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HELLENS LAND LIMITED

NEWBOTTLE STREET, HOUGHTON-LE-SPRING

ENVIRONMENTAL SETTING AND SITE DESIGN (ESSD)

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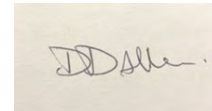
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MAY 2023

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APPENDICES

Appendix 1	Waste Recovery Plan (Wardell Armstrong, Version 2, February 2023)
Appendix 2	Remediation Strategy (Shadbolt Environmental, Issue V3, October 2022)
Appendix 3	Ground Investigation Interpretive Report and Groundwater Risk Assessment (Shadbolt Environmental, Issue V3, September 2022)
Appendix 4	Revised Desktop Study Assessment (Shadbolt Environmental, Version 2, July 2022)
Appendix 5	Foundation Works Risk Assessment (Version 4, October 2022)

DRAWINGS

NT16098-001-P0 Site Location Plan-A4P
20_01591_FU4-A1_SITE_SECTIONS-1011308

1 INTRODUCTION

- 1.1.1 Hellens Land Limited have commissioned Wardell Armstrong LLP in the preparation of an environmental permit application for the permanent deposit of waste as a recovery operation, to construct a development platform for commercial development.
- 1.1.2 The site is situated at Newbottle Street, Houghton-le-Spring, which is within the former Houghton Colliery Site.
- 1.1.3 The following report has been prepared by Wardell Armstrong to provide the Environmental Setting and Site Design to support the deposit for recovery permit application. The report describes the setting of the Site in terms of its geology, hydrogeology and hydrology and explains and justifies the design of the site.
- 1.1.4 The scheme is designed and will be constructed to ensure it is fit for purpose, while mitigating any adverse impacts to the environment.
- 1.1.5 This Environmental Setting and Site Design (ESSD) report has been prepared in accordance with Environment Agency guidance¹.
- 1.1.6 Section 2 provides context of this report.
- 1.1.7 Section 3 provides details of the site location, the activities that are to be undertaken at the Site, and receptors present within close proximity to the Site.
- 1.1.8 Source characterisation is set out in Section 4. This includes details of the historical development of the site and the proposed development.
- 1.1.9 Section 5 characterises pollution control measures, including site engineering and site design.
- 1.1.10 Section 6 details the pathway characterisation including climate, geology, hydrology, and hydrogeology.
- 1.1.11 Section 7 details receptor and compliance points, particularly for groundwater, gas and amenity issues.
- 1.1.12 Section 8 confirms that there is no requirement for a Site Condition Report.
- 1.1.13 Section 9 provides a conclusion and summary of key issues and how these are managed through the scheme design, as a result of various risk assessments.

¹ [Landfill operators: environmental permits - What to include in your environmental setting and site design report - Guidance - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/landfill-operators-environmental-permits-what-to-include-in-your-environmental-setting-and-site-design-report)

2 REPORT CONTEXT

- 2.1.1 The proposal is for the construction of a suitable development platform for a commercial development at the site, which is within the Former Houghton Colliery Site. Further details of the historical use of the site is provided in section 3. The intention is to excavate, treat and re-deposit waste on site in accordance with the approved Waste Recovery Plan (Appendix 1) and approved Remediation Strategy (Appendix 2)
- 2.1.2 A series of reports prepared by Shadbolts Environmental are provided and should be read in conjunction with this ESSD report. These reports have been assessed and approved by the Environment Agency on 31 October 2022.
- 2.1.3 The reports are as follows:
- Remediation Strategy (Issue V3, October 2022) – Appendix 2 of this report;
 - Ground Investigation Interpretive Report and Groundwater Risk Assessment (Issue V3, September 2022) – Appendix 3 of this report;
 - Revised Desktop Study Assessment (V2, July 2022) – Appendix 4 of this report;
 - Foundation Works Risk Assessment (Issue 3, October 2022) – Appendix 5 of this report.
- 2.1.4 In addition to the assessments outlined above in paragraph 2.1.2, Wardell Armstrong has prepared an Environmental Risk Assessment and Habitats Risk Assessment. This ESSD has been developed based on the outcome of the risk assessments and sets out the site setting and site design, with consideration of risks identified through the CSM and subsequent risk assessments.

3 SITE DETAILS

3.1 Site Location and Access

3.1.1 The site is located to the south of Newbottle Street (A182), northeast of Houghton-le-Spring town centre. The National Grid Reference (NGR) for this site is NZ 33812 50382.

3.1.2 The site is an irregular, elongated plot orientated roughly north west to south east, spanning an area of approximately 3.35ha. The majority of the site comprises of grassed surfacing, with some areas concreted. The site comprises a large terrace of maintained grassland bound by slopes to the north east and south west. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall approximately 4m high along the boundary, with a storage yard to the rear of the adjacent petrol filling station (Jet Fuel Station).

3.1.3 The site is surrounded by mixed commercial, industrial and residential areas.

3.1.4 Access is available via a track leaving a service road to the rear of the petrol filling station. The site is fenced around the perimeter. The boundary along Newbottle Street is fenced with close boarded timber fencing up to a pair of billboards adjacent to a van hire depot and petrol filling station at the northern end of the site.

3.1.5 The site location is shown in drawing NT16098-001-P0.

3.2 Site Activities

3.2.1 The site is classified as a deposit for recovery operation, and the Waste Recovery Plan has been approved by the Environment Agency.

3.2.2 The permitted activities will be limited to the excavation of previously deposited waste, treatment (crushing, screening etc.) of waste on site and the deposit of waste.

3.2.3 It is intended that the site will excavate approximately 38,106 m³ of material, suitable material after treatment will be used for the filling and compaction of the final proposed made ground levels to enable the construction of a suitable development platform.

3.2.4 All works will be carried out in accordance with the approved Waste Recovery Plan (Version 2, February 2023) and the agreed Remediation Strategy (Prepared by Shadbolt Environmental, Version 3, October 2022).

3.3 Site Design

3.3.1 The works comprise of a 'cut and fill' operation, whereby in situ material is excavated to a maximum depth of 2 metres below the existing ground level. In situ concrete foundations, bases, tanks and obstructions associated with the former colliery will be removed and crushed.

3.3.2 The underlying bedrock at the site will not be exposed during the remediation works.

3.3.3 The material is then treated by screening and crushing to produce a more appropriate fill with any non-conforming wastes or identified contaminants removed, before placement into the ground and levelling/compaction. The works will result in a suitable development platform to enable the construction of a commercial development.

3.3.4 The site cross sections are shown in drawing 'Proposed Site Sections'.

3.4 Receptors

3.4.1 A number of sensitive receptors are present within close proximity to the Site. These are detailed in Table 3.1 below.

Table 3.1: List of Receptors within 1km of the Site		
Receptor	Distance from Site	Direction
Residential/recreational (including schools)		
Grasswell residential area	50m	North
Sunniside residential area	80m	North west
Burnside Primary School	250m	South west
Newbottle Primary School	335m	North
Houses off Brickburn Crescent	100m	South west
Allotments	<10m	South/south west
Houghton Sports Complex	205m	South
Public Park	165m	South west
Industrial/Commercial		
Jet fuel station	50m	North east
Area of shops	20m	South
Houghton Comrades Club, Tyre Spot, D & J Cars and Commercial, Tan Queen UK	25m	East
Houghton Quarry Landfill Site (managed by Biffa Waste Services)	20m (to site entrance)	East
Infrastructure		
Newbottle Street (A182) Road	<10m	East
Houghton Cut (A690)	330m	East
Environmental		
Deciduous woodland (Priority habitat)	Adjacent to site boundary (<5m)	South/south west
Moors Burn River	760m	West

- 3.4.2 There is an area of Priority Habitat Deciduous Woodland located adjacent to the southern site boundary.
- 3.4.3 There are no other Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Special Area of Conservation (SAC) or Special Protection Areas (SPA) within 2km of the site.
- 3.4.4 The site is located upon a Secondary (A) Aquifer and a Principal Aquifer (The Yellow Sand Formation). The superficial strata located beneath the site are designated as Secondary (A), Secondary (Undifferentiated) and Unproductive aquifers. Formerly classified as minor aquifers, Secondary (A) Aquifers comprise of permeable layers capable of supporting water supplies at a local rather than strategic scale.

4 SOURCE CHARACTERISATION

4.1 Historical Development

4.1.1 The site has historically been a colliery and subsequently a landfill site². The landfill was operated by the City of Sunderland Council, and the original waste disposal licence was issued on 7 September 1995 and surrendered on 7 April 1999. It is understood that the historic landfill site is associated with the reclamation of the former colliery and deposit of inert materials. The site was licenced to receive only clean hardcore and brick and excavation wastes, at no more than 400 tonnes per day, with a maximum capacity of 10,000m³.

4.1.2 A GroundSure report presenting the history of the Site is provided in Appendix B of the Revised Desktop Study Assessment prepared by Shadbolt Environmental.

4.1.3 Although it is considered that the existing ground conditions at the site does not pose a significant risk to future site users and the environment it was considered that a remediation strategy and foundation work risk assessment should be undertaken at the site to ensure that the site can be developed on a more assured basis. Subsequently, these have been provided.

4.1.4 Given the site is located above a primary aquifer, it has been accepted through detailed documentation agreed with Sean Paterson at the Environment Agency, that this site requires remediating and an earthworks strategy, to mitigate any risk of groundwater contamination.

4.2 Proposed Development

4.2.1 The primary purpose of the waste activity is to remediate the site by excavating the previously deposited waste, treat the waste on site (via crushing, screening) and redeposit the material to enable the construction of a suitable development platform for a large commercial development.

4.2.2 The remediation strategy is to place suitable fill material used for deposit to an engineered End Product Specification of 95% of maximum dry density and less than 5% air voids. In addition when the site is developed most of the site will be covered with hardstandings, buildings with formal drainage and therefore the potential for

² [ArcGIS - My Map](#)

rainwater to percolate through the site and mobilise contaminants will be significantly reduced.

- 4.2.3 In addition, areas of landscaping should receive at least 300mm of low permeability clay which will act as a barrier to potential vertical migration of rainwater and protect future site users from the soils beneath.
- 4.2.4 Planning permission (reference:20/01591/FU4) has been granted for the erection of retail units (within use class E) and petrol filling station (Sui Generis), with new vehicular access, parking, servicing areas and landscaping was granted on 16th December 2021.
- 4.2.5 The works are to be completed within 16 weeks of operations commencing.
- 4.2.6 The list of wastes that will be treated and deposited on site are provided in the approved Waste Recovery Plan.
- 4.2.7 Compliance testing of all site won materials selected as earthworks materials required to achieve formation levels shall be carried out by the Earthworks Contractor at a UKAS/ MCERTS accredited testing laboratory.

5 POLLUTION CONTROL MEASURES

5.1 Site Engineering and Site Design

Groundwater Management

- 5.1.1 Groundwater strikes were encountered during drilling and monitoring (of the deep boreholes). Shallow groundwater was encountered within the boreholes and it would appear that the perched water table is separate and distinct from the deeper groundwater table where the low permeable glacial till exists and acts as a partial barrier to vertical migration. The findings are set out within the Foundation Works Risk Assessment (Appendix 5 of this report).

Piling of Foundations and Risk to Groundwater and Gas Migration

- 5.1.2 Appendix 5 provides the Foundation Works Risk Assessment, prepared by Shadbolt Environmental which assesses the risk of mobilisation of contamination or ground gas through a preferential pathway (via the piling of the foundations for the buildings).
- 5.1.3 Based on this risk assessment, it is considered that the use of a driven precast concrete or steel piles founded within the clays and underlying mudstone is the most suitable solution with respect to structural, geotechnical and environmental considerations.

Surface Water Management

- 5.1.4 Rainfall or surface waters will be shed from the site surface and drained away to an appropriate temporary holding tank or sump. These surface water runoffs would be discharged under an appropriate discharge consent or alternatively tankered off site.
- 5.1.5 Surface waters will not be allowed to pond, and any drainage channels will be lined with low permeability clay and maintained to ensure free flow. The low permeability clay to be used will be clean and free from contaminants.
- 5.1.6 Temporary storage ponds are to be created on site to temporarily store waters encountered during the excavations prior to removal from site (tankering or discharged under a discharge consent).

5.2 Engineering Details

- 5.2.1 Surfaces of excavations with a gradient greater than 1:5 which are to receive fill materials must have horizontal benches constructed to match the depths of compacted layers of filling.

- 5.2.2 Where the difference in level between adjacent areas of filling exceeds 600mm, the Earthworks Contractor shall cut into the edge of higher filling to form benches having a minimum width of 600mm and a height equivalent to the depth of a layer of compacted filling. The new filling will be spread and compacted to ensure maximum continuity with the previous filling.
- 5.2.3 The accuracy of and permissible deviation from required formation levels (underside of subbase/capping) shall be as follows:
- beneath mass concrete foundations: $\pm 25\text{mm}$;
 - beneath ground bearing slabs: $\pm 15\text{mm}$;
 - beneath roads and other paved areas: $\pm 20 - 30\text{mm}$;
 - other areas: $\pm 50\text{mm}$.
- 5.2.4 Geotechnical earthworks testing at a frequency of 1 no. suite of tests to be undertaken per $1,000\text{m}^3$ of single class material type, or a minimum of 3 samples per material. The Earthworks Contractor should ensure the environmental and geotechnical suitability of site won materials. Further detail on the engineered fill specification is provided within the Remediation Strategy (Appendix 2 of this report).
- 5.3 Deposit of Fill
- 5.3.1 Treated waste material used for deposit ('fill' material) will be placed to an engineered End Product Specification of 95% of maximum dry density and less than 5% air voids.
- 5.3.2 A suitably qualified contactor will ensure that the final platform is suitable for the placement of the fill.
- 5.3.3 Areas of landscaping should receive at least 300mm of low permeability clay which will act as a barrier to potential vertical migration of rainwater and protect future site users from the soils beneath. Low permeability clay/subsoil (SHW 2A/B with a coefficient of permeability of at least $k=1 \times 10^{-9} \text{ m/s}$) should be clean/contaminated imported material. The thickness of the low permeability clay should be validated by post remediation inspection pit.
- 5.4 Engineered Fill Specification
- 5.4.1 On the basis of the results of a site investigation and earthworks trials which has been carried out, the Earthworks Contractor shall provide the Engineer with the results of the following tests for each type of fill on site:

- natural moisture content (BS1377: Part 2:1990: Section 3).
- liquid and plastic limits for cohesive soils (BS1377: Part 2:1990: Section 4 and 5).
- particle density (specific gravity) to assist in evaluating compaction results;
- particle size distribution by wet sieving method to give the distribution of particle sizes down to fine sand and the percentage of fines (BS1377: Part 2:1990;
- Proctor Soil Compaction Test using a 2.5kg hammer (moisture content versus Maximum dry density compaction curve);
- Calorific Value Tests (acceptable materials to report < 7,000 MJ/Kg);
- a separate compaction trial shall be carried out for each type of fill to be used on the site;
- the volume of geotechnical testing anticipated and provided by the Contractor within fill areas is shown below;
- Earthworks Classification Testing (as above) every 1,000m³ of placed material
- In-situ Density Tests (Sand Replacement Test -SRT) every 1,000m³ of placed material;
- CBR tests at finished remediation level and 50m grid and at 1m height intervals as fill is placed.

5.4.2 Furthermore, where material is predominantly cohesive in nature then the validation testing will also include a series of hand shear vanes (every 1,000m³ of placed material) with target shear strength of no less than 50kPa. Every layer should have at least one SRT undertaken to demonstrate that the appropriate compaction has been achieved.

5.4.3 The laboratory geotechnical testing undertaken on soil retrieved from the ground investigations has shown the soils be to be relatively consistent and it is considered that a testing rate of every 1,000m³ is appropriate.

5.5 Slopes

5.5.1 The scheme is to construct a suitable development platform, and given the topography of the site, slope stability is unlikely to be a concern across the main development area. However, there is a 4m tall retaining wall at the north of the site,

it is unlikely that the development would require similar support but if any significant cuts in to the existing ground profile are proposed then the stability of any formed slopes should be considered.

5.5.2 A slope stability risk assessment has been conducted, and slopes of deposited material should be no steeper than 1:3 (vertical: horizontal).

5.5.3 Permanent batters at the western edge and eastern edge of the development are expected to achieve gradients at 1:3.

5.6 Validation Testing

5.6.1 Validation testing of the expected final formation level should comprise of incremental plate load tests. Plate load tests would comprise of a 600mm diameter plate (in accordance with BS1377 Part 9 with increments of loading at 25%, 50%, 75%, 100% 125% and 150% and 0% of 150kPa) to ensure a modulus of subgrade reaction of at least 27,500 kN/m²/m (which equates to a maximum settlement of 10mm), and to ensure that an equivalent CBR value of at least 3% is achieved to ensure suitability of the final formation levels for the proposed road/pavement construction.

Leachate and Groundwater Analysis

5.6.2 Leachate analysis has been undertaken on soil samples taken from the site (17 samples), which reported low concentrations of contaminants. However slightly elevated concentrations of PAH have been recorded at isolated boreholes.

5.6.3 The remediation screening values for fill materials derived from the CLEA MODEL LQM/CIEH 2015 - 2.5% SOM, and the leachate/Groundwater criteria are provided as Appendix C of the Remediation Strategy (Appendix 2 of this report).

5.6.4 Both the leachate analysis and groundwater analysis show elevated leachable hydrocarbons in the soils, whilst elevated selenium and hydrocarbons were recorded in the groundwaters.

5.6.5 As such, it appears that the deep groundwaters have been slightly impacted with dissolved phase PAH hydrocarbons in places, but it appears to be isolated to individual boreholes rather than site wide.

Gas Management and Monitoring Infrastructure

5.6.6 Strict acceptance procedures will be implemented at the site, whereby waste is tested and assessed pre and post treatment prior to deposit. As a result of this, it can be

determined with a high level of confidence that biodegradation of the material will be negligible.

- 5.6.7 It is proposed to install boreholes for gas and groundwater monitoring the design of the boreholes will be agreed with the Environment Agency. Construction of the boreholes will be undertaken in accordance with a CQA plan.

6 PATHWAY CHARACTERISATION

6.1 Climate

6.1.1 Long term monthly rainfall data has been obtained from the Meteorological Office for Durham weather station, the closes weather station to the site, approximately 7 miles from Houghton-le-Spring. Average rainfall for this period is detailed in Table 6.1 below.

Month	Average Monthly Rainfall (mm)	Month	Average Monthly Rainfall (mm)
January	52	July	54
February	42	August	61
March	45	September	55
April	53	October	61
May	44	November	72
June	55	December	57

6.1.2 The dominant wind direction is from the west. The monthly mean wind speeds for the location are detailed in Table 6.2 below. The average annual wind speed is 6.01 knots.

Month	Monthly mean wind speed at 10m (knots)	Month	Monthly mean wind speed at 10m (knots)
January	8.30	July	4.78
February	7.57	August	4.77
March	7.16	September	5.38
April	5.61	October	5.90
May	5.00	November	6.28
June	4.76	December	6.63

6.1.3 The weather forecast will be checked at the start of each day, and staff will be cognisant of weather conditions throughout the working day. Ideally the works would be carried out during the Summer months to avoid periods where heavy rainfall is more likely.

6.1.4 The site is located in an area of mixed residential, industrial and commercial land use. A Dust Management Plan has been prepared and will be implemented in order to

control any fugitive dust emissions, particularly during dry periods where wind speeds are higher.

6.2 Climate Change Adaptation

6.2.1 The waste operations will be carried out on a relatively short term basis (the waste activities would be completed within circa 16 weeks from operations commencing).

The short nature of the activities will mean that longer term climate change provisions will not be required.

6.2.2 The site will be remediated to an appropriate standard to enable the site to serve the local communities. At present, the site comprises of a large expanse of grassland but attracts anti-social behaviour and vandalism.

7 GEOLOGY

7.1 Overview

7.1.1 Superficial deposits are recorded on site to comprise Diamicton (cohesive glacial till/boulder clay) comprising predominantly of cohesive materials with varying proportions of granular materials; Glaciolacustrine deposits comprising of interbedded clay and silt; and unclassified superficial strata which may be masked by the recorded artificial ground.

7.1.2 The solid geology beneath the site predominantly comprises Permian age sandstone of the Yellow Sand Formation in the northeast of the site, stratigraphically overlying undifferentiated strata of the Pennine Middle Coal Measures comprising interbedded mudstone, siltstone and sandstone in the south west of the site.

7.1.3 Existing boreholes within the site boundary indicate Made Ground at the site to be ashy material with brick and demolition rubble with weathered limestone or sandstone bedrock encountered at 3-6m bgl through the main body of the site with colliery spoil recorded in excess of 12m thickness at the southwestern edge of the site and former tipping area. No coal seams are indicated to outcrop within the site boundary; however, there are eight recorded within 500m of the site.

7.1.4 4.1.5 There are four faults present within 500m of the site including one which runs through the site close to and parallel with the south eastern boundary on a bearing in the order of 070°. This fault is recorded as inferred with an unknown displacement. The inferred fault is unlikely to impact on the development proposals due to its location on the site boundary.

7.2 Soils

7.2.1 The soilscape is slowly permeable seasonally wet acid loamy and clayey soils. Artificial deposits (Made Ground - Undivided) are indicated within the site boundary. These deposits are anticipated to comprise of colliery spoil.

7.3 Coal

7.3.1 Coal is not indicated to be present at, or close to the surface beneath the site but has been worked at depth. Consultation with the Coal Authority is underway as the development is to be undertaken close to or over the three existing shafts. otherwise the risk to developments at the site as a result of underground mine workings for the extraction of coal would be considered negligible.

8 HYDROLOGY

8.1 Surface Water Features

- 8.1.1 Ordnance Survey (OS) mapping shows that there are no surface water features within the Site boundary. The site is currently vacant and no surface water drainage and/or surface ducts are known to exist at the site and therefore it is unlikely that potential mobile contaminants could migrate and impact surface waters via service conduits and existing site drainage and surface run off.
- 8.1.2 The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, dense/light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.
- 8.1.3 Rainfall or surface waters are effectively shed from the surface and drained away to appropriate temporary holding tank/sump. These surface water runoffs would require to be discharged under consent to an appropriate drainage system or alternatively tanked offsite.
- 8.1.4 Surface waters shall not be allowed to pond, and any drainage channels should be lined with low permeability clay and maintained to ensure free flow. The low permeability clay to be utilised will be clean/non-contaminated.
- 8.1.5 Temporary storage ponds are to be utilised/created on site to temporarily store waters encountered during the excavations prior to discharge under consent. The Contractor is to ensure that any required temporary discharge consents are in place prior to discharge of waters. Testing of waters will be required, and agreement sought from NWL/EA prior to discharging under consent.
- 8.1.6 Surface waters will not be allowed to pond, and any drainage channels should be lined with low permeability clay and maintained to ensure free flow. The low permeability clay will be clean and not contaminated.

8.2 Surface Water Abstractions

8.2.1 There are 4 No. Surface Water Abstraction Licence within 2000m of the site. These are located 1681m to 1880m W of the site and are historical permits for mineral washing and dust suppression.

8.3 Surface Water Discharges

8.3.1 There is one record of a Discharge Consent within 500m of the Site. This record relates to Brinkburn Crescent located approximately 200m to the south west of the Site.

8.4 Surface Water Quality

8.4.1 There are no Environment Agency river quality records within 1500m of the site.

8.5 Flood Risk

8.5.1 The site is not located within a flood plain.

9 HYDROGEOLOGY

9.1 Aquifer Characteristics

- 9.1.1 The following information is summarised from the Ground Investigation Interpretive Report and Groundwater Risk Assessment (Prepared by Shadbolt Environmental, Issue V3, September 2022).
- 9.1.2 The site is located upon a Secondary (A) Aquifer and Principal Aquifer (The Yellow Sand Formation) and of these two aquifers, the protection of the Principal aquifer with associated groundwater protection zone is of paramount importance.
- 9.1.3 The superficial strata located beneath the site are designated as Secondary (A), Secondary (Undifferentiated) and Unproductive aquifers. Formerly classified as minor aquifers, Secondary (A) Aquifers comprise 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.
- 9.1.4 The solid geology located beneath the site is designated as Principal and Secondary (A) Aquifers; Principal Aquifers comprise of high intergranular and fracture permeability, usually providing a high level of water storage and may support water supply to rivers on a strategic scale. This includes the Yellow Sand Formation which is designated as a Principal Aquifer by the Environment Agency. The site is situated at the geological base of the limestone classified as a Principal Aquifer and is considered the most sensitive receptor rather than the underlying Middle Coal Measures strata which is a secondary (A) aquifer.
- 9.1.5 There are two Source Protection Zones within 500m of the site, including one within the site to the eastern boundary. The record for the SPZ on site is a Zone 3, total catchment that relates to the Yellow Sand Formation designated by the Environment Agency as a Principal Aquifer. The other record is Zone 2, outer catchment, located approximately 442m north of the site.
- 9.1.6 There are no Source Protection Zones within a Confined Aquifer within 500m of the site.
- 9.1.7 There are 2 No. Potable Water Abstraction Licences within 2000m of the site. These records are located 1953m NE of the site and relate to water supply.

9.2 Groundwater Elevation

9.2.1 The site sits approximately between 70.5m aOD and 73.5m aOD, with the northern extents sitting at approximately 70.5maOD, the southern extents at approximately 71.5m aOD with the centre of the site at approximately 73.5m aOD.

9.2.2 it is understood that the regional hydraulic gradient is to the east.

9.2.3 The surrounding land to the east of the site an approximate elevation of 77m aOD increasing to over 100m aOD at High Haining Farm some 1.5km to the east with Moors Burn located 750m to the west, sitting at an elevation of 45m aOD, suggesting that the local shallow hydraulic gradient in the area may be from east to west towards Moors Burn.

9.2.4 Shallow groundwaters, where present, have the potential to migrate off-site to the west (following the natural topography of the area) and similarly shallow waters located to the east of the site have the potential to migrate towards the site. However, it is likely that shallow/perched ground waters at the site may have their downward vertical migration restricted by low permeability superficial deposits. However, where clay is absent shallow groundwaters are likely to migrate vertically downwards and potentially interact with the deeper groundwaters within the solid strata and flow towards the east following the perceived regional hydraulic gradient.

9.3 Groundwater Vulnerability

9.3.1 Superficial and Bedrock Vulnerability on-site is classified as Low relating to the Secondary Aquifers present and soils on-site are deemed to have a Low Leaching Potential.

9.3.2 Superficial Permeability on site is deemed to comprise mixed flow types with a High maximum permeability and a Low minimum permeability.

9.3.3 Bedrock permeability on site is deemed to consist of a fracture flow type with a High maximum permeability and a Low minimum permeability.

9.4 Groundwater Abstractions

9.4.1 There are 4 No. Groundwater Abstraction Licenses within 2000m of the site. The closest of these are located 636m and 648m NE of the site. Both licenses are for pollution remediation but while one has an active status the other is historical. Other active license uses include water supply at a point 1953m NE.

10 RECEPTOR AND COMPLIANCE POINTS

10.1 Groundwater

10.1.1 Slightly elevated concentrations of PAH have been reported with occasional leachate samples and deep groundwater analysis with isolated boreholes. The previous groundwater risk assessment undertaken at the Site has shown that the soils do not pose a significant risk to the underlying aquifers or local water courses.

10.1.2 To confirm that the piling works, to be undertaken on completion of the earthworks, do not have a negative impact on the underlying aquifer, remediation monitoring boreholes are to be constructed as shown on drawing 2585-303 – Remediation Monitoring Boreholes (within Appendix 1 of this report - Remediation Strategy).

10.1.3 The existing monitoring boreholes which are located at the site can be utilised for this purpose, however it is anticipated that the boreholes will be required to be removed as part of the earthworks.

10.1.4 It is proposed that during the piling works, the boreholes should be monitored on a weekly basis. Monitoring should then be extended to a monthly frequency for a minimum of six months after piling.

10.1.5 In addition, additional monitoring should also be undertaken immediately following exceptional rainfall events.

10.1.6 Chemical testing to be undertaken from the groundwater samples retrieved as per the same determinants detailed in Appendix C 'Remediation Screening Value' of the Remediation Strategy Report – Appendix 2 of this report.

10.1.7 Groundwater boreholes are to be drilled to an anticipated depth of 20m bgl with response zone of the boreholes wholly within the underlying rock. The existing boreholes at the site can be utilised for this purpose, however it is anticipated that the boreholes will be required to be removed/decommissioned as part of the earthworks.

10.2 Gas

10.2.1 Ground gas and water monitoring wells were monitored in accordance with CIRIA C665 and BS8576:2013.

10.2.2 The gas risk assessment has been prepared by Shadbolt Environmental and is set out in section 10 (with monitoring results provided in Appendix F) of the Ground Investigation Interpretive Report and Groundwater Risk Assessment (Appendix 3 of this report).

10.2.3 The maximum methane and carbon dioxide emissions, representative of the Typical Maximum Concentrations were as follows:

- Methane: 0.0% v/v (however 0.1% v/v was used for the calculations as this was the limit of detection of the instrument used);
- Carbon Dioxide: 8.4% v/v.

10.2.4 The maximum recorded concentration of carbon dioxide was 8.4% (peak and steady). Carbon dioxide concentrations and the associated reduced oxygen concentrations may be related to microbial aerobic respiration within the borehole following the increase in available oxygen.

10.2.5 The maximum recorded positive flow rate in the boreholes was 0.0 l/hr, however 0.1 l/hr will be used for calculations as this is the limit of detection of the instrument.

10.2.6 Specific ground gas protection measures are required with respect to Carbon Dioxide.

10.2.7 An assessment with respect to methane and carbon dioxide will be reviewed on completion of the monitoring regime.

10.3 Amenity

10.3.1 The Environmental Risk Assessment identifies fugitive dust emissions having potential to be generated through vehicle movements with the site and generated from waste activities such as crushing, screening and the tipping of fill materials. A Dust Management Plan has been prepared which sets out the daily dust monitoring regime.

11 SITE CONDITION REPORT

11.1.1 There is no requirement to provide a site condition report for the Site as it will be subject to a permanent deposit of material. The purpose of a Site Condition Report is to set out the condition of the land at permit issue so that at permit surrender it is possible to demonstrate that there has been no deterioration in the quality of the land. Clearly in the case of a permanent deposit of waste the land will not be restored to the same condition that was present at permit issue. Instead surrender of the permit will be based on records of the materials accepted and environmental monitoring carried out during the operational life of the Site and post closure to demonstrate that the material that has been deposited is not impacting and will not impact the environment.

11.1.2 Fuel and other potentially harmful liquids for use in Site plant will be stored in an appropriate tank or container with appropriate secondary containment. Bunds will have a capacity of 110% of the largest tank. Tanks or containers storing fuel or other harmful liquids will be stored upon an impermeable surface.

11.2 Restoration and Aftercare

11.2.1 The design profile will be stable in the long term, and the scheme is to ensure the ground is of sufficient stability and the correct profile to facilitate a construction platform.

11.2.2 In order to satisfy the validation requirements, the following testing frequency has been prescribed and approved by Sunderland City Council as set out in table 8.1 below.

Table 8.1: Testing Frequency for Validation Requirements	
Type	Testing Frequency
Earthworks Classification Testing	1 per 1,000m ³ of placed material
In-site density testing (SRT – Sand Replacement Test)	1 per 1,000m ³ of placed material
CBRs tests at finished remediation level and at 1m height intervals as fill is placed	1 per 50m grid
Hand Shear Vanes (average of 3 per test location)	1 per 1,000m ³ of placed cohesive material
Contamination suite	To be confirmed

11.2.3 The Site Engineer will maintain an ongoing site record sheet including the date, test locations, type of tests undertaken and results so as to provide ongoing Construction Quality Assurance (CQA) during the 14 week development platform construction phase. If any areas are found to be non-compliant with the remediation strategy or environmental permit then we will be able to provide advice on the hotspot areas, in accordance with the remediation strategy.

11.2.4 Following each site inspection visit, confirmation as to the competence and compliance of each test area.

11.3 Proposed After-Use of the Site

11.3.1 Following completion of the works, the site will be a development platform in which a commercial development will be built upon. The commercial development will comprise of two large supermarkets and associated infrastructure (such as car parking and access roads). The commercial development will comprise of formal drainage to ensure adequate surface water management.

11.3.2 The surfacing will be predominantly impermeable concrete, with some areas of natural ground whereby virgin soils will be imported.

12 CONCLUSION

- 12.1.1 In summary analysis concluded that there is elevated leachable hydrocarbons in the soils whilst elevated selenium and hydrocarbons were recorded within the groundwaters. As such, it appears that the deep groundwaters have been slightly impacted with dissolved phase PAH hydrocarbons, in places but appears to be isolated to individual borehole rather than site wide.
- 12.1.2 When the site is developed most of the site will be covered with hardstanding's, buildings with formal drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and migrate towards the Principal Aquifer and / or local watercourses will be further significantly reduced. All soils placed at the site would be to an end product specification to achieve at least 95% of maximum dry density and less than 5% air voids thus reducing the potential for contaminants to leach into solution.
- 12.1.3 This piling risk assessment and the results of Shadbolt Group previous investigations has shown that there is low risk of mobilising significant contamination or ground gas through a preferential pathway, as such the overall risk associated with piling are considered to be to be low subject to the mitigation measures (regarding hotspot, monitoring and compaction) detailed within the Remediation Strategy are implemented to mitigate the short-term risks during the construction works.

APPENDICES

APPENDIX 1

Waste Recovery Plan (Wardell Armstrong, Version 2, February 2023)

wardell-armstrong.com

ENERGY AND CLIMATE CHANGE
ENVIRONMENT AND SUSTAINABILITY
INFRASTRUCTURE AND UTILITIES
LAND AND PROPERTY
MINING AND MINERAL PROCESSING
MINERAL ESTATES
WASTE RESOURCE MANAGEMENT



HELLENS GROUP

NEWBOTTLE STREET, HOUGHTON-LE-SPRING

WASTE RECOVERY PLAN

FEBRUARY 2023

DATE ISSUED: FEBRUARY 2023
JOB NUMBER: NT16098
REPORT NUMBER: 0002
VERSION: V2.0
STATUS: FINAL

HELLENS GROUP

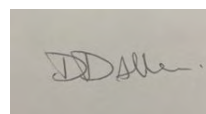
NEWBOTTLE STREET, HOUGHTON-LE-SPRING

WASTE RECOVERY PLAN

FEBRUARY 2023

PREPARED BY:

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1 INTRODUCTION

- 1.1.1 Hellens Group have instructed Wardell Armstrong to assist in the application for a new bespoke environmental permit for the permanent deposit of waste as a recovery operation.
- 1.1.2 The proposal is for the construction of a suitable development platform for commercial development at Newbottle Street, Houghton-le-Spring, which is within Former Houghton Colliery Site. Further detail on the site setting is provided in section 2.
- 1.1.3 The intention is to excavate, treat and re-deposit waste on site. Further detail on the former land use is provided in Section 2.
- 1.1.4 This Waste Recovery Plan has been developed in line with the Environment Agency guidance on Waste Recovery Plans and Deposit for Recovery Permits¹, to describe the proposal and provide evidence that the scheme would be completed using non-waste materials.
- 1.1.5 The Remediation Strategy for the works has prepared by Shadbolt Environmental and has been approved by the Environment Agency and forms part of this environmental permit application.

2 SITE LOCATION AND DESCRIPTION

- 2.1.1 The site is located to the south of Newbottle Street (A182), northeast of Houghton-le-Spring town centre. The National Grid Reference (NGR) for this site is NZ 33812 50382.
- 2.1.2 The site location is shown in drawing NT16098-001.
- 2.1.3 The site has historically been a colliery and subsequently a landfill site². The landfill was operated by the City of Sunderland Council, and the original waste disposal licence was issued on 7th September 1995 and surrendered on 7th April 1999. It is understood that the historic landfill site is associated with the reclamation of the former colliery and deposit of inert materials. The site was licenced to receive clean hardcore and

¹ [Waste recovery plans and deposit for recovery permits - GOV.UK \(www.gov.uk\)](https://www.gov.uk/guidance/waste-recovery-plans-and-deposit-for-recovery-permits)

² [ArcGIS - My Map](#)

brick and excavation wastes only at no more than 400 tonnes per day, with a maximum capacity of 10,000m³.

- 2.1.4 The site comprises a large terrace of maintained grassland bound by slopes to the north east and south west. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall approximately 4m high along the boundary, with a storage yard to the rear of the adjacent petrol filling station (Jet Fuel Station).
- 2.1.5 The embankments at the fringes of the site are planted with small trees and the main body of the site comprises of grass with a central ridge of rough grass/vegetation along the line of a former fence of which some components still remain. There are two roughly circular areas which are not grassed, and concrete is visible; these broadly align with given locations of shafts recorded by the Coal Authority which have been capped at the surface.

3 STATUTORY DESIGNATIONS

- 3.1.1 No statutory designations covering archaeology or ecology have been identified which relate to land within the proposed site boundary.

4 GEOLOGY

- 4.1.1 The soilscape is slowly permeable seasonally wet acid loamy and clayey soils. Artificial deposits (Made Ground - Undivided) are indicated within the site boundary. These deposits are anticipated to comprise of colliery spoil.
- 4.1.2 Superficial deposits are recorded on site to comprise Diamicton (cohesive glacial till / boulder clay) comprising predominantly of cohesive materials with varying proportions of granular materials; Glaciolacustrine deposits comprising of interbedded clay and silt; and unclassified superficial strata which may be masked by the recorded artificial ground.
- 4.1.3 The solid geology beneath the site predominantly comprises Permian age sandstone of the Yellow Sand Formation in the northeast of the site, stratigraphically overlying undifferentiated strata of the Pennine Middle Coal Measures comprising interbedded mudstone, siltstone and sandstone in the south west of the site.

- 4.1.4 BGS boreholes within the site boundary indicate Made Ground at the site to be ashy material with brick and demolition rubble with weathered limestone or sandstone bedrock encountered at 3-6m bgl through the main body of the site with colliery spoil recorded in excess of 12m thickness at the southwestern edge of the site and former tipping area. No coal seams are indicated to outcrop within the site boundary; however, there are eight recorded within 500m of the site.
- 4.1.5 There are four faults present within 500m of the site including one which runs through the site close to and parallel with the south eastern boundary on a bearing in the order of 070°. This fault is recorded as inferred with an unknown displacement. The inferred fault is unlikely to impact on the development proposals due to its location on the site boundary.

5 MINING

5.1 Coal Mining

5.1.1 Shadbolt Environmental have previously assessed the mining history of the site, and the following section summarises their findings. The site is located within an area where the effects of potential coal mining should be assessed, as stated in the Groundsure report and verified by The Coal Authority's Gazetteer. A Coal Authority Report for the site has been obtained and reviewed by Shadbolt Environmental, as part of a Preliminary Coal Mining Risk Assessment which has been issued under separate cover. In brief the Coal Authority report states the following.

- The site is within the zone of influence of workings of seven seams recorded at depths of 122m to 313m bgl.
- No probable shallow mine workings are recorded on site.
- No records of spine roadways at shallow depth are recorded on site.
- Three shafts are recorded on site.
- There have been no damage claims within 50m of the site since 1994.

5.1.2 The Coal Authority report confirms that workings have been undertaken at depth beneath the site. Although coal reserves are known to exist in the area the property is not considered to be in an area where the Coal Authority believe there is coal at or close to the surface, therefore shallow unrecorded mine workings undertaken for the extraction of coal are unlikely to be a risk factor at the site. The presence of the three

mine entries coincide with three circular areas within the site which have been identified as Development High Risk areas are likely the reason for their designation. Two shafts are recorded at the site were originally capped in 1982 before being backfilled with washery wastes up to 1986 and then hardcore in 1987 and recapped in 1988; the third shaft was filled to an unknown specification. Accordingly, the risk to developments at the site as a result of underground mine workings for the extraction of coal is considered to be low but the backfilling of the shafts will need to be verified if development is to proceed within the zone of influence.

5.2 Non-coal Mining and Natural Cavities

5.2.1 There is no record of any non-coal mining activity on the site.

5.2.2 The Groundsure Geo-Insight report indicates the site is not within 1,000m of an area of Brine Extraction, Gypsum Extraction, Tin Mining or Clay Mining.

5.2.3 There is one record of natural cavities within 1,000m. This record relates to a Solution Widened Joint or Fissure 534m east of the site.

6 HYDROGEOLOGY AND HYDROLOGY

6.1.1 The site is located upon a Secondary (A) Aquifer and a Principal Aquifer (The Yellow Sand Formation). The superficial strata located beneath the site are designated as Secondary (A), Secondary (Undifferentiated) and Unproductive aquifers. Formerly classified as minor aquifers, Secondary (A) Aquifers comprise of permeable layers capable of supporting water supplies at a local rather than strategic scale.

6.1.2 An assessment of the hydrogeology and hydrology including flood risk is provided in the Revised Desktop Study Assessment Version 2 dated July 2022 prepared by Shadbolt Group.

7 WASTE RECOVERY

7.1 Introduction

7.1.1 The proposed development works require cut and fill earthworks operations to provide a suitable development platform. Cut materials are to be processed to an engineered fill specification, prior to placement at the site. The commercial development will comprise of two retail units and associated car parking area.

Planning permission (reference:20/01591/FU4) for the erection of retail units (within use class E) and petrol filling station (Sui Generis), with new vehicular access, parking, servicing areas and landscaping was granted on 16th December 2021. The planning consent is shown in Appendix 1.

7.1.2 The Environmental Permitting Guidance on the Waste Framework Directive states that, the key features of a recovery operation is that its principal objective is to ensure that the waste serves a useful purpose by replacing other substances which would have had to be used for that purpose (thereby conserving natural resources)³.

7.1.3 The Environment Agency guidance on Waste Recovery⁴ states that evidence may be provided to demonstrate that if non-waste material would be used there would still be a worthwhile benefit, such as net financial gain or other worthwhile benefit. Meaningful financial gain means the profit and payback period would make it worthwhile to incur the full cost of using non-waste material.

7.2 Benefit from the activity

7.2.1 In order to demonstrate that the deposit of waste is a genuine recovery activity, the financial viability of the project using non-waste is required to be demonstrated. The following section sets out the financial benefit of the scheme and demonstrates how the scheme would be commercially worthwhile to complete using non-waste materials, generating a meaningful financial gain for Hellens Land Ltd.

7.2.2 The land currently does not have commercial use. The enabling works scheme will develop the platform to enable a Tesco and Home Bargains to be built, along with associated car parking, service area and landscaping. Tesco and Home Bargains are popular retailers, and with the residential areas nearby the footfall for consumers will be high, bringing the benefit of additional retail services for the local population. The development will also bring other benefits such as ample employment opportunities for the local population.

7.2.3 The engineering and enabling works are anticipated to be undertaken over a period of approximately 16 weeks for the enabling works to be completed, and a total of one year for the final works (including construction of the buildings and infrastructure) to be completed. Construction of the development platform will require approximately

³ [Environmental Permitting Guidance The Waste Framework Directive \(publishing.service.gov.uk\)](https://publishing.service.gov.uk)

⁴ [Waste recovery plans and deposit for recovery permits - GOV.UK \(www.gov.uk\)](https://www.gov.uk)

38,018m³ of waste to be excavated and disposed of offsite. It is expected that a total of 32,955m³ of material would be required to be imported prior to compaction to construct the platform.

7.2.4 Based on the labour and materials required, a financial model has been developed to demonstrate that the use of waste materials presents genuine substitution. A summary of the financial model for construction of the development platform is provided in Table 7.1. below, with supporting evidence provided as an Appraisal Summary in Appendix 2 and detailed breakdown costings of the works in Appendix 3.

Table 7.1: Financial Model Summary	
Cost item	Cost
Acquisition costs	£1,908,000 ¹
Construction costs	£7,456,284
Enabling works	£3,861,958 ²
Externals	£3,989,910 ³
Other associated fees	£2,234,349
Total cost of works	£19,450,500
Value of land upon completion of works	£20,915,000 ⁴
Profit	£1,464,500
Notes:	
¹ Acquisition cost of the purchase of land (8.31 acres) at £150,421.12 per acre, and other acquisition costs (agent and council fees)	
² Including costs of excavation and importation and placement of materials (price confirmation provided as Appendix 3)	
³ External works meaning the construction of associated infrastructure including roads, roundabout, car parks, retaining walls, drainage etc.	
⁴ As detailed in the Off-Site Appraisal Summary, an agreed figure on completion of build, provided as Appendix 2	

7.2.5 With a profit of £1,464,500, the development would still be undertaken using virgin materials to remediate the land post excavation if necessary and would still be financially viable. This clearly demonstrates that the use of waste would be a genuine substitution for non-waste materials.

7.3 Quantity of Waste

7.3.1 Final fill levels are presented in the Proposed Site Sections plan prepared by Hellens Land, as shown in Appendices 6 and 7. Through processing of the material and disposal of surplus vegetation soil, it is expected that 31,655m³ of material will be used for the filling and compaction of the final processed made ground materials to the sub formation levels. The volume of waste required for the re-deposit is some 1,300m³ less than that in the financial modelling due to there not being a requirement to import suitable topsoil material.

7.3.2 Financial modelling calculations for the scheme have been based on the quantities of material required to complete the enabling scheme.

7.4 Material Suitability

7.4.1 The following sections outline the suitability of materials following excavation of the in-situ wastes on site (colliery spoil and inert wastes), characterisation and classification of wastes and the Waste Acceptance Criteria (WAC).

7.4.2 A Waste Classification Report has been carried out by Shadbolt Environmental Ltd, using HazWasteOnline, which is included as part of this application. The report classifies the waste material on site as non-hazardous waste falling under EWC code 17 05 04 – Soils and stones (other than those mentioned in 17 05 03).

7.4.3 In addition to 17 05 04, other waste codes which may also comprise of the made ground described in section 4.1 of the Remediation Strategy (Version 3, October 2022) which would fall under the waste codes as described in Table 7.2 below. The waste types listed are suitable for deposit for recovery and are typically accepted by the Environment Agency for deposit of waste for recovery⁵.

