inert material. Within proposed areas of soft landscaping a cover layer of 1.0m comprising topsoil and subsoil should be placed to break any pathways between potential surface heat sources and the potentially combustible made ground.

Remedial measures are not normally required beneath areas of hardstanding. Furthermore, no remedial action is normally required beneath new buildings since an insulated floor slab will limit heat transfer to the ground, although this should be verified by the appropriate regulatory authorities.

It should be noted that asbestos has been proven to be present in the made ground elsewhere on the Community Centre, and if any materials suspected of containing asbestos are encountered during these works, then works should cease and advice should be sought from Dunelm.

10 FOUNDATIONS AND GEOTECHNICAL ISSUES

10.1 INTRODUCTION

The proposed development is understood to consist of a new community centre.

Ground conditions encountered during this investigation comprised granular made ground to a maximum depth of 1.6m bbl., underlain by an initially soft slightly sandy slightly gravelly clay to 2.0m bgl (possibly a relict topsoil), underlain by a firm, becoming stiff, slightly sandy slightly gravelly clay to depths of at least 5.45m bgl.

Rock head was not encountered during this investigation by Dunelm.

10.2 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.

10.3 FOUNDATIONS

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

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

Sub-surface concrete should be Design Sulphate Class DS-2, with the site allocated an ACEC Classification of AC-2.

Based on the visual description of the clay soils encountered, and the results of in situ and laboratory geotechnical testing, a safe bearing capacity of 90kN/m² has been determined for trench fill foundations 0.6m wide taken through made ground, softened clays and relict topsoil to found on the firm and stiff natural clay at depths of around 2.0m bgl. At this width of foundation and bearing pressure settlements should be less than 25mm.

Based on plasticity index results, cohesive soils at the site should be regarded as being of moderate 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 current guidance.

Relict foundations are anticipated in the vicinity of former buildings shown on historical plans. Foundations in areas of former structures may need to be deepened to found within suitable strata.

Overdeepened foundations should be stepped in accordance with current guidance.

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.

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

10.4 FLOOR SLABS

In accordance with current guidance, suspended floor slabs should be adopted where made ground exceeds 0.6m in thickness. Furthermore, due to the presence of a deep suspected relict topsoil layer, ground bearing slabs are likely to be unsuitable for new structures and suspended ground floors are therefore recommended.

10.5 BURIED OBSTRUCTIONS

No buried obstructions were encountered during drilling of the three boreholes, however, the site has been developed previously and buried obstructions may be present elsewhere on the site.

10.6 EXCAVATIONS

Observations made during the fieldwork indicate that minor groundwater seepages 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.