Table 7.2: Permitted Wastes	
EWC Code	Description
01 01 02	Wastes from mineral non-metalliferous excavation
17 01 01	Concrete
17 01 02	Bricks
17 01 03	Tiles and ceramics

⁵ [Check if your waste is suitable for deposit for recovery - GOV.UK \(www.gov.uk\)](http://www.gov.uk)

Table 7.2: Permitted Wastes

EWC Code	Description
17 01 07	Mixture of concrete, bricks, tiles and ceramics other than those mentioned in 17 01 06 (metal from reinforced concrete must have been removed)
17 05 04	Soils and stones

- 7.4.4 Shadbolt Environmental have also carried out ground investigations and soil sampling on site, as outlined in the agreed Remediation Strategy.
- 7.4.5 The Remediation Strategy (Appendix 4) has been assessed and approved by the Environment Agency on 31 October 2022 (Appendix 5). The agreed Remediation Strategy uses the CLEA MODE LQM/CIEH 2015 Derivation Tool for the commercial screening values for fill material, as presented in Annex C of the Remediation Strategy.
- 7.4.6 A total of 70 soil samples were taken and submitted for analysis, testing for a suite of common contaminants during the phases of the ground investigations. The laboratory chemical results have reported concentrations of potential contaminants to be within or below the SE TSV for commercial end use (human health criteria). Soil analysis undertaken which reported concentrations above laboratory detection limit but beneath the human health criteria for a commercial end use included heavy metals, cyanide, sulphate, TPH, polyaromatic hydrocarbons, occasional VOCs and SVOCs.
- 7.4.7 Leachate analysis has also been undertaken for 17 samples from site, and the results reported low concentrations of contaminants below the laboratory detection limits and compared to the Threshold Values for Groundwater. The elevated leachable hydrocarbons in the soils and elevated selenium and hydrocarbons were recorded within the groundwaters. As such, it appears that the deep groundwaters have been slightly impacted with dissolved phase PAH hydrocarbons, but this appears to be isolated to an individual borehole as opposed to the whole site.
- 7.4.8 In summary, as detailed in Section 4.8 of the approved Remediation Strategy, the ground investigations carried out by Shadbolt Environmental concluded that when the site is developed, most of the site will be covered with hardstanding, buildings with formal drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and migrate towards the Principal Aquifer and/or local watercourses will be further significantly reduced.

- 7.4.9 Further material sampling of 15 samples has been undertaken at the site to carry out a WAC analysis of the existing waste deposits. Four of the samples were well below the inert threshold limits for all inert waste criteria parameters. All samples were inert with regard to heavy metals. Some parameters of the samples indicated the wastes more likely to be classified as non-hazardous materials rather than inert, for example a marginal exceedance for the inert waste criteria of fluoride, sulphate and mineral oil. One sample had a total PAH level higher than the other samples.
- 7.4.10 Furthermore, there were some samples where Total Organic Carbons (TOCs), were ranging from 3.1 – 11.3 (% w/w). There were also two elevated results for Loss on Ignition at 11.4 and 13.6 (% w/w). There was one sample where PAH (total) was elevated at 206 (mg/kg) in comparison to the other samples. It is highly likely given the site's former use that these levels are resulting from previous deposits of top soils or the presence of coal. Through Shadbolt Environmental's site investigation work, there was no evidence found of hydrocarbon contamination.
- 7.4.11 Although it is considered that the existing ground conditions at the site do not pose a significant risk to future site users and the environment, the approved Remediation Strategy and Foundation Work Risk Assessment will provide a greater level of assurance for the site development.
- 7.4.12 Wastes excavated as part of the 'cut and fill' operation on site will be treated and remediated prior to their re-deposit, in line with the approved Remediation Strategy.
- 7.4.13 Earthworks will undergo appropriate in-situ geotechnical analysis and chemical laboratory analysis where appropriate.
- 7.4.14 Should excavated waste give rise to any unidentified odour, composition or visual characteristics which indicate that the material may be contaminated it will be removed and analysed externally to ensure it is suitable for deposit or disposed of to an appropriately permitted facility.
- 7.4.15 A suitably qualified person will confirm that the chemical and engineering properties of the waste are suitable for the intended use and will not cause pollution.
- 7.4.16 Wastes will be subject to a characterisation prior to re-depositing to provide:
- a description of the waste treatment – or a statement explaining why treatment is not needed;

- testing data on the composition of the waste and its leaching behaviour, where relevant;
- a description of the appearance of the waste – including smell, colour and physical form;
- the European Waste Catalogue (EWC) code.

7.4.17 A suitably qualified person will confirm that the chemical and engineering properties of the waste are suitable for the intended use and will not cause pollution.

7.4.18 Waste will be treated on site, which will comprise of physical treatment only (sorting, screening), to treat the waste prior to redeposit to ensure that the material is suitable to be redeposited.

7.5 Recovery activity completed to an appropriate standard

7.5.1 The planning permission (Ref: 20/01591/FU4) for the erection of retail units (within Use Class E) and petrol filling station (Sui Generis), with new vehicular access, parking, servicing areas and landscaping, was granted on 16 December 2021 by Sunderland City Council. Prior to development a Remediation Scheme which ensures that as a minimum the site will not qualify as contaminated land under Part 2A of the Environmental Protection Act 1990. A Remediation Scheme (also referred to as a Remediation Strategy) has been approved by the Environment Agency on 31 October 2022.

7.5.2 The recovery activities will be supervised by technically competent persons who hold the relevant Certificate of Technical Competency (CoTC) under the Waste Management Industry Training and Advisory Board (WAMITAB).

7.5.3 The activities carried out on site will be managed and operated in accordance with Hellens Environmental Management System (EMS). Operational procedures for the management of the site will ensure that all appropriate pollution prevention and control measures are in place.

APPENDICIES

APPENDIX 1

20_01591_FU4 Planning Permission

APPENDIX 2

Hellens Off Site Appraisal Summary

APPENDIX 3

Schedule of works (Financial Model)

APPENDIX 4

Newbottle St – Remediation Strategy, Oct 2022 V3

APPENDIX 5

Houghton Colliery – Document review comments

APPENDIX 6

Site Sections

APPENDIX 7

Bulk Earthworks Sheet

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APPENDIX 2

Remediation Strategy (Shadbolt Environmental, Issue V3, October 2022)



SHADBOLT
ENVIRONMENTAL



2585 – Former Houghton Colliery

Remediation Strategy

For Hellens Land

Issue V3

October 2022



SHADBOLT
GROUP

2585 – Former Houghton Colliery

Remediation Strategy

Project Reference: 2585

Client	For Hellens Land
Our Reference	2585 – Former Houghton Colliery
Produced by	Iain McLean
Checked by	Mike Taylor
Submitted	Issue V3 – October 2022

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- 2.0 PRINCIPLES OF REMEDIATION
- 3.0 GENERAL SPECIFICATION
- 4.0 REMEDIATION SPECIFICATION
- 5.0 POST EARTHWORKS GROUNDWATER MONITORING
- 6.0 VALIDATION

APPENDICES

- Appendix A** Report Conditions
- Appendix B** Drawings
- Appendix C** Remediation Screening Values for Fill Materials
- Appendix D** SHW Extracts

1.0 CONTRACTURAL ARRANGEMENTS

REFERENCE	COMPANY NAME	CONTACT	TELEPHONE
EARTHWORKS CONTRACTOR	TBC	TBA	TBA
ENGINEER	Shadbolt Group	Mike Taylor	0191 478 3330
CLIENT	Hellens Group	Simon Thorpe	0191 418 0020

Shadbolt Group were commissioned by Hellens Group to act as their geo-environmental consultant to produce a Remediation Strategy which describes the physical works required in order to construct a suitable development platform within Former Houghton Colliery site.

The purpose of this Earthworks Strategy is to describe the physical remedial works that will be undertaken at the site, highlight the supervision that will be undertaken by **The Shadbolt Group** and describes the validation works to be undertaken to enable the site to be developed on a more assured basis.

The specification must be read in conjunction with the following documents.

1. 2585 - Newbottle Street, Houghton Le Spring, Revised Desk Top Study Assessment, Version 2, For Hellens Land, July 2022.
2. 2585 - Newbottle Street, Houghton Le Spring, Ground Investigation Interpretive Report and Groundwater Risk Assessment Version 3 For Hellens Land, September 2022.
3. 2585 -Newbottle Street, Houghton Le Spring, Foundation Works Risk Assessment, Version 3, For Hellens Land, October 2022.
4. All relevant construction design documents reports pertaining to the site

*The proposed development layout is presented in **Appendix B**.*

2.0 SITE INFORMATION

2.1 General

The site is located to the south of Newbottle Street (A182), northeast of Houghton le Spring town centre. The site is an irregular, elongated plot orientated roughly northwest to southeast with an area in the order of 3.35ha.

The approximate National Grid Reference (NGR) for the centre of the site is **433840,550400**.

A general site location plan of the site is presented as Figure 1 and an aerial photograph as Figure 2.

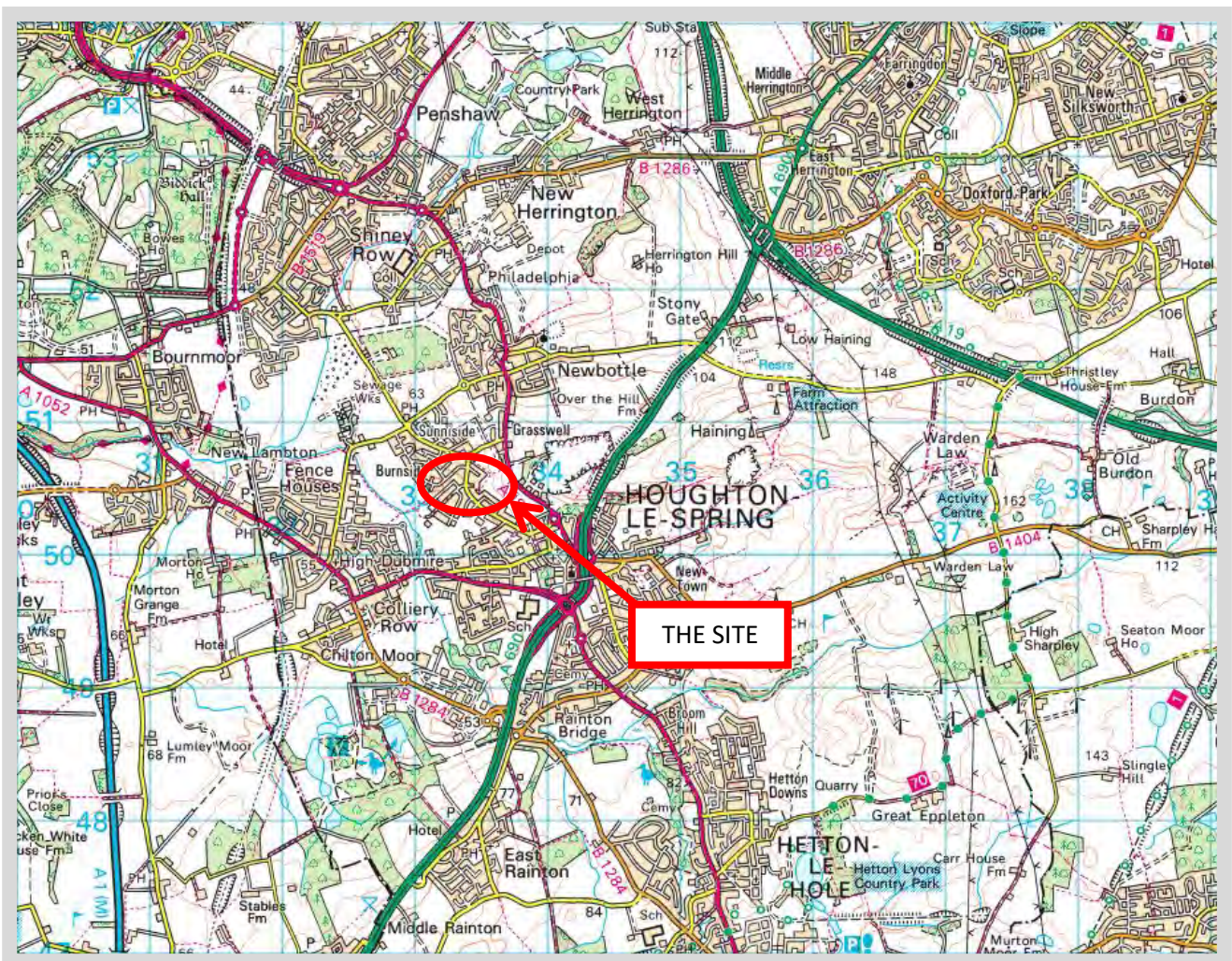


Fig. 1 – General Site Location Plan

2.2 Site Description

An initial site walkover was undertaken by TSG in March 2018.

The site comprises a large terrace of maintained grassland bound by slopes to the northeast and southwest. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall in the order of 4m tall along the boundary with a storage yard to the rear of the adjacent petrol filling station.

Stands of Japanese Knotweed were noted at the top of the northern end of the retaining wall and along the crest of the slope to the north.

The embankments at the fringes of the site are planted with small trees with the main body of the site comprising grass with a central ridge of rough grass / vegetation along the line of a former fence of which some components still remain. 2 No. roughly circular areas are not grassed, and concrete is visible; these broadly align with given location of shafts recorded by the Coal Authority which have been capped at the surface.

The boundary along Newbottle Street is fenced with close boarded timber fencing up to a pair of billboards adjacent to a van hire depot and petrol filling station at the northern end of the site.

Vehicular access is available via a track leaving a service road to the rear of the petrol filling station but is blocked by a boulder placed along the perimeter of additional grassland extending to the north of the site.

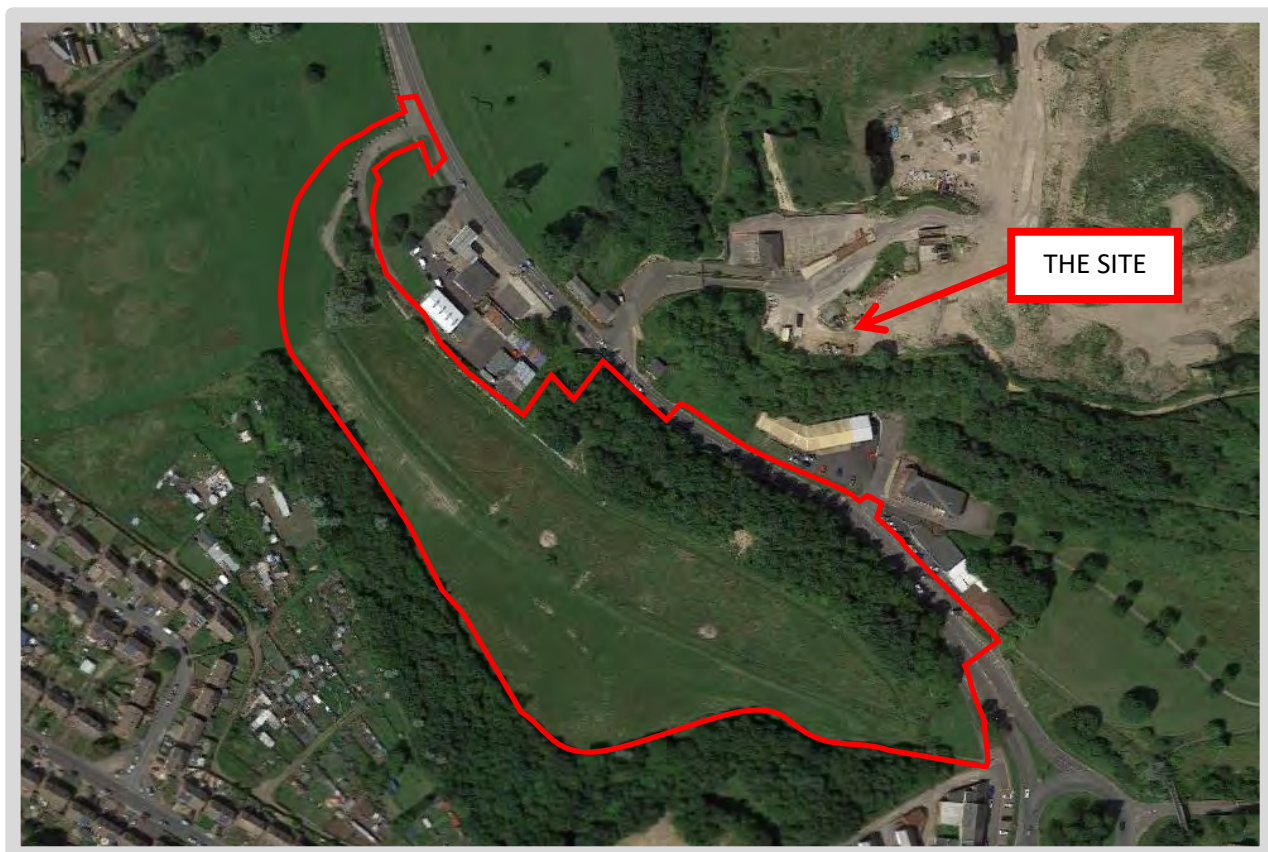


Fig.2 – Aerial Photograph Showing Development Area

3.0 HISTORICAL LAND USE

The site has been developed through much of the mapped history by the Houghton Colliery and associated infrastructure including railway sidings and reservoirs. Following the closure of the colliery in 1981 the site was cleared and has remained as grassed open space to the present day.

Many towns in the surrounding area were reasonably well established in the earliest mapping with the colliery and adjacent limestone quarry providing local employment opportunities. Residential areas were developed through the early 20th century with large developments in the 1940s and 1960s/70s. Extraction at the quarry has ceased and in recent times been repurposed as a landfill site and is now being considered for redevelopment.

Key Areas of Concern

From earliest mapping in 1857 the on-site Houghton Colliery with the associated railway lines, gas works to the south and Houghton Quarry and the associated limekilns to the north are the most potentially contaminative historic activities.

Between 1857 and 1897 the tipping of spoil to the north and east of the site and the presence of mine shafts on-site cause potential concern.

Between 1897 and 1920 the labelled chimneys on-site are indicative of further potential pollution.

Between 1920 and 1939, the labelled tanks at the gas works pose a key area of concern.

Between 1958 and 1969 the mapped electrical substation at Houghton Quarry, the garage to the north and the disused tip to the north-west are key potential contaminative features.

Between 1970 and 1979 the garage developed ~20m to the east of the site poses some cause for concern. Tanks labelled within the southwest corner of the site.

1990s demolition of the former colliery, capping of the mineshafts and infilling of the railway sidings.

4.0 GROUND CONDITIONS

The ground conditions encountered at the site are summarised in the following sections and reference should be made to 2.

- 2585 - Newbottle Street, Houghton Le Spring, Ground Investigation Interpretive Report and Groundwater Risk Assessment Version 3 For Hellens Land, September 2022.

4.1 Made Ground.

Made Ground was encountered in all exploratory holes undertaken across the site to a depth of up to 11m and generally comprised of dark grey, reddish, brown, CLAY with varying amounts of sand, gravel and cobbles (slag, sandstone, shale, brick, concrete, mudstone). The soils have been interpreted as typical of colliery spoil / demolition materials encountered on former colliery sites. Made Ground was typically 3-10m in thickness.

4.2 Topsoil

No Topsoil was encountered on site.

4.3 Superficial Deposits

Superficial deposits were recorded in 16 No. of the exploratory holes and generally comprised Glacial Till comprising stiff, grey, brown gravelly Clay and laminated Clay. The gravel was typically fine to coarse angular sandstone. The deposit was typically 3-10m in thickness.

Superficial glacial clays were encountered within all rotary cored boreholes with the exception of RC01, RC02, RC11 and RC12 and was encountered at depths of between 6.4m bgl and 19.8m bgl.

4.4 Solid Deposits

Solid geology was encountered during the works within all 6 No. rotary open boreholes and 12 No. rotary cored boreholes as Red/Brown weathered Mudstone or Grey Yellow Sandstone / Mudstone. Whilst potential limestone bedrock was noted within the rotary open boreholes (drillers description) the rotary cored boreholes have confirmed that solid geology encountered beneath the site is Sandstone and Mudstone and no limestone was encountered.

Bedrock was encountered between 3.1m bgl and 14.8m bgl. Possible bedrock was encountered within the base of BH10 at 16.2m bgl. Bedrock was subsequently proven to the full depth of RO-02 at 21m bgl. Interbedded Limestone and Sandstone was encountered within RO-04 and RO-05 underlain by Mudstone and Sandstone respectively.

The rotary cored boreholes encountered sandstone, mudstone and siltstone from depths ranging from 5.39m bgl to 19.8m bgl and extended to a maximum depth of 25m bgl (where the majority of the rotary cored boreholes terminated).

As stated above, no deposits of limestone were encountered during the drilling of the rotary cored boreholes.

4.5 Groundwater

Groundwater strikes was encountered in 9 No. of the cable percussion boreholes (CP-01, CP-02, CP-03, CP-05, CP-06, CP-07, CP-11, CP-15 and CP-17) ranging in depth from 3.10m bgl to 10.6m bgl during drilling – considered to be isolated perched water within either the Made Ground or the Superficial deposits.

No groundwater was encountered during the drilling of the rotary open boreholes in April 2020., however the use of water flush inhibits the recoding of the water strikes / water table.

During the drilling of the rotary cored boreholes occasional perched water strikes were reported within the Made Ground and the shallow superficial deposits, with the water table being reported generally at 13-16m bgl at a level of 52-54m aOD. Groundwater has been recorded within all the shallow monitoring wells within the Made Ground / superficial (typically as a small volume collected with the base of the installation) with the highest groundwater level recorded at 4.50m bgl. It should be noted that groundwater levels will vary seasonally.

During the groundwater sampling visits limited groundwater was encountered within the cable percussion boreholes suggesting collection of water within the wells rather than a consisted perched water table (the boreholes were either purged dry during sampling or contained insufficient sample for testing).

Where shallow groundwater was encountered this was generally encountered as perched water above the underlying low permeability clays. The borehole logs and monitoring data suggest that the upper perched ground water is isolated from the lower deep groundwater within the underlying rock where the low permeability clays are present (the clays are absent towards the eastern part of the site in the vicinity of the proposed petrol filling station).

The more recently installed rotary cored boreholes have been monitored and sampled on 3 No. occasions. The deep hydraulic gradient reported at the suggest that groundwater flow at the site appears to lie between 57.97maOD to 54.51m aOD. but with a general hydraulic gradient to the southwest from the northeast (broadly in line with the anticipated hydraulic gradient

4.6 Ground Obstructions / No Recovery / Voids

9 No. cable percussion boreholes encountered obstructions from 1mbgl to 8.5m bgl in the form of buried boulders and concrete. (Please see the exploratory logs for further information).

Poor core recovery was noted within the majority of the Rotary Cored boreholes (no loss of flush) and a void was noted within RC04 at between 5.0 and 6.5m bgl.

Poor recover was considered to be a result of destructive weathering of the underlying bedrock.

4.7 Observed Contamination

No significant visual or olfactory evidence of contamination was recorded during the site investigation works with the exception of ash, brick and concrete fragments observed as part of the Made Ground clay matrix. A very faint hydrocarbon odour was noted from TP-19 (subsequent laboratory analysis did not reported elevated concentrations of contaminants). It should be noted that TP301 was excavated within the same location as TP-19 during the most recent ground investigation works and no evidence of hydrocarbon contamination was noted.

No mobile hydrocarbon contamination was observed or noted during any phase of the ground investigation works. No Light Non-Aqueous Phase Liquids (LNAPL) or Dense Non-Aqueous Phase Liquids (DNAPL) were observed / recorded during all phases of ground investigations works and groundwater monitoring

4.8 Reported Contamination

4.8.1 Soils Contamination

In total 70 No. soil samples were submitted for testing for a suite of common contaminants during the several phases of Shadbolt Group ground investigations.

The laboratory chemical results have reported concentrations of potential contaminants to be within / below SE TSVs for a Commercial end use (human health criteria).

Soils analyses undertaken which reported concentrations above laboratory detection limit but beneath the human health criteria for a commercial enduse included heavy metals and metalloids, Cyanide, sulphate, Total Petroleum Hydrocarbons, Polyaromatic Hydrocarbons, occasional VOCs and SVOCs.

The potential for soils contamination to impact groundwater resources is dictated by the leachability of the soils located at the site and the potential for the soils to come into contact with water.

4.8.2 Leachate Contamination

Leachate analysis undertaken on soils (17 No.) retrieved from the site has reported low concentrations of contaminants below the laboratory detection limits and compared to Threshold Values for Groundwater. However, several contaminants were reported to be slightly elevated when compared to Threshold Values as shown in the table below.

Analyte	Concentration ug/l	EQS Surface Water (ug/l)	Multiple of Threshold	UK Drinking Water Standards (ug/l)	Multiple of Threshold	Location / Strata
Fluoranthene	1.1	0.0063	x 174	N/A		TP209 @ 1.5m bgl (Made Ground)
	0.01		1.6			RC01 @ 4.76-4.89m bgl (Made Ground)
	0.03		4.8			RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		1.6			RC06 @ 5.0-5.2m bgl (Glacial Till)
Benzo (b)fluoranthene	0.6	N/A	N/A	0.1 (sum of 4)	x6	TP209 @ 1.5m bgl (Made Ground)
	0.13				1.3	RC08 @ 6.5-6.6m bgl (Made Ground)
Benzo(a)pyrene	1.8	0.0017	x1058	0.01	x180	TP209 @ 1.5m bgl (Made Ground)
	0.06					RC08 @ 6.5m -6.6m bgl (Made Ground)

Table 4.8.1 - Leachate Analysis Above TSVs Summary Table

4.8.3 Groundwater Contamination

No significant groundwater strikes were encountered during the initial ground investigations and insufficient groundwater was encountered initially within the cable percussions monitoring standpipes to retrieve representative samples.

However recent monitoring off the boreholes has enable the retrieval of water samples from BH01, BH02, BH03 and BH10 and RC01 to RC12. The remainder of the cable percussion boreholes remained dry.

Analyte	Concentration ug/l	EQS Surface Water (ug/l)	Multiple of Threshold	UK Drinking Water Standards (ug/l)	Multiple of Threshold	Location / Response Zone
Selenium	11.5 - 60.01	N/A	N/A	10	x1 – x6	BH01, BH04 and BH10 (all Made Ground / Glacial Till - Elevated concentrations reported during 3 No. monitoring visits)
Naphthalene	7.7	2	3.85	N/A	N/A	RC12 (Visit No.1) - Sandstone
Benzo(b)fluoranthene	7.7	N/A	N/A N/A N/A N/A	0.1	x77	RC12 (Visit No.1) - Sandstone
Benzo(k)fluoranthene	4.3	N/A	N/A	0.1	x43	RC12 (Visit No.1) - Sandstone
Benzo(ghi)perylene	3.0	N/A	N/A	0.1	x30	RC12 (Visit No.1) - Sandstone
Indendo(123CD) pyrene	3.8	N/A	N/A	0.1	x38	RC12 (Visit No.1) - Sandstone
Benzo(a)pyrene	0.4 0.04 7.2	0.00017	x 2352 x 235 x 42352	0.01	x40 x400	BH10 (1 st monitoring visit only) RC11 (Visit No. 2) – Sand RC12 (Visit No.1) - Sandstone
Fluoranthene	0.2-0.3 0.03 0.12, 0.07 15, 0.03 1.3	0.0063	x47 x33 x19 x5 x2380 x33 x206	N/A	N/A	BH01, BH02, BH03 (1 st monitoring visit) RC08 (visit No.3) RC11 (Visit No.2 and 3) – Sand / Sandstone RC12 (Visit No.1 and 3) – Sandstone RC07 (visit No.3)

Table 4.8.3- Groundwater Analysis Above TSVs Summary Table

All other chemical analysis results, including BTEX, VOCs, PCBs and PAHs were reported to be below the laboratory detection limits “with the exception of several VOC’s” i.e., di-n-butyl phthalate, bis(2-ethylhexyl) ester, bis(2-ethylhexyl) phthalate and chloroform.

The leachate analysis table and the groundwater analysis table show elevated leachable hydrocarbons in the soils whilst elevated selenium and hydrocarbons were recorded within the groundwaters.

As such, it appears that the deep groundwaters have been slightly impacted with dissolved phase PAH hydrocarbons, in places but appears to be isolated to individual borehole rather than site wide.

The Ground Investigation Interpretive Report and Groundwater Risk Assessment concluded that

- When the site is developed most of the site will be covered with hardstanding's, buildings with formal drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and migrate towards the Principal Aquifer and / or local watercourses will be further significantly reduced. All soils placed at the site would be to an end product specification to achieve at least 95% of maximum dry density and less than 5% air voids thus reducing the potential for contaminants to leach into solution.
- Although it is considered that the existing ground conditions at the site does not pose a significant risk to future site users and the environment it is considered that a remediation strategy and foundation work risk assessment should be undertaken at the site to ensure that the site can be developed on a more assured basis.

5.0 REMEDIATION SPECIFICATION

Extent and Scope of Works

This specification relates to proposed earthworks at the site known Former Houghton Colliery, to prepare the site for a residential development.

In summary, the earthworks to be undertaken in parcels across the site will comprise.

- Stripping of vegetation and placement into stockpile for offsite disposal.
- Cut and fill works to the required levels (approximately 23,000m³)
- Treatment and/or removal of previously unidentified hotspots.
- Removal of previously unidentified contaminated liquids.
- Appropriate geotechnical and chemical laboratory analysis.
- Appropriate in-situ geotechnical analysis.
- Drilling of groundwater monitoring boreholes
- Environmental Monitoring of Boreholes

The works will be undertaken to provide finished site levels as designed by Portland Consulting Limited to provide a suitable development platform and strategic drainage for the development; namely.

- 2020011-002-1 Retail Development, Newbottle Street, Houghton Le Spring Bulk External Works Sheet 1
- 2020011-002-1 Retail Development, Newbottle Street, Houghton Le Spring Bulk External Works Sheet 2

The Indicative Cut and Fill Model for the site is shown on.

- 2020011-000-1 Retail Development, Newbottle Street, Houghton Le Spring Bulk Earthworks Sheet 1
- 2020011-000-1 Retail Development, Newbottle Street, Houghton Le Spring Bulk Earthworks Sheet 2

It should be noted that based on the cut and fill model the underlying rock will not be exposed during the remediation works.

All fill placed at the site will be to an engineered end product specification to achieve at least 95% maximum dry density and not more than 5% air voids (using the modified Proctor rammer weight of 2.5kg).

Care should be taken to ensure that rainfall or surface waters are effectively shed from the surface and drained away to appropriate temporary holding tank / sump. These surface water runoffs would require to be discharged under consent to an appropriate drainage system or alternatively tanked offsite.

Surface waters shall not be allowed to pond, and any drainage channels should be lined with low permeability clay and maintained to ensure free flow. The low permeability clay to be utilised will be clean / non-contaminated.

Temporary storage ponds are to be utilised / created on site to temporarily store waters encountered during the excavations prior to discharge under consent. The Contractor is to ensure that any required temporary discharge consents are in place prior to discharge of waters. Testing of waters will be required, and agreement sought from NWL / EA prior to discharging under consent.

Earthworks Contractor's Programme

The Earthworks Contractor's programme shall take full account of the conditions of the Main Contract for the proposed phasing of the overall site work, and other activities taking place on the site. This programme shall be agreed prior to the commencement of the Works.

The Control of Noise, Vibration and Mud/Dust Nuisance

The Earthworks Contractor shall comply with the recommendations for practical measures to reduce noise set out in BS5228: Parts 1, 2 and 4.

The Earthworks Contractor shall take all reasonable measures to prevent any dirt or foreign matter being deposited upon or falling upon any public or private highway or access. Where any such material is on any such highway or access, the Earthworks Contractor shall forthwith remove the offending material at his own expense and clean the surface of the highway or access to the satisfaction of the Main Contractor and/or Engineer and/or the Highway Authority.

The Earthworks Contractor shall take all reasonable measures to prevent dust nuisance from being generated by construction traffic, earthworks etc. It is likely that an environmental monitoring system will have to be established on site. The contractor is to make allowances for discussions with the local authority on this matter and complying with any requirements set out.

Traffic Safety and Management

The Earthworks Contractor shall comply in all respects with Chapter 8 of the Traffic Signs Manual for works on or affecting the public highway and/or any private roads forming the highway access to/from the site. The Earthworks Contractor should obtain all necessary consents from the Local Highway Authority for works on the public highway.

On-site accesses and haul routes should be provided and maintained by the Earthworks Contractor in such a manner so as not to endanger either the user, those working in the vicinity of such accesses, haul routes and/or the Works.

Private and Publicly Owned Services

No services are known to be present within Former Houghton Colliery

However, prior to commencing work the Earthworks Contractor shall obtain copies of all available services records and excavate trial pits to locate as necessary.

During the progress of the works the Earthworks Contractor shall (as / if required):

- Take all measures reasonably required by any Public or Statutory Authority for the full protection of its sewers, drains, pipes, mains, cables or any other apparatus, and shall afford proper facilities to accredited representatives of such authorities for access as may be necessary for inspection, repair, renewal or removal of any such apparatus.
- Temporarily support any sewers, drains, pipes, mains, cables or other services

- affected by the works.
- Take responsibility for ensuring that all hydrant covers, stop tap boxes, manhole covers, and the like are raised or lowered to suit the finished levels of the road and footway, margin or verge.
 - Comply with the requirements to utilities providers on all matters relating to services; and indemnify the Client and the Engineer against any claim arising in consequence of the operations.

During the progress of the works the Earthworks Contractor shall provide an alternative service, in full working order to the satisfaction of the owner of the service and the Engineer before any privately-owned service for water, electricity, etc. passing through the site and affected by the works, is cut or disconnected.

Trial pits shall be excavated by hand as necessary in order to verify the position of known existing services to be retained.

Damage to Property

The Earthworks Contractor shall ensure that all precautions are taken in order to avoid any damage to existing property arising from the Works and shall be responsible for the same in the event that any damage should arise from his failure to exercise due care.

Any adjacent structures, services and the like shall be inspected prior to commencement of the Works for evidence of existing defects and, if necessary, a dilapidation survey shall be carried out by the Earthworks Contractor prior to works commencing on site. A re-inspection shall take place on completion of the Contract to verify that no damage or deterioration of said structure, service or apparatus has occurred as a result of the Works. A schedule of the findings of this re-inspection shall be circulated to all parties concerned for their records.

The Earthworks Contractor shall execute the works with care so as to avoid damage to existing structures and drains or other services to be retained.

All fences, trees, paths, shrubs, grassed areas and other surfaces required to be retained shall be protected from spillage and damage caused by site operations and they shall be handed over in an undamaged and proper state to the satisfaction of the Engineer upon completion of the works. The Earthworks Contractor shall not raise or lower the ground level beneath the spread of the branches of any tree to be retained without the approval of the Engineer.

Site Clearance

Before starting the site clearance works, the Earthworks Contractor shall verify with the Client which existing fences, gates, walls, roads, paved areas, trees, shrubs, etc., are to be removed. Any existing water features are to be made redundant and are to be filled. Water features must be cleared of all vegetation and soft/ organic deposits before filling. Any water features / watercourses (e.g., the historic pond) which have previously been filled should be re-excavated and treated likewise.

All materials removed as part of the site clearance shall be disposed of off-site at suitably licensed facilities. On-site burning of materials shall not be permitted.

The Earthworks Contractor shall demolish, break up and remove any redundant concrete slabs, structures, drains and other superficial obstructions in the way of the works or otherwise obstructing the construction of the works as instructed. Where old foundations, beds, basements, filling material,

tanks, service pipes, drains, etc., not shown on the drawings are encountered, instructions should be obtained from the Engineer before proceeding.

Tanks, if encountered, would require their liquids removed, inerted (degassed) and excavated in accordance with best practice (i.e., Guidance for Design, Construction, Modification, Maintenance and Decommissioning of Filling Stations – chapter 15).

At the Earthworks Contractor's discretion, any demolished or cleared materials (e.g., existing brick structures and former stockpiled brick wastes) may be retained on site for use as filling material provided that they are acceptable or are treated so as to become acceptable. Materials are to comply in all respects with this specification and the relevant permit / licencing requirements for the reuse of the site won materials identified onsite.

The use of explosives shall not be permitted.

All fossils, coins, bottles, articles of value or antiquity and structures or other remains or items of geological or archaeological interest discovered on the site shall be immediately reported to the Engineer and shall be deemed to be the absolute property of the Client. All findings to be reported to the County Archaeologist.

Setting Out

The Earthworks Contractor shall be responsible for the true and proper setting-out of the Works and for the correctness of the position, levels, dimensions and alignment of all parts of the Works and for the provision of all necessary instruments, appliances and labour in connection therewith. The Earthworks Contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other articles used in setting out the Works.

Should the Earthworks Contractor find any discrepancies on the drawings he is to refer the matter to the Engineer for verification before proceeding with the works.

General Earthworks Requirements

The Specification for Highway Works (SHW) Series 600 published by HMSO shall form the base specification for all earthworks.

Acceptable engineered fill materials shall meet the requirements of Table 6/1 enclosed as Appendix A to this specification (Appendix 6/1 requirements of which are to be determined after material classification) and Tables 6/2, 6/4 and 6/5 of the SHW reproduced within Appendix A. It should be noted that the vast majority of soils located at the site fall into a 2C classification and are slightly wet of optimum.

Should the soils be wet of optimum to achieve the compaction / air void requirements and to minimise the risk associated with leachate migration, then soil moisture modification may be required.

Any soil modification should be undertaken to achieve the compaction requirements should be undertaken in accordance with the relevant licence / permitting / deployment and with prior agreement with the client

Unacceptable material shall be:

- Peat, materials from swamps, marshes and bogs.

- Logs, stumps and perishable material.
- Materials in a frozen condition.
- Clay having a liquid limit determined in accordance with BS1377: Part 2, exceeding 90% or plasticity index determined in accordance with BS1377: Part 2, exceeding 65%.
- Material susceptible to spontaneous combustion.
- Materials with a calorific value in excess of 7MJ/kg, measured in an as received condition, placed within the fill material
- Materials containing invasive plant species or roots and rhizomes of such; and
- Material having hazardous chemical or physical properties requiring special measures for its excavation, handling, storage, transportation, deposition and disposal. No hazardous materials are to be imported to the site.

Prior to works commencing the material to be excavated and replaced should be classified in accordance with the above specification.

If an authorised formation or material deposited as fill subsequently deteriorates due to inclement weather (or for any other reason) such that it would be reclassified as unacceptable and cannot be compacted in accordance with the Contract, the Earthworks Contractor shall, at his own expense, either:

- Cease work on the material until its condition is such that it can again be classified as acceptable.
- Make good by removing and disposing of the unacceptable material and replacing it with acceptable material.

The Earthworks Contractor shall provide for such measures as may be necessary to ensure that water, whether groundwater, precipitation or water from any other source does not accumulate in excavations or on subgrades.

The Earthworks Contractor shall arrange for the rapid dispersal of water shed on to the surface of earthworks or completed formation during construction or which enters the earthworks above the water table from any source.

The Earthworks Contractor shall provide where necessary temporary watercourses, ditches, drains, pumping or other means of maintaining the earthworks free from water. Such provision shall include carrying out the work of forming the earthworks in such a manner that their surfaces have at all times a sufficient minimum cross-fall and, where practicable, a sufficient longitudinal gradient to enable them to shed water and prevent ponding.

The Earthworks Contractor shall submit proposals for disposal of water to the relevant authority. Where pumping is authorised, precautions shall be taken to prevent disturbance of material in and around excavations. Adequate means of trapping silt shall be provided on temporary systems discharging into permanent drainage systems.

These surface water runoffs would require to be discharged under consent to an appropriate drainage system or alternatively tanked offsite.

Surface waters shall not be allowed to pond, and any drainage channels should be lined with low permeability clay and maintained to ensure free flow. The low permeability clay to be utilised will be clean / non-contaminated.

The Earthworks Contractor shall allow for such seasonal and other variations to the ground water levels indicated in the Site Investigation Reports as might reasonably be anticipated.

Where, in the opinion of the Engineer, earthworks have been adversely affected by the ingress of water during the earthworks contract so as to render the material unacceptable, these works shall be removed and made good at the Earthworks Contractor's expense.

The Earthworks Contractor is required to remove all topsoil and to remove any soft spots prior to filling with acceptable material. Any surplus topsoil shall be removed from site to a suitably licensed off-site tip or other approved location.

Surfaces of excavations with a gradient greater than 1:5 which are to receive filling must have horizontal benches constructed to match the depths of compacted layers of filling.

Where, during the progress of the work, the difference in level between adjacent areas of filling exceeds 600mm, the Earthworks Contractor shall cut into the edge of higher filling to form benches having a minimum width of 600mm and a height equivalent to the depth of a layer of compacted filling. The Earthworks Contractor shall spread and compact new filling to ensure maximum continuity with the previous filling.

The accuracy of and permissible deviation from required formation levels (underside of sub-base/capping) shall be as follows:

- Beneath mass concrete foundations: $\pm 25\text{mm}$
- Beneath ground bearing slabs: $\pm 15\text{mm}$
- Beneath roads and other paved areas: $\pm 20 - 30\text{mm}$
- Other areas: $\pm 50\text{mm}$

Bulk Excavation

The bulk excavation shall be carried out as necessary to remove all unsuitable soils (e.g., topsoil, vegetation, Made Ground to levels as shown on the cut and full model), all obstructions and extraneous items).

Precautions should be taken to ensure the stability of the excavation due to the potential presence of granular Made Ground deposits when encountered; the Earthworks Contractor is responsible for maintaining the stability of temporary excavations during the Works and the stability of adjoining land/property.

Should the Earthworks Contractor intend to use any special methods to assist in excavation work, such as 'soil freezing', 'chemical stabilisation', etc., then details shall be submitted to the Engineer for comment at least three weeks in advance of the work. No work shall be commenced on the portion of the excavation concerned until consent is given.

Any large obstructions or unexpected findings discovered during excavation shall be reported immediately to the Engineer.

Following completion of any excavation, particular care must be taken to avoid deterioration of the excavated surface. The Earthworks Contractor shall be responsible for protecting the excavations against damage from weather and/or construction traffic.

Where areas of ground considered unsuitable by the Engineer are identified at the base of excavations the Earthworks Contractor shall, under the direction of the Engineer, excavate to such further depth as may be required. Such extra depth shall be filled with, acceptable general fill materials or sub-base/capping materials as required by the Engineer.

Excavations shall be carried out by the Earthworks Contractor in such a way as to avoid disturbance and/or damage to the surrounding ground, existing roads, pavements, buildings and services, etc. on and/or adjoining the site.

The Earthworks Contractor shall be solely responsible for the safety of all excavations and for the sufficiency of all temporary supports thereto.

The Earthworks Contractor shall be responsible for disposing of all unacceptable or surplus materials arising from the Works at suitably licensed off-site tips as required.

Should material be encountered that appears contaminated, either by olfactory or visual evidence, the material will be brought to the attention of the Engineer who will advise as to the appropriate course of action. Hotspot removal works should be undertaken as described with the section below.

Hotspots

If during the remediation works if previously unidentified mobile hydrocarbon contaminants or obviously visually or olfactory contamination is noted, the excavation works are to cease in the area, and the LPA / EA notified of the findings. Works shall not recommence until agreement has been sought by the LPA / EA as to the most appropriate way forward, which is likely to involve hotspot removal works and validation of the sides and base of the excavation been removed. The excavated soils would be required to be stockpiled appropriately on site for classification prior to being removed off site to a suitably licensed landfill facility under appropriate duty of care documentation. The procedure for dealing with hotspots is as follows.

- Visually assess the area that is impacted and determine an initial area / depth of excavation, initially a nominal 5m x 5m in area and by the appropriate depth, increasing by 5m intervals until hotspot area is deemed fully excavated.
- Informing the relevant parties / authorities.
- Undertake confirmatory chemical testing at the base and sides of the excavation (minimum of 2 No. samples per side and base for a 5m x 5m excavation, increasing to 4 per side and base for a 10m x 10m excavation, increasing to 6 per side and base for a 15m x 15m excavation and so on (2 No. samples per liner 5m)
- Should hydrocarbon odours / visual staining be noted TPH, PAH, BTEX, MTBE, PCB, SVOCs and VOCs should be tested for.
- Should a hotspot of metal contamination be encountered a full metal suite should be tested for.
- Should asbestos debris be encountered then asbestos testing should be undertaken (identification and quantification). Hand picking will be required under appropriate asbestos management procedures and appropriately qualified asbestos removal contractors.
- Excavated hotspot soils should be tested at a rate of 1/100m³ of arisings (minimum of 3 tests).

- All tests' results to be compared against the Remediation Criteria within Appendix C. should materials fail the criteria, the hotspot area should be extended until all tests pass the remediation criteria.
- Prior to offsite disposal of contaminated soils additional WAC tests should be undertaken.
- All material should be disposed offsite to a suitably licensed landfill facility under appropriate duty of care documentation.
- The resultant excavation should be surveyed, and hotspot removal plans produced showing testing locations / hotspot extents and contaminated volumes.
- All excavated hotspot materials are to be placed into a designated / signposted area. The receiving area have a protective visqueen layer at its base and be approbatively bunded to ensure no contaminated runoff.
- Clearance certificates should be provided by the asbestos contactor following removal of asbestos

Material Classification

To provide formation levels for the proposed development, suitable material may be processed from excavated site soils.

Compliance testing of all imported and site won materials selected as earthworks materials required to achieve formation levels shall be carried out by the Earthworks Contractor at a UKAS / MCERTS accredited testing laboratory. Geotechnical earthworks testing at a frequency of 1 no. suite of tests to be undertaken per 1,000m³ of single class material type, or a minimum of 3 samples per material type (as defined in SHW) imported (See engineered Fill Specification below for details of suite).

The Earthworks Contractor should ensure the environmental and geotechnical suitability of acceptable site and imported materials. The results of the tests shall be made available to the Engineer prior to placement of material as fill.

Should materials be encountered that appear contaminated, either by olfactory or visual evidence, the material will be brought to the attention of the Engineer who will advise as to the appropriate course of action.

Filling

The performance of fill material placed at the site can be ensured by placement of the fill to an Engineered (End Product Specification) i.e., 95% of maximum dry density and less than 5% air voids.

The Earthworks Contractor shall ensure that the final platform is suitable for the placement of the embankment fill.

Areas of landscaping should receive at least 300mm of low permeability clay which will act as a barrier to potential vertical migration of rainwater and protect future site users from the soils beneath. The low permeability clay / subsoil (SHW 2A/B with a coefficient of permeability of at least $k=1 \times 10^{-9}$ m/s) should be clean / non-contaminated imported material. The thickness of the low permeability clay should be validated by post remediation inspection pit.

Engineered Fill Specification

On the basis of the results of a site investigation and earthworks trials which has been carried out, the Earthworks Contractor shall provide the Engineer with the results of the following tests for each type of fill on site.

- Natural moisture content (BS1377: Part 2:1990: Section 3).
- Liquid and plastic limits for cohesive soils (BS1377: Part 2:1990: Section 4 and 5).
- Particle density (specific gravity) to assist in evaluating compaction results.
- Particle size distribution by wet sieving method to give the distribution of particle sizes down to fine sand and the percentage of fines (BS1377: Part 2:1990).
- Proctor Soil Compaction Test using a 2.5kg hammer (moisture content versus Maximum dry density compaction curve).
- Calorific Value Tests (acceptable materials to report < 7,000 MJ/Kg)
- A separate compaction trial shall be carried out for each type of fill to be used on the site.
- The volume of geotechnical testing anticipated and provided by the Contractor within fill areas is shown below.
- Earthworks Classification Testing (as above) **every 1,000m³ of placed material**
- In-situ Density Tests (Sand Replacement Test -SRT) **every 1,000m³ of placed material**
- CBR tests at finished remediation level and **50m grid**
and at 1m height intervals as fill is placed

Furthermore, where material is predominantly cohesive in nature then the validation testing will also include a series of hand shear vanes (**every 1,000m³ of placed material**) with target shear strength of no less than 50kPa. Every layer should have at least one SRT undertaken to demonstrate that the appropriate compaction has been achieved.

The laboratory geotechnical testing undertaken on soil retrieved from the ground investigations has shown the soils to be relatively consistent and it is considered that a testing rate of **every 1,000m³** is appropriate.

General Filling Requirements

The Earthworks Contractor shall be responsible for removing from site any unacceptable material to suitably licensed tips.

Moisture content testing shall also be undertaken on each layer of material excavated and re-compacted. Initially the material placed will be observed by both the plant operators and the attendant Engineer to ensure that compaction is being achieved.

Should imported materials be at or near to its optimum moisture content and the material prove to be too wet to achieve adequate compaction, then the material will be removed, and consideration given to the addition of lime / natural drying (laying out to dry prior to compaction) to reduce the moisture content to make the material suitable for placement.

The Earthworks Contractor should ensure suitability of fill materials for lime modification if required. Such testing will also include for swell potential. Where lime modified material is incorporated in the works a record will be kept of its location, and layer thickness. As stated previously relevant licence / permit / deployment (e.g., mobile plant.) will also be required for lime / cement modified materials.

Any in-situ validation tests (if required and under instruction) will include a record of their layer number and associated X, Y and Z co-ordinates.

Environmental validation testing will be undertaken on soils placed at the site in accordance with Appendix C. Tests are to be undertaken at a rate of 1 per 1,000m³ of placed fill with base of excavation testing and finished level testing undertaken in accordance with the following drawings.

2585-301 - Base of Excavation Sampling Locations

2585-302 - Finished Remediation Level Sampling Locations

The imported subsoil / clay should be tested at a rate of 1/250m³ with a minimum of 3 No. samples tested.

The ground investigations undertaken at the site have shown that the existing soils located at the site are suitable to remain in situ and do not pose a significant impact on the environment and as such the chemical concentration limits are as shown in Appendix C which represent “industry standard” Human Health Criteria for a Commercial Enduse.

Should any soils be imported to the site (preferably naturally occurring materials) the same criteria are to be adopted and all soils to be used on site shall also be checked using HazWaste Online on the chemical results for material reuse / import to determine that the material is non-hazardous.

If recycled materials (typical demolition, recycled aggregates) are to be utilised these shall not report leachable concentrations of contaminants above the water criteria as described within Appendix C, providing an additional level of protection.

In order to develop the site a Deposit for Recovery Environmental Permit is to be obtained from the Environment Agency for reuse of site won Made Ground. Aggregates would be imported under the WRAP Protocol and imported soils under a Materials Management Plan (MMP).

Slopes

Permanent slopes should be no steeper than 1:3 (vertical: horizontal – based on previous slope stability assessments).

Permanent batters at the western edge and eastern edge of the development are expected to achieve gradients at 1:3.

Specific Requirements

Validation testing of the expected final formation level should comprise incremental plate load tests. Plate load tests should comprise a 600mm diameter plate (in accordance with BS1377 Part 9 with increments of loading at 25%, 50%, 75%, 100% 125% and 150% and 0% of 150kPa) to ensure a modulus of subgrade reaction of at least 27,500 kN/m²/m (which equates to a maximum settlement of 10mm), and to ensure that an equivalent CBR value of at least 3% is achieved to ensure suitability of the final formation levels for the proposed road / pavement construction.

Health and Safety

The Earthworks Contractor shall not commence construction works until the project health and safety plan has been prepared to the Main Contractor's satisfaction. The Earthworks Contractor shall be responsible for complying with the plan and he shall be required to:

- Ensure co-operation between other Earthworks Contractors so that they all may comply with the relevant statutory provisions as are relevant to the project themselves.

- Ensure that everyone on site complies with the health and safety plan.
- Take reasonable steps to ensure that only authorised persons are allowed on site (or part thereof as the case may be).
- Display, where they can be easily read, any notification that has been sent to the Health and Safety Executive.
- Prepare method statements for construction operations as required by the Principal Designer; and

The Earthworks Contractor shall pay particular attention to the following in the context of this Specification:

- Potentially hazardous or contaminated materials used or encountered on site.
- Deep excavations.
- Working in the vicinity of underground or overhead services.
- Working in confined spaces.
- Working in or adjacent to watercourses /water features; and
- Working on or in the vicinity of highways.
- Provision of temporary slope stability.

The Earthworks Contractor shall take all necessary safety precautions throughout the ground treatment operations and shall comply with the Health and Safety at Work Act 1974 or any subsequent re-enactment thereof.

The Earthworks Contractor shall take note of the Pre-Tender Health & Safety Plan and comply with the CDM Regulations 2015.

The Earthworks Contractor shall submit for approval all necessary method statements to the Main Contractor prior to commencing the works.

Working Hours

The Earthworks Contractor must liaise with the Client to determine the permitted working hours, which must be strictly observed throughout the duration of the operations.

Contractor's Report

The Earthworks Contractor shall on a weekly basis provide the Engineer within the following information:

- Base of excavation drawing.
- Compliance test results and the locations of sampling.
- Hotspot removal works surveys, test results (e.g., soils, asbestos, and waters)
- Low permeability clay surveys
- Water monitoring results.
- Site compaction records of layer thicknesses and compactive effort.
- Details of compaction plant used.

- Verification test results and their location.
- Material placement records (e.g., what materials were placed where):
- Photographs of the work; and
- As-Built final topographical survey.

On completion of the works a contractor's report should be provided providing all the as built information as detailed above.

6.0 POST EATHWORKS GROUNDWATER MONITORING

Whilst slightly elevated concentrations of PAH have been reported within occasional leachate samples and deep groundwater analysis with isolated boreholes. The groundwater risk assessment previously undertaken at the site has shown that the soils to not pose a significant risk to the underlying aquifers or local water courses.

To confirm that the piling works, to be undertaken on completion of the earthworks, do not have a negative impact on the underlying acquire, remediation monitoring boreholes are to be constructed as shown on the following drawing.

2585-302 - Remediation Monitoring Boreholes.

The boreholes are to be drilled to an anticipated depth of 20m bgl with response zone of the boreholes wholly within the underlying rock.

The existing monitoring boreholes which are located at the site can be utilised for this purpose however, it is anticipated that the boreholes will be required to be removed / decommissioned as part of the earthworks.

During the piling works the boreholes should be monitored on a weekly basis. Monitoring should be extended to monthly for a minimum of six months following piling. The monitoring will be required to extend to the completion of the bulk earthworks should these works still be ongoing 6 months after the piling.

Further monitoring may be required in addition to the above should it be demonstrated that the groundwater conditions have deteriorated or not improved following completion of the monitoring.

In addition, additional monitoring should also be undertaken immediately following exceptional rainfall events.

Chemical testing to be undertaken from the groundwater samples retrieved as per the same determinands detailed in Appendix C 'Remediation Screening Value'.

On completion of the monitoring period following the piling works the boreholes should be decommissioned in accordance with "Good practice for decommissioning redundant boreholes and wells, Environment Agency 2012.

- Remove all headworks and pipework.
- Backfill with bentonite.
- Finish surface as per the requirements of the development drawings.

7.0 VALIDATION

The objective of the earthworks to be undertaken at the site is to provide a suitable development platform for the anticipated retail development utilising piled foundations (Unit 1) and vibro stone columns (Unit 2), and a raft foundation for the PFS.

The works will be considered to be validated on completion of the initial earthworks that show that.

- At least 95% compaction with less than 5% air voids has been achieved (2.5kg proctor rammer) during the earthworks.
- Undrained shear strength of 50kPa reported through the placed fill during the earthworks
- Minimum of 3% CBR within main access road / car parks
- Calorific Values of less than 7MJ/Kg within placed fill
- No elevated concentrations of contaminants reported.
- Groundwater monitoring has shown no deterioration of groundwater quality and has preferability shown an improvement.
- Groundwater monitoring boreholes have been decommissioned.

On completion of the remediation works a completion verification report will be produced to confirm that the data, detailed previously within this Remediation Strategy, will be collected to demonstrate that the works set out previously are complete and have been undertaken in accordance with this document.

Any changes to the Remediation Strategy will be agreed with the Environment Agency / Sunderland City Council and the changes / contingency works undertaken will be detailed within the validation / verification report.

8.0 REFERENCES

- Site walkover survey.
- Historical and Recent Ordnance Survey maps and plans.
- Geological Survey Sheets.
- The Environment Agency.
- Groundsure Report.
- British Geological Survey.
- Coal Authority Mining Report.
- BRE Report BR211; Radon: Protective measures for new buildings.
- NRPB-W26 'Radon Atlas of England and Wales,' NRPB, 2015.
- CIRIA 132 'A guide for safe working on contaminated sites,' CIRIA, 1996.
- CIRIA C552 'Contaminated Land Risk assessment. A guide to good practice,' CIRIA, 2001.
- BS10175 'Investigation of potentially contaminated sites – code of practice,' BS, 2011.
- Environmental Protection Act 1990: Part IIA
- Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance April 2012.
- Ciria C733 Asbestos in soil and made ground: a guide to understanding and managing risks, March 2014.
- BRE Special Digest 1, 2005 (Third Edition). Concrete in aggressive ground. Construction Research Communications Ltd, Watford.
- BS 5930: 1999. Code of practice for site investigations. BSI, UK.
- BS 10175: 2011. Investigation of potentially contaminated sites – Code of Practice. BSI, UK.
- CIRIA C665: 2006. Assessing risks posed by hazardous ground gases to buildings. London UK.
- DD ENV, 1997. Eurocode 7: Geotechnical Design. Parts 1 to 3. BSI, UK.
- Environment Agency, 2008 - onwards, Science Reports SC050021 (SGVs)
- TOMLINSON, M.J., 2001 Foundation design and construction. Prentice Hall, London.
- The LQM/CIEH S4ULs for Human Health Risk Assessment (S4UL3251), November 2014
- The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations, September 2015.
- Keynetix Holebase SI (including connected data sources)
- RocScience Slide and Settle 3D Software
- Priors Hall, Corby, Preliminary Risk Assessment, for Urban & Civic Corby Ltd, January 2018, Shadbolt Group
- Priors Hall Park, Corby Zone 2 and Zone 3 (South) Ground Investigation Interpretive Report Urban & Civic (Corby) Ltd. Issue V2 November 2018, Shadbolt Group
- Earthworks and Remediation Trial Strategy, Zone 2, Priors Hall Park, Corby, Project No. 2564 Urban and Civic (Corby) Ltd. August 2018, V2, Shadbolt Group
- All relevant ecological reports pertaining to the site

APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

PARCEL SPECIFIC EARTHWORKS STRATEGY

*This report is produced for the benefit of **For Hellens Land** in accordance with the terms of the appointment.*

This report has been prepared in accordance with the terms and conditions of the appointment and relates to the condition of the site at the time of ground investigations. No warranty is provided as to the possibility of future changes in the condition of the site.

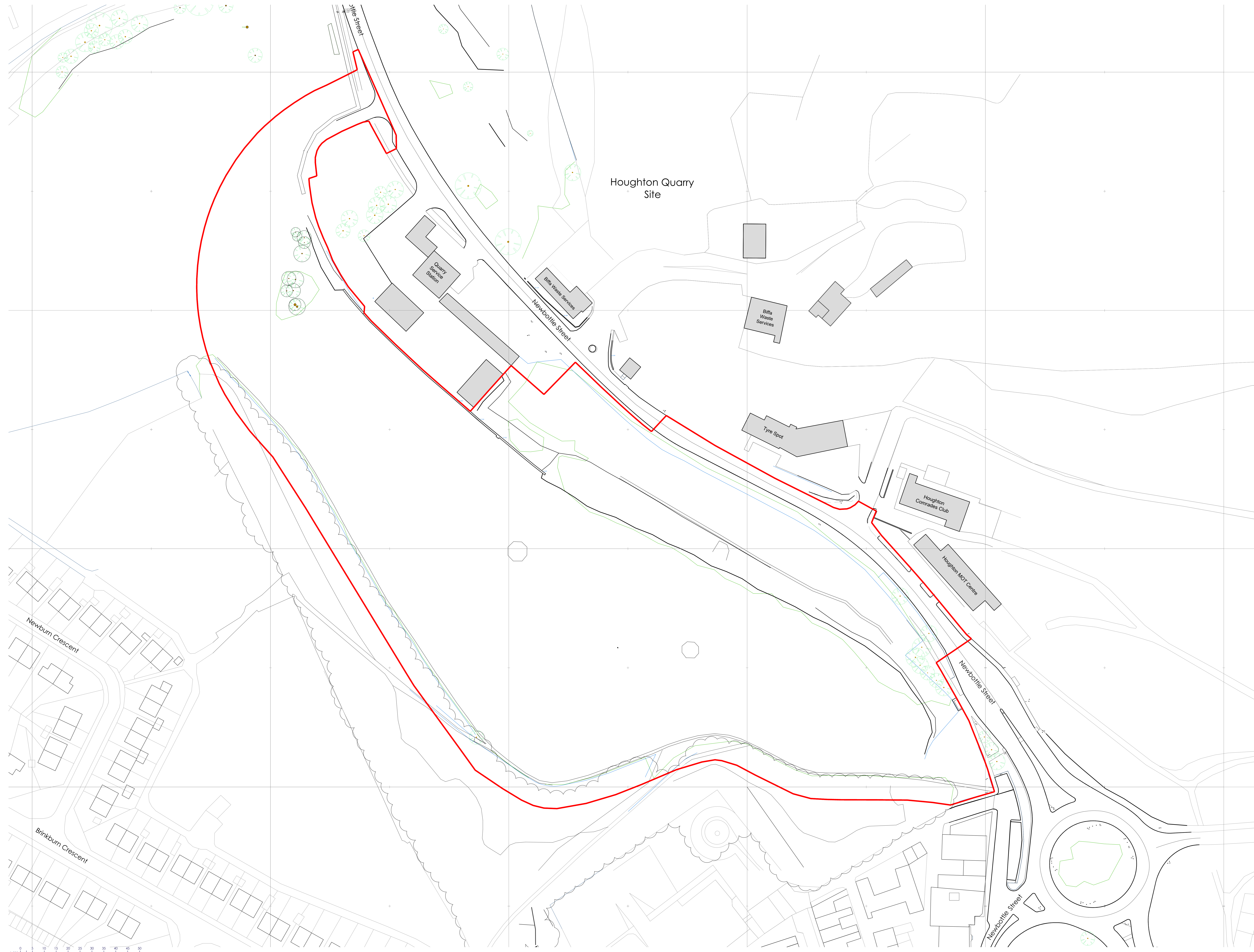
Shadbolt Environmental takes no responsibility for conditions which occur between the individual exploratory holes. Whilst every effort has been made to interpret the conditions between investigation locations, such information is only indicative.

Whilst the contamination assessment detailed within this report reflects our view, because there are no exact UK definitions of these matters, being subject to risk analysis, Shadbolt Environmental are unable to give categoric assurances that they will be accepted by authorities or funds without question. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. In time, improved practices or amended legislation may necessitate a re-assessment.

The report is limited to the geotechnical and environmental aspects detailed within the report and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents.

APPENDIX B

DRAWINGS



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www.hellens.co.uk

FINTRY | ESTATES

IBA ARCHITECTS
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www.iba-architects.com

Project: HOUGHTON COLLETRY RETAIL
Newboole Street
Houghton-le-Spring DH14

Title: Existing Site Plan

Client: Hellens Land / Finty Estates

Drawn: Initials Scale: 1:500 B/A0
Checked: Initial & sign Date: 23.04.20

TENDER

1485 (SP)010 T1

THIS DRAWING IS COPYRIGHT



Key

- Existing Buildings
- Retail Buildings
- Ancillary Buildings
- Landscaped Areas
- Paved Areas
- Concrete Service Yards
- Tarmac
- Totem Sign
- PFS Sign
- Mineshaft
- Planning Application Boundary Line



Houghton Quarry Site

Unit 2

Unit 1

Parking Provision

Standard Parking Spaces 4800 x 2500mm	274no
Accessible Spaces	22no
Parent & Child Spaces	17no
Electric Charging Spaces	16no
Total Spaces	329no

Improving our Environment...
HELLENS
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IBA ARCHITECTS
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 E: info@iba-architects.com T: 0191 461 1411
 www.iba-architects.com

Project: HOUGHTON COLLIERY RETAIL
 Newboothle Street
 Houghton le Spring

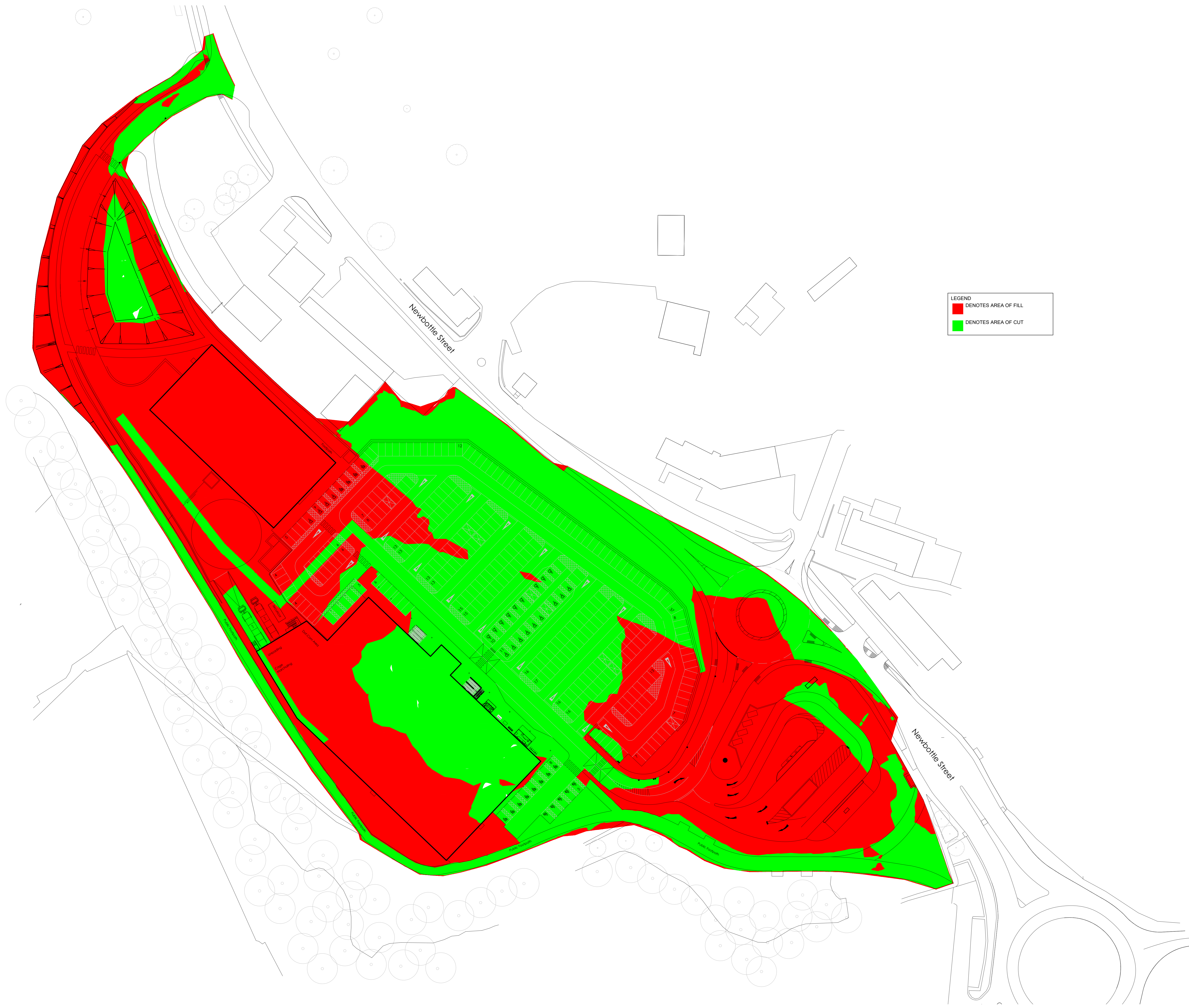
Title: Proposed Site Layout

Client: Hellens Land / Finty Estates

Drawn: KW Scale: 1:500 @ AD
 Checked: FW Date: 04.10.21

TENDER

1485 (SP)040 T1



LEGEND
■ DENOTES AREA OF FILL
■ DENOTES AREA OF CUT

PLAN
 1:500

0	Preliminary Issue	MG	MG	MG	NOTISS
Rev.	Description	By	CHK	App	Date

Portland
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 10 Barkside, The Watermark, Gateshead, Tyne & Wear, NE11 9BY
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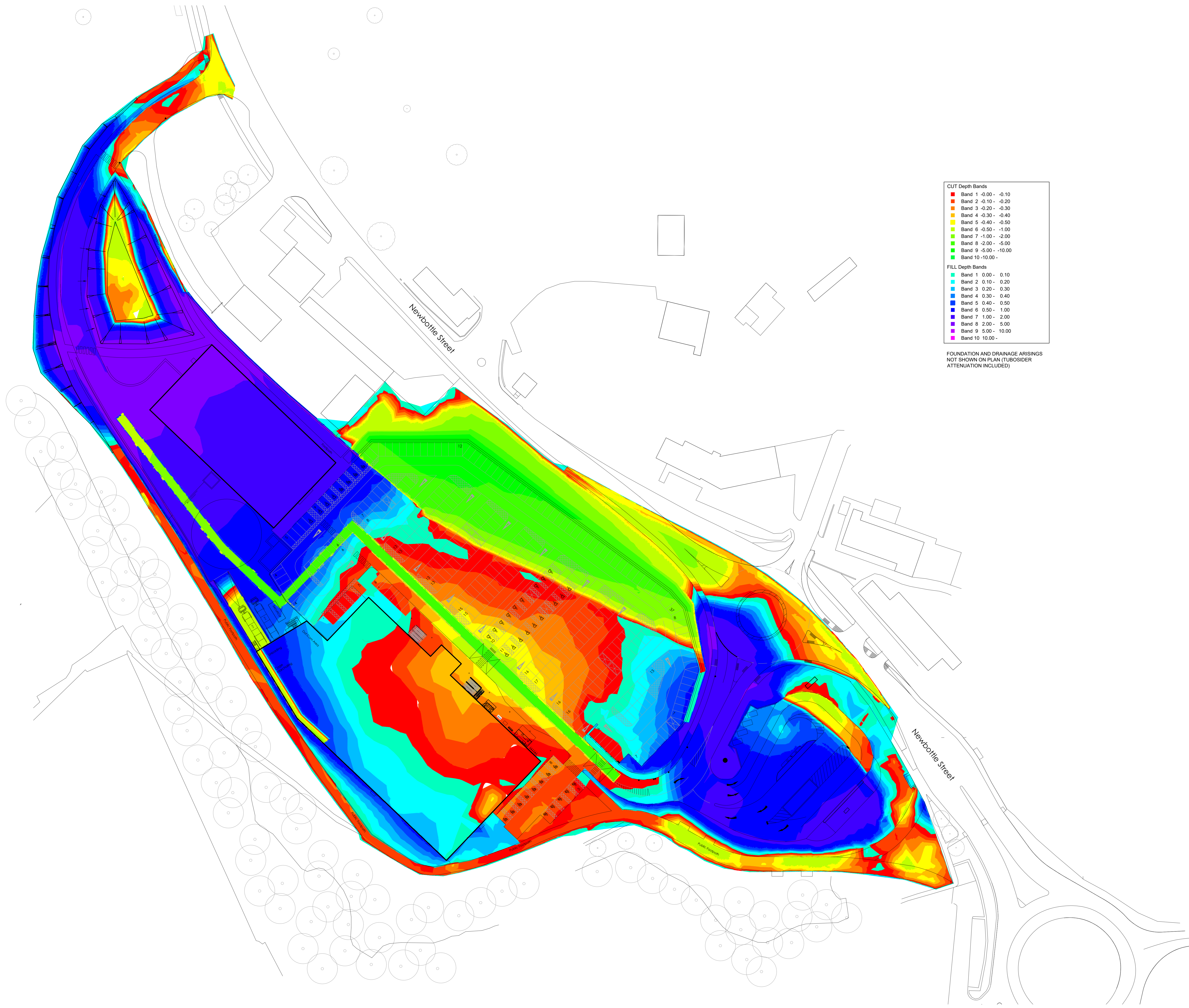
Client: **Hellens Land / Fintry Estates**

Project: **Retail Development
 Newbottle Street
 Houghton le Spring**

Drawing Title: **Bulk Earthworks
 Sheet 2**

Scale	As Shown	Sheet Size	A0
Drawn By	MC	Checked By	MG
Approved By	MG	Date	17/05/21

Drawing Status	Preliminary	
Project No.	2020011	Drawing No.
		000-2
Revision	0	



CUT Depth Bands

- Band 1 -0.00 - -0.10
- Band 2 -0.10 - -0.20
- Band 3 -0.20 - -0.30
- Band 4 -0.30 - -0.40
- Band 5 -0.40 - -0.50
- Band 6 -0.50 - -1.00
- Band 7 -1.00 - -2.00
- Band 8 -2.00 - -5.00
- Band 9 -5.00 - -10.00
- Band 10 -10.00 -

FILL Depth Bands

- Band 1 0.00 - 0.10
- Band 2 0.10 - 0.20
- Band 3 0.20 - 0.30
- Band 4 0.30 - 0.40
- Band 5 0.40 - 0.50
- Band 6 0.50 - 1.00
- Band 7 1.00 - 2.00
- Band 8 2.00 - 5.00
- Band 9 5.00 - 10.00
- Band 10 10.00 -

FOUNDATION AND DRAINAGE ARISINGS
 NOT SHOWN ON PLAN (TUBOSIDER
 ATTENUATION INCLUDED)

PLAN
 1:500

0	Preliminary Issue	MG	MG	MG	17/05/21
Rev.	Description	By	CHK	App	Date



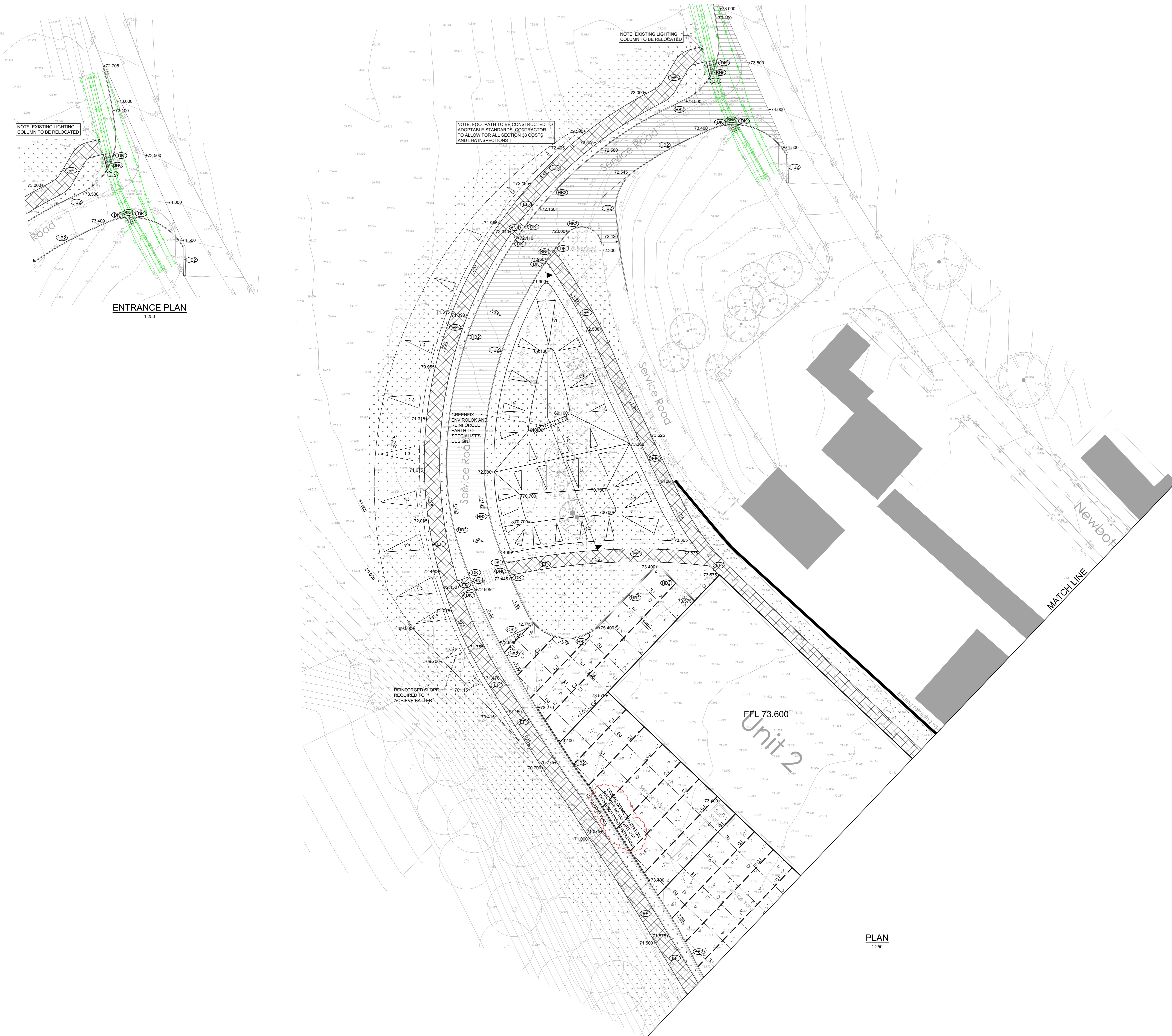
Client: **Hellens Land / Fintry Estates**

Project: **Retail Development
 Newbottle Street
 Houghton le Spring**

Drawing Title: **Bulk Earthworks
 Sheet 1**

Scale	As Shown	Sheet Size	A0
Drawn By	MC	Checked By	MG
Approved By	MG	Date	17/05/21

Project No.	2020011	Drawing No.	000-1	Revision	0
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NOTE: EXISTING LIGHTING COLUMN TO BE RELOCATED

NOTE: FOOTPATH TO BE CONSTRUCTED TO ADOPTABLE STANDARDS. CONTRACTOR TO ALLOW FOR ALL SECTION 38 COSTS AND LHA INSPECTIONS

NOTE: EXISTING LIGHTING COLUMN TO BE RELOCATED

ENTRANCE PLAN
1:250

PLAN
1:250

LEGEND

- CONCRETE YARD
 - 175mm THICK PAV2 CONCRETE (BRUSHED FINISH) WITH A252 FABRIC REINFORCEMENT.
 - 1200g SLIP MEMBRANE
 - 150mm TYPE 1 SUBBASE
 - 300mm 6F2 SUBBASE
- CONCRETE YARD CONSTRUCTION JOINT (CJ)
- SAWN JOINT (SJ)
- EXPANSION JOINT (EJ)
- HB2 HALF BATTERED KERB 125 x 255
- HBQ HALF BATTERED KERB QUADRANT 305 x 255
- BNB BULLNOSE KERB 125 x 150 6mm UPSTAND
- CS2 SQUARE CHANNEL BLOCK 150 x 125
- EF FLAT TOP EDGING 50 x 150
- DK DROP KERB 1:12 GRADIENT
- BOL BOLLARD

NOTE: KERB RADI LESS THAN 12m SHALL BE FORMED USING PRE-FORMED RADIUS KERBS. OTHERWISE STRAIGHTS OF NOT LESS THAN 300mm LONG SHOULD BE USED WITH MITRE CUTS.

ALL KERBS SHALL BE BUTT JOINTED.

KERBS SHALL BE LAID TO THE DESIGN LEVEL +/- 6mm.

FULL LENGTHS OF KERB PIECES SHALL BE USED WHERE POSSIBLE. IF PIECING UP IS REQUIRED UNITS SHALL NOT BE OUT TO LESS THAN HALF THEIR LENGTH.

TOLERANCES

SUB-BASE TO RECEIVE BASE ROAD-BASE + 0/-30mm.

BASE (ROADBASE) TO RECEIVE BINDER COURSE +/- 15mm.

BINDER COURSE TO RECEIVE SURFACE COURSE +/- 6mm.

BINDER COURSE TO RECEIVE SURFACE COURSE ON AREAS OTHER THAN ROADS E.G. CAR PARKS +/- 10mm.

SURFACE COURSE +/- 6mm.

THE SUM OF THE DEVIATIONS IN THE LEVELS OF DIFFERENT PAVEMENTS LAYERS SHALL NOT RESULT IN A REDUCTION OF THE REQUIRED DESIGN THICKNESS BY MORE THAN 8.5% OR IN THE OVERALL SURFACE COURSE THICKNESS BY MORE THAN 5mm.

LEGEND

- TARMAC - ACCESS ROAD
 - 30mm SURFACE COURSE (STONE MASTIC ASPHALT SURF 40/60)
 - 70mm BINDER COURSE (AC20 DENSE BIN 100/150 REC. (CL 906))
 - 90mm BASE COURSE (AC32 HDM BASE 40/60 DES. LAID IN ONE PASS (CL929))
 - 300mm SUB-BASE (GRANULAR TYPE 1 TO CL803)
- TARMAC - ADOPTABLE
 - 40mm SURFACE COURSE (HRA DESIGNATION R40/14F SURF 40/60 DES. WITH 20mm PRECOATED CHIPPINGS. (CL915))
 - 60mm BINDER COURSE (AC20 DENSE BIN 100/150 REC. (CL 906))
 - 110mm BASE COURSE (AC32 HDM BASE 40/60 DES. LAID IN ONE PASS (CL929))
 - 330mm SUB-BASE (GRANULAR TYPE 1 TO CL803)
 - 275mm 6F2 SUBGRADE IMPROVEMENT
- TARMAC - PARKING
 - 30mm SURFACE COURSE (STONE MASTIC ASPHALT SURF 40/60)
 - 70mm BINDER COURSE (AC20 DENSE BIN 100/150 REC. (CL 906))
 - 225mm SUB-BASE (GRANULAR TYPE 1 TO CL803)
- TARMAC - FOOTPATH
 - 20mm SURFACE COURSE WITH 6mm NOMINAL SIZE CLOSE GRADE MACADAM (AC5 DENSE SURF. TO CL. 909)
 - 50mm BINDER COURSE WITH 20mm NOMINAL SIZE DENSE MACADAM (AC20 DENSE BIN. TO CL. 906)
 - 150mm SUB-BASE (TYPE 1 GRANULAR MATERIAL TO CL. 803)
- TACTILE PAVING/CROSSING POINT
 - PAVING TO ARCHITECT'S SPECIFICATION ON SAND BED
 - 50mm TYPE 1 SUBBASE
- PAVING
 - PAVING TO ARCHITECT'S SPECIFICATION ON SAND BED
 - 150mm TYPE 1 SUBBASE
- CONCRETE YARD
 - 175mm THICK PAV2 CONCRETE (BRUSHED FINISH) WITH A252 FABRIC REINFORCEMENT.
 - 1200g SLIP MEMBRANE
 - 150mm TYPE 1 SUBBASE
 - 300mm 6F2 SUBBASE

+79.646* EXISTING LEVEL
+79.646 PROPOSED LEVEL

Health and Safety Notes:

The following key residual health and safety risks have not been eliminated by design and are identified below:

- Refer Design Risk Assessments Ref: 2020011-DRA

Safe methods and systems of work remain the responsibility of the contractor.

This drawing shall be read in conjunction with specification ref: 2020011-SP-001 Site Preparation and Earthworks & 2020011-SP-004 External Concrete Slabs

J	Clouded revisions	MG	MG	MG	02/12/21
H	Issued for Tender	MG	MG	MG	05/11/21
G	Stage 4 Issue	MG	MG	MG	01/10/21
F	Updated to suit Architect's revised layout	MG	MG	MG	07/05/21
E	Clouded revisions	MG	MG	MG	25/08/20
D	Preliminary Issue	MG	MG	MG	12/06/20
C	Updated to suit Architect's revised site layout received 29/04/20.	MG	MG	MG	04/04/20
B	Updated to suit Architect's revised site layout received 08/04/20	MG	MG	MG	08/04/20
A	Drawing updated to suit Architect's latest input	MG	MG	MG	07/04/20
Q	Preliminary Issue	MG	MG	MG	21/02/20
Rev.	Description	By	CHK	App	Date

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Client: **Hellens Land / Fintry Estates**

Project: **Retail Development
Newbottle Street
Houghton le Spring**

Drawing Title: **External Works Layout - Sheet 1**

Scale	As Shown	Sheet Size	A0
Drawn By	MG	Checked By	MG
Approved By	MG	Date	21/02/20
Project No.	2020011	Drawing No.	002-1
Revision	J		

This drawing and design for use shall be in conjunction with the above project. This drawing is the copyright of Portland Consulting Engineers and must not be reproduced, stored or copied without written consent. All dimensions and setting out shall be checked on site before construction. Do not scale from this drawing. This drawing is to be read in conjunction with all other information relevant to the project. Any apparent discrepancy shall be brought to the attention of Portland Consulting Engineers.

ISO 9001 REGISTERED FIRM



LEGEND

4 CONCRETE YARD
 • 175mm THICK PAV2 CONCRETE (BRUSHED FINISH) WITH A252 FABRIC REINFORCEMENT.
 • 1200g SLIP MEMBRANE
 • 150mm TYPE 1 SUBBASE
 • 300mm 6F2 SUBBASE
 CONCRETE YARD
 CONSTRUCTION JOINT (CJ)
 SAWN JOINT (SJ)
 EXPANSION JOINT (EJ)
 (HB2) HALF BATTERED KERB 125 x 255
 (HBQ) HALF BATTERED KERB QUADRANT 305 x 255
 (BN6) BULLNOSE KERB 125 x 150 6mm UPSTAND
 (CS2) SQUARE CHANNEL BLOCK 150 x 125
 (EF) FLAT TOP EDGING 50 x 150
 (DK) DROP KERB 1:12 GRADIENT
 BOL BOLLARD
 NOTE: KERB RADI LESS THAN 12m SHALL BE FORMED USING PRE-FORMED RADIUS KERBS. OTHERWISE STRAIGHTS OF NOT LESS THAN 300mm LONG SHOULD BE USED WITH MITRE CUTS.
 ALL KERBS SHALL BE BUTT JOINTED.
 KERBS SHALL BE LAID TO THE DESIGN LEVEL +/- 6mm.
 FULL LENGTHS OF KERB PIECES SHALL BE USED WHERE POSSIBLE. IF PIECING UP IS REQUIRED UNITS SHALL NOT BE OUT TO LESS THAN HALF THEIR LENGTH.
TOLERANCES
 SUB-BASE TO RECEIVE BASE ROAD-BASE +/- 30mm.
 BASE (ROADBASE) TO RECEIVE BINDER COURSE +/- 15mm.
 BINDER COURSE TO RECEIVE SURFACE COURSE +/- 6mm.
 BINDER COURSE TO RECEIVE SURFACE COURSE ON AREAS OTHER THAN ROADS E.G. CAR PARKS +/- 10mm.
 SURFACE COURSE +/- 6mm.
 THE SUM OF THE DEVIATIONS IN THE LEVELS OF DIFFERENT PAVEMENTS LAYERS SHALL NOT RESULT IN A REDUCTION OF THE REQUIRED DESIGN THICKNESS BY MORE THAN 8.5% OR IN THE OVERALL SURFACE COURSE THICKNESS BY MORE THAN 5mm.

LEGEND

TARMAC - ACCESS ROAD
 • 30mm SURFACE COURSE (STONE MASTIC ASPHALT SURF 40/60)
 • 70mm BINDER COURSE (AC20 DENSE BIN 100/150 REC. (CL 906))
 • 90mm BASE COURSE (AC32 HDM BASE 40/60 DES. LAID IN ONE PASS (CL929))
 • 300mm SUB-BASE (GRANULAR TYPE 1 TO CL803)
 TARMAC - ADAPTABLE
 • 40mm SURFACE COURSE (HRA DESIGNATION R40/14F SURF 40/60 DES. WITH 20mm PRECOATED CHIPPINGS (CL915))
 • 60mm BINDER COURSE (AC20 DENSE BIN 100/150 REC. (CL 906))
 • 110mm BASE COURSE (AC32 HDM BASE 40/60 DES. LAID IN ONE PASS (CL929))
 • 330mm SUB-BASE (GRANULAR TYPE 1 TO CL803)
 • 275mm 6F2 SUBGRADE IMPROVEMENT
 TARMAC - PARKING
 • 30mm SURFACE COURSE (STONE MASTIC ASPHALT SURF 40/60)
 • 70mm BINDER COURSE (AC20 DENSE BIN 100/150 REC. (CL 906))
 • 225mm SUB-BASE (GRANULAR TYPE 1 TO CL803)
 TARMAC - FOOTPATH
 • 20mm SURFACE COURSE WITH 6mm NOMINAL SIZE CLOSE GRADE MACADAM (AC3 DENSE SURF TO CL 909)
 • 50mm BINDER COURSE WITH 20mm NOMINAL SIZE DENSE MACADAM (AC20 DENSE BIN. TO CL 906)
 • 150mm SUB-BASE (TYPE 1 GRANULAR MATERIAL TO CL 803)
 TACTILE PAVING/ CROSSING POINT
 • PAVING TO ARCHITECT'S SPECIFICATION ON SAND BED
 • 50mm TYPE 1 SUBBASE
 PAVING
 • PAVING TO ARCHITECT'S SPECIFICATION ON SAND BED
 • 150mm TYPE 1 SUBBASE
 PAVING
 • PAVING TO ARCHITECT'S SPECIFICATION ON SAND BED
 • 300mm CONCRETE SLAB PAV2 SLAB ON 1200g MEMBRANE
 • 150mm TYPE 1 SUBBASE
 CONCRETE YARD
 • 175mm THICK PAV2 CONCRETE (BRUSHED FINISH) WITH A252 FABRIC REINFORCEMENT.
 • 1200g SLIP MEMBRANE
 • 150mm TYPE 1 SUBBASE
 • 300mm 6F2 SUBBASE
 +79.646' EXISTING LEVEL
 +79.646' PROPOSED LEVEL

Rev.	Description	By	CHK	App	Date
L	Clouded revisions	MG	MG	MG	02/12/21
K	Issued for Tender	MG	MG	MG	05/11/21
J	Stage 4 Issue	BO	MG	MG	01/10/21
H	Updated to suit Architect's revised layout	MG	MG	MG	27/05/21
F	Clouded revisions	BO	MG	MG	21/10/20
E	Clouded revisions	MG	MG	MG	25/08/20
D	Preliminary Issue	BO	MG	MG	15/07/20
C	Updated to suit Architect's revised site layout received 29/04/20	MG	MG	MG	30/04/20
B	Updated to suit Architect's revised site layout received 08/04/20	MG	MG	MG	08/04/20
A	Levels updated and drawing updated to suit Architect's latest layout	MG	MG	MG	07/04/20
G	Preliminary Issue	MG	MG	MG	21/02/20

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Client: **Hellens Land / Fintry Estates**
 Project: **Retail Development
Newbottle Street
Houghton le Spring**
 Drawing Title: **External Works Layout - Sheet 2**
 Scale: As Shown Sheet Size: A0
 Drawn By: MG Checkered By: MG Approved By: MG Date: 21/02/20
 Drawing Status: **Tender**
 Project No: 2020011 Drawing No: 002-2 Revision: L

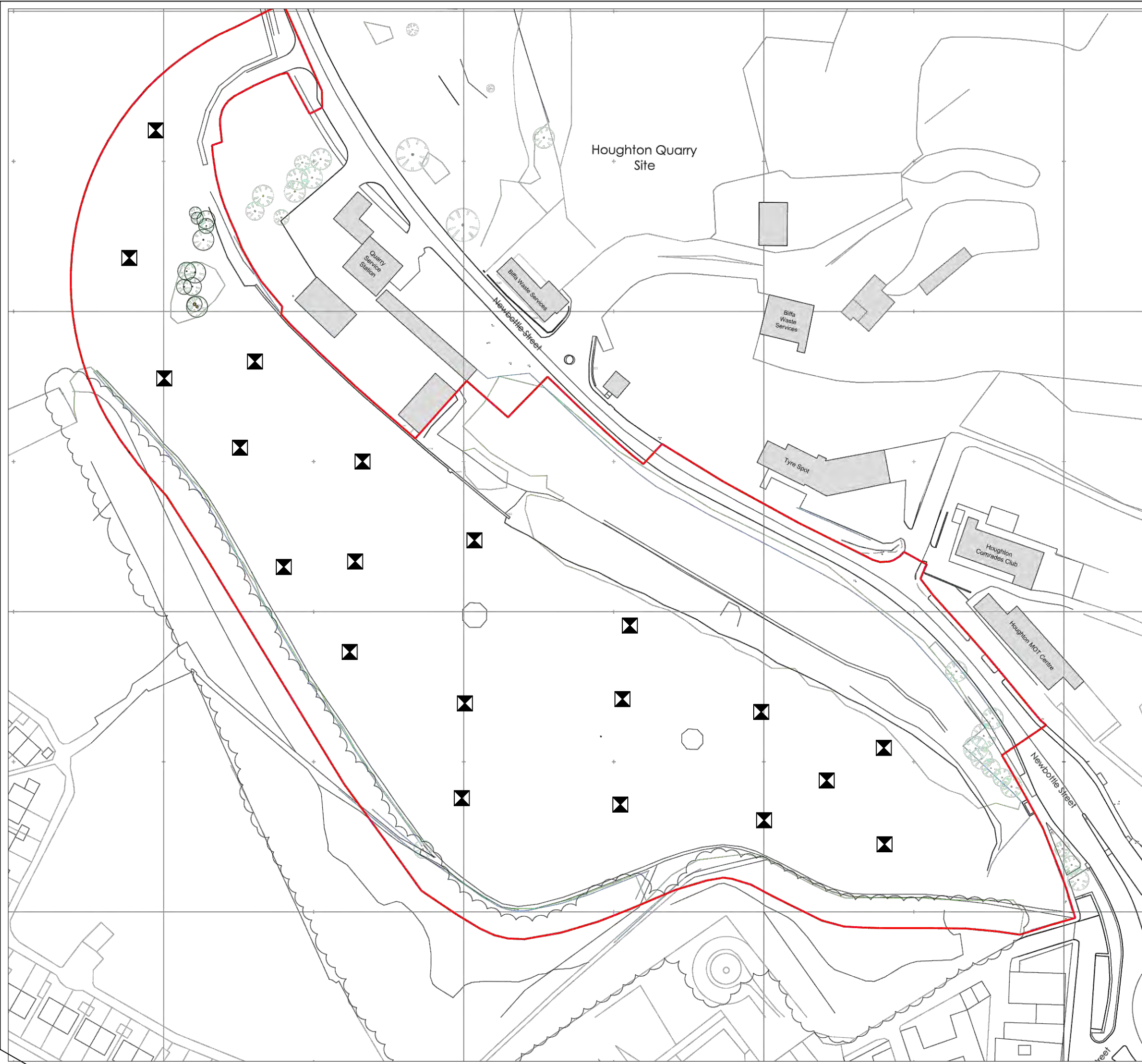
This drawing and design is for use only in connection with the above project. This drawing is the copyright of Portland Consulting Engineers and shall not be used, copied, altered or copied without written consent. All dimensions and setting out shall be checked on site before construction. Do not scale from this drawing. This drawing is to be read in conjunction with all other information relevant to the project. Any apparent discrepancy shall be brought to the attention of Portland Consulting Engineers.