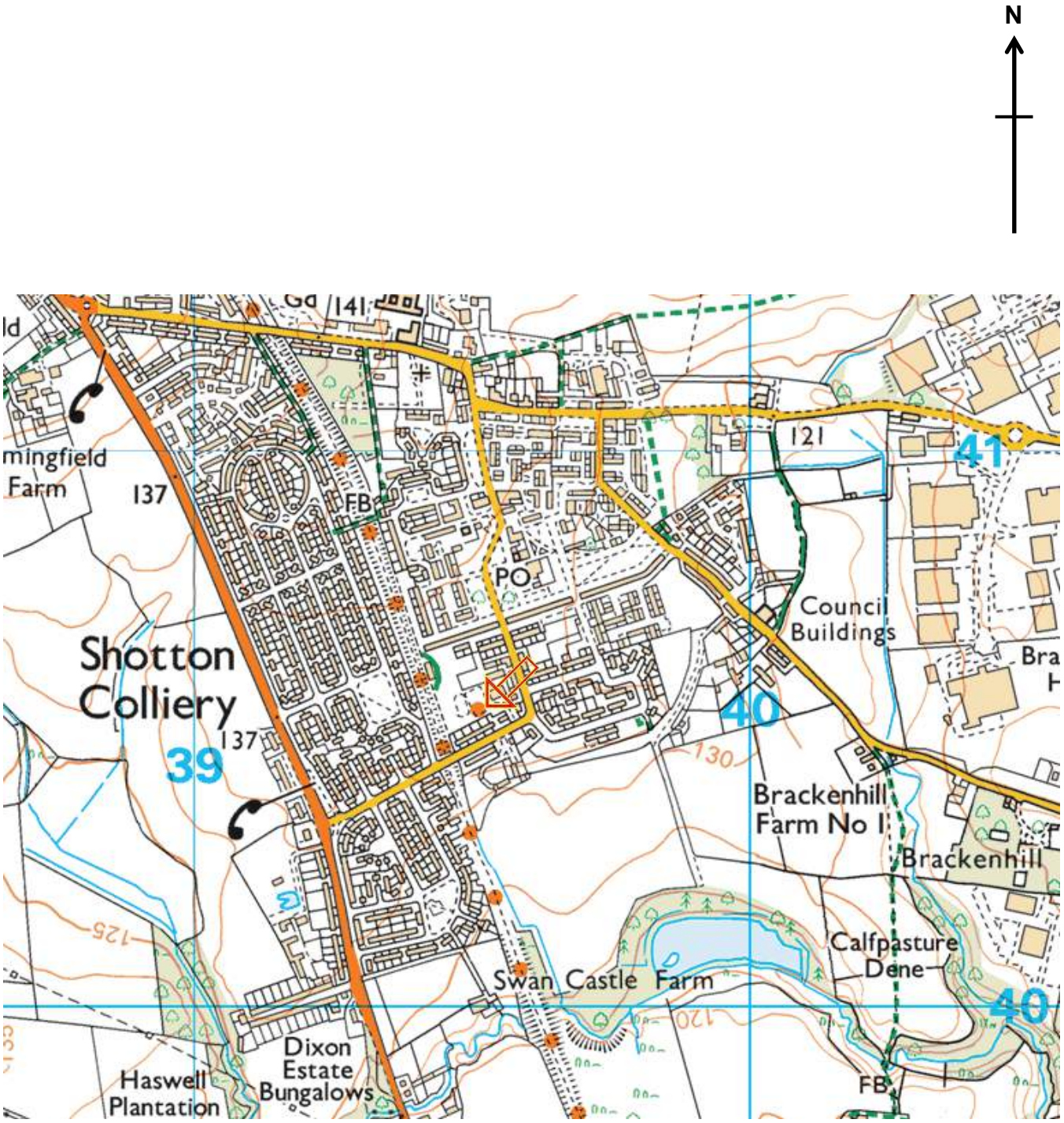
Excavation sides should be designed, constructed and supported in accordance with the recommendations given in CIRIA Report No. 97.

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 although breaking out of relict foundations and other obstructions should be anticipated.

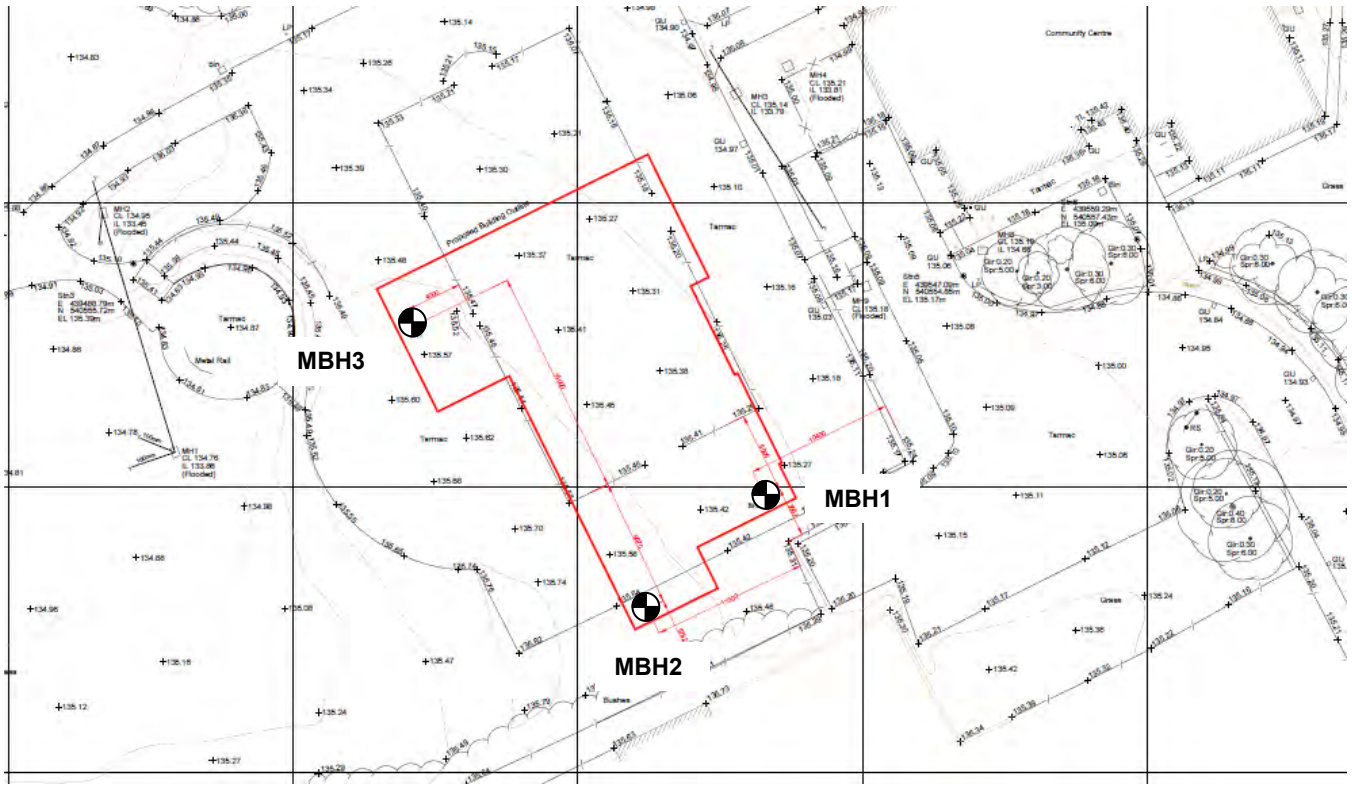
Appendix A

Drawings



DUNELM GEOTECHNICAL & ENVIRONMENTAL	**Contract:** Shotton Community Centre			**Contract No:** D9128
	Client: Shotton Parish Council			
TEL: 0191 378 3151 FAX: 0191 378 3157	**Drawing Title:** Site Location Plan			
Drawing No: D9128/01	**Date:** December 2018	**Scale:** NTS	**Status:** Final	**Drawn by:** RS

N



DUNELM GEOTECHNICAL & ENVIRONMENTAL	**Contract:** Shotton Community Centre			**Contract No:** D9128
	Client: Shotton Parish Council			
TEL: 0191 378 3151 FAX: 0191 378 3157	**Drawing Title:** Exploratory Hole Location Plan			
Drawing No: D9128/02	**Date:** December 2018	**Scale:** NTS	**Status:** Final	**Drawn by:** RS

Appendix B

Photographic Survey

Photograph 1: View looking towards MBH01 and MBH02.

Photograph 2: View looking towards MBH01 and MBH02.

DUNELM GEOTECHNICAL & ENVIRONMENTAL

TEL: 0191 378 3151
FAX: 0191 378 3157

Contract: Shotton Community Centre		**Contract No:** D9128
Client: Shotton Parish Council		
Site Photographs	**Date: Dec 2018**	**Sheet 1 of 3**

Photograph 3: View looking towards MBH03.

Photograph 4: View looking towards MBH03.

DUNELM GEOTECHNICAL & ENVIRONMENTAL

TEL: 0191 378 3151
FAX: 0191 378 3157

Contract: Shotton Community Centre		**Contract No:** D9128
Client: Shotton Parish Council		
Site Photographs	**Date: Dec 2018**	**Sheet 2 of 3**

Photograph 5: Existing MUGA sports area.

Photograph 6: Existing MUGA sports area.

DUNELM GEOTECHNICAL & ENVIRONMENTAL TEL: 0191 378 3151 FAX: 0191 378 3157	**Contract:** **Shotton Community Centre**		**Contract No:** **D9128**
	Client: **Shotton Parish Council**		
	Site Photographs	**Date: Dec 2018**	**Sheet 3 of 3**

Appendix D

Exploratory Hole Records

INFORMATION GENERALLY RELATING TO ALL EXPLORATORY HOLE RECORDS

GENERAL

Borehole/Trial Pit No
The exploratory hole identity number used throughout the report.