PLAN
 1:250

DO NOT SCALE

GENERAL NOTES

☒ Indicative Sampling Location



Rev	Description	By	Ckd	Date
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SHADBOLT
ENVIRONMENTAL

Drawing Status: **INFORMATION**

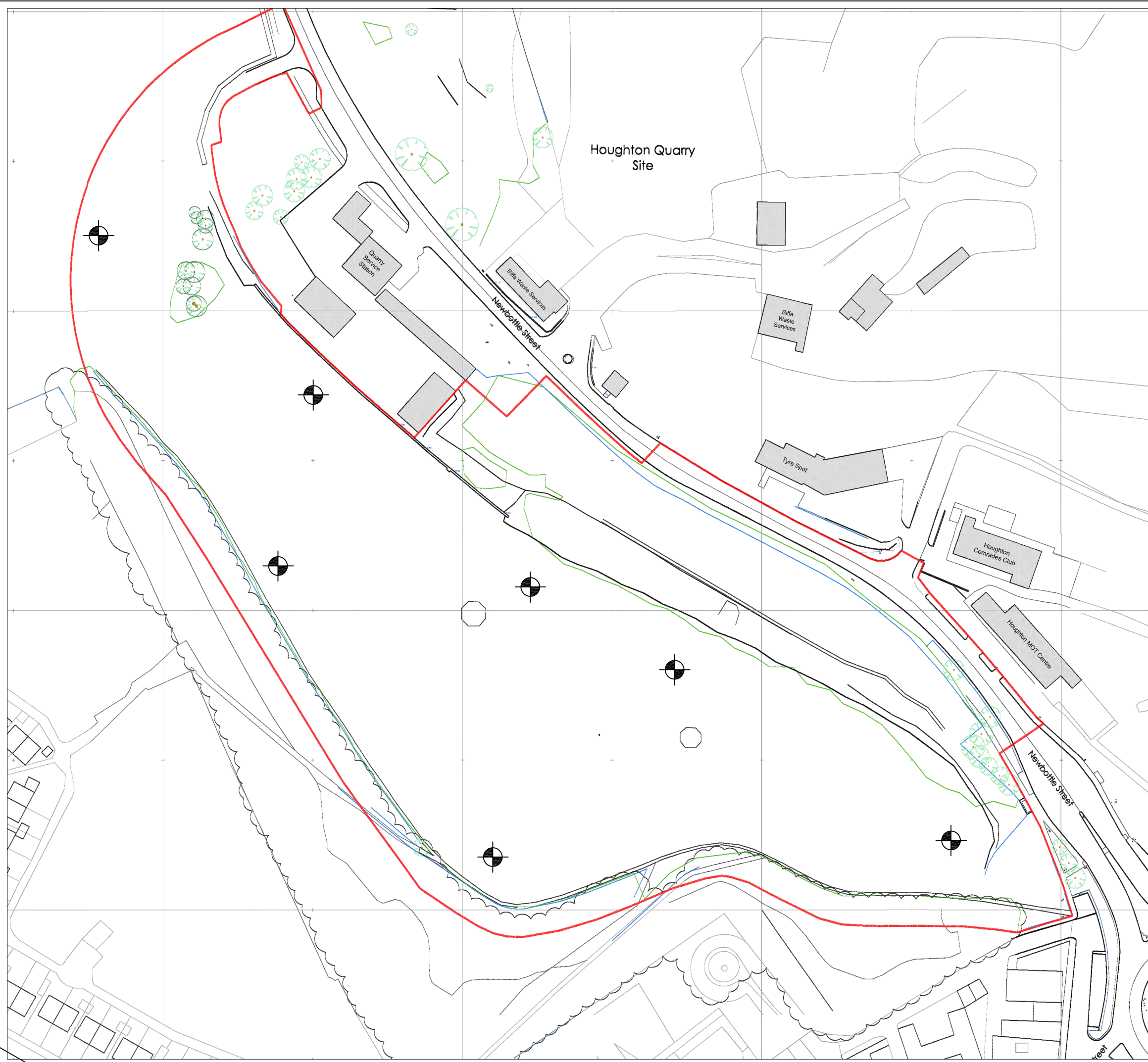
Client: **Hellens Group**

Project: **Former Houghton Colliery
Houghton le Spring**

Drawing Title: **Base of Excavation
Validation Sampling Locations**

Drawing No: **2585 - 301** Rev: **-**

Scale: **1:1250 @ A3** By: **IM** Ckd: **MJT** Date: **Jan '21**



DO NOT SCALE

GENERAL NOTES

 Remediation Monitoring Boreholes

Rev	Description	By	Ckd	Date
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SHADBOLT
ENVIRONMENTAL

Drawing Status: **INFORMATION**

Client: **Hellens Group**

Project: **Former Houghton Colliery
Houghton le Spring**

Drawing Title: **Remediation Monitoring
Borehole Locations**

Drawing No: **2585 - 303** Rev: **-**

Scale: **1:1250 @ A3** By: **TJS** Ckd: **MJT** Date: **Sept 22**

APPENDIX C

REMEDIATION SCREENING VALUES FOR FILL MATERIALS

REMEDIATION SCREENING VALUES FOR FILL MATERIALS - HOUGHTON DEVELOPMENT SITE

Determinand	Units	Commercial	Derivation Tool
pH		<5, >9	Nuetral Conditions
Asbestos	%	No Asbestos Identified	Lab Ttesting
HEAVY METALS/METALLOIDS			
Arsenic	mg/kg	640	CLEA MODE LQM/CIEH 2015
Beryllium	mg/kg	12	CLEA MODE LQM/CIEH 2015
Boron	mg/kg	240000	CLEA MODE LQM/CIEH 2015
Cadmium	mg/kg	190	CLEA MODE LQM/CIEH 2015
Chromium (III)	mg/kg	8600	CLEA MODE LQM/CIEH 2015
Chromium (VI)	mg/kg	33	CLEA MODE LQM/CIEH 2015
Copper	mg/kg	68000	CLEA MODE LQM/CIEH 2015
Lead	mg/kg	2330	pC4SL
Mercury (Elemnetal)	mg/kg	58 ^{vap} (25.8)	CLEA MODE LQM/CIEH 2015
Mercury (Inorganic)	mg/kg	1100	CLEA MODE LQM/CIEH 2015
Mercury (Methyl)	mg/kg	320	CLEA MODE LQM/CIEH 2015
Nickel	mg/kg	980	CLEA MODE LQM/CIEH 2015
Selenium	mg/kg	12000	CLEA MODE LQM/CIEH 2015
Vanadium	mg/kg	9000	CLEA MODE LQM/CIEH 2015
Zinc	mg/kg	730000	CLEA MODE LQM/CIEH 2015
GENERAL INORGANICS			
Free Cyanide	mg/kg	373	ATRISK
US EPA PRIORITY PAHs			
Acenaphthene	mg/kg	97000 (141sol)	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Acenaphthylene	mg/kg	97000 (212sol)	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Anthracene	mg/kg	540000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Benzo(a)Anthracene	mg/kg	170	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Benzo(a)pyrene	mg/kg	35	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Benzo(b)fluoranthene	mg/kg	44	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Benzo(k)fluoranthene	mg/kg	1200	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Benzo(g,h,i)perylene	mg/kg	4000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Chrysene	mg/kg	350	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Di-benzo(a,h)anthracene	mg/kg	3.6	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Indeno(1,2,3-cd)pyrene	mg/kg	510	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Fluoranthene	mg/kg	23000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Fluorene	mg/kg	68000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Naphthalene	mg/kg	460 (183)sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Phenanthrene	mg/kg	22000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Pyrene	mg/kg	54000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Coal Tar (Bap as surrogate marker)	mg/kg	15	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH (Environment Agency 16 Fractions)			
TPH Aliphatic >C5-6	mg/kg	5900 (558) sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aliphatic >C6-8	mg/kg	17000 (332) sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aliphatic >C8-10	mg/kg	4800 (190) vap	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aliphatic >C10-12	mg/kg	23000 (118) vap	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aliphatic >C12-16	mg/kg	82000 (59) sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aliphatic >C16-35	mg/kg	1700000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aliphatic > C35-44	mg/kg	1700000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC5-7	mg/kg	46000 (2260) sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC7-8	mg/kg	110000 (1920) sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC8-10	mg/kg	8100 (1500) vap	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC10-12	mg/kg	28000 (899) sol	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC12-16	mg/kg	37000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC16-21	mg/kg	28000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC21-35	mg/kg	28000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
TPH Aromatic >EC35-44	mg/kg	28000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
Alphatic - Aromatic EC44-70	mg/kg	28000	CLEA MODEL LQM/CIEH 2015 - 2.5% SOM
BTEX			
Benzene	mg/kg	47.00	LQM/CIEH 2015 - 2.5% SOM
Toluene	mg/kg	110000 vap (1920)	LQM/CIEH 2015 - 2.5% SOM
Ethylbenzene	mg/kg	13000 vap (1220)	LQM/CIEH 2015 - 2.5% SOM
Xylenes (ortho)	mg/kg	15000 sol (1120)	LQM/CIEH 2015 - 2.5% SOM
Xylenes (meta)	mg/kg	14000 vap (1470)	LQM/CIEH 2015 - 2.5% SOM
Xylenes (para)	mg/kg	14000 sol (1350)	LQM/CIEH 2015 - 2.5% SOM
Misc'			
PCBs	MG/KG	0.184	ATRISK
MTBE	mk/kg	3140	ATRISK

Leachate / Groundwater Criteria

Inorganics ug/l						
Analyte	Guideline Value	Guidance Source		Analyte	Guideline Value	Guidance Source
Arsenic	10	UKDWS		Mercury	1	UKDWS
Boron	1,000	UKDWS		Nickel	20	UKDWS
Cadmium	5	UKDWS		Sulphate	250,000	UKDWS
Chromium	50	UKDWS		Selenium	10	UKDWS
Copper	2000	UKDWS		Zinc	3000	SWR
Cyanide	50	UKDWS		pH	6.5-9.5	UKDWS
Lead	10	UKDWS				

EQS (f) – Environmental Quality Standard for Freshwater, EA

UKDWS – UK Drinking Water Standard Guidelines taken from the “The Water Supply (Water Quality) Regulations 2016”

SWR - The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 2001

Table 1 – Inorganic Analytes

Leachate / Groundwater Criteria

Organics ug/l					
Analyte	Guideline Value	Guidance Source	Analyte	Guideline Value	Guidance Source
Benzo(a)pyrene	0.01	UKDWS	Fluoranthene	0.0063	EQS (f)
Naphthalene	2	EQS (f)	Benzene	1	UKDWS
Acenaphthylene	5.8	WRc plc (2002), R&D Technical Report	Toluene	74	EQS (f)
Sum of 4 PAH	0.1	UKDWS	Ethyl benzene	300	WHO
Benzo(b)fluoranthene					
Benzo(k)fluoranthene					
Benzo(g,h,i)perylene					
Indeno(1,2,3-cd)pyrene					
TPH (Hydrocarbons)	10	UKDWS	Xylene	30	EQS (f)
C5-C6 (Ali)	1.5x10 ⁴	WHO	C5-C6 (Aro)	1	WHO
C6-C8 (Ali)	1.5x10 ⁴	WHO	C6-C8 (Aro)	700	WHO
C8-C10 (Ali)	3x10 ²	WHO	C8-C10 (Aro)	300 (ethylbenzne) 500 (xylene)	WHO
C10-C12 (Ali)	3x10 ²	WHO	C10-C12 (Aro)	90	WHO
C12 – C16 (Ali)	3x10 ²	WHO	C12 – C16 (Aro)	90	WHO
C16-C21 (Ali)	-	WHO	C16-C21 (Aro)	90	WHO
C21-C35 (Ali)	-	WHO	C21-C35 (Aro)	90	WHO

EQS (f) – Environmental Quality Standard for Freshwater, EA

UKDWS – UK Drinking Water Standard Guidelines taken from the “The Water Supply (Water Quality) Regulations 2016”

SWR - The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 2001

WHO – World Health Organization Guidelines

Table 2 Organic Analytes

APPENDIX D
SHW EXTRACTS
SITE SPECIFIC REQUIREMENTS

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:				
						Lower	Upper			
G E N E R A L	Well graded granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties (i), (ii) and (iv) in next column, shall not apply to chalk). Recycled aggregate	(i) grading	BS 1377 : part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	1	A
				(ii) uniformity coefficient	See Note 5	10	-			
				(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1			
				(iv) MCV	Clause 632	App 6/1	App 6/1			
				(v) IDD of chalk	Clause 634	-	App 6/1			
G R A N U L A R	Uniformly graded granular material	General Fill	Any material, or combination of materials, other than chalk. Recycled aggregate	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	1	B
				(ii) uniformity coefficient	See Note 5	-	10			
				(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1			
				(iv) MCV	Clause 632	App 6/1	App 6/1			
F I L L	Coarse granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties (i) and (ii) in next column, shall not apply to chalk). Recycled aggregate	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 5	1	C
				(ii) uniformity coefficient	See Note 5	5	-			
				(iii) Los Angeles coefficient	Clause 635	-	50			

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
2 A G E N E R A L C O	Wet cohesive material	General Fill	Any material, or combination of materials, other than chalk.	(i) grading	BS 1377 : part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 1 except for materials with liquid limit greater than 50, determined by BS1377 : Part 2, only deadweight tamping or vibratory tamping rollers or grid rollers shall be used.	2 A -
				(ii) plastic limit (PL)	BS 1377 : part 2	-	-		
				(iii) mc	BS 1377 : Part 2	PL-4%	App 6/1		
				(iv) MCV	Clause 632	App 6/1	App 6/1		
				(v) Undrained shear strength of remoulded material	Clause 633	App 6/1	App 6/1		
2 B H E S I V E F I L L	Dry cohesive material	General Fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2 B -
				(ii) plastic limit (PL)	BS 1377 : Part 2	-	-		
				(iii) mc	BS 1377 : Part 2	App 6/1	PL-4%		
				(iv) MCV	Clause 632	App 6/1	App 6/1		
				(v) undrained shear strength of remoulded material	Clause 633	App 6/1	App 6/1		

TABLE 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
2	Stony cohesive material	General Fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 : part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	2
				(ii) plastic limit (PL)	BS 1377 : part 2	-	-		
				(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(iv) MCV	Clause 632	App 6/1	-		
				(v) Undrained shear strength of remoulded material	Clause 633	App 6/1	-		
2	Silty cohesive material	General Fill	Any material, or combination of materials, other than chalk	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	2
				(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(iii) MCV	Clause 632	App 6/1	App 6/1		
				(iv) undrained shear strength of remoulded material	Clause 633	App 6/1	App 6/1		
2	Reclaimed pulverised fuel ash cohesive material	General Fill	Reclaimed material from lagoon or stockpile containing not more than 20% furnace bottom ash	(i) mc	BS 1377 : Part 2	To enable compaction to Clause 6/12		End product 95% of maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method)	2
				(ii) bulk density	BS 1377 : Part 9	App 6/1	App 6/1		

G E N E R A L C O H E S I V E F I L L

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
G F E I N L L C H A L K	Chalk	General Fill	Chalk and associated materials all designated as Class 3 in the Contract	(i) mc	BS 1377 : Part 2	-	App 6/1	3	- -
				(ii) IDD	Clause 634	App 6/1	App 6/1		
L F A I N L D L S C A P E	Various	Fill to landscape areas	See App 6/1	(i) grading	BS 1377 : Part 2	App 6/1	App 6/1	4	- -
				(ii) mc	BS 1377 : Part 2	-	App 6/1		
				(iii) MCV	Clause 632	App 6/1	App 6/1		
T O P S O I L	Topsoil, or turf, existing on site	Topsoiling	Topsoil or turf designated as Class 5A in the Contract	(i) grading	Clause 618	-	Clause 618	5	A -
				-	-	-	-		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower			Upper
6 S E L E C T E D	Selected well graded granular material	Below water	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil or any combination thereof. (Properties (i) and (ii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	No compaction	6 A
				(ii) uniformity	See Note 5	10	-		
				(iii) SMC of chalk index	Clause 634	-	20%		
				(iv) plasticity index	BS 1377 : Part 2	Non-plastic			
6 G R A N U L A R	Selected coarse granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. (Properties (ii) and (iii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 5	6 B
				(ii) plasticity index	BS 1377 : Part 2	Non-plastic			
				(iii) Los Angeles coefficient	Clause 635	-	50		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower			Upper
S E L E C T E D G R A N U L A R F I L L	Selected uniformly graded granular material	Starter layer	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. (Property (iii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2 Method 3	6	
				(ii) uniformity coefficient	See Note 5	-	10		
				(iii) plasticity index	BS 1377 : Part 2	Non-plastic			
				(iv) Los Angeles coefficient	Clause 635	-	50		
				(v) mc	BS 1377 : Part 2	App 6/1	App 6/1		
6	Selected uniformly graded granular material	Starter layer below pulverised fuel ash	Natural gravel, natural sand, crushed gravel, crushed rock other than argillaceous rock, crushed concrete, chalk, well burnt colliery spoil, slag or any combination thereof. Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2 Method 4	6	
				(ii) uniformity coefficient	See Note 5	-	10		
				(iii) plasticity index	BS 1377 : Part 2	Non-plastic			
				(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(v) MCV	Clause 632	App 6/1	App 6/1		

TABLE 6/1: (11/08) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		Compaction Requirements in Clause 612	Class
						Lower	Upper		
S E L E C T E D G R A N U L A R F I L L	Selected granular material (Class 9A)	For stabilisation with cement to form capping	Any material, or combination of materials, other than unburnt colliery spoil and argillaceous rock. (Properties (i), (ii) and (iii) in next column, shall not apply to chalk.) Recycled aggregate	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Not applicable	6 E -
				(ii) mc	BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5		
				(iii) liquid limit	BS 1377 : Part 2	-	App 6/1		
				(iv) plasticity index	BS 1377 : Part 2	-	45		
				(v) organic matter	BS 1377 : Part 2	-	20		
				(vi) water soluble (WS) sulfate content	BS 1377 : Part 3	-	App 6/1		
				(vii) oxidisable sulfides (OS) content	TRL Report 477, Test No. 1	-	3000 mg/l as SO ₄		
				(viii) SMC of chalk	TRL Report 477, Tests No. 2 and 4	-	0.6% as SO ₄		
					Clause 634		20%		

TABLE 6/1: (11/09) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Acceptable Limits Within:		Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Lower	Upper			
S E L E C T E D G R A N U L A R F I L L	Selected granular material (fine grading)	Capping	Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-			
				(iii) mc	BS 1377 : Part 2	Optimum mc - 2%	Optimum mc			
				(iv) Los Angeles coefficient	Clause 635	-	60			
				(v) Class Ra (asphalt) content	Clause 710	-	50%			
				(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%			
U L A R F I L L	Selected granular material (coarse grading)	Capping	Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt and tar-bitumen binders, unburnt colliery spoil and argillaceous rock. Property (i) in the next column shall not apply to chalk. Property (vi) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 6	6	F
				(ii) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-			
				(iii) mc	BS 1377 : Part 2	Optimum mc - 2%	Optimum mc			
				(iv) Los Angeles coefficient	Clause 635	-	50			
				(v) Class Ra (asphalt) content	Clause 710	-	50%			
				(vi) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%			

TABLE 6/1: (11/09) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		Compaction Requirements in Clause 612	Class
						Lower	Upper		
S E L E C T E D G R A N U L A R	Selected granular material	Capping	Any material, or combination of materials with not less than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil and argillaceous rock	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 6 Maximum Compacted layer thickness shall be 200 mm	6
				(ii) optimum mc	Clause 613	-	-		
				(iii) mc	Clause 613	Optimum mc - 2%	Optimum mc		
				(iv) Class Ra (asphalt) content	Clause 710	50%	-		
				(v) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	10%		
F I L L	Selected granular material (fine grading) - imported on to the Site	Capping	Unbound mixture complying with BS EN 13285. Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (x) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) Size designation and overall grading category	BS EN 13285 - 0/31.5 and G_E	Tab 6/5	Tab 6/5	Tab 6/4 Method 6	6
				(ii) Maximum fines and oversize categories	BS EN 13285 - UF_{15} and OC_{75}	Tab 6/5	Tab 6/5		
				(iii) Los Angeles coefficient	BS EN 13242 - LA_{60}	-	60		
				(iv) Volume stability of blast furnace slag	BS EN 13242 - free from dicalcium silicate and iron disintegration	-	-		

TABLE 6/1: (11/09) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6(1))	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower			Upper
S E L E C T E D G R A N U L A R F I L L	4 (contd)			(v) Volume stability of steel (BOF) and EAF) slag	BS EN 13242 - V_5	-	-		
				(vi) Other aggregate requirements	BS EN 13242 - Category _{NR} (no requirement)	-	-		
				(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 - declared values	-	-		
				(viii) Water content	BS EN 1097-5	Optimum _{WC - 2%}	Optimum _{WC}		
				(ix) Clas Ra (asphalt) content	Clause 710	-	50%		
				(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%		

TABLE 6/1: (11/09) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		Compaction Requirements in Clause 612	Class
						Lower	Upper		
S E L E C T E D G R A N U L A R F I L L	Selected granular material (coarse grading) - imported on to the Site	Capping	Unbound mixture complying with BS EN 13285. Any material, or combination of materials - including recycled aggregates with not more than 50% by mass of recycled bituminous planings and granulated asphalt, but excluding materials that contain tar and tar-bitumen binders, unburnt colliery spoil, argillaceous rock and chalk. Property (x) in the next column shall not apply if the Class Ra (asphalt) content of any recycled aggregate is 20% or less.	(i) Size designation and overall grading category	BS EN 13285 - 0/80 and G_E	Tab 6/5	Tab 6/5	Tab 6/4 Method 6	5
				(ii) Maximum fines and oversize categories	BS EN 13285 - UF_{12} and OC_{75}	Tab 6/5	Tab 6/5		6
				(iii) Los Angeles coefficient	BS EN 13242 - LA_{50}	-	50		
				(iv) Volume stability of blast furnace slag	BS EN 13242 - free from dicalcium silicate and iron disintegration	-	-		
				(v) Volume stability of steel (BOF) and EAF slag	BS EN 13242 - V_5	-	-		
				(vi) Other aggregate requirements	BS EN 13242 - Category _{NR} (no requirement)	-	-		
				(vii) Laboratory dry density and optimum water content	BS EN 13285, clause 5.3 - declared values	-	-		
				(viii) Water content	BS EN 1097-5	Optimum _{wc} - 2%	Optimum _{wc}		
				(ix) Clas Ra (asphalt) content	Clause 710	-	50%		
				(x) bitumen content	BS EN 12697-1 or BS EN 12697-39	-	2.0%		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
6	Selected granular material	Gabion filling	Natural gravel, crushed rock, crushed concrete or any combination thereof. None of these constituents shall include any argillaceous rock..	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	None	6
				(ii) Los Angeles coefficient	Clause 635	-	50		
6	Selected granular material	Drainage layer to reinforced soil and anchored earth structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, chalk, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. (Properties (vi), (vii), (viii), (ix), (x), (xi) and (xii) in next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) (Properties (ii) and (v) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/4 Method 3	6
				(ii) plasticity index	BS 1377 : Part 2	Non-plastic			
S E L E C T E D G R A N U L A R F I L L				(iii) Los Angeles coefficient	Clause 635	-	50		
				(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(v) MCV	Clause 632	App 6/1	App 6/1		
				(vi) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3		
				(vii) chloride ion content	BS EN 1744-1	-	Tab 6/3		
				(viii) water soluble (WS) sulfate content	TRL Report 447, Tests No. 1	-	Tab 6/3		
				(ix) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3		
				(x) restivity	Clause 637	Tab 6/3	-		
				(xi) redox potential	Clause 638	Tab 6/3	-		
				(xii) organic content	BS 1377 : Part 3	-	Tab 6/3		
				(xiii) microbial activity index	Table 6/3	-	Tab 6/3		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within: Lower Upper			
6	Selected well graded granular material	Fill to reinforced soil and anchored earth structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof except that chalk shall not be combined with any other constituent. None of these constituents shall include any argillaceous rock. (Properties (i), (ii) and (v) in next column shall not apply to chalk.) (Properties (viii), (ix), (x), (xi), (xii), (xiii) and (xiv) only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	I	
				(ii) uniformity coefficient	See Note 5	10	-		-
				(iii) SMC of chalk	Clause 634	-	20%		-
				(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1		-
				(v) MCV	Clause 632	App 6/1	App 6/1		-
				(vi) effective angle of friction (ϕ') and effective cohesion (c')	Clause 636	App 6/1	App 6/1		-
				(vii) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1	App 6/1		-
				(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3		-
				(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3		-
				(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3		-
				(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3		-
				(xii) resistivity	Clause 637	Tab 6/3	Tab 6/3		-
				(xiii) redox potential	Clause 638	Tab 6/3	Tab 6/3		-
				(xiv) organic content	BS 1377 : Part 3	-	Tab 6/3		-
				(xv) microbial activity index	Table 6/3	-	Tab 6/3		-

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower			Upper
S E L E C T E D G R A N U L A R F I L L	Selected uniformly graded granular material	Fill to reinforced soil and anchored earth	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof, except that chalk shall not be combined with any other constituent. None of these constituents shall include any argillaceous rock. (Properties (viii), (ix), (x), (xi), (xii), (xiii) and (xiv) in next column only apply when metallic reinforcing or anchor elements, facing units or fastenings are used.) (Properties (i), (ii) and (v) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	6	J
				(ii) uniformity coefficient	See Note 5	5	10		
				(iii) SMC of chalk	Clause 634	-	20%		
				(iv) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(v) MCV	Clause 632	App 6/1	App 6/1		
				(vi) effective angle of friction (ϕ') and effective cohesion (c')	Clause 636	App 6/1	-		
				(vii) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1	-		
				(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3		
				(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3		
				(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3		
				(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos 2 and 4	-	Tab 6/3		
				(xii) resistivity	Clause 637	Tab 6/3	-		
				(xiii) redox potential	Clause 638	Tab 6/3	-		
				(xiv) organic content	BS 1377 : Part 3	-	Tab 6/3		
				(xv) microbial activity index	Table 6/3	-	Tab 6/3		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
6 K S E L E C T E D G R A N U L A R F I L L	Selected granular material	Lower bedding for corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 90% of maximum dry density of BS 1377 : Part 4 (Vibrating hammer method)	6 K
				(ii) uniformity coefficient	See Note 5	5	-		
				(iii) plasticity index	BS 1377 : Part 2	-	6		
				(iv) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-		
				(v) mc	BS 1377 : Part 2	Optimum mc -2%	Optimum mc +1%		
				(vi) MCV	Clause 632	App 6/1	App 6/1		
				(vii) Los Angeles coefficient	Clause 635	-	40		
				(viii) resistivity	Clause 637	2000 ohm cm	-		
				(ix) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO ₄		
				(x) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos 2 and 4	-	0.06% as SO ₄		
				(xi) chloride ion content	BS EN 1744-1	-	0.025%		
				(xii) pH value	BS 1377 : Part 3	6	9		
				(xiii) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/01 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/01 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S F E I L L E L C T E D G R A N U L A R	Selected uniformly graded granular material	Upper bedding for corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	None	6 L -
				(ii) resistivity	Clause 6/37	2000 ohm cm	-		
				(iii) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO ₄		
				(iv) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.06% as SO ₄		
				(v) chloride ion content	BS EN 1744-1	-	0.025%		
				(vi) pH value	BS 1377 : Part 3	6	9		
				(vii) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Compaction Requirements in Clause 612	Class	
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower			Upper
S E L E C T E D G R A N U L A R F I L L	Selected granular material	Surround to corrugated steel buried structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 90% of maximum dry density of BS 1377 : Part 4 (Vibrating hammer method) unless otherwise stated in App 6/1	6 M -
				(ii) uniformity coefficient	See Note 5	5	-		
				(iii) plasticity index	BS 1377 : Part 2	-	6		
				(iv) optimum mc	BS 1377 : Part 4 (vibrating hammer method)	-	-		
				(v) mc	BS 1377 : Part 2	Optimum mc -2%	Optimum mc +1%		
				(vi) MCV	Clause 632	App 6/1	App 6/1		
				(vii) Los Angeles coefficient	Clause 635	-	40		
				(viii) resistivity	Clause 637	2000 ohm cm	-		
				(ix) water soluble (WS) sulfate content	TRL Report 447 Test No. 1	-	300 mg/l as SO ₄		
				(x) oxidisable sulfides (OS) content	TRL Report 447 Tests Nos. 2 and 4	-	0.06% as SO ₄		
				(xi) chloride ion content	BS EN 1744-1	-	0.025%		
				(xii) pH value	BS 1377 : Part 3	6	9		
				(xiii) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper		

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S F E I L L E L C T E E D G R A N U L A R	Selected well graded granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377 : Part 4 (vibrating hammer method)	6
				(ii) uniformity coefficient	See Note 5	10	-		
				(iii) Los Angeles coefficient	Clause 635	-	40		
				(iv) undrained shear parameters (c and ϕ)	Clause 633	App 6/1	-		
				(v) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	App 6/1	-		
				(vi) permeability	Clause 640	App 6/1	-		
				(vii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(viii) MCV	Clause 632	App 6/1	App 6/1		
				(ix) slope stability test (where required in App 6/6)	Clause 610	App 6/6			
								N	
								-	

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)	Compaction Requirements in Clause 612	Class
						Lower	Upper			
S E L E C T E D G R A N U L A R F I L L	Selected granular material	Fill to structures	Natural gravel, natural sand, crushed gravel, crushed rock, crushed concrete, slag, chalk, well burnt colliery spoil or any combination thereof. None of these constituents shall include any argillaceous rock. (Properties (i), (ii) and (ix) in next column shall not apply to chalk.) Recycled aggregate except recycled asphalt	(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2	Tab 6/2	End product 95% of maximum dry density of BS 1377 : Part 4 (vibrating hammer method)	6
				(ii) uniformity coefficient	See Note 5	5	-	-		
				(iii) IDD of chalk	Clause 634	-	App 6/1	-		
				(iv) Los Angeles coefficient	Clause 635	-	60	-		
				(v) undrained shear parameters (c and ϕ)	Clause 633	App 6/1	-	-		
				(vi) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	App 6/1	-	-		
				(vii) permeability	Clause 640	App 6/1	-	-		
				(viii) mc	BS 1377 : Part 2	App 6/1	App 6/1	App 6/1		
				(ix) MCV	Clause 632	App 6/1	App 6/1	App 6/1		
				(x) slope stability test (where required in App 6/6)	Clause 610	App 6/6	App 6/6	App 6/6		

TABLE 6/1: (11/08) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)			Acceptable Limits Within:		Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Lower	Upper			
S E L E C T E D	Well graded uniformly graded or coarse granular material	Overlying fill for corrugated steel buried structures	As Class 1A, 1B or 1C granular fill materials, but not to include argillaceous rock, slag or PFA in any proportions. Recycled aggregate except recycled asphalt	As for Class 1A, 1B or 1C with the addition of the following:					6	O
				(i) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO ₄			
				(ii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.06% as SO ₄			
				(iii) chloride ion content	BS EN 1744-1	-	0.025%			
				(iv) pH value	BS 1377 : Part 3	6	9			
G R A N U L A R	Selected granular material	For stabilisation with lime and cement to form capping (Class 9F)	Any material, or combination of materials, other than unburnt colliery spoil and argillaceous rock. (Properties (i), (ii) and (iii) in text column, shall not apply to chalk.)	(v) sulfide and hydrogen sulfide	Standard textbook of qualitative inorganic analysis	-	Rapid blackening of lead acetate paper			
				(i) grading	BS 1377 : Part 2 (On-site)	Tab 6/2	Tab 6/2			
				(ii) mc	BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5			
				(iii) liquid limit	BS 1377 : Part 2	App 6/1	-			
				(iv) plasticity index	BS 1377 : Part 2	-	45			
F I L L				(v) organic matter	BS 1377 : Part 3	-	App 6/1			
				(vi) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	3000 mg/l as SO ₄			
				(vii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.6% as SO ₄			
				(viii) IDD of chalk	Clause 634	-	App 6/1			

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
6	Selected well graded granular material	Filter layer below subbase	Crushed rock or sand	(i) grading	BS 1377 : Part 2 (On-site)	Lower Tab 6/2	Upper Tab 6/2	-	S
					BS EN 933-2 (Off-site)	Tab 6/5	Tab 6/5		
				(ii) plasticity index	BS 1377 : Part 2	-	Non-plastic	6	
S E L E C T E D G R A N U L A R F I L L									

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S F E I L L E L C T E D C O H E S I V E	Selected cohesive material	Fill to structures	Any material or combination of materials, other than argillaceous rock and materials designated as Class 3 in the Contract. If chalk is used it shall form 100% of constituents. (Properties (i) and (iii) shall not apply to chalk.) (Properties (vii) and (viii) may be increased to 54% and 31% respectively for Lias Clay only and subject to the requirements of Appendix 6/6)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	End product: 100% of maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method) or a dry density corresponding to 5% air voids at field mc whichever is lower	7 A -
				(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(iii) MCV	Clause 632	App 6/1	App 6/1		
				(iv) undrained shear parameters (c and φ)	Clause 633	App 6/1	App 6/1		
				(v) effective angle of internal friction (φ') and effective cohesion (c')	Clause 636	App 6/1	App 6/1		
				(vi) IDD of chalk	Clause 634	App 6/1	App 6/1		
				(vii) liquid limit	BS 1377 : Part 2	-	45		
				(viii) plasticity index	BS 1377 : Part 2	-	25		

TABLE 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/31)			Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
				Lower	Upper			
S F E I L L E L C T E D C O H E S I V E	Selected conditioned pulverised fuel ash cohesive material	Fill to structures and to reinforced soil	Conditioned material direct from power station dust collection system and to which a controlled quantity of water has been added	(i) mc	BS 1377 : Part 2	To enable compaction to Clause 6/12	End product: 95% of maximum dry density of BS 1377 : Part 4 (2.5 kg rammer method)	7
				(ii) bulk density	BS 1377 : Part 9	App 6/1		App 6/1
				(iii) undrained shear parameters (c and ϕ)	Clause 633	App 6/1		-
				(iv) effective angle of internal friction (ϕ') and effective cohesion (c')	Clause 636	App 6/1		-
				(v) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1		-
				(vi) permeability	Clause 640	App 6/1		-
				(vii) slope stability test (where required in App 6/6)	Clause 610	App 6/6		-
							B	

TABLE 6/1: (05/04) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/01 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/01 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S E L E C T E D C O H E S I V E F I L L	Selected wet cohesive material	Fill to reinforced soil	Any material, or combination of materials, other than unburnt colliery spoil, argillaceous rock and chalk. (Properties (viii), (ix), (x), (xi) and (xii) in next column only apply when metallic reinforcing elements, facing units or fastenings are used)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 1	7 C -
				(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(iii) MCV	Clause 632	App 6/1	App 6/1		
				(iv) effective angle of internal friction (ϕ) and effective cohesion (c')	Clause 636	App 6/1	-		
				(v) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1	-		
				(vi) liquid limit	BS 1377 : Part 2	-	45		
				(vii) plasticity index	BS 1377 : Part 2	-	25		
				(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3		
				(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3		
				(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3		
				(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3		
				(xii) resistivity	Clause 637	Tab 6/3	-		
				(xiii) redox potential	Clause 638	Tab 6/3	-		

TABLE 6/1: (05/04) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/31)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S E L E C T E D C O H E S I V E F I L L	Selected stony cohesive material	Fill to reinforced soil	Any material, or combination of materials, other than unburnt colliery spoil, argillaceous rock and chalk. (Properties (vi), (vii), (viii), (ix), (x), (xi) and (xii) in next column only apply when metallic reinforcing elements, facing units or fastenings are used)	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Tab 6/4 Method 2	7 D
				(ii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(iii) MCV	Clause 632	App 6/1	App 6/1		
				(iv) effective angle of internal friction (ϕ) and effective cohesion (c')	Clause 636	App 6/1	-		
				(v) coefficient of friction and adhesion (fill/elements)	Clause 639	App 6/1	-		
				(vi) liquid limit	BS 1377 : Part 2	-	45		
				(vii) plasticity index	BS 1377 : Part 2	-	25		
				(viii) pH value	BS 1377 : Part 3	Tab 6/3	Tab 6/3		
				(ix) chloride ion content	BS EN 1744-1	-	Tab 6/3		
				(x) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	Tab 6/3		
				(xi) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	Tab 6/3		
				(xii) resistivity	Clause 637	Tab 6/3	-		
				(xiii) redox potential	Clause 638	Tab 6/3	-		

TABLE 6/1: (11/03) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S E L E C T E D C O H E S I V E	Selected cohesive material	For stabilisation with lime to form capping (Class 9D)	Any material, or combination of materials, other than unburnt colliery spoil	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Not applicable	7
				(ii) mc	BS 1377 : Part 2	-	App 6/1		
				(iii) MCV	Clause 632	App 6/1	-		
				(iv) plasticity index	BS 1377 : Part 2	10	-		
				(v) organic matter	BS 1377 : Part 3	-	App 6/1		
				(vi) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	App 6/1		
				(vii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	App 6/1		
				(viii) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	App 6/1		
F I L L	Selected silty cohesive material	For stabilisation with cement to form capping (Class 9F)	Any material, or combination of materials, other than chalk, unburnt colliery spoil and argillaceous rock	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Not applicable	7
				(ii) uniformity coefficient	See Note 5	5	-		
				(iii) mc	BS 1377 : Part 2	App 6/1	App 6/1		
				(iv) MCV	Clause 632	App 6/1	App 6/1		
				(v) liquid limit	BS 1377 : Part 2	-	45		
				(vi) plasticity index	BS 1377 : Part 2	-	20		
				(vii) organic matter	BS 1377 : Part 3	-	App 6/1		
				(viii) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	App 6/1		
(ix) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	App 6/1						
(x) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	App 6/1						

TABLE 6/1: (11/05) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class	
				Property (See exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:				
						Lower	Upper			
S E L E C T E D C O H E S I V E F I L L	Selected conditioned pulverised fuel ash cohesive material	For stabilisation with cement to form capping (Class 9C)	Conditioned material direct from power station dust collection system and to which a controlled quantity of water has been added	(i) mc	BS 1377 : Part 2	App 6/1	App 6/1	Not applicable	7	G
				(ii) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	3000 mg/l as SO ₄			
				(iii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.6% as SO ₄			
				(iv) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	1.2% as SO ₄			
7	Wet, dry, stony or silty cohesive material and chalk	Overlying fill for corrugated steel buried structures	As Class 2A, 2B, 2C, 2D general cohesive fill material or Class 3 chalk fill material, except that argillaceous rock, slag, PFA or any combination thereof shall not be used	As for Class 2A, 2B, 2C, 2D or 3 with the addition of the following	(i) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	300 mg/l as SO ₄	7	H
					(ii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	0.06% as SO ₄		
					(iii) chloride ion content	BS EN 1744-1	-	0.025%		
					(iv) pH value	BS 1377 : Part 3	6	9		

TABLE 6/1: (11/03) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S E L E C T E D C O H E S I V E F I L L	Selected cohesive material	For stabilisation with lime and cement to form capping (Class 9E)	Any material, or combination of materials, other than unburnt colliery spoil	(i) grading	BS 1377 : Part 2	Tab 6/2	Tab 6/2	Not applicable	7 I
				(ii) mc	BS 1377 : Part 2	-	App 6/1		
				(iii) MCV	Clause 632	App 6/1	-		
				(iv) plasticity index	BS 1377 : Part 2	10	-		
				(v) organic matter	BS 1377 : Part 3	-	App 6/1		
				(vi) water soluble (WS) sulfate content	TRL Report 447, Test No. 1	-	App 6/1		
				(vii) oxidisable sulfides (OS) content	TRL Report 447, Tests Nos. 2 and 4	-	App 6/1		
				(viii) total potential sulfate (TPS) content	TRL Report 447, Test No. 4	-	App 6/1		

TABLE 6/1: Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 601 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 601 and Testing in Clause 631)				Compaction Requirements in Clause 612	Class
				Property (See exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
8	Class 1, Class 2 or Class 3 material	Lower trench fill	Any, except there shall not be any stones or lumps of clay >40 mm nominal diameter. Recycled aggregate	(i) mc	BS 1377 : Part 2	App 6/1	App 6/1	Tab 6/4	8
				(ii) MCV	Clause 632	App 6/1	App 6/1		
9	Cement stabilised well graded granular material	Capping	Class 6E with addition of cement according to Clause 614	(i) pulverisation	BS 1924 : Part 2	60%	-	Tab 6/4 Method 6	9
				(ii) bearing ratio	BS 1924 : Part 2	App 6/1	-		
				(iii) mc	BS 1924 : Part 2	App 6/1	App 6/1		
9	Cement stabilised silty cohesive material	Capping	Class 7F with addition of cement according to Clause 614	(i) pulverisation	BS 1924 : Part 2	App 6/1	-	Tab 6/4 Method 7	9
				(ii) MCV immediately before compaction	Clause 632	App 6/1	12		
				(iii) bearing ratio	BS 1924 : Part 2	App 6/1	-		
				(iv) mc	BS 1924 : Part 2	App 6/1	App 6/1		
9	Cement stabilised conditioned pulverised fuel ash cohesive material	Capping	Class 7G with addition of cement according to Clause 614	(i) pulverisation	BS 1924 : Part 2	60%	-	End product 95% of maximum dry density of BS 1924 : Part 2 (2.5 kg rammer method)	9
				(ii) bearing ratio	BS 1924 : Part 2	App 6/1	-		
				(iii) mc	BS 1924 : Part 2	To enable compaction to Clause 612			
9	Lime stabilised cohesive material	Capping	Class 7E with addition of lime according to Clause 615	(i) pulverisation	BS 1924 : Part 2	30%	-	Tab 6/4 Method 7	9
				(ii) MCV immediately before compaction	Clause 632	App 6/1	App 6/1		
				(iii) bearing ratio	BS 1924 : Part 2	App 6/1	-		
				(iv) mc	BS 1924 : Part 2	App 6/1	App 6/1		

TABLE 6/1: (11/04) Acceptable Earthworks Materials: Classification and Compaction Requirements (See footnotes) (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All Subject to Requirements of Clause 6/1 and Appendix 6/1)	Material Properties Required for Acceptability (In Addition to Requirements on Use of Fill Materials in Clause 6/1 and Testing in Clause 6/1)				Compaction Requirements in Clause 6/12	Class
				Property (See Exceptions in Previous Column)	Defined and Tested in Accordance with:	Acceptable Limits Within:			
						Lower	Upper		
S M T A A T B E I R L I I A S L E S	Lime and cement stabilised cohesive material	Capping	Class 7I with addition of lime and cement according to Clause 6/43	(i) pulverisation	BS 1924 : Part 2	30%	-	Tab 6/4 Method 7	9
				(ii) MCV immediately before completion	Clause 6/32	App 6/1	App 6/1		
				(iii) bearing ratio	BS 1924 : Part 2	App 6/1	-		
				(iv) mc	BS 1924 : Part 2	App 6/1	App 6/1		
D 9	Lime and cement stabilised well graded granular material	Capping	Class 6R with addition of lime and cement according to Clause 6/43	(i) pulverisation	BS 1924 : Part 2	60%	-	Tab 6/4 Method 6	9
				(ii) bearing ratio	BS 1924 : Part 2	App 6/1	-		
				(iii) mc	BS 1924 : Part 2	App 6/1	App 6/1		

Footnotes to Table 6/1

1. App = Appendix
2. Tab = Table
3. Where in the Acceptable Limits column reference is made to App 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where Appendix 6/1 gives limits for other properties not listed in this Table such limits shall also apply.
4. (05/04) Where BS 1377 : Part 2 is specified for mc, this shall mean BS 1377 : Part 2 or BS EN 1097-5 as appropriate.
5. Uniformity coefficient is defined as the ratio of the particle diameters D_{60} to D_{10} on the particle-size distribution curve, where:
 D_{60} = particle diameter at which 60% of the soil by weight is finer
 D_{10} = particle diameter at which 10% of the soil by weight is finer
6. (11/04) The limiting values for Class U1B material are given in Appendix 6/14 and Appendix 6/15.