Site
The ground investigation project name.

Client
Client's name responsible for funding the ground investigation project.

Ground Level and Location
The precise ground level in meters above Ordnance Datum at the exploratory hole location from which the reduced level for each stratigraphic boundary is calculated. The exploratory hole position is given as either national grid-coordinates or local grid as specified.

ABBREVIATIONS

Samples

B Bulk disturbed sample generally representative of the soil type for cohesive and fine granular soils.

D Small disturbed tub sample normally taken at intermediate depth between other sampling or testing operations. The sample is stored in an airtight container.

BRE Sample taken for electrochemical testing

ES Sample of potentially contaminated materials.

C Core sample.

SB Bulk disturbed sample subsampled from a liner sample

SD Small disturbed tub sample subsampled from a liner sample.

U 100mm diameter undisturbed thick walled sample (OS-TK/W)

UT 100mm diameter undisturbed thin walled sample (OS-T/W)

UF An attempted but failed 100mm undisturbed sample.

W Water sample.

In-situ Testing

CBR California Bearing Ratio mould sample or test.

SPT Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding 'N' value is given in the test result column.

Rock Quality and Core Recovery

TCR Total core recovery - The length of the recovered core expressed as a percentage of the length of core run.

SCR Solid Core Recovery - The sum length of all core pieces (measured along the centre of the core), expressed as a percentage of the length core run.

RQD Rock Quality Designation- The sum length of all core pieces that are 100mm or longer (measured along the centre of the core), expressed as a percentage of the length of core run.

FI Fracture Index- The number of fractures per 1000mm length of solid core.

NI Non-intact- The material recovered in a non-intact state.

NR No recovery from the core run.

AZCL Assessed Zone of Core Loss.

COBBLE CONTENT

Low <10%, medium 10 – 20%, high >20%

Exploratory Hole Log Legend

BOREHOLE LEGEND:

TOPSOIL

MADE GROUND

SILT

CLAY

SAND

GRAVEL

PEAT

MUDSTONE

SILTSTONE

SANDSTONE

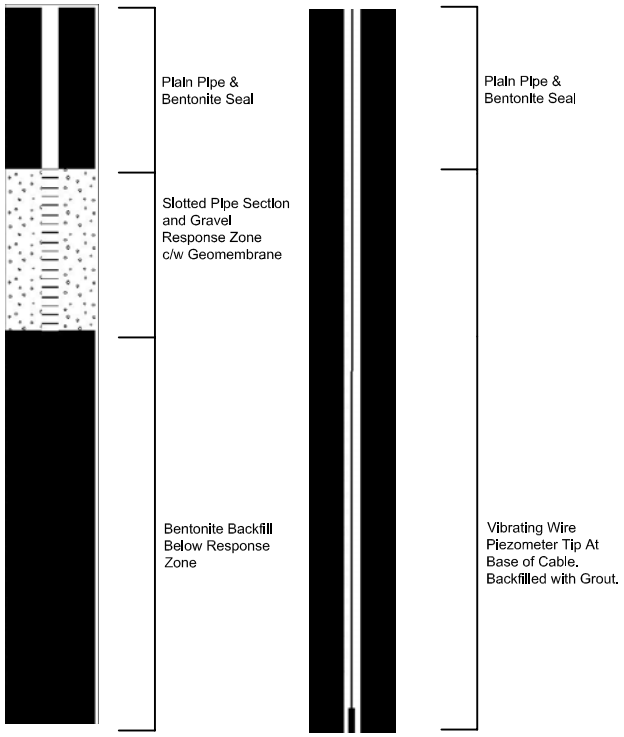
LIMESTONE

CHALK

COAL

BENTONITE/ GROUT

MONITORING INSTALLATION LEGEND:



NB Where strata consists of material of more than one soil or rock type the legends are appropriately combined.