TABLE 6/2: (05/04) Grading Requirements for Acceptable Earthworks Materials Other Than Classes 6F4, 6F5 and 6S

Class	Percentage by Mass Passing the Size Shown																Class				
	Size (mm)		Size (mm) BS Series										Size (microns) BS Series					Size (microns)			
	500	300	125	90	75	37.5	28	20	14	10	6.3	5	3.35	2	1.18	600	300	150	63	2	
1A		100	95-100																<15		1A
1B			100																<15		1B
1C	100		10-95													0-25			<15		1C
2A & 2B			100											80-100					15-100		2A & 2B
2C			100											15-80					15-80		2C
2D			100																80-100	0-20	2D
6A	100									0-100						0-45			0-5		6A
6B	100		0-10																		6B
6C			100			0-100					0-100			0-35		0-2					6C
6D										100		89-100			60-100	15-80	5-48	0-15 except 0-20 for crushed rock			6D
6E & 6R			100	85-100						25-100						10-100			<15		6E & 6R
6F1					100	75-100				40-95		30-85				10-50			<15		6F1
6F2			100	80-100	65-100	45-100				15-60		10-45				0-25			0-12		6F2
6F3			100	80-100	65-100	45-100				15-60		10-45				0-25			0-12		6F3
6H								100				60-100			15-45	0-25		0-5			6H
6I & 6J			100		85-100				25-100						15-100	9-100			<15		6I & 6J
6K								100											0-10		6K
6L										100		89-100			60-100	15-100	5-70	0-15 except 0-20 for crushed rock			6L

TABLE 6/2: (11/05) Grading Requirements for Acceptable Earthworks Materials (continued)

Class	Percentage by Mass Passing the Size Shown																	Class			
	Size (mm)		Size (mm) BS Series													Size (microns) BS Series			Size (microns)		
	500	300	125	90	75	37.5	28	20	14	10	6.3	5	3.35	2	1.18	600	300	150	63	2	
6M					100														0-10		6M
6N & 6P					100														<15		6N & 6P
6S					100										60-100	30-90		4-45	0-16		6S
7A					100														15-100		7A
7C			100		85-100				83-100						80-100	60-100			15-45	0-20	7C
7D			100		85-100				40-90						15-79	15-75			15-45	0-20	7D
7E					100		95-100												15-100		7E
7F			100																15-100		7F
7I					100		95-100												15-100		7I

TABLE 6/3: (11/05) Limits of Material Properties of Fill for Use With Metal Components in Reinforced Soil and Anchored Earth Structures for Class 6H, 6I, 6J, 7C and 7D Materials

Reinforcing Element Material	Properties of Fill								
	pH Value		Max Chloride Ion Content	Max Organic Content	Max Water Soluble (WS) Sulfate Content	Maximum Oxidisable Sulfides (OS) Content	Minimum Resistivity	Minimum Redox Potential	Microbial Activity Index
	Min	Max	%	%	mg/l as SO ₄	% as SO ₄	Ohm.cm	volts	
Galvanised Steel	5	10	0.02	0.2	300	0.06	5000	0.40))) Less than 5
Stainless Steel	5	10	0.025	0.2	600	0.12	3000	0.35))

NOTES:

1 A method of calculating the Microbial Activity Index may be obtained by reference to TRRL Contractor Report 54 ‘Soil Corrosivity Assessment’.

2 (11/03) The corrosion potential of frictional fill shall be assessed from resistivity, pH, chloride, water soluble sulfate and oxidisable sulfides tests. For cohesive soil it will be necessary to test additionally for organic content. Should either organic content or sulfate be in excess of the specified levels, then tests shall also be included for Redox Potential and Microbial Activity Index. Further information may be obtained by reference to TRRL Contractor Report 54.

3 (11/03) The water soluble sulfate content and oxidisable sulfides content shall be determined in accordance with the methods described in TRL Report 447, Tests Nos. 1, 2 and 4.

4 (11/03) Methods of test (except for Microbial Activity Index, water soluble sulfate content and oxidisable sulfides content) are given in BS 1377 : Part 3.

TABLE 6/4: Method Compaction for Earthworks Materials: Plant and Methods (Method 1 to Method 6)
(This Table is to be read in conjunction with sub-Clause 612.10)

Type of Compaction Plant	Ref No.	Category	Method 1		Method 2		Method 3		Method 4		Method 5		Method 6		
			D	N#	D	N#	D	N#	D	N	D	N	N for D = 110 mm	N for D = 150 mm	N for D = 250 mm
Smoothed wheeled roller (or vibratory roller operating without vibration)	1	Mass per metre width of roll: over 2100 kg up to 2700 kg over 2700 kg up to 5400 kg over 5400 kg	125	8	125	10	125	10*	175	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	2		125	6	125	8	125	8*	200	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	3		150	4	150	8	unsuitable		300	4	unsuitable	unsuitable	16	16	unsuitable
Grid roller	1	Mass per metre width of roll: over 2700 kg up to 5400 kg over 5400 kg up to 8000 kg over 8000 kg	150	10	unsuitable		150	10	250	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	2		150	8	125	12	unsuitable		325	4	unsuitable	20	unsuitable	unsuitable	unsuitable
	3		150	4	150	12	unsuitable		400	4	unsuitable	12	20	unsuitable	unsuitable
Deadweight tamping roller	1	Mass per metre width of roll: over 4000 kg up to 6000 kg over 6000 kg	225	4	150	12	250	4	350	4	unsuitable	12	20	unsuitable	20
	2		300	5	200	12	300	3	400	4	unsuitable	8	12	unsuitable	12
Pneumatic-tyred roller	1	Mass per wheel: over 1000 kg up to 1500 kg over 1500 kg up to 2000 kg over 2000 kg up to 2500 kg over 2500 kg up to 4000 kg over 4000 kg up to 6000 kg over 6000 kg up to 8000 kg over 8000 kg up to 12000 kg over 12000 kg	125	6	unsuitable		150	10*	240	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	2		150	5	unsuitable		unsuitable		300	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	3		175	4	125	12	unsuitable		350	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	4		225	4	125	10	unsuitable		400	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	5		300	4	125	10	unsuitable		unsuitable		unsuitable	12	unsuitable	unsuitable	unsuitable
	6		350	4	150	8	unsuitable		unsuitable		unsuitable	12	unsuitable	unsuitable	unsuitable
	7		400	4	150	8	unsuitable		unsuitable		unsuitable	10	16	unsuitable	unsuitable
	8		450	4	175	6	unsuitable		unsuitable		unsuitable	8	12	unsuitable	unsuitable
Vibratory tamping roller	1	Mass per metre width of a vibrating roll: over 700 kg up to 1300 kg over 1300 kg up to 1800 kg over 1800 kg up to 2300 kg over 2300 kg up to 2900 kg over 2900 kg up to 3600 kg over 3600 kg up to 4300 kg over 4300 kg up to 5000 kg over 5000 kg	100	12	100	12	150	12	100	10	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	2		125	12	125	12	175	12*	175	8	unsuitable	12	unsuitable	unsuitable	unsuitable
	3		150	12	150	12	200	12*	unsuitable		unsuitable	8	12	unsuitable	unsuitable
	4		150	9	150	9	250	12*	unsuitable		400	5	10	unsuitable	unsuitable
	5		200	9	200	9	275	12*	unsuitable		500	6	10	unsuitable	unsuitable
	6		225	9	225	9	300	12*	unsuitable		600	6	8	unsuitable	unsuitable
	7		250	9	250	9	300	9*	unsuitable		700	6	7	unsuitable	unsuitable
	8		275	9	275	9	300	7*	unsuitable		800	6	6	unsuitable	unsuitable

TABLE 6/4: Method Compaction for Earthworks Materials: plant and Methods (Method 1 to Method 6)
(This Table is to be read in conjunction with sub-Clause 612.10)

Type of Compaction Plant	Ref No.	Category	Method 1		Method 2		Method 3		Method 4		Method 5		Method 6			
			D	N#	D	N#	D	N#	D	N	D	N for D = 110 mm	N for D = 150 mm	N for D = 250 mm		
Vibratory roller		Mass per metre width of a vibratory roll: over 270 kg up to 450 kg over 450 kg up to 700 kg over 700 kg up to 1300 kg over 1300 kg up to 1800 kg over 1800 kg up to 2300 kg over 2300 kg up to 2900 kg over 2900 kg up to 3600 kg over 3600 kg up to 4300 kg over 4300 kg up to 5000 kg over 5000 kg	75	16	150	16	150	16	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	1		unsuitable							unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	2		unsuitable	75	12	150	12	150	12	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable
	3		100	12	125	10	150	6	10	125	10	16	16	16	16	16
	4		125	8	150	8	200	10*	4	175	4	6	6	6	6	12
	5		150	4	150	4	225	12*	unsuitable	unsuitable	unsuitable	4	5	5	5	11
	6		175	4	175	4	250	10*	unsuitable	unsuitable	unsuitable	400	5	5	5	10
	7		200	4	200	4	275	8*	unsuitable	unsuitable	unsuitable	500	5	5	5	8
	8		225	4	225	4	300	8*	unsuitable	unsuitable	unsuitable	600	5	4	4	7
	9		250	4	250	4	300	6*	unsuitable	unsuitable	unsuitable	700	5	4	4	6
10	275	4	275	4	300	4*	unsuitable	unsuitable	unsuitable	800	5	3	3			
Vibrating plate compactor		Mass per m ² of base plate: over 880 kg up to 1100 kg over 1100 kg up to 1200 kg over 1200 kg up to 1400 kg over 1400 kg up to 1800 kg over 1800 kg up to 2100 kg over 2100 kg	unsuitable	unsuitable	75	6	6	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	1		unsuitable						unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	2		unsuitable	75	10	100	6	10	75	10	10	10	10	10	10	
	3		unsuitable	75	6	150	6	8	150	8	8	8	8	8	8	
	4		100	6	125	6	150	4	unsuitable	unsuitable	unsuitable	8	8	8	8	
	5		150	6	150	5	200	4	unsuitable	unsuitable	unsuitable	5	5	5	5	
6	200	6	200	5	250	4	unsuitable	unsuitable	unsuitable	3	3	3	3			
Vibro-tamper		Mass: over 50 kg up to 65 kg over 65 kg up to 75 kg over 75 kg up to 100 kg over 100 kg	100	3	100	3	150	3	125	3	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	1		100						125	3	4	4	4	4		
	2		125	3	125	3	200	3	150	3	3	3	3	3	12	
	3		150	3	150	3	225	3	175	3	2	2	2	2	10	
4	225	3	200	3	225	3	250	3	2	2	2	2	10			
Power rammer		Mass: 100 kg up to 500 kg over 500 kg	150	4	150	6	unsuitable	unsuitable	200	4	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	1		150						200	4	5	5	5	5	14	
2	275	8	275	12	unsuitable	unsuitable	400	4	400	4	8	8	8	8		
Dropping-weight compactor		Mass of rammer over 500 kg weight drop: over 1 m up to 2 m over 2 m	600	4	600	8	8	450	8	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
	1		600						450	8	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	
2	600	2	600	8	8	8	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable	unsuitable		

TABLE 6/4: Method Compaction for Earthworks Materials: Plant and Methods (Method 7)
(This Table is to be read in conjunction with sub-Clause 612.10)

Type of Compaction Plant	Ref No.	Category	Method 7	
			N for D = 150 mm	N for D = 250 mm
Smooth wheeled roller (or vibratory roller operating without vibration)	1	Mass per metre width of roll: over 2100 kg up to 2700 kg over 2700 kg up to 5400 kg over 5400 kg	unsuitable	unsuitable
	2		unsuitable	unsuitable
	3		12	unsuitable
Grid roller	1	Mass per metre width of roll: over 2700 kg up to 5400 kg over 5400 kg up to 8000 kg over 8000 kg	unsuitable	unsuitable
	2		16	unsuitable
	3		8	unsuitable
Deadweight tamping roller	1	Mass per metre width of roll: over 4000 kg up to 6000 kg over 6000 kg	4	8
	2		3	6
Pneumatic-tyred roller	1	Mass per wheel: over 1000 kg up to 1500 kg over 1500 kg up to 2000 kg over 2000 kg up to 2500 kg over 2500 kg up to 4000 kg over 4000 kg up to 6000 kg over 6000 kg up to 8000 kg over 8000 kg up to 12000 kg over 12000 kg	unsuitable	unsuitable
	2		12	unsuitable
	3		6	unsuitable
	4		5	unsuitable
	5		4	16
	6		unsuitable	8
	7		unsuitable	4
	8		unsuitable	4
Vibratory tamping roller	1	Mass per metre width of vibrating roll: over 700 kg up to 1300 kg over 1300 kg up to 1800 kg over 1800 kg up to 2300 kg over 2300 kg up to 2900 kg over 2900 kg up to 3600 kg over 3600 kg up to 4300 kg over 4300 kg up to 5000 kg over 5000 kg	unsuitable	unsuitable
	2		unsuitable	unsuitable
	3		16	unsuitable
	4		12	unsuitable
	5		10	unsuitable
	6		8	16
	7		7	14
	8		6	12
Vibratory roller	1	Mass per metre width of vibrating roll: over 270 kg up to 450 kg over 450 kg up to 700 kg over 700 kg up to 1300 kg over 1300 kg up to 1800 kg over 1800 kg up to 2300 kg over 2300 kg up to 2900 kg over 2900 kg up to 3600 kg over 3600 kg up to 4300 kg over 4300 kg up to 5000 kg over 5000 kg	unsuitable	unsuitable
	2		unsuitable	unsuitable
	3		unsuitable	unsuitable
	4		unsuitable	unsuitable
	5		12	unsuitable
	6		10	unsuitable
	7		10	unsuitable
	8		8	unsuitable
	9		8	unsuitable
	10		6	12
Vibratory plate compactor	1	Mass per m ² of base plate: over 880 kg up to 1100 kg over 1100 kg up to 1200 kg over 1200 kg up to 1400 kg over 1400 kg up to 1800 kg over 1800 kg up to 2100 kg over 2100 kg	unsuitable	unsuitable
	2		unsuitable	unsuitable
	3		unsuitable	unsuitable
	4		10	unsuitable
	5		8	unsuitable
	6		6	unsuitable
Vibro-tamper	1	Mass: over 50 kg up to 65 kg over 65 kg up to 75 kg over 75 kg up to 100 kg over 100 kg	unsuitable	unsuitable
	2		unsuitable	unsuitable
	3		unsuitable	unsuitable
	4		8	unsuitable
Power rammer	1	Mass: 100 kg up to 500 kg over 500 kg	8	unsuitable
	2		6	10
Dropping weight compactor	1	Mass of rammer over 500 kg height drop: over 1 m up to 2 m over 2 m	unsuitable	unsuitable
	2		unsuitable	unsuitable

TABLE 6/5: (11/05) Off-Site Grading Requirements for Class 6 Acceptable Earthworks Materials

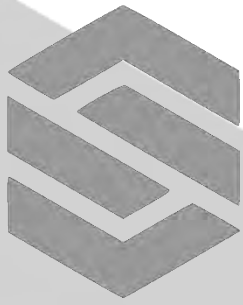
Class	Percentage by Mass Passing the Size Shown													Class								
	Size (mm)			Size (microns) BS EN 933-2 Series																		
	500	300		125	80	63	40	31.5	20	16	10	8	6.3	4	2	1	500	250	125	63	0	
6A	100										0-100		0-85				0-45			0-5		6A
6B	100			0-10																		6B
6C				100			0-100						0-100	0-35	0-10		0-2					6C
6D											100			85-100	60-100	30-100	15-80	5-48	0-15 except 0-20 for crushed rock			6D
6E & 6R				100	85-100						25-100						10-100			<15		6E & 2R
6F3				100	75-99		50-90		30-75		15-60				0-35					0-12		6F3
6F4				100		100		75-99		50-90		30-75				0-35				<15		6F4
6F5				100	75-99		50-90		30-75		15-60									0-12		6F5
6H									100				60-100			15-45	0-25		0-5			6H
6I & 6J				100	85-100					25-100					15-100		9-100			<15		6I & 6J
6K									100											0-10		6K
6L											100			85-100	60-100	30-100	15-100	5-70	0-15 except 0-20 for crushed rock			6L
6M					100															0-10		6M
6N & 6P					100															<15		6N & 6P
6S						100									60-100		30-90		8-45	0-16		6S

Site Specific Earthworks Specification

Appendix 6/1

The earthwork specification, (utilising Series 600 – Specification for Highways Works), was to achieve;

- At least 95% maximum dry density and less than 5% air voids,
- Undrained Shear strength - 50kPa in remoulded / re-engineered fill (where applicable).
- A CBR value of 3% at finished level prior to capping and pavement construction.
- Optimum MC% of fill to be (Average 18%). Excessively wet / dry moisture at +/-6% is likely to be unacceptable.
- 2A/B/C cohesive material to be compacted to an end product specification. Site trial required to confirm layer thickness, passes in relation to plant
-



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APPENDIX 3

Ground Investigation Interpretive Report and Groundwater Risk Assessment (Shadbolt Environmental, Issue V3, September 2022)



SHADBOLT
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Newbottle Street, Houghton-le-Spring
Ground Investigation Interpretive Report and
Groundwater Risk Assessment
Hellens Land

Issue V3

September 2022



SHADBOLT
GROUP

Newbottle Street Houghton-le-Spring

Ground Investigation Interpretive Report and Groundwater Risk Assessment

Project Reference: 2585

Client	Hellens Land
Our Reference	2585 – Newbottle Street
Produced by	Tim Shepherd
Checked by	Mike Taylor
Submitted	Issue V3 – September 2022



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APPENDICES

Appendix A	Report Conditions
Appendix B	Exploratory Hole Logs Falling Head Tests Drawing No. 2585/Newbottle Street/005 - Exploratory Hole Location Plan Geological Sections Conceptual Site Model Inferred Groundwater Level Contours
Appendix C	Shadbolt Environmental Soils Tier 1 Screening Values
Appendix D	Chemical Laboratory Results
Appendix E	Geotechnical Laboratory Results
Appendix F	Gas Risk Assessment Tables Gas Protection Measures Assessment Tables Gas and Groundwater Monitoring Results
Appendix G	Development Plan (Correct at the Time of Writing)
Appendix H	Mine Shaft Investigation Letter Report

1.0 INTRODUCTION

Shadbolt Group (SG) were commissioned by the Client, **Hellens Land** to undertake intrusive site investigations in respect of the proposed development of a commercial development at Newbottle street, Houghton-le-Spring.

This report provides an assessment of the ground conditions encountered at the site with regards to the proposed development which is to include commercial developments with associated infrastructure.

1.1 Aims and Objectives

The purpose of the investigation was to determine the existing ground conditions and identify possible geotechnical and contamination related issues arising from past uses of the site which may provide constraints to the proposed development.

1.2 Scope of Works

The site investigation, designed by Shadbolt Group, comprised intrusive investigations including Cable Percussive Boreholes with falling head tests, Trial pits, hand pits, rotary open holes and rotary cored boreholes. The intrusive investigations were followed by post-siteworks Gas and Groundwater Monitoring and Geotechnical and Chemical Laboratory Testing.

1.3 Limitations

The recommendations and opinions expressed in this report are based on the strata observed in the borings and excavations; together with the results of the site and laboratory tests as detailed within the report. Shadbolt Group take no responsibility for ground conditions which occur between the exploratory hole positions.

Every effort has been made to interpret the conditions between investigation locations; however, such information is indicative. A detailed review of the extent of limitations of this report is included in the **Report Conditions** included in **Appendix A** and the standard terms and conditions of the agreement.

This report has been prepared in accordance with the letter of appointment, report conditions and the terms and conditions of the agreement.

The site is to be developed for 2 No. retail units, petrol filling station, access road, landscaping and associated parking and infrastructure.

The proposed development layout IBA Drawing 1485 (SP) 040 T1 is presented in **Appendix G**.

2.0 SITE INFORMATION

2.1 General

The site is located to the south of Newbottle Street (A182), north east of Houghton le Spring town centre. The site is an irregular, elongated plot orientated roughly north west to south east with an area in the order of 3.35ha. The approximate National Grid Reference (NGR) for the centre of the site is 433840,550400.

A general site location plan of the site is presented as Figure 1 and an aerial photograph as Figure 2.

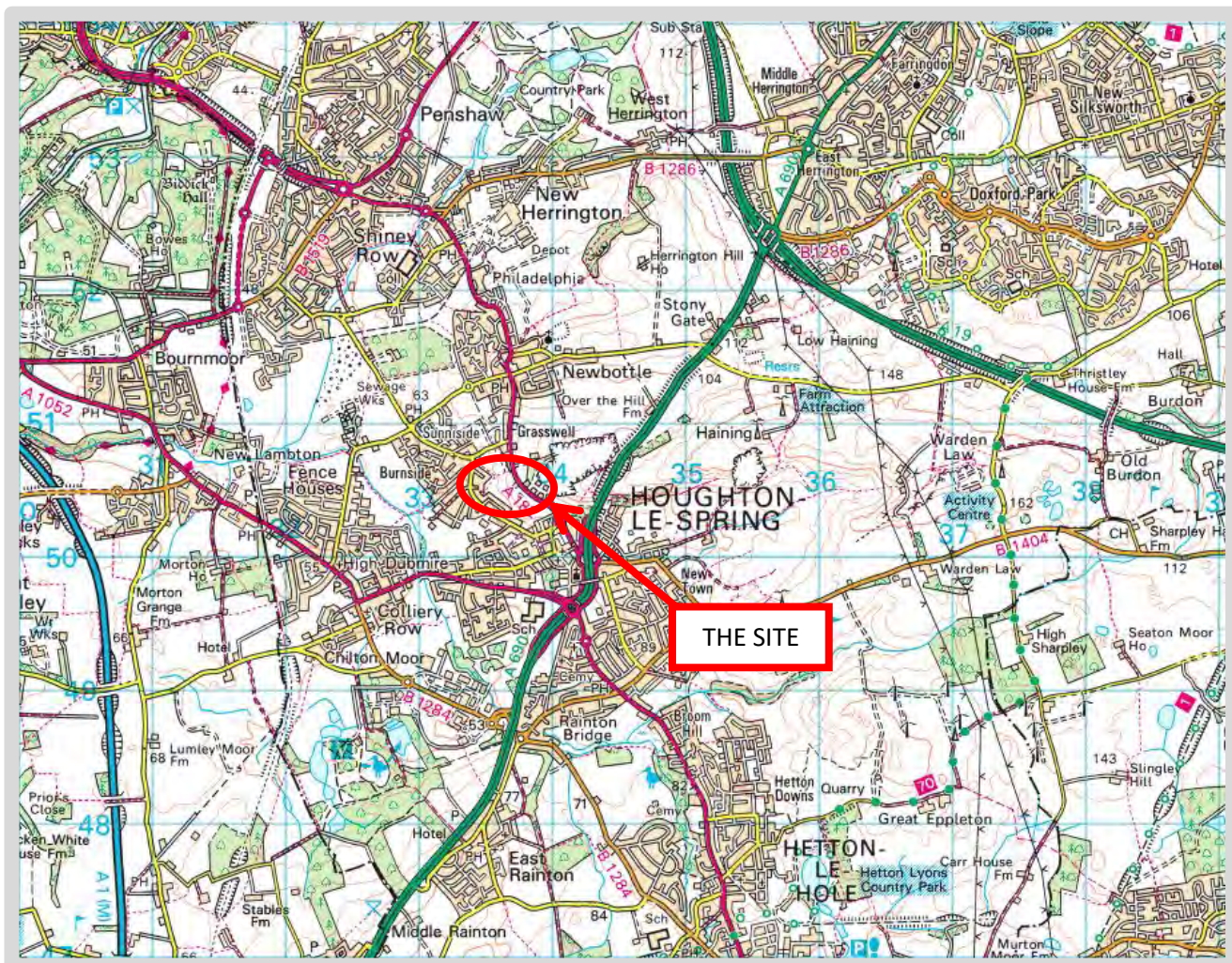


Fig. 1 – General Site Location Plan

2.2 Site Description

An initial site walkover was undertaken by TSG in March 2018.

The site comprises a large terrace of maintained grassland bound by slopes to the north east and south west. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall in the order of 4m tall along the boundary with a storage yard to the rear of the adjacent petrol filling station.

Stands of Japanese Knotweed were noted at the top of the northern end of the retaining wall and along the crest of the slope to the north.

The embankments at the fringes of the site are planted with small trees with the main body of the site comprising grass with a central ridge of rough grass / vegetation along the line of a former fence of which some components still remain. 2 No. roughly circular areas are not grassed, and concrete is visible; these broadly align with given location of shafts recorded by the Coal Authority which have been capped at the surface.

The boundary along Newbottle Street is fenced with close boarded timber fencing up to a pair of billboards adjacent to a van hire depot and petrol filling station at the northern end of the site.

Vehicular access is available via a track leaving a service road to the rear of the petrol filling station but is blocked by a boulder placed along the perimeter of additional grassland extending to the north of the site.



Fig.2 – Aerial Photograph Showing Development Area

3.0 HISTORICAL LAND USE

The site has been developed through much of the mapped history by the Houghton Colliery and associated infrastructure including railway sidings and reservoirs. Following the closure of the colliery in 1981 the site was cleared and has remained as grassed open space to the present day.

Many towns in the surrounding area were reasonably well established in the earliest mapping with the colliery and adjacent limestone quarry providing local employment opportunities. Residential areas were developed through the early 20th century with large developments in the 1940s and 1960s/70s. Extraction at the quarry has ceased and in recent times been repurposed as a landfill site and is now being considered for redevelopment.

Key Areas of Concern

From earliest mapping in 1857 the on-site Houghton Colliery with the associated railway lines, gas works to the south and Houghton Quarry and the associated limekilns to the north are the most potentially contaminative historic activities.

Between 1857 and 1897 the tipping of spoil to the north and east of the site and the presence of mine shafts on-site cause potential concern.

Between 1897 and 1920 the labelled chimneys on-site are indicative of further potential pollution.

Between 1920 and 1939, the labelled tanks at the gas works pose a key area of concern.

Between 1958 and 1969 the mapped electrical substation at Houghton Quarry, the garage to the north and the disused tip to the north-west are key potential contaminative features.

Between 1970 and 1979 the garage developed ~20m to the east of the site poses some cause for concern. Tanks labelled within the southwest corner of the site.

1990s demolition of the former colliery, capping of the mineshafts and infilling of the railway sidings.

4.0 ENVIRONMENTAL SETTING

4.1 Geology, Mining, Ground Stability and Ground Workings

4.1.1 Geology

Artificial deposits (Made Ground - Undivided) are indicated within the site boundary. These deposits are anticipated to comprise colliery spoil.

Superficial deposits are recorded on site to comprise Diamicton (Cohesive glacial till / boulder clay) comprising predominantly cohesive materials with varying proportions of granular materials; Glaciolacustrine deposits comprising interbedded clay and silt; and unclassified superficial strata which may be masked by the recorded artificial ground.

The solid geology beneath the site predominantly comprises Permian age sandstone of the Yellow Sands Formation in the north east of the site, stratigraphically overlying undifferentiated strata of the Pennine Middle Coal Measures comprising interbedded mudstone, siltstone and sandstone in the south west of the site.

BGS boreholes within the site boundary indicate Made Ground at the site to be ashy material with brick and demolition rubble with weathered limestone or sandstone bedrock encountered at 3-6m bgl through the main body of the site with colliery spoil recorded in excess of 12m thickness at the south western edge of the site and former tipping area.

No coal seams are indicated to outcrop within the site boundary; however 8 No. are recorded within 500m of the site.

4 No. faults are present within 500m of the site including 1 No. which runs through the site close to and parallel with the south eastern boundary on a bearing in the order of 070°. This fault is recorded as inferred with an unknown displacement. The inferred fault is unlikely to impact on the development proposals due to its location on the site boundary.

4.1.2 Coal Mining

The site is located within an area where the effects of potential coal mining should be assessed as stated in the Groundsure report and verified by The Coal Authority's Gazetteer.

A Coal Authority Report for the site has been obtained has been reviewed as part of a Preliminary Coal Mining Risk Assessment by The Shadbolt Group which has been issued under separate cover. In brief the Coal Authority report states the following:

- *The site is within the zone of influence of workings of 7 No. seams recorded at depths of 122m to 313m bgl.*
- *No probable shallow mine workings are recorded on site.*
- *No records of spine roadways at shallow depth are recorded on site.*
- *3 No. shafts are recorded on site.*
- *There have been no damage claims within 50m of the site since 1994.*

The Coal Authority report confirms that workings have been undertaken at depth beneath the site. Although coal reserves are known to exist in the area the property is not considered to be in an area where the Coal Authority believe there is coal at or close to the surface, therefore shallow unrecorded mine workings undertaken for the extraction of coal are unlikely to be a risk factor at the site. 2 No shafts recorded at the site were originally capped in 1982 before being backfilled with washery wastes up to 1986 and then hardcore in 1987 and recapped in 1988; the third shaft was filled to an unknown specification.

Accordingly, the risk to developments at the site as a result of underground mine workings for the

extraction of coal is considered to be low but the backfilling of the shafts will need to be verified if development is to proceed within the zone of influence.

4.1.3 Non-Coal Mining and Natural Cavities

There is no record of any non-coal mining activity on the site.

The Groundsure Geo-Insight report indicates the site is not within 1000m of an area of Brine Extraction, Gypsum Extraction, Tin Mining or Clay Mining.

There is 1 No. record of natural cavities within 1000m. This record relates to a Solution Widened Joint or Fissure 534m E of the site.

4.1.4 Ground Stability

The BGS consider the overall risk to the site from natural ground subsidence to be Negligible to Moderate. This takes in to account the combined risks on site from Shrink-Swell Clays, Landslides, Soluble Rocks, Compressible Ground, Collapsible Rocks and Running Sands.

The most onerous of these risk factors has been applied to a low risk of landslides within slopes on the north eastern boundary and parallel with the south eastern boundary and a moderate risk of compressible deposits recorded in the same areas relating to the presence of unconsolidated colliery spoil and embankments.

4.1.5 Ground Workings

There are 32 No. historic surface ground workings features identified within 250m of the site including 16 No. within the site boundary recorded on historic mapping. These records include a reservoirs, ponds, unspecified heaps and tips, workings, pits, a colliery, a sands pit, a limestone quarry, cuttings and an old clay pit.

There are 3 No. records of Underground Workings Features on historical mapping within 1000m of the site. These include a colliery / mine on site and an unspecified disused shaft 970m NW of the site.

The BGS BRITPITS database contains 9 No. records relating to current ground workings within 1000m of the site. These records relate to coal (deep), clay and shale, limestone, dolomite and sandstone extraction. Each of the recorded workings is noted to have ceased operations.

4.2 Radon

Reference to the NRPB Report W26 '*Radon Atlas of England and Wales*,' 2002 and information contained in the EnviroInsight report indicates the following.

The property is in a Radon Affected Area as defined by the Health Protection Agency (HPA) as between 1% and 3% of properties are above the Action Level.

However, the property is not 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.

4.3 Hydrogeology, Hydrology, Flood Risk and Drainage Issues

4.3.1 Hydrogeology

Information on the hydrogeological characteristics of the site has been obtained from the following:

- The Environment Agency Groundwater Vulnerability Maps
- The GroundSure Report

The site is located upon a Secondary (A) Aquifer and Principal Aquifer (The Yellow Sand Formation) and of these two aquifers the protection of the principal aquifer with associated groundwater protection zone is of paramount importance.

The superficial strata located beneath the site are designated as **Secondary (A), Secondary (Undifferentiated) and Unproductive aquifers**. Formerly classified as minor aquifers, Secondary (A) Aquifers comprise 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.

The solid geology located beneath the site is designated as **Principal and Secondary (A) Aquifers**; Principal Aquifers comprise of high intergranular and fracture permeability, usually providing a high level of water storage and may support water supply to rivers on a strategic scale. This includes the Yellow Sand Formation which is designated as a Principal Aquifer by the Environment Agency. The site is situated at the geological base of the limestone classified as a Principal Aquifer and is considered the most sensitive receptor rather than the underlying Middle Coal Measures strata which is a secondary (A) aquifer.

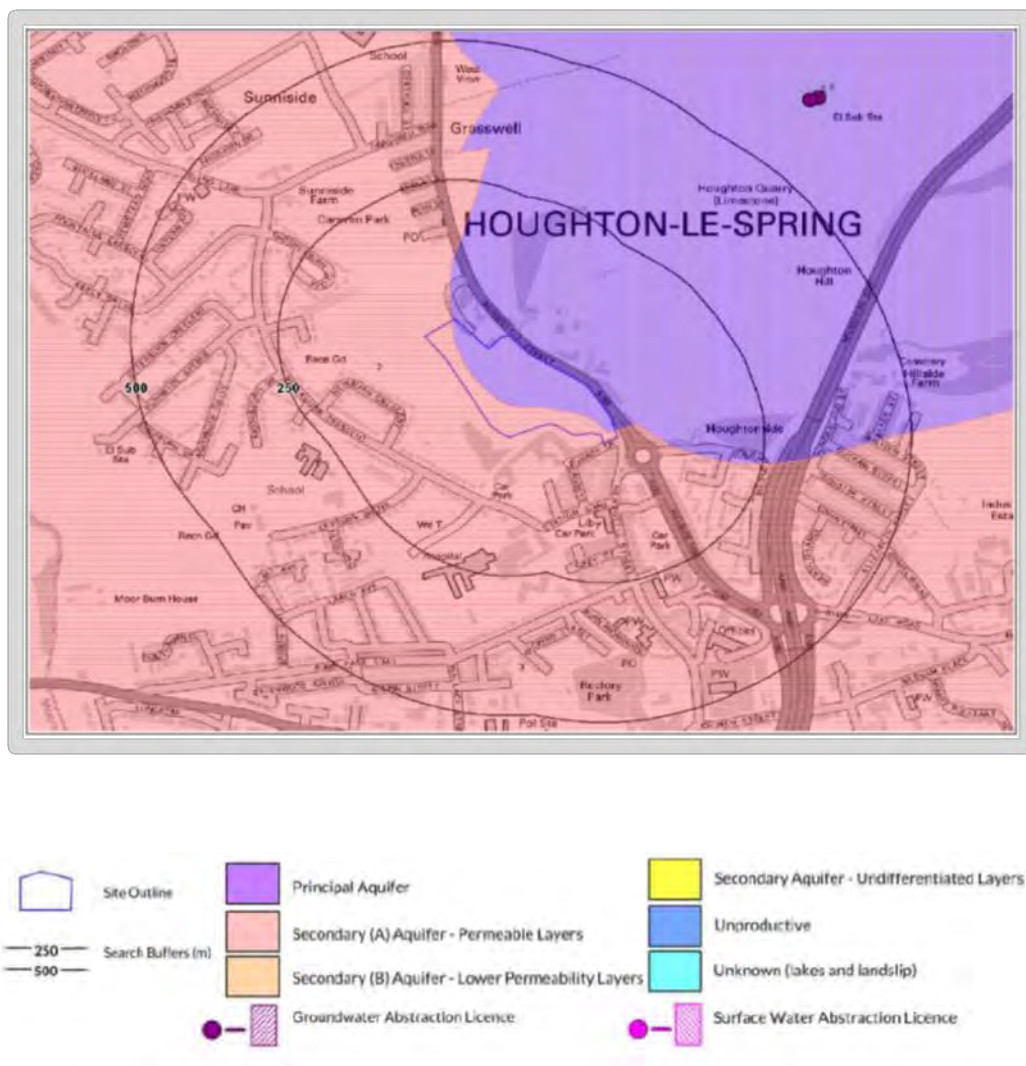


Fig.3 -Bedrock Aquifer Classification

The eastern edge of the site is located within a Source Protection Zone 3 – Total Catchment area as shown below.

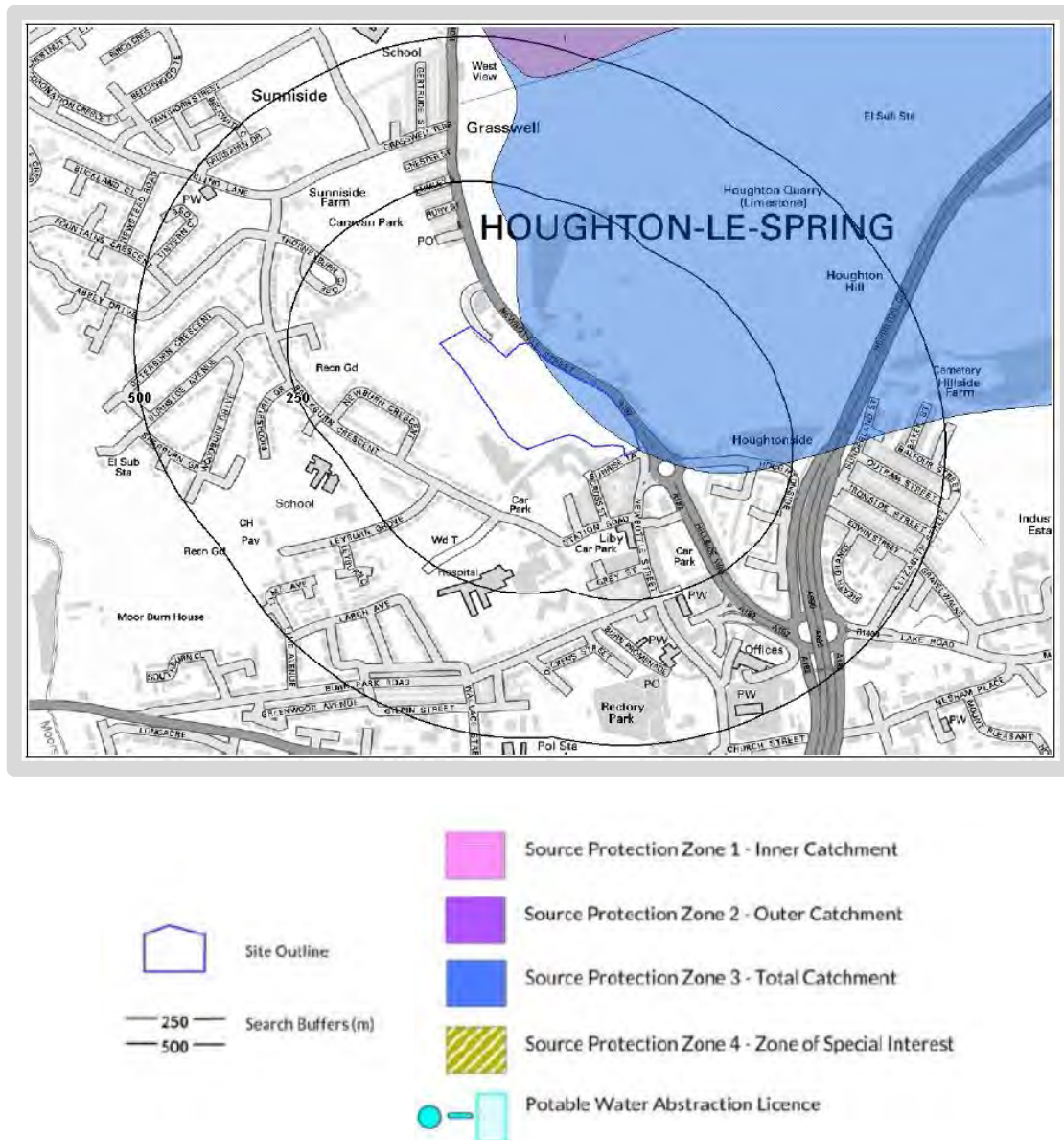


Figure 4 – Source Protection Zones

There are 2 No. Potable Water Abstraction Licences within 2000m of the site. These records are located 1953m NE of the site and relate to water supply.

The site sits approximately between 70.5m aOD and 73.5m aOD, with the northern extents sitting at approximately 70.5m aOD, the southern extents at approximately 71.5m aOD with the centre of the site at approximately 73.5m aOD.

At the time of writing there is no hydrogeology sheet available for this area, however it is understood that the regional hydraulic gradient is to the east (Younger 1994).

The surrounding land to the east of the site has an approximate elevation of 77m aOD increasing to over 100m aOD at High Haining Farm some 1.5km to the east with Moors Burn located 750m to the west, sitting at an elevation of 45m aOD, suggesting that the local shallow hydraulic gradient in the area may be from east to west towards Moors Burn.

Shallow groundwaters, where present, have the potential to migrate off-site to the west (following the natural topography of the area) and similarly shallow waters located to the east of the site have the potential to migrate towards the site. However, it is likely that shallow / perched ground waters at the site may have their downward vertical migration restricted by low permeability superficial deposits. However, where clay is absent shallow groundwaters are likely to migrate vertically downwards and potentially interact with the deeper groundwaters within the solid strata and flow towards the east following the perceived regional hydraulic gradient.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, dense / light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.

4.3.2 Hydrology and Flood Risk

Information from the Environment Agency (EA) indicates that the site does not lie within 250m of an indicated Environment Agency Zone 2 and Zone 3 flood plain.

Information from the Environment Agency RoFRaS (Risk of Flooding from Rivers and Sea) database indicates that the risk of flooding at the centre of the site is **Very Low** (less than 1 in 1000 chance of flooding in a given year).

Additionally, there are no Flood Defences or areas benefitting from Flood Defences or Flood Storage within 250m of the site.

The BGS indicate that the site lies within 50m of groundwater flooding susceptible areas. The BGS note that there is Potential at Surface relating to Superficial Deposits Flooding and their confidence in this classification is high.

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

4.3.3 Watercourse Network, Surface Water Features and Groundwater Features

There are no Environment Agency river quality records within 1500m of the site.

There are 3 No. river network features recorded within 500m of the site the closest of which relates to a culvert 223m NE of the site (Houghton Burn) which appears to run through Houghton Quarry.

4.3.4 Groundwater, Surface Water and Potable Water Abstraction Licences

There are 4 No. Groundwater Abstraction Licenses within 2000m of the site. The closest of these are located 636m and 648m NE of the site. Both licenses are for pollution remediation but while one has an active status the other is historical. Other active license uses include water supply at a point 1953m NE.

There are 4 No. Surface Water Abstraction Licence within 2000m of the site. These are located 1681m to 1880m W of the site and are historical permits for mineral washing and dust suppression.

There are 2 No. Potable Water Abstraction Licences within 2000m of the site. These records are located

1953m NE of the site ad relate to water supply.

4.3.5 Source protection Zones

There are 2 No. Source Protection Zones within 500m of the site including 1 No. on site. The record on site is Zone 3, Total Catchment and relates to the Yellow Sand Formation designated by the Environment Agency as a Principle Aquifer. The other record 442m N of the site is Zone 2, Outer Catchment.

Total Catchment area as shown below.

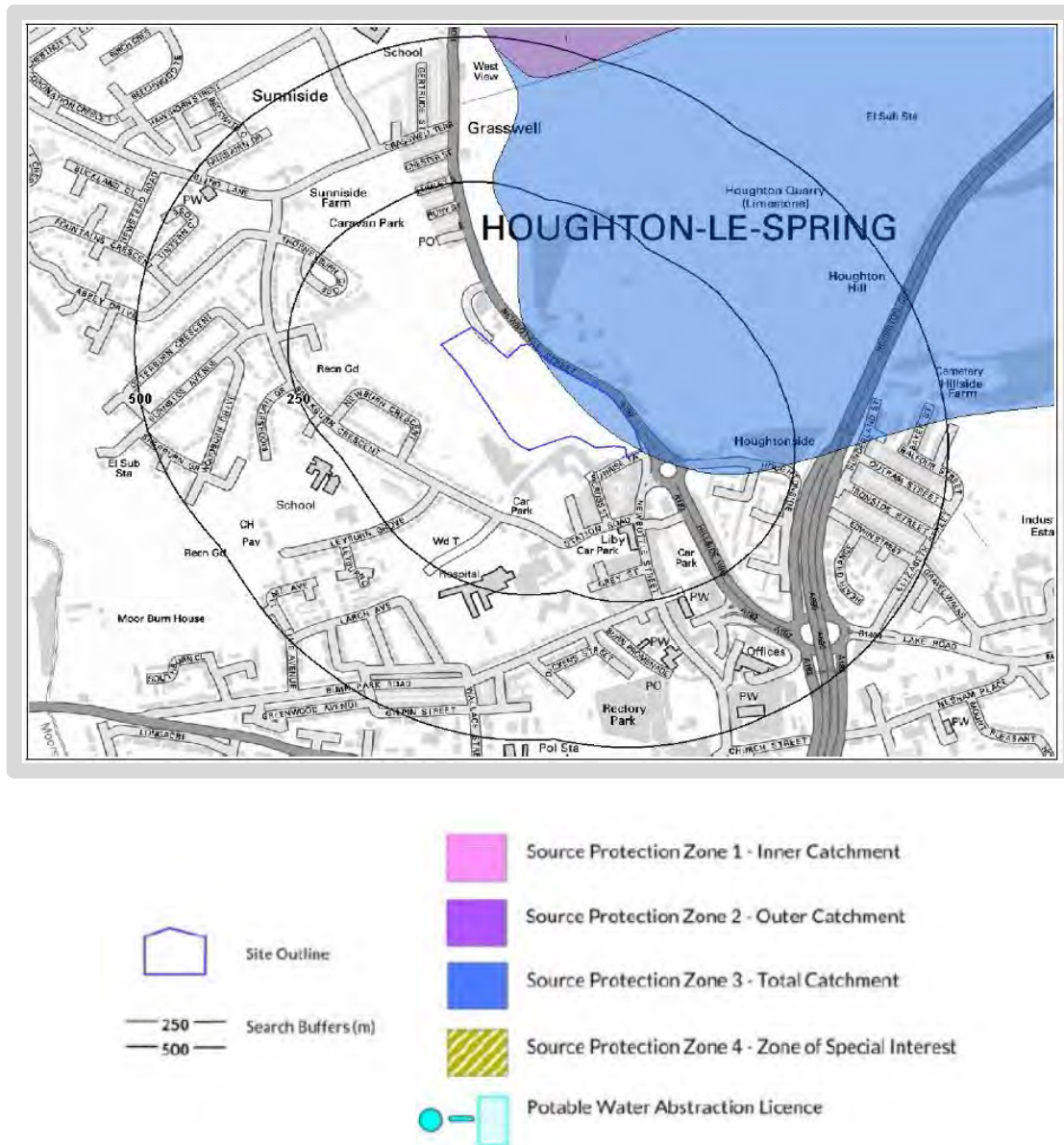


Figure 4 – Source Protection Zones

There are no Source Protection Zones within a Confined Aquifer within 500m of the site.

4.3.6 Groundwater Vulnerability

Superficial and Bedrock Vulnerability on-site is classified as Low relating to the Secondary Aquifers present and soils on-site are deemed to have a Low Leaching Potential.

Superficial Permeability on site is deemed to comprise mixed flow types with a High maximum permeability and a Low minimum permeability.

Bedrock permeability on site is deemed to consist of a fracture flow type with a High maximum permeability and a Low minimum permeability.

4.4 Landfill and Other Waste Sites

4.4.1 Landfill Sites

There is 1 No. record of Environment Agency Registered Landfill Site Licenses Issued within 500m of the site. This is located 33m NE of the site and relates to a waste landfill site operated by Biffa Waste Services Ltd.

There are 3 No. records of Environment Agency Historic Landfill Site Licenses Issued within 500m of the site. The closest relates to 3 landfill sites at Houghton Colliery located on-site. The license was issued on the 7th of September 1995 and surrendered on the 7th of April 1999. It is understood that the historic landfill sites on-site are associated with the reclamation of the former colliery,

The EA have confirmed that the three records relate to the same “landfill site” (License TW452SL) with one of the EA records stating the site is known as Houghton Colliery, which was operated by City of Sunderland, City Building Services.

The site was licensed to receive clean hardcore and brick and Category A Wastes i.e.

“Excavation Wastes only, containing no biodegradable or soluble chemical material. This category may include subsoil, sand, clay, shale or rock, provided they are not contaminated with any other materials”.

The landfill was licensed to receive 400 tonnes per day or 50 loads with a maximum capacity of 10,000m³. City Council have also been contacted regarding the landfill; however, no information has been forthcoming.

There are no records on the BGS / DoE Landfill Site Survey Database within 500m of the site relating to a site.

There are no records of Local Authority Landfill Sites within 500m of the site.

5.0 PREVIOUS INVESTIGATIONS

The Client has supplied a preliminary ground investigation undertaken by Allied Exploration and Geotechnics Ltd. For Sunderland City Council, in January 2006 comprising 12 No. mechanically excavated trial pits and limited environmental testing.

The trial pits identified mixed Made Ground across the site comprising predominantly colliery spoil with demolition wastes bound by cohesive soils ranging from 1.50m to in excess of 4.80m. Superficial deposits were found to comprise stiff clays of glacial origin and variably gravelly sands which likely represent weathered bedrock. Weathered sandstone bedrock was reported in 4 No. locations at depths ranging from 3.10m to 3.80m.

A number of boreholes have been undertaken on site and in the surrounding area. Some records are held by the BGS and made available via their data portal and have also been reviewed.

Records of a borehole undertaken in 1987 towards the southern corner of the site indicated colliery spoil to be present in excess of 12.00m bgl and limestone as shallow as 3.00m bgl in the northeast of the site.

Shaft records from Houghton Colliery indicate a number of thin seams from around 16m bgl with the first notable seam being recorded at 170 ft bgl (approximately 52m bgl) of 13 inches followed by another of 29 inches at 252 ft 7 in bgl (approximately 77m bgl).

6.0 SITE INVESTIGATION

The physical ground investigation work was carried out by Shadbolt Environmental during July 2019, December 2019, July 2020, November 2020 and most recently in July 2022.

Several phases of ground investigations have been undertaken due to site constraints and various Correspondence received from Sunderland City Council and the Environment Agency during the planning process.

6.1 Proposed Development

The site is proposed to be developed for commercial purpose (supermarket with mixed use) with associated infrastructure.

6.2 Scope of Investigation

The initial site works in July 2019 comprised the following:

- 20 No. trial pits to a maximum depth of 3.50m bgl (TP01 – TP20)
- 18 No Cable percussion boreholes to a maximum depth of 20m bgl (CP-01 to CP18)
- 3 No. Falling Head tests in the CP Boreholes.
- Gas and Groundwater monitoring visits.

Additional trial trenching to investigate the potential mineshaft located adjacent to the northern boundary was undertaken in December 2019 and is presented in **Appendix B**.

The second phase of ground investigation in April 2020 comprised the following;

- 6 No. rotary boreholes were undertaken to confirm the depth to rock head in the vicinity of the mineshafts (RO1 – RO6)
- 4 No. laboratory CBR (CBR1 – CBR4) tests were undertaken on samples retrieved from the Made Ground.

The third phase of investigation was undertaken in July 2020 following initial comments received from Sunderland City Council to undertake additional / confirmatory chemical analysis. The works comprised.

- 4 No. trial pits (TP206 – TP209)
- 7 No. hand pits (HP01 – HP07)

The fourth phase of investigations were undertaken at the site following correspondence received from the EA to retrieve shallow samples to assess the potential for BTEX and VOCs within the Made Ground and to undertake groundwater monitoring of the boreholes located at the site.

The most recent, and final phase of ground investigations were undertaken at the site in July and August 2022 and consisted of the following;

- 12 No. Rotary Cored Boreholes (RC01 – RC12) predominantly drilled to facilitate the groundwater monitoring of the underlying bed rock.

- 8 No. Trial Pits (TP301 – TP308)

Plans showing the approximate location of the exploratory holes and the extent of the areas of investigation are presented as **Drawing No. 2585/Newbottle street/005** in **Appendix C**.

The soils encountered during this investigation have been logged in accordance with BS5930:2015 “Code of Practice for Site Investigation”. During excavation, representative samples were taken at regular intervals from the exploratory holes to assist in the identification of the soils, and to allow geotechnical testing of selected samples to be programmed / scheduled.

19 No. ground gas and water monitoring installations were installed across the phases of these works to assess the potential risks to future site users and developments from ground gases and to provide an insight into the near surface and deeper groundwater regime and to provide information on the permeability of the fill materials.

It is known that the site has been subject to demolition, site clearance and infilling and the capping of mineshafts. The exploratory holes were positioned to provide an overview of the ground conditions at the site and target where possible potential structures are to be developed and enable the assessment of the shallow and deep Made Ground soils, the underlying glacial deposits and mudstone / sandstone rock.

6.3 In-Situ Testing

Standard Penetration Tests were undertaken at regular intervals in Cable Percussive boreholes.

Results of the in-situ testing are presented on the relevant exploratory hole logs included in **Appendix B**.

6.4 Geotechnical Laboratory Testing

Selected samples (scheduled by SG) were submitted to our nominated geotechnical testing laboratories. Results of the geotechnical testing are presented within **Appendix E**.

6.5 Chemical Laboratory Testing

Selected samples (scheduled by SG) were submitted to our nominated chemical testing laboratories. Results of the chemical testing are presented within **Appendix D**.

6.6 Gas and Groundwater Monitoring

Gas monitoring has been undertaken in wells across the site. 6 No. monitoring visits have been made of 6 No. in accordance with CIRIA C665.

Groundwater monitoring and sampling from the cable percussion boreholes and the rotary cored boreholes has been undertaken on 3 No. separate occasions. Groundwater levels are presented in **Appendix F**.

6.7 Limitations

It should be noted that although every effort has been made to ensure the accuracy of the data obtained from the investigation, the possibility exists of variations in ground and groundwater conditions between and around the exploratory hole locations. In addition, groundwater levels and ground gas concentrations will vary seasonally and with changes in weather conditions.

7.0 GROUND CONDITIONS

Reference should be made to the individual exploratory hole logs presented in **Appendix B** for detailed descriptions of strata encountered at each location.

The ground conditions encountered at the site are summarised in the following sections.

7.1 Topsoil

No Topsoil was encountered on site.

7.2 Made Ground

Made Ground was encountered in all exploratory holes undertaken across the site to a depth of up to 11m and generally comprised of dark grey, reddish, brown, CLAY with varying amounts of sand, gravel and cobbles (slag, sandstone, shale, brick, concrete, mudstone). The soils have been interpreted as typical of colliery spoil / demolition materials encountered on former colliery sites. Made Ground was typically 3-10m in thickness.

7.3 Superficial Deposits

Superficial deposits were recorded in 16 No. of the exploratory holes and generally comprised Glacial Till comprising stiff, grey, brown gravelly Clay and laminated Clay. The gravel was typically fine to coarse angular sandstone. The deposit was typically 3-10m in thickness.

Superficial glacial clays were encountered within all rotary cored boreholes with the exception of RC01, RC02, RC11 and RC12 and was encountered at depths of between 6.4m bgl and 19.8m bgl.

7.4 Solid Deposits

Solid geology was encountered during the works within all 6 No. rotary open boreholes and 12 No. rotary cored boreholes as Red/Brown weathered Mudstone or Grey Yellow Sandstone / Mudstone. Whilst potential limestone bedrock was noted within the rotary open boreholes (drillers description) the rotary cored boreholes have confirmed that solid geology encountered beneath the site is Sandstone and Mudstone and no limestone was encountered.

Bedrock was encountered between 3.1m bgl and 14.8m bgl. Possible bedrock was encountered within the base of BH10 at 16.2m bgl. Bedrock was subsequently proven to the full depth of RO-02 at 21m bgl. Interbedded Limestone and Sandstone was encountered within RO-04 and RO-05 underlain by Mudstone and Sandstone respectively.

The rotary cored boreholes encountered sandstone, mudstone and siltstone from depths ranging from 5.39m bgl to 19.8m bgl and extended to a maximum depth of 25m bgl (where the majority of the rotary cored boreholes terminated).

As stated above, no deposits of limestone were encountered during the drilling of the rotary cored boreholes.

7.5 Groundwater

Groundwater strikes was encountered in 9 No. of the cable percussion boreholes (CP-01, CP-02, CP-03, CP-05, CP-06, CP-07, CP-11, CP-15 and CP-17) ranging in depth from 3.10m bgl to 10.6m bgl during drilling – considered to be isolated perched water within either the Made Ground or the Superficial deposits.

No groundwater was encountered during the drilling of the rotary open boreholes in April 2020., however the use of water flush inhibits the recoding of the water strikes / water table.

During the drilling of the rotary cored boreholes occasional perched water strikes were reported within the Made Ground and the shallow superficial deposits, with the water table being reported generally at 13-16m bgl at a level of 52-54m aOD. Groundwater has been recorded within all the shallow monitoring wells within the Made Ground / superficial (typically as a small volume collected with the base of the installation) with the highest groundwater level recorded at 4.50m bgl. It should be noted that groundwater levels will vary seasonally.

During the groundwater sampling visits limited groundwater was encountered within the cable percussion boreholes suggesting collection of water within the wells rather than a consisted perched water table (the boreholes were either purged dry during sampling or contained insufficient sample for testing).

Where shallow groundwater was encountered this was generally encountered as perched water above the underlying low permeability clays. The borehole logs and monitoring data suggest that the upper perched ground water is isolated from the lower deep groundwater within the underlying rock where the low permeability clays are present (the clays are absent towards the eastern part of the site in the vicinity of the proposed petrol filling station).

The more recently installed rotary cored boreholes have been monitored and sampled on 3 No. occasions.

The deep hydraulic gradient reported at the suggest that groundwater flow at the site appears to lie between 57.97maOD to 54.51m aOD. but with a general hydraulic gradient to the east from the west (broadly in line with the anticipated hydraulic gradient

Ground water strikes / levels were generally encountered during monitoring (of the deep boreholes) are summarised below.

Borehole with response zone with the underlying rock	Depth to standing water m aOD	Comments
RC01	57.23	Approximate Strike Similar to Monitoring Level
RC02	56.37	Approximate Strike Similar to Monitoring Level
RC04	54.51	Strike Similar to Monitoring Level
RC05	57.29	Strike Similar to Monitoring Level
RC06	56.40	Water Strike (rose to 60.59m aOD on monitoring – potential silting up of borehole)
RC07	56.27	Water Strike (rose to 63.96 m aOD on monitoring – potential silting up of borehole)
RC08	57.97	Water Strike (rose to 61.92m aOD on monitoring – potential silting up of borehole)
RC09	55.40	Strike Similar to Monitoring Level
RC12	55.28	Strike Similar to Monitoring Level

- RC03, RC10 and RC11 had response zones within the shallow soils.

Geological Sections through the site and a groundwater level contour plan are presented in **Appendix B** with groundwater monitoring levels presented in **Appendix F**.

7.6 Ground Obstructions / No Recovery / Voids

9 No. cable percussion boreholes encountered obstructions from 1mbgl to 8.5m bgl in the form of buried boulders and concrete. (Please see the exploratory logs for further information).

Poor core recovery was noted within the majority of the Rotary Cored boreholes (no loss of flush) and a void was noted within RC04 at between 5.0 and 6.5m bgl.

Poor recover was considered to be a result of destructive weathering of the underlying bedrock.

7.7 Observed Contamination

No significant visual or olfactory evidence of contamination was recorded during the site investigation works with the exception of ash, brick and concrete fragments observed as part of the Made Ground clay matrix. A very faint hydrocarbon odour was noted from TP-19 (subsequent laboratory analysis did not reported elevated concentrations of contaminants). It should be noted that TP301 was excavated within the same location as TP-19 during the most recent ground investigation works and no evidence of hydrocarbon contamination was noted.

No mobile hydrocarbon contamination was observed or noted during any phase of the ground investigation works.

During the hand pitting exercise (HP01 – HP07) and groundwater water monitoring which reported low concentrations of BTEX, VOCs and SVOCs, all samples were also tested for potential SVOCs and VOC contaminates using a handheld Mini Rae Photoionization Detector (PID) and as would be expected, based on the chemical analysis results all samples reported no VOCs.

No Light Non-Aqueous Phase Liquids (LNAPL) or Dense Non Aqueous Phase Liquids (DNAPL) were observed / recorded during all phases of ground investigations works and groundwater monitoring.

7.8 In-Situ and Laboratory Geotechnical Analysis

The following in-situ and laboratory geotechnical testing has been undertaken, the results of which are summarised in Table 7.8 (below) and are presented on logs and laboratory reports in full in **Appendices B and E** respectively.

Method	Strata	Parameter	Comments
Particle Size Distribution	Made Ground Strata	Clay/Silt =12-57% Sand = 6-70% Gravel =13-50% Cobbles =3-47%	PSD analysis indicates cohesive materials in Class 2C.
Standard Penetration Test (SPT)	Made Ground 0.0 m-10.50m	SPT 'N-Values' in range N=3 to N=50 (Avg range N=23)	SPTs confirm the Made Ground to be Medium Dense.
	Cohesive Superficial	SPT 'N-Values' in range	SPTs confirm the Glacial Till to be

	Strata 0.50m-2.50m	N=21 to N=42 (Avg range N=34)	Hard.
Undrained Shear Strength (Triaxial)	Made Ground 3.00m to 3.45m	Shear Strength (Cu) value 27kpa	Testing indicates that Made Ground to be locally soft in paces.
	Cohesive Superficial Strata 9.50m to 9.95m	Shear Strength (Cu) value 21kpa	Testing indicates the Glacial Till to be locally soft in places
Compaction (Dry Density / Moisture Content)	Made Ground 0.50m-2.50m	Optimum MC 7.7 to 14% Natural MC 13 to 25%	Made Ground is generally wet of optimum for earthworks and some drying treatment (lime) may be required.
Laboratory CBR	Made Ground	CBR Values – 3.9% to 54.6%	Design CBR of 5% for Made Ground Cohesive Design CBR of 15% for Made Ground Granular

Table 7.8 – Summary of In-Situ and Laboratory Geotechnical Testing undertaken.

3 No falling head tests were undertaken within CP01 (8.0m bgl) , CP04 (9m bgl) and CP16B (6.0m bgl) within the Made Ground. The ground conditions within the boreholes generally comprised Made Ground of dark grey, gravelly sandy Clay where the gravel includes fine to medium, angular coal, brick, sandstone, brick ash and slag (potentially colliery spoil). It is considered hat the ground conditions encountered within CP01, CP04 and CP16B are representative of the site Made Ground material (please see exploratory hole logs in **Appendix B** for confirmation).

All 3 No. falling head tests undertaken reported low coefficients of permeability in the order of $k=1.78e-8$ m/s to $k= 2.88e-8$ m/s (similar to a low permeable glacial till).

8.0 GROUND CONTAMINATION ASSESSMENT

8.1 Legislation

Part IIA of the Environmental Protection Act 1990 provides for the control of specific threats to health or the environment from existing land contamination. In accordance with the Act, the statutory guidance document and The Contaminated Land (England) Regulations 2000, the definition of contaminated land is intended to embody the concept of risk assessment. Therefore, land is only “contaminated land” where it appears to the regulatory authority, by reason of substances within, on, or under the land that:

Significant harm is being caused, or there is significant possibility of such harm being caused; or

Pollution of controlled waters is being, or is likely to be, caused.

The guidance defines “risk” as the combination of:

Probability, or frequency, of occurrence of a defined hazard (for example, exposure of a property to a substance with the potential to cause harm); and

Magnitude (including the seriousness) of the consequences.

For a risk of pollution or environmental harm to occur as a result of ground contamination, all of the following elements must be present:

Source, i.e. a substance that is capable of causing pollution or harm;

Receptor (or target), i.e. something which could be adversely affected by the contaminant; and

Pathway, i.e. a route by which the contaminant can reach the receptor.

If one of these elements is missing (source, pathway or receptor) there can be no significant risk. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

8.2 Assessment Methodology

In order to assess the environmental risk posed by potential contaminants within the underlying soils and groundwater to controlled waters, Shadbolt Group undertook an initial screen of the laboratory results using Shadbolt Group Tier One Screening Values which include the Atkins ATRISK Values (Human Health) Environmental Quality Standards (EQS) and Drinking Water Standards (DWS).

Contaminant concentrations below the TSVs are considered not to warrant further risk assessment. Concentrations of potential contaminants above the TSVs require further consideration of the potential pollutant linkages. *It should be noted that exceedance of the TSVs does not necessarily require that the site be remediated.*

8.3 Derivation of Soils TSVs

A discussion on the development of Shadbolt Group Human Health TSVs is presented, along with the relevant values at the time of writing in **Appendix C**.

8.4 Derivation of Leachate and Groundwater TSVs

The majority of the criteria utilised in the assessment of the site is presented in Table 6.2.1 and Table 6.2.2 below and are representative of the values published within UK Drinking Water Standard Guidelines taken from the "The Water Supply (Water Quality) Regulations 2016" and "Environmental Quality Standard for Freshwater", published by the EA. Where no UK criteria exists Shadbolt Group have referenced SWR - The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 3001 and WHO – World Health Organization Guidelines.

Inorganics ug/l					
Analyte	Guideline Value	Guidance Source	Analyte	Guideline Value	Guidance Source
Arsenic	10	UKDWS	Mercury	1	UKDWS
Boron	1,000	UKDWS	Nickel	20	UKDWS
Cadmium	5	UKDWS	Sulphate	250,000	UKDWS
Chromium	50	UKDWS	Selenium	10	UKDWS
Copper	2000	UKDWS	Zinc	3000	SWR
Cyanide	50	UKDWS	pH	6.5-9.5	UKDWS
Lead	10	UKDWS			

EQS (f) – Environmental Quality Standard for Freshwater, EA

UKDWS – UK Drinking Water Standard Guidelines taken from the "The Water Supply (Water Quality) Regulations 2016"

SWR - The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 3001

Table 6.2.1 – Inorganic Analytes

Organics ug/l					
Analyte	Guideline Value	Guidance Source	Analyte	Guideline Value	Guidance Source
Benzo(a)pyrene	0.01	UKDWS	Fluoranthene	0.0063	EQS (f)
Naphthalene	2	EQS (f)	Benzene	1	UKDWS
Acenaphthylene	5.8	WRc plc (2002), R&D Technical Report	Toluene	74	EQS (f)
Sum of 4 PAH Benzo(b)fluoranthene Benzo(k)fluoranthene Benzo(g,h,i)perylene Indeno(1,2,3-cd)pyrene	0.1	UKDWS	Ethyl benzene	300	WHO
TPH (Hydrocarbons)	10	UKDWS	Xylene	30	EQS (f)
C5-C6 (Ali)	1.5x10 ⁴	WHO	C5-C6 (Aro)	1	WHO
C6-C8 (Ali)	1.5x10 ⁴	WHO	C6-C8 (Aro)	700	WHO
C8-C10 (Ali)	3x10 ²	WHO	C8-C10 (Aro)	300 (ethylbenzne) 500 (xylene)	WHO
C10-C12 (Ali)	3x10 ²	WHO	C10-C12 (Aro)	90	WHO
C12 – C16 (Ali)	3x10 ²	WHO	C12 – C16 (Aro)	90	WHO
C16-C21 (Ali)	-	WHO	C16-C21 (Aro)	90	WHO
C21-C35 (Ali)	-	WHO	C21-C35 (Aro)	90	WHO

EQS (f) – Environmental Quality Standard for Freshwater, EA

UKDWS – UK Drinking Water Standard Guidelines taken from the “The Water Supply (Water Quality) Regulations 2016”

SWR - The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (as amended). SI 1996 / 2001

WHO – World Health Organization Guidelines

Table 6.2.2 Organic Analytes

8.5 Soil Contamination Assessment

In total 70 No. soil samples were submitted for testing for a suite of common contaminants during the several phases of Shadbolt Group ground investigations.

The laboratory chemical results have reported concentrations of potential contaminants to be within / below SE TSVs for a Commercial end use (human health criteria).

Soils analyses undertaken which reported concentrations above laboratory detection limit but beneath the human health criteria for a commercial enduse included heavy metals and metalloids, Cyanide, sulphate, Total

Petroleum Hydrocarbons, Polyaromatic Hydrocarbons, occasional VOCs and SVOCs.

The potential for soils contamination to impact groundwater resources is dictated by the leachability of the soils located at the site and the potential for the soils to come into contact with water.

Leachate contamination assessment is discussed in **Section 8.6**.

8.5.1 Soils Statistical Assessment

Statistical Assessment for human health is not required due to the low concentrations of contaminants reported.

8.6 Leachate Contamination Assessment

Leachate analysis undertaken on soils (17 No.) retrieved from the site has reported low concentrations of contaminants below the laboratory detection limits and compared to Threshold Values for Groundwater. However, several contaminants were reported to be slightly elevated when compared to Threshold Values as shown in the table below.

Analyte	Concentration ug/l	EQS Surface Water (ug/l)	Multiple of Threshold	UK Drinking Water Standards (ug/l)	Multiple of Threshold	Location / Strata
Fluoranthene	1.1	0.0063	x 174	N/A		TP209 @ 1.5m bgl (Made Ground)
	0.01		1.6			RC01@4.76-4.89mbgl (Made Ground)
	0.03		4.8			RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		1.6			RC06 @ 5.0-5.2m bgl(Glacial Till)
Benzo (b)fluoranthene	0.6	N/A	N/A	0.1 (sum of 4)	x6	TP209 @ 1.5m bgl (Made Ground)
	0.13					1.3
Benzo(a)pyrene	1.8	0.0017	x1058	0.01	x180	TP209 @ 1.5m bgl (Made Ground)
	0.06					

Table 8.6.1 - Leachate Analysis Above TSVs Summary Table

Several contaminants were also reported to be above the laboratory detection limit and are as follows;

Analyte	Concentration (ug/l)	Lab' L.O.D (ug/l)	Location
EPH (C10-C40)	29	10	RC01 @ 4.76-4.89m bgl (Made Ground)
	69		RC02 @ 5.5-5.6m bgl (Made Ground)
	120		RC11@0.1-0.2m bgl (Made Ground)
	97		RC12@0.5-0.6m bgl (Made Ground)
	21		TP209 @ 1.5m bgl (Made Ground)
Acenaphthene	0.02	0.01	RC08 at 5.6-5.7m bgl (Made Ground)
	0.03		RC08 @ 6.5-6.6m bgl (Glacial Till)
	0.00.01		RC12@0.5-0.6m bgl (Made Ground)
Fluorene	0.04	0.01	RC01 @ 6.23m-6.4m bgl (Mudstone)
	0.02		RC02 @ 5.5 -5.6m bgl (Made Ground)
	0.01		RC08 at 5.6-5.7m bgl (Made Ground)
	0.02		RC08 @ 6.5-6.6m bgl (Glacial Till)
Phenanthrene	0.01	0.01	RC01 @4.76-4.89m bgl (Made Ground)
	0.02		RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.02		RC08 at 5.6-5.7m bgl (Made Ground)
	0.09		RC08 @ 6.5-6.6m bgl (Glacial Till))
	0.01		RC11@0.1-0.2m bgl (Made Ground)
	0.02		RC12@0.5-0.6m bgl (Made Ground)
	0.4		TP209 @ 1.5m bgl (Made Ground)
Anthracene	0.03	0.01	RC08 @ 6.5-6.6m bgl (Glacial Till)
	0.01	0.01	RC11@0.1-0.2m bgl (Made Ground)
	0.01	0.01	RC12@0.5-0.6m bgl (Made Ground)
Fluoranthene	0.01	0.01	RC01 @4.76-4.89m bgl(Made Ground)
	0.03		RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		RC06 @ 5.0-5.2m bgl (Glacial Till)
	0.01		RC11@0.1-0.2m bgl (Made Ground)
	0.02		RC12@0.5-0.6m bgl (Made Ground)
	1.1		TP209 @ 1.5m bgl (Made Ground)
Pyrene	0.02	0.01	RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		RC11@0.1-0.2m bgl (Made Ground)
	0.02		RC12@0.5-0.6m bgl (Made Ground)
	0.9		TP209 @ 1.5m bgl (Made Ground)
Chrysene	0.01	0.01	RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.4		TP209 @ 1.5m bgl (Made Ground)

Table 8.5.2 -Leachate Analysis Above Laboratory Detection Limit Summary Table

As can be seen several of the samples retrieved reported concentrations of PAH above laboratory detection limit but where no Shadbolt TSV currently exists.

8.6 Groundwater Contamination Assessment

No significant groundwater strikes were encountered during the initial ground investigations and insufficient groundwater was encountered initially within the cable percussions monitoring standpipes to retrieve representative samples.

However recent monitoring off the boreholes has enable the retrieval of water samples from BH01, BH02, BH03 and BH10 and RC01 to RC12. The remainder of the cable percussion boreholes remained dry.

Analyte	Concentration ug/l	EQS Surface Water (ug/l)	Multiple of Threshold	UK Drinking Water Standards (ug/l)	Multiple of Threshold	Location / Response Zone
Selenium	11.5 - 60.01	N/A	N/A	10	x1 – x6	BH01, BH04 and BH10 (all Made Ground / Glacial Till - Elevated concentrations reported during 3 No. monitoring visits)
Naphthalene	7.7	2	3.85	N/A	N/A	RC12 (Visit No.1) - Sandstone
Benzo(b)fluoranthene	7.7	N/A	N/A N/A N/A N/A	0.1	x77	RC12 (Visit No.1) - Sandstone
Benzo(k)fluoranthene	4.3	N/A	N/A	0.1	x43	RC12 (Visit No.1) - Sandstone
Benzo(ghi)perylene	3.0	N/A	N/A	0.1	x30	RC12 (Visit No.1) - Sandstone
Indendo(123CD)pyrene	3.8	N/A	N/A	0.1	x38	RC12 (Visit No.1) - Sandstone
Benzo(a)pyrene	0.4 0.04 7.2	0.00017	x 2352 x 235 x 42352	0.01	x40 x400	BH10 (1 st monitoring visit only) RC11 (Visit No. 2) – Sand RC12 (Visit No.1) - Sandstone
Fluoranthene	0.2-0.3 0.03 0.12, 0.07 15, 0.03 1.3	0.0063	x47 x33 x19 x5 x2380 x33 x206	N/A	N/A	BH01, BH02, BH03 (1 st monitoring visit) RC08 (visit No.3) RC11 (Visit No.2 and 3) – Sand / Sandstone RC12 (Visit No.1 and 3) – Sandstone RC07 (visit No.3)

Table 8.6.1 - Groundwater Analysis Above TSVs Summary Table

Analyte	Concentration (ug/l)	Lab' L.O.D (ug/l)	Location / Response Zone
EPH (C10-C40)	<20 to 410 <20 to 15,000	10	RC01 to RC12 (Visit No. 1) RC01 to RC12 (Visit No. 2)
Acenaphthene	0.04 0.04 0.01 2.8 0.02 0.02 0.66	0.01	RC01 (Visit No. 1) - Sandstone RC10 (Visit No. 1) - Made Ground RC11 (Visit No. 1) - Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) - Sand / Sandstone RC08 (Visit No.3) - Mudstone RC07 (Visit No.3) - Clay / Mudstone
Fluorene	0.02 4.0 0.02 0.02 0.88	0.01	RC10 (Visit No. 1) - Made Ground RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) - Sand / Sandstone RC08 (Visit No.3) - Mudstone RC07 (Visit No.3) - Clay / Mudstone
Phenanthrene	0.02 0.02 0.04 0.06 0.06 0.04 27 0.03 0.06 0.03 0.06 0.02 0.3 0.2 0.03 0.02 0.04 0.02 1.3	0.01	RC01 (Visit No. 1) - Sandstone RC03 (Visit No. 1) - Made Ground RC04 (Visit No. 1) - Siltstone/ Sandstone RC05 (Visit No. 1) - Sandstone RC10 (Visit No. 1) - Made Ground RC11 (Visit No. 1) - Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC01 (Visit No. 2) - Sandstone RC05 (Visit No. 2) - Sandstone RC10 (Visit No. 2) - Made Ground RC11 (Visit No. 2) - Sand / Sandstone RC12 (Visit No. 2) - Sandstone BH01 (Visit No.1) - Made Ground BH10 (Visit No.1) - Made Ground RC08 (Visit No. 3) - Mudstone RC09 (Visit No. 3) - Siltstone RC11 (Visit No. 3) - Sand / Sandstone RC12 (Visit No.3) Sandstone RC07 (Visit No.3) - Clay / Mudstone
Anthracene	0.01 2.9 0.03 0.03 0.02 0.88	0.01	RC11 (Visit No. 1) - Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) - Sand / Sandstone RC08 (Visit No.3) - Mudstone RC11 (Visit No. 3) - Sand / Sandstone RC07 (Visit No.3) - Clay / Mudstone
Fluoranthene	0.02 0.01 0.02 0.05 15 0.02 0.12 0.02 0.03 0.07 0.03 1.0	0.01	RC04 (Visit No. 1) - Siltstone/ Sandstone RC05 (Visit No. 1) - Sandstone RC10 (Visit No. 1) - Made Ground RC11 (Visit No. 1) - Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC10 (Visit No. 2) - Made Ground RC11 (Visit No. 2) - Sand / Sandstone RC12 (Visit No. 2) - Sandstone RC08 (Visit No. 3) - Mudstone RC11 (Visit No. 3) - Sand / Sandstone RC12 (Visit No.3) Sandstone RC07 (Visit No.3) - Clay / Mudstone
Pyrene	0.02 0.03 0.08 20 0.02 0.3 0.2 0.3 0.06 0.1 0.03 2.8	0.01	RC05 (Visit No.1) - Sandstone RC10 (Visit No. 1) - Made Ground RC11 (Visit No. 1) - Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC05 (Visit No.2) - Sandstone BH01 (Visit No. 1) - Made Ground BH02 (Visit No. 1) - Made Ground BH10 (Visit No. 1) - Made Ground RC08 (Visit No. 3) - Mudstone RC11 (Visit No. 3) - Sand / Sandstone RC12 (Visit No.3) Sandstone RC07 (Visit No.3) - Clay / Mudstone
Chrysene	7.6 0.06 0.2 0.03 0.02 0.78	0.01	RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) - Sand / Sandstone BH10 (Visit No. 1) - Made Ground RC08 (Visit No. 3) - Mudstone RC11 (Visit No. 3) - Sand / Sandstone RC07 (Visit No.3) - Clay / Mudstone

Table 8.6.2 - Groundwater Analysis Above Laboratory Detection Limit Summary Table

All other chemical analysis results, including BTEX, VOCs, PCBs and PAHs were reported to be below the laboratory detection limits “with the exception of several VOC’s” i.e. di-n-butyl phthalate, bis(2-ethylhexyl)ester, bis(2-ethylhexyl)phthalate and chloroform.

The leachate analysis table and the groundwater analysis table show elevated leachable hydrocarbons in the soils whilst elevated selenium and hydrocarbons were recorded within the groundwaters.

As such, it appears that the deep groundwaters have been slightly impacted with dissolved phase PAH hydrocarbons, in places.

9.0 ENVIRONMENTAL RISK ASSESSMENT

All available data has been collated and evaluated to establish an initial conceptual model of the site in its current condition and post development identifying sources, pathways and receptors and pollutant linkages. The conceptual site model has been developed in accordance with BS10175: 2011. A pictorial representation of the Conceptual Site Model is presented in **Appendix B**.

The site is to be developed for a supermarket (Unit 1), retail unit (Unit 2) and petrol filling station and a Tier 1 risk assessment has been undertaken using the appropriate guidelines for a COMMERCIAL end use as this represents the most sensitive receptor in the proposed development.

It is understood that the main superstructures of the supermarket are to be piled to approximately 15m bgl with the foundations for the retail unit to be vibro replacement columns (typically 5m deep) with the Petrol Filling Station utilising a raft foundation. Please note that there are no below ground fuel tanks proposed within the development.

Formal drainage is to be adopted for the site as a whole and the fuel tanks associated with the petrol filling station are to be located above ground with appropriate pollution / drainage management system incorporated into the design. It is understood that the PFS is to be constructed utilising a raft foundation.

The superficial strata located beneath the site are designated as Secondary (A), Secondary (Undifferentiated) and Unproductive aquifers. Formerly classified as minor aquifers, Secondary (A) Aquifers comprise 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.

The solid geology located beneath the site is designated as Principal and Secondary (A) Aquifers; Principal Aquifers comprise of high intergranular and fracture permeability, usually providing a high level of water storage and may support water supply to rivers on a strategic scale. This includes the Yellow Sand Formation which is designated as a Principal Aquifer by the Environment Agency. The easternmost part of the site is also located within a Zone 3, Total Catchment Source Protection Zone and relates to the Yellow Sand Formation.

As can be seen in figure 10.1 below the principal aquifer encroaches into the site and is partially located beneath Unit 1 and Unit 2. However, Unit 1 and Unit 2 are out with the groundwater source protection zone.

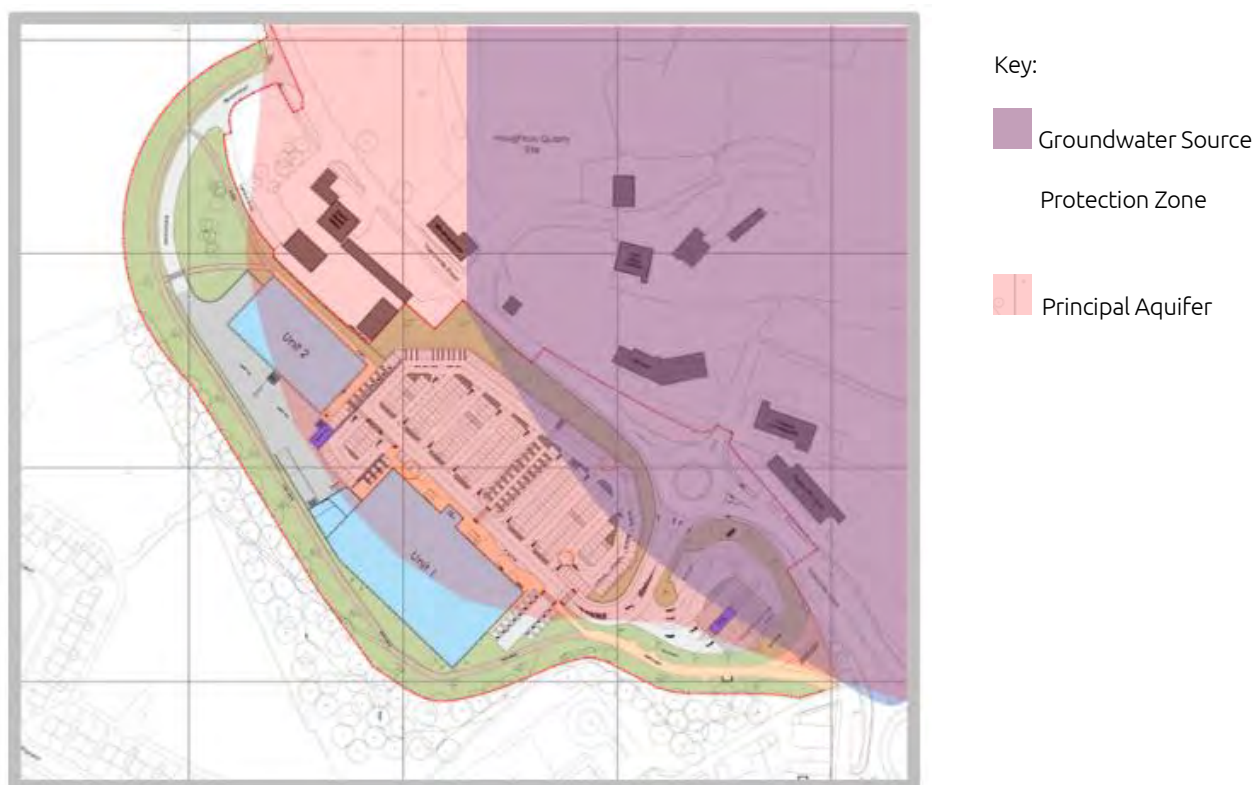


Figure 10.1 – Overlay of Development / Principal Aquifer and Groundwater Source Protection Zone

9.1 Contamination Sources

Potential Sources

Given the site history and the current topography Made Ground is considered to be present across the site in deposits remaining from former spoil heaps, inert waste materials and potential buried former tanks.

The industrial legacy of the site and surrounding areas, give an increased potential for contaminants to be present in any Made Ground or within the fabric of the underlying bedrock. Considering the site and surrounding areas history, potential contaminants may include;

- Polyaromatic Hydrocarbons (PAHs)
- Phenols
- Total Petroleum Hydrocarbons (both aliphatic and aromatic)
- Volatile and semi-volatile organic compounds (VOS's and SVOCs)
- Benzene, Toluene, Ethyl-Benzene Xylene (BTEX Compounds)
- Methyl tert-butyl ether (MTBE)
- Polychlorinated biphenyls (PCBs)
- Asbestos,
- Heavy metals and metalloids
- Pesticides
- inorganic compounds (pH, sulphates, sulphur, cyanides)
- Coal Tars, Alcohols, glycols, chlorides, nitrogen, herbicides and pesticides.

The potential also exists for deeper Made Ground associated with the colliery and more recent landfilling of the mine shafts and railway cutting including potentially biodegradable materials or naturally occurring organic

material in adjacent superficial strata resulting in the potential for 'landfill' gas production by the burial and decomposition of organic material.

However, it should be noted that the site was previously an inert landfill and significant contamination is not anticipated within these fill materials.

Actual Sources

In total, 70 No. soil samples, 17 No. leachate samples and 51 No. water samples were submitted for testing for a suite of common contaminants from the SG ground investigations. The majority of samples tested have either reported concentrations of contaminants below Shadbolt Group TSVs or below the laboratory detection limit.

The laboratory chemical results report all soil samples to be within the TSVs and therefore no further assessment is required.

Leachate analysis has reported low concentrations of contaminants except for slightly elevated, Fluoranthene, Benzo (b)fluoranthene and Benzo(a)pyrene reported within the Made Ground and superficial deposits

Ground water analysis has been undertaken on samples retrieved from 17 No. boreholes and has reported slightly elevated concentrations of Selenium and PAH's.

Considering the chemical testing undertaken to date and the prevailing ground conditions it is unlikely that any significant contamination will be encountered during foreseeable works or post-development occupation (Hardstanding's and building as part of the commercial development will effectively act as a barrier between future site users and the Made Ground beneath; however, it is possible that instances of contaminants may be present on site through made ground, leakages, spillages, localised historic importing of contaminants or soils or unrecorded fly-tipping of wastes.

9.2 Potential Contaminant Pathways

The following potential contaminant pathways are proposed considering the proposed end-use(s).

- Inhalation of dust and volatile contaminants
- Direct contact (ingestion and dermal contact)
- Leaching of contaminants and migration through permeable soils
- Groundwater migration
- Migration through service conduits
- Migration through the local drainage network
- Leakage from site drainage
- Surface water run-off
- Ground gas migration
- Plant root up-take

9.3 Potential Contamination Receptors

The potential receptors listed below are proposed considering the current status of the site and surrounding area, and the proposed development for commercial end use.

Human Health

- Current site users.

Environmental

- Future establishment of flora and fauna.

- Future site users.
- Site development workers.
- Buildings and underground services.
- Controlled waters and aquifers.

9.4 Qualitative Risk Assessment

By considering the sources, pathways and receptors, an assessment of the environmental risks is made with reference to the significance and degree of the risk to the development for current and future site users.

The qualitative risk assessment has been undertaken in accordance with BS10175:2011 and CIRIA Document C552: Contaminated Land Risk assessment, A Guide to Good Practice.

The risk assessment has been carried out by assessing the severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the target, based on the categories given in Table 9.4.1 below.

<i>Category</i>	<i>Definition</i>
Severe	Acute risks to human health, catastrophic damage to buildings / property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures
Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species

Table 9.4.1 – Definition of Risk Severity

The likelihood of an event (probability) takes into account both the presence of the hazard and target and the integrity of the pathway and has been assessed based on the categories given in Table 10.4.2 below.

<i>Category</i>	<i>Definition</i>
High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low Likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

Table 9.4.2 – Definition of Risk Probability

The potential severity of the risk and the probability of the risk occurring have been combined in accordance

with the following matrix in order to give a level of risk for each potential hazard, given in Table 10.4.3 below.

		<i>Potential Severity</i>			
		<i>Severe</i>	<i>Medium</i>	<i>Mild</i>	<i>Minor</i>
<i>Probability of Risk</i>	<i>High Likelihood</i>	Very high	High	Moderate	Low/Moderate
	<i>Likely</i>	High	Moderate	Low/Moderate	Low
	<i>Low likelihood</i>	Moderate	Low/Moderate	Low	Very low
	<i>Unlikely</i>	Low/Moderate	Low	Very low	Very low

Table 9.4.3 – Risk Matrix of Potential Hazard

The contamination risk assessment for the site based on identified sources is presented in Table 10.4.4. Further discussion of the more significant pollutant linkages is provided in a discussion below for each receptor in turn.

Hazard / Pollutant	Source	Pathway	Receptor	Potential severity	Probability of risk	Level of risk		
<p>The site has been historically associated with industrial uses including Made Ground / Colliery / Inert Landfill History with associated railway land, on-site landfill sites and adjacent quarrying / landfill, tip, spoil heaps, garages, petrol station and former gas works.</p> <p>The ground investigations have identified the following contamination sources</p> <ul style="list-style-type: none"> • Polyaromatic Hydrocarbons (PAHs) 	Potential Made Ground, former and current off-site and on-site sources.	Inhalation, Dermal contact and Ingestion	Future site users, future buildings and structures.	Medium	Unlikely	Low		
		Inhalation, Dermal contact and Ingestion	Development workers.	Medium	Low Likelihood	Low/Moderate		
		Root Uptake	Plants	Minor	Low likelihood	Very Low		
		Contaminated Groundwater Migration	Secondary (A) Aquifer	Mild	Low Likelihood	Low		
			Principle Aquifer (The Yellow Sand Formation)	Medium	Low Likelihood	Low/Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Leaching of Soil Contamination	Secondary (A) Aquifer	Mild	Low Likelihood	Low		
			Principle Aquifer (The Yellow Sand Formation),	Medium	Low Likelihood	Low/Moderate		
			Culvert / Water Course	Medium	Unlikely	Low/		
		Migration through service conduits, Foundations, drainage solutions	Secondary (A) Aquifer	Mild	Low Likelihood	Low		
			Principle Aquifer (The Yellow Sand Formation)	Medium	Low Likelihood	Low/Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Surface Run-off	Secondary (A) Aquifer	Mild	Low Likelihood	Low		
			Principle Aquifer (The Yellow Sand Formation)	Medium	Low Likelihood	Low/Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Volatilisation (vapour phase migration and partitioning into sorbed / dissolved phase).	Secondary (A) Aquifer	Mild	Low Likelihood	Low		
			Principle Aquifer (The Yellow Sand Formation)	Medium	Low Likelihood	Low/Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Hazardous gas and volatile compounds	Migration from possible Made Ground and buried organic soils	Inhalation, Explosion	Future site users, Structures	Medium	Low Likelihood	Low
					Site development workers	Medium	Unlikely	Low

Table 9.4.4 – Contamination Risk Assessment

9.4.1 Current and Future Site Users

Potential pathways considered significant to current and future site uses are dermal contact, ingestion of impacted soils and inhalation of dusts and vapours.

The site is currently well vegetated and used by dog walkers. No soils are exposed at the surface, and it is considered that the risk to existing site users is **LOW**.

The majority of the site is likely to be covered with hardstanding's and building which will effectively break the pathway from isolated potential contaminants and future site users.

Based on the chemical analysis data it is considered that the site presents a **LOW** risk to future site users from the soils located at the site, subject to a commercial hard standing end use being developed.

Whilst the Made Ground has reported low concentrations of contaminants, texturally the soils are not suitable to be located at near surface depths within landscaped areas and topsoil should be imported for grass verges etc.

9.4.2 Ground Excavation / Development Workers

It is considered that the risk to construction and/or maintenance workers during redevelopment works is **LOW / Moderate** owing to identified concentrations of contaminants. As the site is going to developed for commercial end use a major part of the ground will be hardstanding with the exception of landscaping areas which will locally require a clean cover layer. The made ground around future services should be replaced with clean soil to prevent contact with groundworkers.

Site development workers should remain vigilant for any evidence of potential contamination. Should any materials be suspected of being contaminated work should cease and specialist environmental advice obtained.

9.4.3 Controlled Waters

9.4.3.1 Underlying Aquifer

The site is located upon a Secondary (A) Aquifer and Principal Aquifer (The Yellow Sand Formation) and of these two aquifers the protection of the principal aquifer with associated groundwater protection zone is of paramount importance. The geological and hydrogeological plans for the site suggest that the northeastern part of the site lies within the groundwater protection zone whilst the majority of the building's footprints appear to be located within the secondary aquifer (Coal Measures Strata).

Prior to the ground investigations being undertaken at the site it was not known if there is a competent thickness of low permeable superficial strata located beneath the site that would protect the groundwater protection zone and restrict the potential for potential mobile contamination (impacted groundwater, leachate from soils contamination, dense / light non-aqueous phase liquids (DNAPL and LNAPL)) and potentially volatilised hydrocarbons that may exist to migrate vertically downwards and impact the underlying principal aquifer.

The exploratory holes undertaken at the site have generally encountered Made Ground overlying, glacial till which in-turn was underlain Mudstone or Sandstone (Coal Measures Strata). Low permeability clay was encountered across much of the site but was absent in RC11 (no returns likely to be sand /clay) and RC12 which encountered Made Ground directly overlying bedrock within the centre of the site where future car

parking is to be constructed.

The majority of samples tested from the shallow perched waters and the deep waters within the underlying rock have reported low concentrations of contaminants with the significant majority reported to be below laboratory detection limits (PCB's, SVOCs, VOCs, BTEX and MTBE).

However, elevated concentrations of PAH contaminants above UKDWS have been reported within the underlying Coal Measures Strata within RC11 and RC12 (Sand) and elevated Selenium within BH10 within the Made Ground.

The initial groundwater sample retrieved from RC12 has reported significantly elevated concentrations of PAH (benzo(a)pyrene at 7.2ug/l for example) above UKDWS during the initial groundwater visit and this coincides with the absence of glacial till beneath the Made Ground, suggesting that mobile contaminants may have migrated vertically downwards through the Made Ground and into the underlying bedrock. The shallow / perched water table is separate and distinct from the deeper groundwater table where the low permeable glacial till exists and acts as a barrier to vertical migration. It should be noted, however, that the elevated concentrations have not been reported consistently across the monitoring visits indicating that the sources of the elevated concentrations of contaminants are limited in volume.