Dunelm Geotechnical & Environmental Ltd
Foundation House, St John's Road, Meadowfield
Durham, DH78TZ
Tel: 0191 378 3151
Fax: 0191 378 3157
e-mail: admin@dunelm.co.uk
web: www.dunelm.co.uk

BOREHOLE RECORD

Borehole MBH1

Contract No: D9128

Site: Shotton Community Centre

GL (m AOD): -

Scale 1:50

Easting: -

Northing: -

Client: Shotton Parish Council

Driller: RW | Logged By: FR

Sheet 1 of 1

Method: Cable Percussive Boring Using Mini Rig

Checked By: RS

Dates: 19/11/2018

Type	Depth From-To (m)	Insitu Testing	(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
D	0.10			MADE GROUND: Black macadam.	(0.20)			
ES	0.10				0.20			
D	0.30			MADE GROUND: Light brown gravelly sand. Sand is fine to coarse. Gravel is angular to subrounded, fine to coarse of sandstone and limestone. (Sub-base).	(0.25)			
ES	0.30				0.45			
D	0.50			MADE GROUND: Dark brown ashy, slightly gravelly sand. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, coal, frequent clinker, rare brick, ceramic, glass and rubber.	(0.85)			
ES	0.50							
D	1.00		1					
ES	1.00							
SPT (S)	1.20 - 1.65	N=1 (1,0/0,0,0,1)	(1.20) Dry		1.30			
D	1.50			Soft grey slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone and coal. Organic odour noted - possible relict topsoil.	(0.70)			
ES	1.50							
SPT (S)	2.00 - 2.45	N=8 (1,1/1,2,2,3)	2 (2.00) Dry	Firm brown slightly gravelly, slightly sandy CLAY. Sand is fine to coarse gravel is subangular to subrounded, fine to coarse of sandstone and coal.	2.00			
SPT (S)	3.00 - 3.45	N=10 (2,2/2,2,3,3)	3 (3.00) Dry		(3.45)			
SPT (S)	4.00 - 4.45	N=14 (2,1/3,2,4,5)	4 (4.00) Dry					
D	4.50							
SPT (S)	5.00 - 5.45	N=19 (3,5/5,5,5,4)	5 (5.00) Dry	*5.00m: Becoming stiff.*				
				End of Borehole at 5.45 m	5.45			
			6					
			7					
			8					
			9					
			10					

Ground Water (m)

Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)
1.20	1.00			

Log last updated 06/12/2018

Chiselling / Hard Strata

From (m)	To (m)	Time (hr)

Casing Depths

Diameter (mm)	Depth (m)

Hole Diameter

Diameter (mm)	Depth (m)
67	2.00
77	3.00
67	5.00

General Remarks

1. Hand dug inspection pit to 1.20m.

BOREHOLE RECORD

Borehole MBH2

Contract No: D9128

Site: Shotton Community Centre

GL (m AOD) -

Scale 1:50

Easting: -

Northing: -

Client: Shotton Parish Council

Driller: RW | Logged By: FR

Sheet 1 of 1

Method: Cable Percussive Boring Using Mini Rig

Checked By: RS

Dates: 19/11/2018

Type	Depth From-To (m)	Insitu Testing	(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
				MADE GROUND: Dark brown slightly ashy, slightly gravelly sandy topsoil. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, coal and rare glass.	(0.20) 0.20			
D	0.20							
ES	0.20							
D	0.50							
ES	0.50							
				MADE GROUND: Dark brown ashy slightly gravelly sand. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, coal, frequent clinker, rare brick, ceramic and glass.	(1.40)			
D	1.00		1					
ES	1.00							
SPT (S)	1.20 - 1.65	N=1 (1,0/0,0,0,1)	(1.20) Dry					
D	1.50							
ES	1.50							
D	1.70			Soft grey slightly gravelly, slightly sandy CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone, coal and rare glass. Organic odour noted - possible relict topsoil.	1.60 (0.40)			
ES	1.70							
SPT (S)	2.00 - 2.45	N=3 (1,1/1,1,0,1)	2 (2.00) Dry		2.00			
				Firm greyish brown slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone and coal.				
D	2.50							
SPT (S)	3.00 - 3.45	N=8 (2,1/1,2,2,3)	3 (3.00) Dry					
D	3.50				(3.45)			
SPT (S)	4.00 - 4.45	N=18 (1,2/3,3,5,7)	4 (4.00) Dry	*4.00m: Becoming stiff.*				
D	4.50							
SPT (S)	5.00 - 5.45	N=15 (1,3/3,4,3,5)	5 (5.00) Dry					
				End of Borehole at 5.45 m	5.45			
			6					
			7					
			8					
			9					
			10					