When the site is developed the majority of the site will be covered with hardstanding's, buildings with formal drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and impact on the underlying aquifers will be significantly reduced.

The underlying glacial till where encountered beneath the Made Ground will also act as a barrier to downward migration further restricting the potential for the underlying aquifers to be impacted by the soils located at the site (permeability reported to be of $k=1.78e-8$ m/s to $k=2.88e-8$ m/s). It should be noted that glacial till was not located towards the eastern part of the site and a low permeable barrier is not present across the entire site.

Whilst it is acknowledged that Unit 1 is to be piled and Unit 2 to be constructed using vibro stone columns and founded within the underlying clays and Mudstone / Sandstone, the units are not located within a groundwater protection zone and no limestone (SPZ) has been reported within the more detailed rotary cored boreholes. Groundwater monitoring of the boreholes within the footprint of the units have not reported elevated concentrations of contaminants within the groundwater and limited elevated concentrations of leachate have been reported within the above Made Ground.

Further assessment should be carried out should significant mobile contamination be encountered during the development works. However, no significant source of mobile contamination has been reported at the site and limited pathways exist to impact on the underlying aquifer and controlled waters.

The foundation solution of the future development of Unit 1 and Unit 2 has the potential to provide preferential pathways for potential mobile contaminants to migrate vertically downwards, however, the combined soils, leachate and groundwater analysis has shown that there are limited sources of mobile contamination located at the site which would impact the underlying aquifers.

Therefore, it is considered that there is a **low to moderate** risk of the underlying aquifers being impacted by mobile contamination at the site based on the following;

- the elevated concentrations of leachate and groundwater concentrations have been reported within isolated boreholes and the majority of potentially mobile contaminants have been reported below UKDWS and below laboratory detection limits.
- the thickness of low permeability clays reported beneath the site which will partially protect the underlying aquifer.
- the proposed hardstanding end use which will restrict infiltration from entering the site and minimise downward vertical migration of potential contaminants.

It is considered that during the piling / development works that groundwater monitoring is undertaken throughout the construction works and prior to occupation to confirm that no mobile contaminants have impacted the underlying aquifer.

9.4.3.2 Water Courses

The exploratory holes undertaken at the site have generally encountered Made Ground overlying, glacial till which in-turn was underlain Mudstone or Sandstone (Coal measures Strata) and occasional elevated concentrations of PAHs within leachate and within groundwater analysis has been reported above EQS standards.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is considered to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, unidentified dense / light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.

The site is currently vacant and no surface water drainage and or service ducts are known to exist at the site and therefore it is unlikely that potential mobile contaminants could currently migrate and impact surface waters via service conduits and existing site drainage and surface run off.

When the site is developed most of the site will be covered with hardstanding's, buildings with formal drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and migrate towards local watercourses will be further significantly reduced.

It is considered that during the piling / development works that groundwater monitoring is undertaken throughout the construction works and prior to occupation to confirm that no mobile contaminants have impacted the underlying aquifer.

It is considered that there is a **LOW** risk of potential contamination migrating and impacting local water courses. Assuming the culverted watercourse is in a good state of repair this risk maybe reduced to **VERY LOW**.

No significant mobile contamination has been reported at the site and it is considered that the risk of mobile contamination migrating onto the site from the historical gasworks area to the southeast is LOW (local hydraulic gradient to the east). Whilst the potential does exist for hydrocarbons to migrate onto the site from the adjacent petrol filling station no evidence has been reported during the ground investigations and it is likely that the petrol station is fitted with appropriate leakage alarm system. It is considered that the risk of mobile contamination migrating onto the site from the adjacent petrol filling

station is LOW

9.4.4 Flora

Low contaminant concentrations have been reported at shallow depth across the site and it is therefore considered that there is **LOW** risk to the establishment of flora at the site. The natural materials present on site are considered suitable for reuse in any proposed soft landscaping or private gardens at the site. Before work commences any topsoil should be removed and stockpiled for reuse.

9.4.5 Future Developments including Buried Structures and Services

The risk to encountering buried structures and services (i.e. possible migration of contamination within service corridors) is considered to be **MODERATE** due to the sites industrial history.

10.0 GROUND GAS

10.1 Gas Monitoring

Ground gas and water monitoring wells have been monitored in accordance with CIRIA C665 and BS8576:2013.

10.2 Gas Risk Assessment

CIRIA have developed a characterisation system for all buildings except for low-rise housing developments with a clear ventilated sub-floor void. Low-rise housing developments are generally covered by the NHBC's "Guidance on Evaluation of Development Proposals on Sites where Methane and Carbon Dioxide are Present".

The CIRIA system as detailed in CIRIA Report C659, is a risk-based system which compares gas emission rates to generic Characteristic Situations (CS) derived and expanded on from CIRIA 149. The NHBC guidance uses a concept of 'Traffic Lights' developed by Boyle and Witherington for the assessment of gas emission rates for a residential development.

Each methodology utilises 'Typical Maximum Concentrations' for initial screening purposes and the development of risk-based Gas Screening Values (GSVs) for consideration when the Typical Maximum Concentrations are exceeded. The GSVs are calculated by multiplying the borehole flow rate by the concentration in the air stream of the particular gas being considered.

The Traffic Light and Characteristic Situation systems have been designed for both methane and carbon dioxide, with the worst-case value adopted for assessment. The relevant assessment tables from each methodology referenced below are presented in Appendix F for clarity.

Ground Gas Monitoring Data

6 No. of the scheduled 6 No. monitoring visits have been undertaken and monitoring is considered to be complete. The gas monitoring results are presented in **Appendix F**.

The maximum Methane and Carbon Dioxide emissions, which are representative of the Typical Maximum Concentrations, were as follows:

Methane:	0.0% v/v
Carbon Dioxide:	8.4% v/v

The maximum recorded concentration of methane was 0.0% v/v, however 0.1% v/v will be used for calculations as this is the limit of detection of the instrument.

The maximum recorded concentration of carbon dioxide was 8.4% (peak and steady). Carbon dioxide concentrations at this location (CP-10) and the associated reduced oxygen concentrations may be related to microbial aerobic respiration within the borehole following the increase in available oxygen.

The maximum recorded positive flow rate in the boreholes was 0.0 l/hr, however 0.1 l/hr will be used for calculations as this is the limit of detection of the instrument.

The calculated GSVs for Methane and Carbon Dioxide are as follows:

Methane: $(0.1/100) \times 0.1 = 0.0001 \text{ l/hr}$

Carbon Dioxide: $(8.4/100) \times 0.1 = 0.0084 \text{ l/hr}$

When monitoring data to date is compared to the values in Table 8.5 in CIRIA Report C659, the site is classified as: Characteristic Situation 2 (CS2).

Gas monitoring results are presented within **Appendix F**.

10.3 Gas Protection Measures

BS8485:2015, "Code of Practice for the Design of Protective Measures for Methane and Carbon Dioxide Ground Gases for New Buildings" sets out a methodology for determining an appropriate level of protection against ground gases in respect of the Characteristic Situation classification and the proposed building type.

For any non-residential properties the methodology in BS8485 should be followed through Tables 3 to 7 inclusive which are presented in Appendix F for reference. In working through the tables the development is categorised by Building Type; a Minimum Gas Protection Score is determined by Characteristic Situation of the site under C665 and Building Type; and Gas Protection Scores are calculated based on proposed/required structural barrier, ventilation details and gas resistant membrane.

The proposed development is predominantly Type-C commercial buildings spread throughout the site.

For a Type C building on a site with a CS2 gas regime a **Gas Protection Score of 2.5** is required, i.e. gas protection measures are required with respect to carbon dioxide.

10.4 Discussion

Using calculated GSVs for Carbon Dioxide, both of the assessment methods classify the site as low risk classification, e.g. CS2 with a proposed Type C development.

Specific ground gas protection measures are required for developments at the site with respect to Carbon Dioxide.

The risk from Carbon Dioxide affecting the property (Type C Building) with characteristic Situation 'CS2' is assessed as 'Low Risk'. The development requires a 2.5 gas protection score according to the 'Code of Practice for the Design of Gas Protective Measures for Methane and Carbon Dioxide for New Buildings'.

This can be achieved by a cast in situ ground bearing floor slab to give a score of '0.5' and a gas resistant membrane to give a score of '2' which gives a total score of '2.5'.

The assessment with respect to Methane and Carbon Dioxide will be reviewed on completion of the scheduled monitoring.

11.0 ENGINEERING CONSIDERATIONS

11.1 Proposed Development

The site is to be developed for a commercial (supermarket and mixed use) end use with associated infrastructure.

11.2 Ground Obstructions

3 No. mining shafts were known to be located on site. 2 No. of the shafts are located clearly on the site and their positions have been recorded and their treatment is known. However, the third mine shaft is located within dense vegetation along the northeast boundary and has been investigated and believed to have been encountered (see **Appendix H**).

During the ground investigations works 9 No. boreholes (of the 30 No. drilled) encountered obstructions in the form of buried boulders, concrete, and concrete posts which may impact on future piling works.

Obstructions may also preclude the use of vibro-stone columns as a viable foundation solution as columns may be required to be pre-bored in order for the development to proceed on a more assured basis. It is recommended that a specialist vibro stone column contractor is contacted to confirm if a vibro stone column solution is viable.

11.3 Coal Mining

The Coal Authority report obtained for the site confirms that workings have been undertaken at depth beneath the site and that 3 No. shafts are recorded within the site boundary. 2 No. shafts have been treated and capped and third has been backfilled to an unknown specification.

From initial consultation with the Coal Authority any development undertaken close to or over the existing shafts would depend on confirmatory investigation of the shafts but otherwise the risk to developments at the site because of underground mine workings for the extraction of coal is considered to be negligible. Development undertaken within 20m of the mine entry should be in agreement with the Coal Authority.

All 3 No. shafts have been investigated with the findings included within **Appendix H**. It is considered that the 2 No. shaft located within the centre of the site are in good condition and no further significant works maybe required (subject to Coal Authority agreement). The third shaft located within the trees adjacent to the northern boundary appears to have a very thin cap installed and will require treatment in the same manner as the two central shafts and a new cap constructed.

The following table (**Table 8.1**) represents the coal mining risk assessment based on published data including the Coal Authority Mining Report obtained for the site, BGS mapping and the Coal Authority's online map viewing system and ground investigations undertaken at the site.

Coal Mining Issue	Risk Factor?	Risk Assessment
Past Underground Mining	No	<p>Coal Authority data and geological plans indicate that no <u>shallow</u> mine workings have been undertaken within the site boundary.</p> <p>Risk to developments at the site from recorded shallow mine workings is considered to be NEGLIGIBLE.</p>
Underground Coal Mining (probable unrecorded shallow workings)	No	<p>The Coal Authority do not consider the site to be within an area where unrecorded shallow mine workings may be present.</p> <p>Risk to developments at the site from unrecorded shallow mine workings is considered to be NEGLIGIBLE.</p>
Recorded Workings	Yes	<p>There are 37 records of underground mining within the zone of influence of the site. These range in depth from 122m bgl to 313m bgl within seams including the Main, Yard, Maudlin, Low Main, Harvey, Hutton and Busty.</p> <p>These workings are all recorded at sufficient depth to mitigate against and related ground instability.</p>
Spine Roadways at Shallow Depth	No	<p>The Coal Authority have no records of spine roadways at shallow depth.</p> <p>The risk to developments at the site from recorded roadways is NEGLIGIBLE.</p>
Mine entries	Yes	<p>Coal Authority Mining Report and geological plans confirms that 3 No. known mine entries exist at the site. 2 No. shafts along the centre line of the site are recorded to have been reinstated to NCB specifications in 1988. The third shaft located in the wooded area adjacent to Newbottle Street has been filled to an unknown specification.</p> <p>The risk to developments at the site from known mine entries is considered to be LOW.</p>

Opencast Mines	No	Coal Authority data and geological plans indicate that no opencast workings are known within 500m of the site. The risk to developments at the site from known opencast workings at the site is considered to be NEGLIGIBLE.
Recorded coal mining subsidence	No	The Coal Authority has not received a damage notice or any claim for the site. A fault is recorded running close and parallel to the south eastern boundary but is not expected to impact on the development due to its location. The risk to developments at the site from coal mining subsidence is considered to be NEGLIGIBLE
Record of past mine gas emissions	No	There is no reported history of past mine gas emissions in the area. The risk to developments at the site from mine gas emissions is considered to be VERY LOW.

Table 8.1: Potential Risk Factors arising from Coal Mining (Preliminary Risk Assessment).

11.4 Foundations and Settlement Issues

Based on the ground conditions encountered pile foundations formed within natural Glacial Till / underlying bedrock are considered the most appropriate/ financially viable foundation solutions for Unit 2, as thickness of made ground encountered varies from 8m to 11m.

Vibro stone columns solution is anticipated for Unit 1, however columns maybe required to be pre-bored for Unit 1

While earthworks could be undertaken, the proximity of the site boundary may preclude full depth treatment beneath proposed structures.

It should be note that due to the site being a former landfill that a Waste Recovery Plan and Environmental Permit is likely to be required as part of any earthworks undertaken at the site.

11.5 Earthworks

As the majority of the site will be hardstanding and a clean cover layer is not considered to be required.

The Made Ground “as dug” has been generally reported to be wet of optimum moisture content and some degree of drying / treatment may be required to undertake significant earthworks to provide a suitable development platform. The Calorific Values of the Made Ground has been reported to be between 4,000 – 4,500 kJ/kg.

There is no statutory guidance for the assessment of potential combustibility of in-situ material, however guidance given in ICRCL Guidance note 61/84 ‘Notes on the fire hazards of contaminated land’ states that material with calorific values in excess of 10 MJ/kg are likely to ignite, and there is an unacceptable risk of smouldering when the calorific value of soils exceeds 7 MJ/kg. Therefore, it is considered that no further action is required. Confirmatory combustibility testing should be undertaken on earthworks materials during the development works.

11.6 Chemical Attack on Buried Structures

The water-soluble sulphate test results generally recorded concentrations between 13mg/l and 2440mg/l. The soil pH was generally between 7.5 and 11 indicating slightly acidic to slightly alkali but generally neutral conditions.

The results have been assessed in accordance with the guidance given in BRE Special Digest 1:2005. Assuming a greenfield site with static groundwater the **Design Sulphate Class** across site is **DS-3, ACEC Class AC-2**.

11.7 Drainage and Infrastructure

3 No falling head tests were undertaken within CP01, CP04 and CP16B within the Made Ground. The ground conditions within the boreholes generally comprised Made Ground of dark grey, gravelly sandy CLAY where the gravel includes fine to medium, angular coal, brick, sandstone, brick ash and slag (potentially colliery spoil).

All 3 No. falling head tests undertaken reported comparatively low coefficients of permeability in the order of $k=1.78e-8$ m/s to $k=2.88e-8$ m/s.

The permeability test report is included within **Appendix B**.

11.8 Historic Landfill and Waste Issues

The site is located within a former inert landfill and the use of a Materials Management Pan to enable the movement of materials will not be appropriate and it is likely that a waste recovery plan (WRP) and bespoke deposit for recovery environmental permit is likely to be required to facilitate the development of the site.

12.0 CONCLUSIONS

Shadbolt Group were commissioned by the Client, Hellens Land to undertake intrusive site investigations in respect of the proposed commercial development at the Newbottle Street, Houghton-le-Spring.

Ground investigations comprising 18 No. Cable Percussion Boreholes, 35 No. Trial pits, 7 No. hand pits, 4 No. CBR tests, 6 No. rotary open holes, 3 No. soak away tests and 12 No. rotary cored boreholes have been undertaken at the site and encountered a thick layer of Made Ground overlying Glacial Till underlain by Coal Measures Strata.

Chemical analysis of soil retrieved from the exploratory holes have reported low concentrations of contaminants beneath the TSVs (Human Health) for a commercial development.

The majority of samples tested from the shallow perched waters and the deep waters within the underlying rock have reported low concentrations of contaminants, with the significant majority reported to be below laboratory detection limits (PCB,s SVOCs, VOCs, BTEX and MTBE).

However, elevated concentrations of PAH contaminants above UKDWS have been reported within the underlying Coal Measures Strata within RC11 and RC12 (Sand) and elevated Selenium within BH10 within the Made Ground.

The initial groundwater sample retrieved from RC12 has reported significantly elevated concentrations of PAH (benzo(a)pyrene at 7.2ug/l for example) above UKDWS during the initial groundwater visit and this coincides with the absence of glacial till beneath the Made Ground, suggesting that mobile contaminants may have migrated vertically downwards through the Made Ground and into the underlying bedrock. It would appear that the shallow / perched water table is separate and distinct from the deeper groundwater table where low permeable glacial till exists.

It should be noted, however, that the elevated concentrations have not been reported consistently across the monitoring visits indicating that the sources of the elevated concentrations of contaminants are limited in volume.

When the site is developed the majority of the site will be covered with hardstanding's, buildings with formal drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and impact on the underlying aquifers will be significantly reduced and the risk to future site users and the environment is considered to be **Low to Moderate**.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, unidentified dense / light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.

The site is currently vacant and no surface water drainage and or service ducts are known to exist at the site and therefore it is unlikely that potential mobile contaminants could currently migrate and impact surface waters via service conduits and existing site drainage and surface run off.

When the site is developed most of the site will be covered with hardstanding's, buildings with formal

drainage and therefore the potential for rainwater to percolate through the site and for contaminants to leach into solution and migrate towards local watercourses will be further significantly reduced. All soils placed at the site would be to an end product specification to achieve at least 95% of maximum dry density and less than 5% air voids thus reducing the potential for PAHs to leach into solution.

It is considered that there is a **LOW** risk of potential contamination migrating and impacting local water courses. Assuming the culverted watercourse is in a good state of repair this risk maybe reduced to **VERY LOW**.

Based on the ground conditions encountered pile foundations formed within natural Glacial Till / underlying bedrock are considered the most appropriate/ financially viable foundation solutions for Unit 2, as thickness of made ground encountered varies from 8m to 11m. A vibro stone columns solution is anticipated for Unit 1, however columns maybe required to be pre-bored for Unit 1

It is recommended that formal drainage is adopted for the development.

Gas monitoring completed to date indicates **gas protection measures are necessary with respect to Carbon Dioxide (CS-2)**.

The site has been assessed in accordance with guidance given in BRE special digest 1:2005 assuming brownfield site with static groundwater the **Design Sulphate Class** across site is **DS-3, ACEC Class AC-2** although the majority of testing across the area indicates a DS-2/AC-1s may be more appropriate.

As the majority of the site will be hardstanding and clean cover layer is not necessary. The made ground around landscaping and services will have to be replaced with a clean cover to prevent contact with groundworkers.

It is considered that a waste recovery plan (WRP) and bespoke deposit for recovery environmental permit is likely to be required to facilitate the development of the site.

Although it is considered that the existing ground conditions at the site does not pose a significant risk to future site users and the environment it is considered that a remediation strategy and foundation work risk assessment should be undertaken at the site to ensure that the site can be developed on a more assured basis. As part of these works, all existing and new boreholes as part of the potential/remediation works, should be decommissioned.

13.0 REFERENCES

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APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

GEO-ENVIRONMENTAL GROUND INVESTIGATION

*This report is produced for the benefit of **Hellens Land** in accordance with the terms of the appointment.*

This report has been prepared in accordance with the terms and conditions of the appointment and relates to the condition of the site at the time of ground investigations. No warranty is provided as to the possibility of future changes in the condition of the site.

Shadbolt Environmental takes no responsibility for conditions which occur between the individual exploratory holes. Whilst every effort has been made to interpret the conditions between investigation locations, such information is only indicative.

Whilst the contamination assessment detailed within this report reflects our view, because there are no exact UK definitions of these matters, being subject to risk analysis, Shadbolt Environmental are unable to give categoric assurances that they will be accepted by authorities or funds without question. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. In time, improved practices or amended legislation may necessitate a re-assessment.

The report is limited to the geotechnical and environmental aspects detailed within the report, and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents.

APPENDIX B

EXPLORATORY HOLE LOGS

FALLING HEAD TESTS

DRAWING NO. 2585/NEWBOTTLE STREET/005 - EXPLORATORY HOLE LOCATION PLAN

GEOLOGICAL SECTIONS

CONCEPTUAL SITE MODEL



Borehole Log

Borehole No.

CP-01

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433958E - 550322N	Hole Type	CP
Location:	Houghton le Spring			Level:	71.35	Scale	1:50
Client:	Hellens Group			Dates:	15/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.60	B				Grass over, dark grey, cobbly CLAY. Cobbles include angular brick, concrete, plastic and sandstone. MADE GROUND	
		1.00	D					
		1.20 - 1.70	B	N=8 (1,7/2,2,2,2)				
		1.20	SPT					
		1.90	D					
		2.00 - 2.50	B	N=6 (1,1/1,2,1,2)				
		2.00	SPT					
		2.80	D					
		3.00 - 3.50	B	N=13 (2,3/2,3,4,4)				
		3.00	SPT					
	3.80	D						
	4.00 - 4.50	B	N=17 (2,2/3,9,2,3)					
	4.00	SPT		4.50	66.85			
	4.80	D						
	5.00 - 5.50	B	N=15 (3,4/3,4,4,4)				Soft, dark grey, boulder CLAY. Boulders include angular brick, concrete, plastic and sandstone. MADE GROUND	
	5.00	SPT						
	6.00	D						
	6.50 - 7.00	B	N=37 (4,6/6,17,7,7)	6.50	64.85		Brown, gravelly SAND. Gravel includes fine to coarse, angular SAND. MADE GROUND	
	6.50	SPT						
	7.50							
	8.00 - 8.45	U		8.00	63.35		Firm, grey, brown, laminated CLAY. GLACIAL TILL	
	8.50	D						
	9.00 - 9.50	B						
	9.50 - 10.00	B	N=24 (3,5/5,6,6,7)	9.50	61.85		Brown, gravelly SAND. Gravel includes fine to coarse, angular SANDSTONE. SAND AND GRAVEL	
	9.50	SPT						
				10.00	61.35		End of Borehole at 10.00m	

Remarks
Groundwater encountered at 6.50m bgl and 9.00m bgl.





Borehole Log

Borehole No.

CP-02

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433938E - 550329N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.00	Scale	1:50
Client:	Hellens Group			Dates:	15/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.80	B				Grass over, dark grey, boulder CLAY. Boulders include angular, concrete and plastic. MADE GROUND	
		1.10 1.20 - 1.70 1.20	D B SPT	N=11 (1,3/2,3,3)				
		1.90 2.00 - 2.50 2.00	D B SPT	N=20 (2,3/5,5,6,4)				
		2.80 3.00 - 3.50 3.00	D B SPT	N=15 (4,4/4,3,4,4)				
		3.80 4.00 - 4.50 4.00	D B SPT	N=16 (3,3/3,4,4,5)				
		4.80 5.00 - 5.50 5.00	D B SPT	N=36 (4,7/9,9,9,9)	5.00	67.00	Soft, dark grey, boulder CLAY. Boulders include mudstone and plastic. MADE GROUND	
		6.00	D					
		6.50 - 7.00	B					
		7.50	D					
		8.00 - 8.50 8.00	B SPT	N=21 (3,4/5,5,5,6)	8.00	64.00	Brown, gravelly SAND. Gravel includes fine to coarse, angular SANDSTONE. SAND AND GRAVEL	
	9.00	D						
	10.00	B		10.00	62.00	End of Borehole at 10.00m		

Remarks
Groundwater encountered at 8.20m bgl.





Borehole Log

Borehole No.

CP-03

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433890E - 550339N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.65	Scale	1:50
Client:	Hellens Group			Dates:	16/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.80	B				Grass over, dark grey, boulder CLAY. Boulders include angular, sandstone and brick. MADE GROUND	
		1.00	D					
		1.20 - 1.70	B	N=31 (3,5/7,7,8,9)				
		1.20	SPT					
		1.80	D					
		2.00 - 2.50	B	N=7 (1,0/1,1,2,3)				
		2.00	SPT					
		2.80	D					
		3.00 - 3.50	B	N=22 (3,7/5,7,7,3)				
		3.00	SPT					
		3.80	D					
		4.00 - 4.50	B	N=14 (1,2/3,3,3,5)				
		4.00	SPT					
		4.80	D					
		5.00 - 5.50	B	N=20 (5,4/5,4,6,5)				
		5.00	SPT					
		6.00	D					
		6.50 - 7.00	B	N=22 (4,5/5,5,6,6)				
		6.50	SPT					
		7.50	D					
		8.00 - 8.50	B	N=33 (4,7/8,8,8,9)	8.00	64.65	Firm, brown, grey, sandy gravelly CLAY. Gravel includes fine to coarse, angular, sandstone. GLACIAL TILL	
		8.00	SPT					
		9.00	D					
		9.50 - 10.00	B	N=39 (3,5/10,10,9,10)				
		9.50	SPT					
		10.00			10.00	62.65	End of Borehole at 10.00m	

Remarks
Groundwater encountered at 9.20m bgl.





Borehole Log

Borehole No.

CP-04

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433859E - 550329N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.80	Scale	1:50
Client:	Hellens Group			Dates:	25/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.20 - 0.70	B				Soft to firm, dark grey, red, cobbly CLAY. Cobbles include angular brick and slag. MADE GROUND	
		1.00	D					
		1.20 - 1.70	B	N=11 (1,3/2,3,2,4)				
		1.20	SPT					
		1.90	D					
		2.00 - 2.50	B	N=16 (2,2/3,4,4,5)				
		2.00	SPT					
		2.80	D					
		3.00 - 3.50	B	N=20 (3,4/5,5,5,5)				
		3.00	SPT					
		3.80	D					
		4.00 - 4.50	B	N=13 (1,3/3,3,4,3)				
		4.00	SPT					
		4.80	D					
		5.00 - 5.50	B	N=21 (3,4/4,5,6,6)				
		5.00	SPT					
		6.00	D					
		6.50 - 7.00	B	N=23 (10,5/3,7,4,9)				
		6.50	SPT					
		7.50	D					
		8.00 - 8.50	B	N=15 (1,3/3,4,4,4)				
		8.00	SPT					
		9.00	D		8.80		Firm to stiff, grey brow, laminated CLAY. GLACIAL TILL	
		9.50 - 9.95	U					
		10.00	D		10.00		End of Borehole at 10.00m	

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-05

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433853E - 550362N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.15	Scale	1:50
Client:	Hellens Group			Dates:	16/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B				Grass over, dark grey, brown, red, cobbly CLAY. Cobbles include angular sandstone and brick. MADE GROUND		
		1.00	D					1	
		1.20 - 1.70	B	N=20 (1,1/3,3,5,9)					
		1.20	SPT						
		1.90	D					2	
		2.00 - 2.50	B	N=36 (3,7/20,4,6,6)					
		2.00	SPT						
		2.80	D					3	
		3.00 - 3.50	B	N=28 (3,5/5,5,7,11)					
		3.00	SPT						
		3.80	D				4		
		4.00 - 4.50	B	50 (7,15/39,4,7,)					
		4.00	SPT						
		4.80	D				5		
		5.00 - 5.50	B	N=19 (3,4/4,5,5,5)					
		5.00	SPT						
		6.00	D				6		
		6.50 - 7.00	B	N=16 (3,7/3,4,4,5)	6.50	65.65	Soft, dark grey, brown, sandy gravelly CLAY. Gravel include fine to coarse, angular brick, sandstone and mudstone. MADE GROUND	7	
		6.50	SPT						
		7.50	D						
		8.00 - 8.50	B	N=21 (3,5/5,5,5,6)				8	
		8.00	SPT						
		9.00	D				9		
		9.50 - 10.00	B	N=24 (2,4/5,6,6,7)					
		9.50	SPT						
					10.00	62.15	End of Borehole at 10.00m	10	

Remarks
Groundwater encountered at 6.5m bgl.





Borehole Log

Borehole No.

CP-06

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433829E - 550339N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.00	Scale	1:50
Client:	Hellens Group			Dates:	16/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.80	B				Grass over, dark grey, gravelly CLAY with high cobble content. Gravel /cobbles include brick, sandstone, shale and plastic. MADE GROUND		
		1.00	D					1	
		1.20 - 1.65	B	N=28 (3,5/5,7,7,9)					
		1.20	SPT						
		1.90	D					2	
		2.00 - 2.50	B	N=27 (4,7/7,7,6,7)					
		2.00	SPT						
		2.80	D					3	
		3.00 - 3.50	B	N=14 (9,12/4,3,3,4)					
		3.00	SPT						
		3.80	D				4		
		4.00 - 4.50	B	N=15 (1,1/3,3,3,6)					
		4.00	SPT						
		4.80	D				5		
		5.00 - 5.50	B	N=17 (1,3/6,6,2,3)					
		5.00	SPT						
		6.00	D				6		
	▼	6.50 - 7.00	B	N=7 (1,1/2,1,2,2)	6.50	66.50	Soft, brown, sandy gravelly CLAY. Gravel includes fine to coarse, angular to subangular sandstone. MADE GROUND	7	
		6.50	SPT						
		7.50	D						
		8.00 - 8.50	B	N=11 (4,7/2,3,3,3)				8	
		8.00	SPT						
		9.00	D				9		
		9.50 - 10.00	B	N=20 (1,5/5,4,5,6)					
		9.50	SPT						
					10.00	63.00	End of Borehole at 10.00m	10	

Remarks
Groundwater encountered at 6.60m bgl.





Borehole Log

Borehole No.

CP-07

Sheet 1 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433803E - 550328N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.70	Scale	1:50
Client:	Hellens Group			Dates:	23/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.70	B				Grass over, dark grey, red gravelly CLAY. Gravel includes, coarse, angular brick and ash fill. MADE GROUND		
		1.00	D					1	
		1.20 - 1.70	B						
		1.20	SPT	N=19 (3,3/4,4,5,6)					
		1.80	D						
		2.00 - 2.50	B		2.00	70.70		2	
		2.00	SPT	N=25 (1,3/5,6,6,8)			Friable, red, dark grey gravelly CLAY. Gravel includes fine to coarse, angular burnt shale. Ash was encountered. MADE GROUND		
		2.80	D						
		3.00 - 3.50	B					3	
		3.00	SPT	N=19 (3,3/4,5,5,5)					
		3.80	D						
		4.00 - 4.50	B					4	
		4.00	SPT	N=36 (1,5/7,7,9,13)					
		4.80	D						
		5.00 - 5.50	B					5	
		5.00	SPT	N=41 (10,15/5,7,12,17)					
		6.00	D						
		6.50 - 7.00	B					7	
		6.50	SPT	N=23 (3,4/4,5,7,7)					
		7.50	D						
		8.00 - 8.50	B		8.00	64.70		8	
		8.00	SPT	N=14 (2,3/3,4,3,4)			Dark grey ASH. MADE GROUND		
		9.00	D					9	
		9.50 - 10.00	B						
		9.50	SPT	N=10 (2,3/2,2,3,3)				10	

Continued on Next Sheet

Remarks
Groundwater encountered at 10.60m bgl.





Borehole Log

Borehole No.

CP-07

Sheet 2 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433803E - 550328N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.70	Scale	1:50
Client:	Hellens Group			Dates:	23/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50	D	N=26 (2,3/4,6,8,8)	10.50	62.20	Dark grey ASH. MADE GROUND		
		11.00 - 11.45	U		Firm, grey, brown, laminated CLAY. GLACIAL TILL	11			
		11.50	D						
		12.00 - 12.50	B			12			
		12.50 - 13.00 12.50	B SPT			13			
		13.50	D						
		14.00 - 14.45 14.00 - 14.50	U B			14			
		15.00	D			15			
		15.50 - 16.00 15.50	B SPT		N=37 (2,3/7,8,8,14)	15.00	57.70	Stiff, grey, brown, laminated CLAY. Occasional occurrence of cobbles. GLACIAL TILL	15
		16.50	D			16			
		17.00 - 17.45 17.00 - 17.50	U B			17			
		18.00	D			18			
		18.50 - 19.00 18.50	B SPT		N=46 (5,7/9,11,12,14)	19			
	19.50	D		19					
	20.00	D		20.00	52.70	End of Borehole at 20.00m	20		

Remarks
Groundwater encountered at 10.60m bgl.





Borehole Log

Borehole No.

CP-08

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433813E - 550348N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.00	Scale	1:50
Client:	Hellens Group			Dates:	26/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.70	B				Soft, dark brown, gravelly CLAY. Gravel includes fine to coarse, sandstone, brick and slag. MADE GROUND		
		1.00	D					1	
		1.20 - 1.70	B	N=10 (10,2/3,2,2,3)	1.20	71.80	Dark grey, sandy gravelly COBBLES. Gravel/cobbles include brick, ash and concrete. MADE GROUND		
		1.20	SPT						
		1.90	D					2	
		2.00 - 2.50	B	N=9 (1,2/1,2,2,4)					
		2.00	SPT						
		2.80	D					3	
		3.00 - 3.50	B	N=6 (1,0/1,2,1,2)					
		3.00	SPT						
		3.80	D					4	
		4.00 - 4.50	B	N=17 (3,4/3,4,4,6)					
		4.00	SPT						
		4.80	D					5	
		5.00 - 5.50	B	N=18 (2,3/4,4,5,5)					
		5.00	SPT						
		6.00	D					6	
		6.50 - 7.00	B						
		7.50	D					7	
		8.00	D		7.90	65.10	CONCRETE OBSTRUCTION	8	
					8.00	65.00	MADE GROUND		
End of Borehole at 8.00m									

Remarks
No Groundwater encountered .





Borehole Log

Borehole No.

CP-09

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433809E - 550366N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.00	Scale	1:50
Client:	Hellens Group			Dates:	18/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B					Grass over, gravelly CLAY. Gravel includes fine to coarse, angular brick and mudstone. Ash was encountered MADE GROUND	
		1.10 1.20 - 1.70 1.20	D B SPT	N=50 (3,7/9,15,15,11)					1
		1.80 2.00 - 2.50 2.00	D B SPT	N=46 (4,4/8,9,12,17)					2
		2.80 3.00 - 3.50 3.00	D B SPT	50 (2,7/34,16,,)					3
		3.80 4.00 - 4.50 4.00	D B SPT	N=32 (3,4/8,8,8,8)					4
		4.80 5.00 - 5.50	D B						5
		6.00	D						6
		6.50 6.70							66.50 66.30
						End of Borehole at 6.70m		7	
								8	
								9	
								10	

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-10

Sheet 1 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433831E - 550382N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.05	Scale	1:50
Client:	Hellens Group			Dates:	29/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B				Grass over, dark grey, brown, reddish gravelly CLAY. Gravel includes fine to coarse, angular to subangular brick, concrete and mudstone. Ash was encountered. MADE GROUND		
		1.10 1.20 - 1.70 1.20	D B SPT	N=50 (5,7/11,15,17,7)				1	
		1.90 2.00 - 2.50 2.00	D B SPT	N=22 (3,4/5,5,5,7)				2	
		2.80 3.00 - 3.50 3.00	D B SPT	N=22 (1,3/4,4,6,8)				3	
		3.80 4.00 - 4.50 4.00	D B SPT	N=9 (1,1/2,2,2,3)				4	
		4.80 5.00 - 5.50 5.00	D B SPT	N=4 (1,0/1,1,1,1)				5	
		6.00	D					6	
		6.50 - 7.00 6.50	B SPT	50 (25 for 85mm/50 for 85mm)	7.00	66.05	Yellow, SAND. MADE GROUND	7	
		7.50	D					8	
		8.00 - 8.50 8.00	B SPT	N=21 (4,4/3,6,6,6)				8	
		8.50	D		8.50	64.55	Soft, grey, boulder CLAY. GLACIAL TILL	9	
		9.00	D					9	
		9.50 - 9.95	U	90				10	
		10.00	D					10	

Continued on Next Sheet

Remarks

Very damp at 7.10m bgl.





Borehole Log

Borehole No.

CP-10

Sheet 2 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433831E - 550382N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.05	Scale	1:50
Client:	Hellens Group			Dates:	29/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		10.50 - 10.80	B		16.40	56.65		Soft, grey, boulder CLAY. GLACIAL TILL	
		11.00 - 11.50 11.00	B SPT	N=38 (4,5/6,6,9,17)					11
		12.00 12.00 - 12.50 12.00	D B SPT	N=42 (4,4/9,9,9,15)					12
		13.00 - 13.95	U	22					13
		14.00	D						14
		14.50 - 14.80	B						
		15.00 - 15.50 15.00	B SPT	N=42 (3,5/7,9,10,16)					15
		16.00 16.20 16.40 16.40	D SPT D SPT	50 (25 for 10mm/50 for 235mm) 50 (25 for 0mm/50 for 0mm)					16
							End of Borehole at 16.40m	17	
								18	
								19	
								20	

Remarks
Very damp at 7.10m bgl.





Borehole Log

Borehole No.

CP-11

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433811E - 550390N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.00	Scale	1:50
Client:	Hellens Group			Dates:	22/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
		0.10 - 0.80	B		2.70	70.30		Grass over, dark grey, brown, reddish gravelly CLAY. Gravel includes fine to coarse, angular to subangular brick, concrete and mudstone. Ash was encountered. MADE GROUND	1				
		1.00	D										
		1.20 - 1.70	B										
		1.20	SPT	50 (5,20/50 for 235mm)								Sandstone boulder	
		1.80	D										
		2.00 - 2.50	B										
		2.00	SPT	N=5 (1,0/1,1,1,2)									2
		2.80	D										
		3.00 - 3.50	B										
		3.00	SPT	N=12 (1,1/2,2,3,5)								Brown, very sandy bouldery CLAY. Boulders include angular concrete sandstone and concrete. MADE GROUND	3
3.80	D												
4.00 - 4.50	B												
4.00	SPT	N=28 (3,7/7,7,7,7)					4						
4.80	D												
5.00 - 5.50	B												
5.00	SPT	50 (25 for 50mm/50 for 235mm)	5.00	68.00			SANDSTONE BOULDERS MADE GROUND	5					
6.00	D												
6.50 - 7.00	B												
6.50	SPT	50 (25 for 10mm/50 for 25mm)						6					
7.00	SPT	50 (25 for 20mm/50 for 20mm)	7.10	65.90			End of Borehole at 7.10m	7					
								8					
								9					
								10					

Remarks
Groundwater encountered at 3.10m bgl.





Borehole Log

Borehole No.

CP-12

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433783E - 550363N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.60	Scale	1:50
Client:	Hellens Group			Dates:	17/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description					
		Depth (m)	Type	Results									
		0.20 - 0.80	B		2.80	69.80		Grass over, dark grey, boulder CLAY. Boulders include angular brick and concrete. MADE GROUND	1				
		1.00	D							2			
		1.20 - 1.70	B	N=50 (5,10/13,13,17,7)							3		
		1.20	SPT										
		1.90	D									4	
		2.00 - 2.50	B	N=27 (1,5/7,4,7,9)									
		2.00	SPT										
		2.80	D										5
		3.00 - 3.50	B	20 (25 for 20mm/20 for 20mm)									
		3.00	SPT										
	3.80	D		6									
	4.00 - 4.50	B	50 (25 for 0mm/50 for 0mm)										
	4.00	SPT											
	4.80	D			7								
	5.00 - 5.50	B	N=41 (10,15/21,6,7,7)										
	5.00	SPT											
	6.00	D				8							
	6.50 - 7.00	B	50 (3,9/50 for 150mm)										
	6.50	SPT											
	7.50	D					9						
	8.00 - 8.50	B	50 (7,10/50 for 150mm)										
	8.00	SPT											
	8.50	SPT	50 (25 for 0mm/50 for 0mm)	10									
			8.30		64.30				SANDSTONE/CONCRETE OBSTRUCTION MADE GROUND				
			8.50		64.10								
											End of Borehole at 8.50m		

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-13

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433777E - 550350N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.45	Scale	1:50
Client:	Hellens Group			Dates:	17/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[Hatched Pattern]	[Empty]	0.10 - 0.70	B				[Hatched Pattern]	Grass over, dark grey, boulder CLAY. Boulders include angular brick, sandstone and concrete. MADE GROUND	
		1.00	D						
		1.20 - 1.70	B	N=8 (1,2/1,2,2,3)					
		1.20	SPT						
		1.80	D						
		2.00 - 2.50	B	N=26 (2,3/5,7,7,7)					
		2.00	SPT						
		2.80	D						
		3.00 - 3.50	B	N=50 (7,9/39,4,4,3)					
		3.00	SPT						
		3.80	D						
		4.00 - 4.50	B	N=18 (4,3/4,3,4,7)					
		4.00	SPT						
		4.80	D						
		5.00 - 5.50	B	N=14 (2,1/2,3,4,5)					
		5.00	SPT						
		6.00	D						
		6.50 - 7.00	B	N=41 (3,7/7,8,11,15)					
		6.50	SPT						
		7.50	D						
		8.00 - 8.50	B	N=32 (3,3/5,9,9,9)					
		8.00	SPT						
		9.00	D						
	▼	9.50 - 10.00	B	N=12 (2,2/2,3,3,4)	9.50	62.95	[Hatched Pattern]	Firm, brown, grey, slightly sandy CLAY. GLACIAL TILL	
		9.50	SPT						
		10.00			10.00	62.45	[Hatched Pattern]	End of Borehole at 10.00m	

Remarks
Groundwater encountered at 9.50m bgl.





Borehole Log

Borehole No.

CP-14

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433785E - 550387N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.90	Scale	1:50
Client:	Hellens Group			Dates:	22/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description				
		Depth (m)	Type	Results								
		0.20 - 0.70	B		2.00	70.90		Grass over, soft, dark grey, green, gravelly CLAY. Gravel includes medium to coarse, angular brick, ash and concrete. MADE GROUND				
		1.00	D									1
		1.20 - 1.70	B	N=46 (4,7/9,9,11,17)								
		1.20	SPT									
		1.90	D									
		2.00 - 2.50	B	N=5 (3,2/1,1,2,1)							Friable, dark grey, gravelly SAND. Gravel includes fine to coarse, angular brick, sandstone, ash and concrete. MADE GROUND	
		2.00	SPT									
		2.80	D									
		3.00 - 3.45	U									
		3.50	D									
		3.70 - 3.90	B									
		4.00 - 4.50	B	N=47 (3,5/5,7,12,23)								
		4.00	SPT									
	4.80	D										
	5.00 - 5.50	B										
	6.00	D										
	6.50 - 7.00	B	N=9 (2,3/2,2,3,2)									
	6.50	SPT										
	7.50	D										
	7.80	SPT	50 (25 for 75mm/50 for 20mm)	7.80	65.10							
	8.00	SPT	50 (25 for 0mm/50 for 0mm)	8.00	64.90		OBSTRUCTION MADE GROUND					
							End of Borehole at 8.00m					

Remarks
Very damp at 6.80m bgl.





Borehole Log

Borehole No.

CP-15

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433757E - 550390N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.20	Scale	1:50
Client:	Hellens Group			Dates:	18/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
Well	Water Strikes	0.20 - 0.80	B		2.00	70.20	Legend	Grass over, soft, dark grey, brown gravelly CLAY. Gravel includes fine to coarse, angular brick and ash. MADE GROUND	1
		1.10 1.20 - 1.70 1.20	D B SPT	N=20 (4,4/4,5,5,6)					
		1.90 2.00 - 2.50 2.00	D B SPT	N=4 (1,0/1,1,1,1)					2
		2.90 3.00 - 3.50 3.00	D B SPT	N=7 (1,2/1,2,2,2)					3
		3.80 4.00 - 4.50 4.00	D B SPT	N=10 (2,2/2,3,2,3)					4
		4.80 5.00 - 5.50 5.00	D B SPT	N=20 (3,4/4,5,5,6)					5
		6.00	D						6
		6.50 - 7.00 6.50	B SPT	N=25 (4,4/5,5,7,8)					7
		7.50	D						8
		8.00 - 8.50 8.00	B SPT	N=18 (4,4/5,4,5,4)					9
9.00	D		9						
9.50 - 10.00 9.50	B SPT	N=20 (3,3/4,5,5,6)	10						
				10.00	62.20		End of Borehole at 10.00m	10	

Remarks
Groundwater encountered at 7.50m bgl.





Borehole Log

Borehole No.

CP-16

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433775E - 550417N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.65	Scale	1:50
Client:	Hellens Group			Dates:	26/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B				Grass over, dark grey, gravely CLAY. Gravel includes fine to coarse, angular, brick and sandstone. MADE GROUND		
		1.00	D		0.90	71.75			
		1.00	D		1.00	71.65	CONCRETE OBSTRUCTION	1	
		1.00	SPT	50 (25 for 0mm/50 for 0mm)			MADE GROUND End of Borehole at 1.00m		
								2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Remarks
No Groundwater encountered.





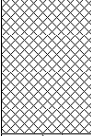

Borehole Log

Borehole No.