Ground Water (m)

Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)
1.20	1.00			

Chiselling / Hard Strata

From (m)	To (m)	Time (hr)

Casing Depths

Diameter (mm)	Depth (m)

Hole Diameter

Diameter (mm)	Depth (m)
87	2.00
77	3.00
67	5.00

General Remarks

1. Hand dug inspection pit to 1.20m.

Log last updated 06/12/2018

DUNELM GEOTECHNICAL & ENVIRONMENTAL — BRITISH DRILLING ASSOCIATION

BOREHOLE RECORD

Borehole MBH3

Contract No: D9128

Site: Shotton Community Centre

GL (m AOD): - Scale 1:50

Easting: - Northing: -

Client: Shotton Parish Council

Driller: RW Logged By: FR

Sheet 1 of 1

Method: Cable Percussive Boring Using Mini Rig

Checked By: RS

Dates: 19/11/2018

Type	Depth From-To (m)	Insitu Testing	(Casing) Groundwater	STRATA RECORD Description	Depth (m)	Level (m AOD)	Legend	Well/ Backfill
D	0.10			MADE GROUND: Black macadam.	(0.15)			
ES	0.10				0.15			
D	0.30			MADE GROUND: Yellow sandy gravel. Sand is fine to coarse. Gravel is subangular to subrounded, fine to coarse of sandstone and limestone. (Sub-base).				
ES	0.30				(0.55)			
					0.70			
D	1.00		1	Soft grey mottled brown and orange slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse of sandstone and coal.				
ES	1.00							
SPT (S)	1.20 - 1.65	N=1 (1,0/0,0,0,1)	(1.20) Dry		(1.30)			
D	1.50							
SPT (S)	2.00 - 2.45	N=11 (3,3/2,2,3,4)	2 (2.00) Dry		2.00			
D	2.50			Firm brown mottled grey slightly sandy, slightly gravelly CLAY. Sand is fine to coarse. Gravel is fine to coarse of sandstone, coal and mudstone.				
SPT (S)	3.00 - 3.45	N=16 (3,4/4,4,3,5)	3 (3.00) Dry	*3.00m: Becoming stiff.*				
D	3.50				(3.45)			
SPT (S)	4.00 - 4.45	N=13 (2,2/3,3,3,4)	4 (4.00) Dry	*4.00m: Becoming stiff.*				
D	4.50							
SPT (S)	5.00 - 5.45	N=11 (1,2/2,3,2,4)	5 (5.00) Dry					
				End of Borehole at 5.45 m	5.45			
			6					
			7					
			8					
			9					
			10					

Ground Water (m)

Depth Struck (m)	Casing Depth (m)	Water Level	Minutes	Water sealed (m)

Chiselling / Hard Strata

From (m)	To (m)	Time (hr)

Casing Depths

Diameter (mm)	Depth (m)

Hole Diameter

Diameter (mm)	Depth (m)
87	2.00
77	3.00
67	5.00

General Remarks

1. Hand dug inspection pit to 1.20m.
2. No groundwater encountered.

Log last updated 06/12/2018

Appendix E

Chemical Testing Records

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	18-36715-1
Initial Date of Issue:	28-Nov-2018
Client	Dunelm Geotechnical and Environmental
Client Address:	Foundation House St Johns Road Meadowfield County Durham DH78TZ
Contact(s):	Rob Schofield
Project	D9128 - Shotton Community Centre

Quotation No.:		**Date Received:**	22-Nov-2018
Order No.:	15792/RS/D9128	**Date Instructed:**	22-Nov-2018
No. of Samples:	3		
Turnaround (Wkdays):	5	**Results Due:**	28-Nov-2018
Date Approved:	28-Nov-2018		

Approved By:

Details: Martin Dyer, Laboratory Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: D9128 - Shotton Community Centre

Client: Dunelm Geotechnical and Environmental			**Chemtest Job No.:**		18-36715	18-36715	18-36715
Quotation No.:			**Chemtest Sample ID.:**		729331	729335	729340
			Sample Location:		MBH 1	MBH 2	MBH 3
			Sample Type:		SOIL	SOIL	SOIL
			Top Depth (m):		0.50	0.50	0.30
			Date Sampled:		19-Nov-2018	19-Nov-2018	19-Nov-2018
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Moisture	N	2030	%	0.020	16	22	5.2
pH	U	2010		N/A	7.0	6.7	9.0
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10.000	670	110	< 10
Calorific Value	N	2140	MJ/kg	0.10	9.5	17	
Arsenic	U	2450	mg/kg	1.0	55	50	15
Cadmium	U	2450	mg/kg	0.10	0.19	1.1	0.16
Chromium	U	2450	mg/kg	1.0	19	17	3.5
Copper	U	2450	mg/kg	0.50	140	85	4.1
Mercury	U	2450	mg/kg	0.10	0.24	< 0.10	< 0.10
Nickel	U	2450	mg/kg	0.50	52	51	6.2
Lead	U	2450	mg/kg	0.50	220	160	19
Selenium	U	2450	mg/kg	0.20	1.5	1.8	< 0.20
Zinc	U	2450	mg/kg	0.50	260	160	32
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	52	78	
Naphthalene	U	2700	mg/kg	0.10	0.54	< 0.10	
Acenaphthylene	U	2700	mg/kg	0.10	0.76	< 0.10	
Acenaphthene	U	2700	mg/kg	0.10	2.4	< 0.10	
Fluorene	U	2700	mg/kg	0.10	2.6	< 0.10	
Phenanthrene	U	2700	mg/kg	0.10	15	< 0.10	
Anthracene	U	2700	mg/kg	0.10	3.6	< 0.10	
Fluoranthene	U	2700	mg/kg	0.10	23	1.2	
Pyrene	U	2700	mg/kg	0.10	20	1.2	
Benzo[a]anthracene	U	2700	mg/kg	0.10	8.6	< 0.10	
Chrysene	U	2700	mg/kg	0.10	12	< 0.10	
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	9.5	< 0.10	
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	4.2	< 0.10	
Benzo[a]pyrene	U	2700	mg/kg	0.10	6.4	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	4.9	< 0.10	
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	2.1	< 0.10	
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	4.8	< 0.10	
Total Of 16 PAH's	U	2700	mg/kg	2.0	120	2.4	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2140	Calorific Value	Calorific Value	Bomb Calorimeter
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID

Chemtest
The right chemistry to deliver results

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix F

Geotechnical Testing Results

Laboratory Report Front Sheet

Site name	Job number
Shotton Community Centre	D9128

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com

UKAS TESTING
7607

Client details:

Reference:	D9128
Name:	Dunelm
Address:	Foundation House, St John's Road, Meadowfield, County Durham, DH7 8TZ
Telephone:	0191 3783151
Email:	rschofield@dunelm.co.uk
FAO:	R Schofield

Date commenced: 21/11/2018

Date reported: 02/12/2018

Observations and interpretations are outside of the UKAS Accreditiation

A copy of the Laboratory Schedule of accredited tests as issued by UKAS is attached to this report. 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. This certificate shall not be reproduced in full, without the prior written approval of the laboratory.

Samples will be held at the laboratory for a period of 4 weeks after the report date. After the 02-01-2019 all samples will be disposed of. Should further testing be required then the office should be informed before the above date.

Signature:	Approved Signitories:
	☐ K Watkin (Lab Manager) ☑ U Mazhar (Assistant Lab Manager) ☐ I Nicholson (Technical Manager)

Summary of Classification Tests

Site name	Job number
Shotton Community Centre	D9128

Solmek
12-16 Yarm Road,
Stockton on Tees,
TS18 3NA
01642 607083
lab@solmek.com

UKAS TESTING
7607

Hole	Depth Top m	Depth Base m	Type	w %	Oven temp. °c	w_a %	P_a %	P_r %	w_L %	w_P %	I_P %	I_L	Plasticity class	Preparation method
MBH1	1.50		D	28	105		99	1	36-s	21	15		CI	Tested after >425µm removed by hand
MBH1	2.00	2.45	D	18	105		96	4	31-s	16	15		CL	Tested after >425µm removed by hand
MBH2	2.00	2.45	D	45	105		98	2	56-s	23	33		CH	Tested after >425µm removed by hand
MBH2	3.00	3.45	D	20	105		87	13	32-s	14	18		CL	Tested after >425µm removed by hand
MBH3	1.00		D	24	105		99	1	44-s	22	22		CI	Tested after >425µm removed by hand
MBH3	2.00	2.45	D	14	105		68	32	30-s	14	16		CL	Tested after >425µm removed by hand

All tests found in Solmek UKAS Schedule of Accreditation are tested to standard unless otherwise indicated

Key	Description		Category	BS Test Code
w	Moisture content			BS 1377:1990 Part 2 Clause 3.2
w_a	Equivalent moisture content passing 425µm sieve			BS 1377:1990 Part 2 Clause 3.2
w_L	Liquid limit	Single point	-s	BS 1377:1990 Part 2 Clause 4.4
		Four point	-f	BS 1377:1990 Part 2 Clause 4.3
w_P	Plastic limit			BS 1377:1990 Part 2 Clause 5.2
P_a	Percentage passing 425um sieve			
P_r	Percentage retained 425um sieve			
I_P	Plasticity index			BS 1377:1990 Part 2 Clause 5.4
I_L	Liquidity index			BS 1377:1990 Part 2 Clause 5.4
	Suffix indicating test is "Not UKAS Accredited"		*	

Approved by	UM
Approval date	02/12/2018 08:38
Date report generated	02/12/2018 09:01
Report Number	SLMK_18009286

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

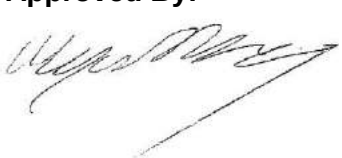
UKAS TESTING
2183

Final Report

Report No.:	18-37700-1
Initial Date of Issue:	04-Dec-2018
Client	Solmek Ltd
Client Address:	12 Yarm Road Stockton-on-Tees TS18 3NA
Contact(s):	Kathryn Watkin Office
Project	D9128 - Shotton Community Centre

Quotation No.:		**Date Received:**	29-Nov-2018
Order No.:		**Date Instructed:**	29-Nov-2018
No. of Samples:	6		
Turnaround (Wkdays):	5	**Results Due:**	05-Dec-2018
Date Approved:	04-Dec-2018		

Approved By:



Details: Glynn Harvey, Laboratory Manager

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Results - Soil

Project: D9128 - Shotton Community Centre

Client: Solmek Ltd				**Chemtest Job No.:**	18-37700	18-37700	18-37700	18-37700	18-37700	18-37700
Quotation No.:				**Chemtest Sample ID.:**	733833	733834	733835	733836	733837	733838
				Sample Location:	MBH1	MBH1	MBH2	MBH2	MBH3	MBH3
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.50	2.00	2.00	3.00	1.00	2.00
				Bottom Depth (m):		2.45	2.45	3.45		2.45
Determinand	**Accred.**	**SOP**	**Units**	**LOD**						
Moisture	N	2030	%	0.020	17	14	31	13	19	10
pH	U	2010		N/A	[A] 8.3	[A] 8.3	[A] 7.3	[A] 8.2	[A] 7.5	[A] 8.2
Sulphate (2:1 Water Soluble) as SO4	U	2120	mg/l	10.000	10	< 10	< 10	< 10	< 10	< 10

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
733833			MBH1		A	Plastic Tub 500g
733834			MBH1		A	Plastic Tub 500g
733835			MBH2		A	Plastic Tub 500g
733836			MBH2		A	Plastic Tub 500g
733837			MBH3		A	Plastic Tub 500g
733838			MBH3		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES

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Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Appendix G

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

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. 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 reserve the right to pursue full payment of the invoice prior to release of any information including reports. 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.