CP-16A

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433777E - 550414N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.65	Scale	1:50
Client:	Hellens Group			Dates:	26/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		1.00	SPT	50 (25 for 0mm/50 for 0mm)	0.90 1.00	71.75 71.65	 Grass over, dark grey, gravely CLAY. Gravel includes fine to coarse, angular, brick and sandstone. MADE GROUND		
							 CONCRETE OBSTRUCTION MADE GROUND End of Borehole at 1.00m	1	
								2	
								3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-16B

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433768E - 550411N	Hole Type	CP
Location:	Houghton le Spring			Level:	72.65	Scale	1:50
Client:	Hellens Group			Dates:	30/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B				Grass over, dark grey, gravelly sandy CLAY. Gravel includes fine to medium, angular coal, brick, sandstone and brick. MADE GROUND		
		1.10	D					1	
		1.20 - 1.70	B						
		1.20	SPT	N=17 (3,4/4,4,4,5)					
		1.80	D						
		2.00 - 2.50	B					2	
		2.00	SPT	N=13 (2,3/3,3,3,4)					
		2.80	D						
		3.00 - 3.50	B					3	
		3.00	SPT	N=7 (1,1/2,1,2,2)					
		3.80	D						
		4.00 - 4.50	B					4	
		4.00	SPT	N=30 (4,4/5,7,7,11)					
		4.80	D						
		5.00 - 5.50	B					5	
		5.00	SPT	N=18 (2,3/3,3,4,8)					
		6.00	D						
		6.50 - 7.00	B					6	
		6.50	SPT	N=23 (3,3/4,4,6,9)					
		7.50	D						
		8.00 - 8.50	B					7	
		8.00	SPT	N=31 (3,3/5,6,9,11)					
		9.00	D		9.00	63.65		8	
		9.50 - 10.00	B				Stiff, boulder CLAY. (Driller log)	9	
		9.50 - 9.95	U				GLACIAL TILL		
					10.00	62.65		10	
								End of Borehole at 10.00m	

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-17

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433720E - 550471N	Hole Type	CP
Location:	Houghton le Spring			Level:	71.15	Scale	1:50
Client:	Hellens Group			Dates:	25/07/2019	Logged By	EB

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B				Grass over, dark grey, gravelly CLAY. Gravel includes fine to coarse, angular, brick and ash. MADE GROUND		
		1.00	D					1	
		1.20 - 1.70	B	N=6 (1,0/1,1,2,2)					
		1.20	SPT						
		1.90	D						
		2.00 - 2.50	B	N=16 (3,4/3,4,4,5)	2.00	69.15	Brown, red sandy GRAVEL. Gravel includes fine to coarse, angular brick and sandstone. MADE GROUND	2	
		2.00	SPT						
		2.80	D						
		3.00 - 3.50	B	N=17 (2,2/3,4,5,5)				3	
		3.00	SPT						
		3.80	D						
		4.00 - 4.50	B	N=16 (3,4/3,4,4,5)				4	
		4.00	SPT						
		4.80	D						
		5.00 - 5.50	B	N=14 (2,3/2,3,4,5)				5	
		5.00	SPT						
		6.00	D						
		6.50 - 7.00	B	N=31 (3,4/10,9,5,7)				7	
		6.50	SPT						
		7.50	D						
		8.00 - 8.50	B	N=23 (2,4/6,6,5,6)				8	
		8.00	SPT						
		9.00	D						
		9.50 - 10.00	B		9.40	61.75	Firm to stiff, brown, grey laminated CLAY. GLACIAL TILL	9	
		9.50 - 9.95	U						
					10.00	61.15		10	
								End of Borehole at 10.00m	

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-18

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433852E - 550404N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.25	Scale	1:50
Client:	Hellens Group			Dates:	31/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.20 - 0.80	B				Grass over. Brick concrete fill. MADE GROUND		
		1.00	D					1	
		1.20 - 1.65	D						
		1.20 - 1.70	B						
		1.20	SPT	N=50 (5,10/31,5,9,5)					
		1.90	D						
		2.00 - 2.45	D		2.00	71.25		2	
		2.00 - 2.50	B				Yellow Sand with Sandstone cobbles. MADE GROUND		
		2.00 - 2.50	D						
		2.00	SPT	N=39 (3,4/4,8,8,19)	2.50	70.75			
		2.50	SPT	N=50 (25 for 0mm/50 for 75mm)	2.60	70.65			
		2.60	D				Concrete obstruction. MADE GROUND		
							End of Borehole at 2.50m	3	
								4	
								5	
								6	
								7	
								8	
								9	
								10	

Remarks
No Groundwater encountered.





Borehole Log

Borehole No.

CP-18A

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433846E - 550407N	Hole Type	CP
Location:	Houghton le Spring			Level:	73.25	Scale	1:50
Client:	Hellens Group			Dates:	31/07/2019	Logged By	RP

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description			
		Depth (m)	Type	Results							
		0.20 - 0.80	B				Brick Concrete Ash fill. MADE GROUND				
		1.00	D						1		
		1.20 - 1.65	D	N=9 (1,0/1,2,3,3)							
		1.20 - 1.70	B								
		1.20	SPT								
		1.90	D								
		2.00	D		2.00	71.25					
		2.00 - 2.20	D	N=50 (25 for 0mm/50,0,0,0) N=50 (25 for 0mm/50,0,0,0)	2.20	71.05	Concrete obstruction. MADE GROUND				
		2.00	SPT								2
		2.20	SPT								End of Borehole at 2.20m
								3			
								4			
								5			
								6			
								7			
								8			
								9			
								10			

Remarks
No Groundwater encountered.





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433768.79 - 550426.10
Level: 72.45

Date
16/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Brown, gravelly SAND. Gravel/cobbles includes angular sandstone and concrete. MADE GROUND
	1.00	D					
	2.00	B					
				3.50	68.95		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433908.86 - 550329.19
Level: 72.25

Date
15/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
0.60
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, friable, dark grey, sandy very gravelly CLAY. Gravel includes fine to coarse, angular, wood, coal, brick, metal pipes, cement pipes, metal wire. A small quantity of concrete cobbles were encountered. MADE GROUND
	0.80	B					
	1.20	D					
	1.50	B					
	1.90	D					
				3.50	68.75		Occasional pockets of light brown damp gravelly CLAY
							End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433904.17 - 550357.00
Level: 72.70

Date
16/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Brown, grey, sandy COBBLES. Cobbles include concrete slabs and bricks. MADE GROUND
	1.50	B					
	2.00	D					
				3.50	69.20		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring


Project No.
2585

Co-ords: 433874.75 - 550329.62
Level: 72.65

Date
15/07/2019

Location: Houghton le Spring

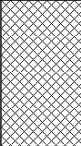
Dimensions (m): 3.00
Depth 3.50



Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D		0.40	72.25		Grass over, firm, brown, silty sandy gravelly CLAY. Gravel includes fine to coarse, angular to subrounded mudstone and sandstone. MADE GROUND
	0.50	B					Dark brown, dark grey, friable, gravelly CLAY. Gravel includes fine to coarse, angular to subangular sandstone, mudstone, brick, concrete coal and wood. MADE GROUND
	1.00	D					
	1.50	D					
	2.00	B					<i>Cobbles encountered below 1.9m bgl.</i>
				3.50	69.15		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433882.47 - 550380.29
Level: 73.35

Date
16/07/2019

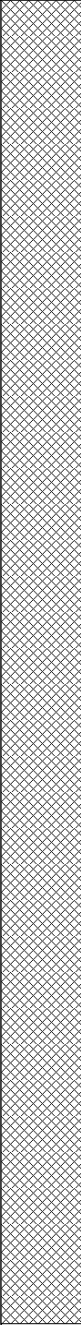
Location: Houghton le Spring

Dimensions (m): 3.00
0.60 
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Brown, cobbly clayey SAND. Cobbles include angular brick and sandstone. MADE GROUND
	0.80	D					
	1.50	D					
	2.00	D					
	2.20	B					
				3.50	69.85		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433859.11 - 550394.47
Level: 73.35

Date
16/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, brown, clayey gravelly SAND. Gravel includes fine to coarse brick, tar, plastic, concrete post. MADE GROUND
	0.50	B					
	1.00	D					
				2.00	71.35		Light brown SAND. MADE GROUND
	2.30	D					
	2.50	B					
				3.50	69.85		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433826.25 - 550366.38
Level: 73.30

Date
15/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50 0.60

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	D				0.60	Grass over, firm, brown, silty sandy gravelly CLAY. Gavel includes fine to coarse, angular to subrounded mudstone and sandstone. MADE GROUND	
	0.50	D					0.7m Boulder encountered	
	1.00	B		0.80	72.50	0.60	Friable, brown, red, sandy COBBLES. Cobbles include coarse, angular bricks. MADE GROUND	1
	1.50	B						
	1.60	D						
				1.80	71.50	0.60	Grey, red, slightly gravelly SAND. Gravel includes fine to coarse, angular sandstone. MADE GROUND	2
				3.50	69.80	0.60	End of Pit at 3.50m	3
								4

Remarks: No Groundwater encountered. Obstruction at 2.7m bgl.

Stability: Collapse below 1.2m bgl.

Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433815.96 - 550314.75
Level: 72.65

Date
15/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 2.70

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Dark grey, sandy COBBLY CLAY. Gravel includes fine to coarse, angular, brick, mudstone and shale. MADE GROUND
	0.50	B					
	1.20	D		1.00	71.65		
	2.00	B					
				2.70	69.95		End of Pit at 2.70m

Remarks: No Groundwater encountered.

Stability: Collapse below 1.3m bgl

Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433759.72 - 550371.73
Level: 72.25

Date
15/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50 0.60

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D				[Cross-hatched pattern]	Grass over, friable, dark grey, sandy very gravelly CLAY. Gravel includes fine to coarse, angular, wood, coal, brick, metal pipes, cement pipes, metal wire. A small quantity of concrete cobbles were encountered. MADE GROUND
	0.60	D					
	1.00	B		1.10	71.15		Dark grey, sandy cobbly CLAY. Gravel includes fine to coarse, angular, wood, coal, brick, metal pipes, cement pipes, metal wire. MADE GROUND
	1.40	D					
				1.80	70.45	[Cross-hatched pattern]	Friable, red, sandy GRAVEL. Gravel includes fine to coarse, angular shale. MADE GROUND
				3.50	68.75		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Collapse below 2.3m bgl

Plant: JCB 3CX





Trial Pit Log

Project Name: **Newbottle Street, Houghton le Spring**

Project No.
2585

Co-ords: **433833.49 - 550411.81**
Level: **73.15**

Date
16/07/2019

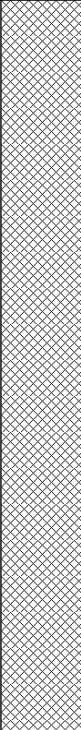
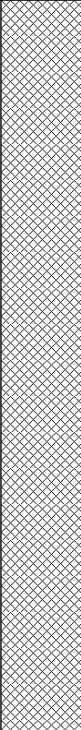
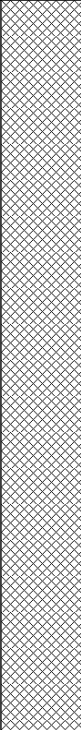
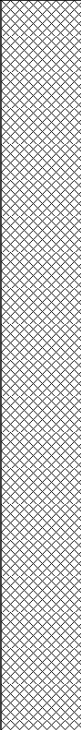
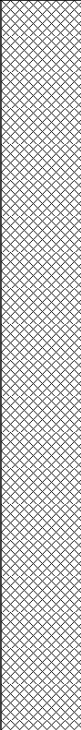


Location: **Houghton le Spring**

Dimensions (m): **3.00**
Depth **3.50**

Scale
1:20

Logged
EB

Client: **Hellens Group**

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Friable, brown, gravelly sandy cobbly CLAY. Gravel/ cobbles includes fine to coarse, angular bricks and concrete slabs. MADE GROUND
	1.00	B					
	1.50	D					
				1.95	71.20		Soft, dark green, grey, brown, gravelly CLAY. Gravel includes fine to coarse, angular mudstone, wood and coal. MADE GROUND
	2.20	D					
				2.30	70.85		Stiff, fissured, light brown, grey, CLAY. GLACIAL TILL
	2.50	D					
				3.50	69.65		End of Pit at 3.50m

Remarks: **No Groundwater encountered.**

Stability: **Stable**
Plant: **JCB 3CX**





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433799.20 - 550435.95
Level: 72.50

Date
16/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, sandy gravelly COBBLES. Cobbles/gravel include angular bricks, concrete poles, reinforcement bar, cement slabs and wood. MADE GROUND
	1.20 1.20	B D		1.00	71.50		Friable, Light brown, gravelly CLAY. Cobbles include angular bricks. MADE GROUND
	1.50	D		1.30	71.20		Dark grey, sandy GRAVEL . Gravel includes fine to coarse , angular shale and ash. MADE GROUND
	1.80	D		1.70	70.80		Light brown, damp gravelly SAND. Gravel includes fine to medium angular mudstone and sandstone. MADE GROUND
	2.50	D		1.90	70.60		Firm to stiff, light grey, light brown CLAY. GLACIAL TILL
				3.50	69.00		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433788.04 - 550408.72
Level: 72.60

Date
16/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, brown, gravelly cobbly SAND. Cobbles/gravel include angular brick and concrete posts. MADE GROUND
	0.80	D		0.55	72.05		Dark grey, brown, gravelly sandy CLAY. Gravel include fine to coarse, angular coal, brick and sandstone. MADE GROUND
	1.50	B					
	2.00	D					
	2.20	B					
				3.50	69.10		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433780.45 - 550456.09
Level: 71.40

Date
15/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, sandy gravelly COBBLES. Cobbles/gravel include angular concrete poles, bricks, mudstone and slag. MADE GROUND
	0.80	D					
	1.00	B					
	2.00	D		1.90	69.50		Firm, light brown, light grey, banded CLAY. GLACIAL TILL
				3.50	67.90		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433763.11 - 550471.08
Level: 71.30

Date
15/07/2019

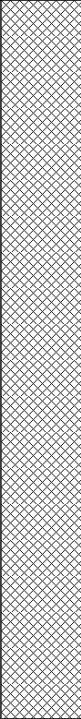
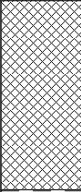
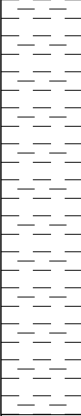
Location: Houghton le Spring

Dimensions (m): 3.00
0.50 
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, dark brown, sandy COBBLES. Cobbles includes bricks, mudstone and slag. Few slag boulders encountered. MADE GROUND
	0.70	D					
	1.00	B					
				1.90	69.40		Dark grey, GRAVEL. Gravel includes fine to coarse, angular coal. MADE GROUND
	2.20	D					
				2.40	68.90		Firm, laminated, light brown, light grey, CLAY. GLACIAL TILL
	2.50	D					
				3.50	67.80		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: **Newbottle Street, Houghton le Spring**

Project No.
2585

Co-ords: **433732.92 - 550454.36**
Level: **71.40**

Date
15/07/2019

Location: **Houghton le Spring**

Dimensions (m): **3.00**
Depth **3.50**

Scale
1:20

Logged
EB

Client: **Hellens Group**

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D		0.40	71.00		Firm, brown, gravelly CLAY. Gravel includes fine to coarse, angular to subrounded sandstone and mudstone. MADE GROUND
	0.50	D					Dark brown, sandy gravelly CLAY. Gravel includes fine to coarse, angular, coal, mudstone, shale and metal wire cables. MADE GROUND
	1.50	B		1.70	69.70		Firm, light to dark brown, slightly gravelly sandy CLAY. Gravel includes fine to coarse, angular to subrounded mudstone, brick, and sandstone. MADE GROUND
	2.50	B					
				3.50	67.90		End of Pit at 3.50m

Remarks: **No Groundwater encountered.**

Stability: **Stable**
Plant: **JCB 3CX**





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433729.47 - 550501.08
Level: 70.70

Date
15/06/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.00

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D					Grass over, friable, dark brown, sandy gravelly CLAY. Gavel includes fine to coarse, angular to subrounded mudstone, slag, shale and sandstone. MADE GROUND
	0.60	B		0.70	70.00		Friable, dark grey ASH. MADE GROUND
	0.80	D		0.90	69.80		Dark brown, sandy clayey GRAVEL. Gravel includes fine to coarse mudstone, and brick. MADE GROUND
	2.00 2.00	B D					
▼				3.00	67.70		End of Pit at 3.00m

Remarks: No groundwater encountered.

Stability: Collapse below 2.2m bgl.

Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433702.00 - 550490.22
Level: 70.65

Date
15/07/2019

Location: Houghton le Spring

Dimensions (m): 3.00
Depth 3.50

Scale
1:20

Logged
EB

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.20	D		0.40	70.25		Grass over, firm, brown, silty sandy gravelly CLAY. Gavel includes fine to coarse, angular to subrounded mudstone and sandstone. MADE GROUND
	0.70	D					Firm, brown, silty sandy gravelly COBBLES. Gavel includes fine to coarse, angular to subrounded mudstone and sandstone. MADE GROUND
	1.50	D		3.50	67.15		End of Pit at 3.50m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring	Project No. 2585	Co-ords: 433765.00 - 550445.00 Level: 72.20	Date: 31/07/2020
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Location: Houghton le Spring	Dimensions (m): 3.20	Scale: 1:20
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Client: Hellens Group	Depth: 2.30	0.60	Logged TS
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Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.05 - 0.15 0.05 - 0.50	D B		0.15	72.05		MADE GROUND Turf over light brown sandy slightly gravelly clay with rootlets. Gravel is angular, fine to medium sandstone, ash and limestone.
	0.20 - 0.80 0.20 - 0.80	B D					MADE GROUND brown sandy gravelly clay with some cobbles. Gravel is angular, fine to medium sandstone and some brick. Cobbles of sandstone and brick.
	1.00 - 1.30 1.00 - 1.30	B D		0.90	71.30		MADE GROUND Dark grey sandy gravel. Gravel is angular, fine to medium occasionally coarse coal, ask and clinker and brick.
	1.50 - 2.00	B		1.40	70.80		MADE GROUND Light brown sandy gravel of limestone with cobbles of limestone. Possible weathered rockhead.
	2.30	D		2.30	69.90		End of Pit at 2.30m

Remarks: No groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433783.00 - 550376.00
Level: 72.50

Date
31/07/2020

Location: Houghton le Spring

Dimensions (m): 3.00
8.00
Depth 2.50

Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.05 - 0.10 0.05 - 0.10	B D		0.10	72.40		MADE GROUND Turf over sandy gravelly silty clay with rootlets. Gravel is angular, fine to medium sandstone and limestone.
	0.20 - 0.60 0.20 - 0.60	B D					MADE GROUND Brown and dark brown dessicated clayey sandy gravel with cobbles and boulders. Gravel is angular, fine to coarse brick, sandstone, concrete and ash. rare wire fragments noted and whole bricks.
	1.00	D					... concrete boulder encountered at 1.00mbgl
	1.30 - 2.00	B					... many brick and difficult to excavate from 1.20mbgl
	2.30	D		2.50	70.00		End of Pit at 2.50m

Remarks: No groundwater encountered.

Stability: Unstable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433831.00 - 550341.00
Level: 73.05

Date
31/07/2020

Location: Houghton le Spring

Dimensions (m): 2.80
Depth 3.00

Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.00 - 0.15 0.00 - 0.15	B D		0.20	72.85		MADE GROUND Turf over friable sandy gravelly silt with rootlets. Gravel is angular, fine to medium sandstone and limestone.
	0.30 - 0.50	B					MADE GROUND Dark brown sandy gravel. Gravel is angular, fine to medium ash and clinker
	0.50 - 0.60	B		0.50	72.55		MADE GROUND Light brown sandy gravel of clinker.
	1.00 - 1.50 1.00 - 1.50	B D		0.60	72.45		MADE GROUND Dark grey sandy gravel. Gravel is angular, fine to medium occasionally coarse mudstone and brick and ash.
	2.00	D					
	2.50	B					
				3.00	70.05		End of Pit at 3.00m

Remarks: No groundwater encountered.

Stability: Stable
Plant: JCB 3CX





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433921.00 - 550353.00
Level: 72.35

Date
31/07/2020

Location: Houghton le Spring

Dimensions (m): 3.20
Depth 2.70

Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.30	D				[Cross-hatched pattern]	MADE GROUND Turf over brown sandy gravel with cobbles and boulders. Gravel is angular, fine to coarse brick, concrete, ash, tarmacadam and limestone. Occasional wire fragments, whole bricks and concrete paving slabs noted.
	1.00	B					
	1.50	D					
	2.00 - 2.50 2.00 - 2.50	B D					
				2.70	69.65		End of Pit at 2.70m

Remarks: No groundwater encountered.

Stability: Unstable
Plant: JCB 3CX





Trial Pit Log

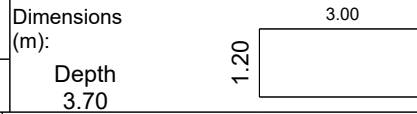
Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433733.00 - 550495.00
Level:

Date
03/05/2022

Location: Houghton le Spring



Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
▼	0.15	D				[Cross-hatch pattern]	Tree chippings over friable dark brown slightly sandy gravelly CLAY with occasional cobbles. Gravel is fine to coarse angular to sub-angular sandstone, brick fragments, clinker, slag and mudstone.
	0.35					[Cross-hatch pattern]	MADE GROUND
	0.50 - 0.60 0.50 - 0.60	B D				[Cross-hatch pattern]	Light brown and partly dark grey sandy GRAVEL with cobbles. Gravel is fine to coarse angular to sub angular sandstone, whole bricks, clinker, slag, concrete. MADE GROUND <i>Angular Boulders of concrete encountered.</i>
	0.80					[Cross-hatch pattern]	Brown/Dark grey clayey gravelly SAND. Gravel is fine to coarse angular to subangular sandstone, ash, brick and plastic. MADE GROUND
	1.00 - 1.20 1.00 - 1.20	B D				[Cross-hatch pattern]	
	1.30					[Cross-hatch pattern]	Light brown slightly clayey very gravelly SAND. Gravel is fine to coarse subangular to subrounded sandstone, mudstone, brick, clinker and coal. MADE GROUND
	1.50 - 1.60	D				[Cross-hatch pattern]	
2.00 - 2.20	B				[Cross-hatch pattern]		
2.80					[Cross-hatch pattern]		
3.00 - 3.20 3.00 - 3.20	B D					[Pattern with 'x' marks]	Stiff Pinkish brown slightly sandy silty laminated CLAY with occasional cobbles and boulders of angular Sandstone. GLACIAL TILL
3.60 3.70						[Pattern with dots]	Possible weathered light yellowish SANDSTONE rockhead. <i>Difficult to excavate due to hard strata.</i> End of Pit at 3.70m

Remarks: Slight groundwater seepage from 2.60m bgl. Pit terminated at 3.70 m bgl due to hard strata.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log

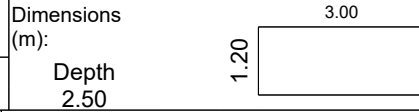
Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433768.00 - 550452.00
Level:

Date
03/05/2022

Location: Houghton le Spring



Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D		0.25			Grassover friable brown slightly sandy gravelly CLAY with rootlets. Gravel is fine to coarse angular to subangular sandstone, limestone and ash.
	0.60 - 0.70 0.60 - 0.70	B D		0.80			MADE GROUND Brown slightly sandy very gravelly CLAY with cobbles. Gravel is fine to coarse angular sandstone, whole bricks, wood, plastic, concrete and clinker. MADE GROUND
	1.00 - 1.20 1.00 - 1.20	B D		1.40			Dark grey sandy very gravelly CLAY. Gravel is fine to coarse angular to subangular coal, brick, ash and clinker. MADE GROUND
	1.50 - 1.60 1.50 - 1.60	B D		2.50			Light brown sandy GRAVEL with angular coarse cobbles and boulders of limestone. Possible weathered rockhead. MADE GROUND
	2.50	D		2.50			End of Pit at 2.50m

Remarks: Obstruction at 2.50m bgl due to boulders.

Stability: Stable

Plant: Komatsu 910





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433812.00 - 550457.00
Level:

Date
03/05/2022

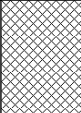
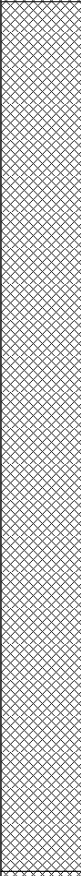
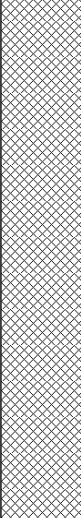
Location: Houghton le Spring

Dimensions (m): 3.00

Depth
4.00

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D		0.30			Grassover with tree stumps and chippings brown slightly sandy gravelly CLAY. Gravel is fine to coarse angular to subangular brick, sandstone and mudstone.
	0.60 - 0.80 0.60 - 0.80	B D					MADE GROUND Dark grey sandy GRAVEL. Gravel is fine to coarse angular to subangular whole bricks, coal, sandstone, concrete, clinker and plastic.
	1.40 - 1.50	D		2.60			MADE GROUND <i>Cobbles/ Boulders of angular coarse limestone / sandstone.</i>
	2.00 - 2.30	D					Light brown /yellow sandy GRAVEL. Gravel is fine to coarse angular to subangular limestone/ sandstone.
	2.80 - 3.00 2.80 - 3.00	B D		4.00			MADE GROUND <i>Cobbles/ Boulders of angular coarse limestone / sandstone noted. Possible weathered rockhead.</i>
	3.50 - 3.60	D					
	4.00	B		4.00			End of Pit at 4.00m

Remarks: No groundwater encountered.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433847.00 - 550447.00
Level:

Date
03/05/2022

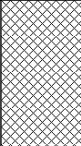
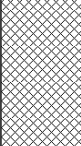
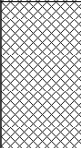
Location: Houghton le Spring

Dimensions (m): 3.00
1.20 
Depth 4.50

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.15 - 0.20	D		0.40			Grassover with tree stumps and chippings brown slightly sandy gravelly CLAY. Gravel is fine to coarse angular to subangular brick, sandstone and mudstone. MADE GROUND
	0.60 - 0.70	D					Dark grey sandy GRAVEL. Gravel is fine to coarse angular to subangular brick, concrete, clinker, ash and shale. MADE GROUND
	1.40 - 1.50 1.40 - 1.50	B D		1.30			Dark grey sandy GRAVEL with cobbles. Gravel is fine to coarse angular to subangular of laminated shale/ mudstone. MADE GROUND <i>Cobbles and boulder of angular coarse LIMESTONE noted from 1.3m bgl.</i>
	2.00	D					
	2.50	B		3.00			
	3.20 - 3.50	D					Light brown sandy GRAVEL. Gravel is fine to coarse angular LIMESTONE. Possible weathered bedrock. MADE GROUND

Remarks: No groundwater encountered.

Stability: Stable
Plant: Komatsu 910



Continued on Next Sheet



Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433847.00 - 550447.00
Level:

Date
03/05/2022

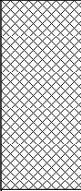
Location: Houghton le Spring

Dimensions (m): 3.00

Depth
4.50

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	4.50	B		4.50			Light brown sandy GRAVEL. Gravel is fine to coarse angular LIMESTONE. Possible weathered bedrock. MADE GROUND
							End of Pit at 4.50m

Remarks: No groundwater encountered.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log

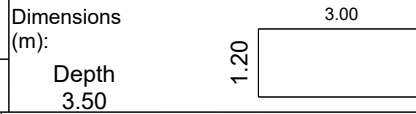
Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433883.00 - 550429.00
Level:

Date
03/05/2022

Location: Houghton le Spring



Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D		0.40			Grassover with tree stumps and wood chippings: Brown slightly sandy gravelly CLAY with rootlets. Gravel is fine to coarse angular to subangular of brick, plastic, timber, and sandstone. MADE GROUND
	0.80 - 1.00 0.80 - 1.00	B D					Dark brown slightly sandy gravelly CLAY. Gravel is fine to coarse angular to subangular sandstone, limestone, coal and brick fragments. MADE GROUND
	1.50 1.50	B D		1.40			Dark grey/ black sandy GRAVEL. Gravel is fine to coarse angular to subangular shale, coal, tiles, ash, whole bricks, metal rods, pvc pipes, plastic, concrete slabs and a steel girder structure. MADE GROUND
	2.30 - 2.50	D					
	3.50	D		3.50			End of Pit at 3.50m

Remarks: Made Ground obstruction at 3.5m bgl.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log

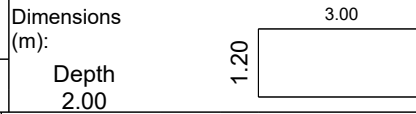
Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433910.00 - 550413.00
Level:

Date
02/05/2022

Location: Houghton le Spring



Scale
1:20

Client: Hellens Group

Logged
RK

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D					Grassover with tree stumps and wood chippings: Brown slightly sandy gravelly CLAY with rootlets. Gravel is fine to coarse angular to subangular of brick, plastic, timber, and sandstone.
	0.50 - 0.70 0.50 - 0.70	B D		0.30			MADE GROUND Stiff light brown slightly sandy very gravelly CLAY. Gravel is fine to coarse angular to subangular brick, limestone, mudstone, coal, concrete slabs, slag, wood and clinker.
				0.90			MADE GROUND <i>Boulders of angular limestone noted with increasing depth.</i>
	1.50 - 1.60	D					Dark grey sandy GRAVEL with cobbles. Cobbles include coarse, angular whole bricks. MADE GROUND
				1.90			Concrete Obstruction.
				2.00			MADE GROUND End of Pit at 2.00m

Remarks: No Groundwater encountered. Pit stopped at 2m bgl due to Made ground obstruction.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log

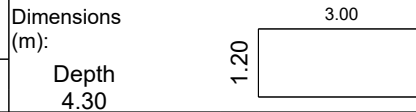
Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433906.00 - 550386.00
Level:

Date
03/05/2022

Location: Houghton le Spring



Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10 - 0.15	D		0.40			Grassover brown sandy gravelly CLAY with rootlets. Gravel is fine to coarse angular to subangular brick, clinker, coal and sandstone. MADE GROUND	
	0.50 - 0.60 0.50 - 0.60	B D					Dark grey/ black sandy GRAVEL. Gravel is fine to coarse angular to subangular brick, coal, ash, clinker, slag, concrete, limestone, sandstone and mudstone. MADE GROUND	
	1.20 - 1.30	D		1.40			Light brown sandy GRAVEL with cobbles.. Gravel is fine to coarse angular of brick, sandstone, limestone . Cobbles include coarse, angular limestone. MADE GROUND	
	1.80 - 1.90 1.80 - 1.90	B D					Reddish brown slightly gravelly clayey fine to coarse grained SAND. Gravel is fine to medium angular to subangular sandstone, limestone and mudstone. MADE GROUND	
	2.20 - 2.30 2.20 - 2.30	B D		2.80			Light yellowish brown sandy GRAVEL with cobbles. Gravel is fine to coarse angular sandstone. Cobbles include coarse , angular sandstone. SANDSTONE	
	3.10 3.10	B D					Light yellowish brown silty fine to medium grained SAND.	
	3.70 3.70	B D		3.60				

Continued on Next Sheet

Remarks: No Groundwater encountered.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433906.00 - 550386.00
Level:

Date
03/05/2022


Location: Houghton le Spring

Dimensions (m): 3.00

 Depth
4.30

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				4.30			Light yellowish brown silty fine to medium grained SAND.
							End of Pit at 4.30m

Remarks: No Groundwater encountered.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433962.00 - 550347.00
Level:

Date
03/05/2022

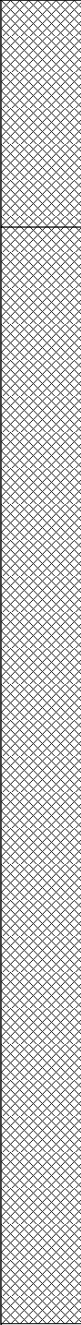
Location: Houghton le Spring

Dimensions (m): 
Depth
3.50

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D					Grassover friable brown slightly sandy gravelly CLAY with high root content. Gravel is fine to coarse angular to subangular brick, tarmacadam, coal, slag, sandstone and tree stumps. MADE GROUND
	0.60 - 0.70 0.60 - 0.70	B D		0.60			Friable brown very sandy very gravelly cobby CLAY. Gravel is fine to coarse angular to subangular of brick, concrete, clinker, slag, ash, metal wires, plastic, styrofoam and pvc pipings. MADE GROUND
	1.20 - 1.30	D					
	2.00 - 2.20 2.00 - 2.20	B D					<i>Boulder of angular concrete slabs and limestone noted. Large structure of concrete encountered within strata.</i>
	2.80 - 3.00	D					
	3.50	D		3.50			End of Pit at 3.50m

Remarks: No groundwater encountered.

Stability: Stable

Plant: Komatsu 910





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433845.00 - 550347.00
Level:

Date
03/05/2022

Location: Houghton le Spring

Dimensions (m): 3.00
1.20
Depth 4.50

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D		0.30			Grassover Light brown slightly sandy gravelly silty CLAY. Gravel is fine to coarse angular to sub rounded of brick, mudstone and sandstone.
	0.60 - 0.70 0.60 - 0.70	B D					MADE GROUND Friable dark grey/ black slightly clayey very sandy GRAVEL. Gravel is fine to coarse angular to sub angular brick, sandstone, mudstone, slag, clinker and coal.
	1.20 - 1.30 1.20 - 1.30	B D		1.10			Friable red sandy GRAVEL. Gravel is fine to coarse angular brick, coal, sandstone, clinker, slag and mudstone. MADE GROUND <i>Occasional boulders of angular limestone noted in strata.</i>
	2.00 - 2.20 2.00 - 2.20	B D		1.70			Light grey thinly laminated MUDSTONE. Recovered as angular gravels. <i>Cobbles of angular coarse sandstone also noted within strata.</i>
	2.80 - 3.00	D					

Continued on Next Sheet

Remarks: No groundwater encountered.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log


Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433845.00 - 550347.00
Level:

Date
03/05/2022


Location: Houghton le Spring

Dimensions (m): 3.00

 Depth
4.50

Scale
1:20

Logged
RK

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	4.20 4.20	B D		4.50			Light grey thinly laminated MUDSTONE. Recovered as angular gravels.
							End of Pit at 4.50m

Remarks: No groundwater encountered.

Stability: Stable
Plant: Komatsu 910





Trial Pit Log


Project Name: **Newbottle Street, Houghton le Spring**

Project No.
2585

Co-ords: **433804.00 - 550371.00**
Level:

Date
03/05/2022

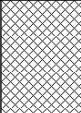
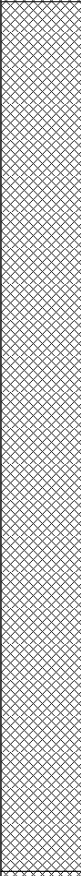
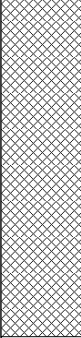
Location: **Houghton le Spring**

Dimensions (m): 3.00

Depth
3.50

Scale
1:20

Logged
RK

Client: **Hellens Group**

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.10 - 0.15	D		0.30			Grassover Light brown slightly sandy gravelly silty CLAY. Gravel is fine to coarse angular to sub rounded of brick, mudstone and sandstone.
	0.60 - 0.70 0.60 - 0.70	D D					MADE GROUND Friable Dark brown very sandy very gravelly CLAY. Gravel is fine to coarse angular to subangular brick, sandstone, mudstone, coal, limestone and concrete.
	1.20 - 1.50 1.20 - 1.50	B D		2.60			MADE GROUND <i>Angular boulders of sandstone noted with strata.</i>
	2.60	D					Dark brown/ Red slightly clayey sandy COBBLES. Cobbles are angular coarse of whole red bricks in a dark brown sandy clayey matrix with occasional cobbles of angular coarse concrete and sandstone.
	3.50	D		3.50			MADE GROUND
	End of Pit at 3.50m						

Remarks: No groundwater encountered.

Stability: **Stable**
Plant: **Komatsu 910**





Trial Pit Log

Project Name: **Newbottle Street, Houghton le Spring**

Project No.
2585

Co-ords: **433942.00 - 550341.00**
Level: **72.05**

Date
02/11/2020

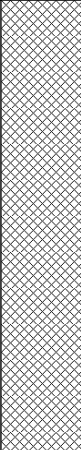
Location: **Houghton le Spring**

Dimensions (m): **0.30**
Depth **1.20**

Scale
1:20

Logged
TS

Client: **Hellens Group**

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.60 - 1.20	D		1.20	70.85		MADE GROUND Turf over dark brown sandy gravel. Gravel is angular fine to medium of ash sandstone and coal.
							End of Pit at 1.20m

Remarks: **No groundwater encountered**

Stability: **stable**
Plant: **Hand excavated**

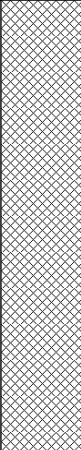




Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring	Project No. 2585	Co-ords: 433874.00 - 550374.00 Level: 73.30	Date: 02/11/2020
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Location: Houghton le Spring	Dimensions (m): 0.40	Scale: 1:20
Client: Hellens Group	Depth: 1.20	Logged: TS

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.60	D		1.20	72.10		MADE GROUND Turf over dark brown sandy gravel. Gravel is angular, fine to medium ash, brick and concrete.
							End of Pit at 1.20m

Remarks: No groundwater encountered

Stability: stable

Plant: hand excavated





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433820.00 - 550352.00
Level: 73.30

Date
02/11/2020


Location: Houghton le Spring

Dimensions (m): 0.40
Depth 1.20 0.40

Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50 - 1.20	D		1.20	72.10		MADE GROUND Turf over brown sandy clay and cobbles. Gravel is angular, fine to coarse brick, concrete, ash, tarmacadam, limestone and with occasional wire fragments.
							End of Pit at 1.20m

Remarks: No groundwater encountered

Stability: stable
Plant: Hand excavated





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring


Project No.
2585

Co-ords: 433826.00 - 550401.00
Level: 73.15

Date
02/11/2020

Location: Houghton le Spring

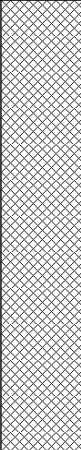
Dimensions (m): 0.40
Depth 1.20



Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.60 - 0.80	D		1.20	71.95		MADE GROUND Turf over brown sandy clay and cobbles. Gravel is angular, fine to coarse brick, concrete, ash, tarmacadam, limestone and with occasional wire fragments.
							End of Pit at 1.20m

Remarks: No groundwater encountered

Stability: Stable

Plant: Hand excavated





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433773.00 - 550448.00
Level: 72.20

Date
02/11/2020

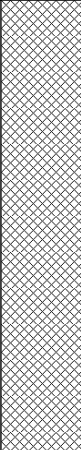
Location: Houghton le Spring

Dimensions (m): 0.40
Depth 1.20 0.40

Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.60 - 1.20	D		1.20	71.00		MADE GROUND Turf over dark brown sandy gravel. Gravel is angular fine to medium of ash sandstone and coal.
							End of Pit at 1.20m

Remarks: No groundwater encountered

Stability: stable
Plant: Hand excavated





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring


Project No.
2585

Co-ords: 433731.00 - 550421.00
Level: 71.67

Date
02/11/2020

Location: Houghton le Spring

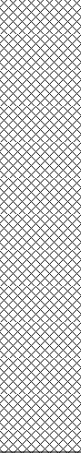
Dimensions (m): 0.40
Depth 1.20



Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50	D		1.20	70.47		MADE GROUND Turf over dark brown sandy gravel. Gravel is angular, fine to medium ash, brick, coal and concrete.
							End of Pit at 1.20m

Remarks: No groundwater encountered

Stability: stable
Plant: Hand excavated





Trial Pit Log

Project Name: Newbottle Street, Houghton le Spring


Project No.
2585

Co-ords: 433756.00 - 550466.00
Level: 71.35

Date
02/11/2020

Location: Houghton le Spring

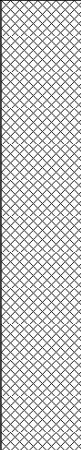
Dimensions (m): 0.40
Depth 1.20



Scale
1:20

Logged
TS

Client: Hellens Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.50 - 1.00	D		1.20	70.15		MADE GROUND Turf over dark brown sandy gravel. Gravel is angular, fine to medium ash, coal, brick and concrete.
							End of Pit at 1.20m

Remarks: No groundwater encountered

Stability: stable
Plant: Hand excavated





Borehole Log

Borehole No.

RO-01

Sheet 1 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433799E - 550396N	Hole Type	RO
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Location:	Houghton le Spring	Level:	72.85	Scale	1:100
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Client:	Hellens Group	Dates:	20/04/2020	Logged By	DRILLER
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Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Brown sandy gravelly CLAY. Gravel consists of sandstone . Sandstone boulders also encountered.	1
									2
									3
									4
									5
									6
									7
									8
									9
									10
									11
									12
									13
									14
					14.80	58.05		Red/Brown weathered MUDSTONE.	15
									16
									17
									18
									19
								Continued on Next Sheet	20

Remarks
No groundwater encountered.





Borehole Log

Borehole No.

RO-01

Sheet 2 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433799E - 550396N	Hole Type	RO
Location:	Houghton le Spring			Level:	72.85	Scale	1:100
Client:	Hellens Group			Dates:	20/04/2020	Logged By	DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								Red/Brown weathered MUDSTONE.	21
									22
									23
									24
									25
									26
					27.30	45.55			27
								Brown SANDSTONE.	28
									29
					30.00	42.85			30
								End of Borehole at 30.00m	31
									32
									33
									34
									35
									36
									37
									38
									39
									40

Remarks
No groundwater encountered.





Borehole Log

Borehole No.

RO-02

Sheet 1 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433808E - 550403N	Hole Type	RO
Location:	Houghton le Spring			Level:	73.00	Scale	1:100
Client:	Hellens Group			Dates:	20/04/2020	Logged By	DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
[REDACTED]					2.10	70.90		Brown gravelly CLAY. Gravel consists of coarse sandstone.	1
								Brown coarse sandstone GRAVEL. Sandstone boulders also encountered.	2
					7.60	65.40		Brown gravelly CLAY. Gravel consists of coarse sandstone.	3
									4
					13.10	59.90		Red/Brown weathered MUDSTONE.	5
					16.70	56.30		Grey MUDSTONE.	6
					17.50	55.50		Yellow/Grey weathered SANDSTONE.	7
								8	
								9	
								10	
								11	
								12	
								13	
								14	
								15	
								16	
								17	
								18	
								19	
								20	

Continued on Next Sheet

Remarks
No groundwater encountered.





Borehole Log

Borehole No.

RO-02

Sheet 2 of 2

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433808E - 550403N	Hole Type	RO
Location:	Houghton le Spring			Level:	73.00	Scale	1:100
Client:	Hellens Group			Dates:	20/04/2020	Logged By	DRILLER

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					21.00	52.00	Yellow/Grey weathered SANDSTONE.	21
								End of Borehole at 21.00m	22
									23
									24
									25
									26
									27
									28
									29
									30
									31
									32
									33
									34
									35
									36
									37
									38
									39
									40

Remarks
No groundwater encountered.





Borehole Log

Borehole No.

RO-03

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433873E - 550352N	Hole Type	RO
Location:	Houghton le Spring			Level:	72.95	Scale	1:100
Client:	Hellens Group			Dates:	20/04/2020	Logged By	Driller

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					1.40	71.55		Brown gravelly CLAY. Gravel consists of coarse brick.	1
								Black SHALE / ASH.	2
									3
									4
									5
					5.80	67.15		Brown gravelly CLAY. Gravel consists of coarse sandstone.	6
					7.40	65.55		Red/Brown MUDSTONE.	7
								8	
								9	
								10	
					10.70	62.25		Yellow/Grey SANDSTONE.	11
								12	
					12.40	60.55		End of Borehole at 12.40m	13
								14	
								15	
								16	
								17	
								18	
								19	
								20	

Remarks
No groundwater encountered.





Borehole Log

Borehole No.

RO-04

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433878E - 550364N	Hole Type	RO
Location:	Houghton le Spring			Level:	73.00	Scale	1:100
Client:	Hellens Group			Dates:	21/04/2020	Logged By	Driller

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results						
					1.40	71.60		Brown gravelly CLAY.	1	
					1.90	71.10			Yellow GRAVEL. Gravel consists of coarse sandstone and limestone. Black ASH/SLAG	2
					4.90	68.10			Yellow weathered SANDSTONE and LIMESTONE.	5
					10.80	62.20				Grey MUDSTONE.
					17.00	56.00		End of Borehole at 17.00m		17

Remarks
No groundwater encountered.





Borehole Log

Borehole No.

RO-05

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433888E - 550384N	Hole Type	RO
Location:	Houghton le Spring			Level:	73.40	Scale	1:100
Client:	Hellens Group			Dates:	20/04/2020	Logged By	Driller

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					3.10	70.30		Brown gravelly CLAY. Gravel consists of ash/slag.	1
								Yellow weathered LIMESTONE/SANDSTONE.	2
					12.40	61.00		Light grey weathered SANDSTONE.	3
15.00	58.40							End of Borehole at 15.00m	15

Remarks
No groundwater encountered.





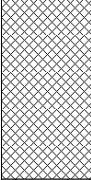
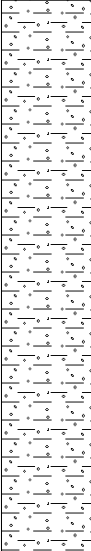
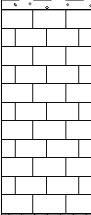
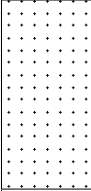
Borehole Log

Borehole No.

RO-06

Sheet 1 of 1

Project Name:	Newbottle Street, Houghton le Spring	Project No.	2585	Co-ords:	433795E - 550406N	Hole Type	RO
Location:	Houghton le Spring			Level:	72.80	Scale	1:100
Client:	Hellens Group			Dates:	21/04/2020	Logged By	Driller

Well	Water Strikes	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					2.40	70.40		Brown gravelly CLAY. Gravel consists of brick/ash.	1
								Brown gravelly CLAY. Gravel consists of coarse sandstone.	2
					9.80	63.00		Yellow weathered LIMESTONE/SANDSTONE.	3
								Grey weathered SANDSTONE.	4
					15.00	57.80		End of Borehole at 15.00m	5

Remarks
No groundwater encountered.





Rotary Core Log

Borehole No.

RC01

Sheet 1 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433745.00 - 550470.00

Location: Houghton le Spring

Level: 71.73

Scale
1:25

Client: Hellens Group

Dates: 20/06/2022 - 20/07/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.10 - 0.20	ES				0.30	71.43		Scrub grass over TOPSOIL: Stiff brown sandy gravelly CLAY with high root content. Gravel is angular to sub-angular fine to coarse and incudes sandstone, brick and mudstone	
							0.50	71.23		MADE GROUND: Stiff yellowish brown sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone and brick. Cobbles are angular small to large of brick and sandstone.	
		1.00 - 1.20	ES							MADE GROUND: Yellowish brown clayey SAND and GRAVEL with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-round fine to coarse and includes brick, coal, sandstone and mudstone. Cobbles are angular small to large of brick, sandstone and mudstone.	1
		1.20 - 2.00									
		2.00 - 3.50									
		3.50 - 5.00									
		4.76 - 4.89	ES							Sandstone boulders with firm to stiff thin (0.10m) clay bands between 3.50m and 5.39m bgl.	4
											5

Continued on Next Sheet

Remarks

Inspection pit dug to 1.20m bgl. Depth to groundwater not identified due to drilling flush. Drilling run 11 (15.50m to 17.00m bgl) became stuck in the core barrel due to the presence of sand resulting in the extensive drilling fractures below 15.88m bgl.





Rotary Core Log

Borehole No.

RC01

Sheet 2 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433745.00 - 550470.00

Location: Houghton le Spring

Level: 71.73

Scale
1:25

Client: Hellens Group

Dates: 20/06/2022 - 20/07/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50	15	42	42	15	5.39	66.34		MADE GROUND: Yellowish brown clayey SAND and GRAVEL with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-round fine to coarse and includes brick, coal, sandstone and mudstone. Cobbles are angular small to large of brick, sandstone and mudstone.	
		6.23 - 6.40	ES							Weak to moderately strong reddish brown distinctly to destructively weathered MUDSTONE. <i>Horizontal to vertical very close to closely spaced planar rough to smooth very tight to open clean.</i>	6
		6.80 - 7.00	ES				6.68	65.05		<i>Horizontal to sub-horizontal (10°) closely to medium spaced planar to undulating smooth to rough very tight to open clean.</i>	
		6.50 - 8.00	4	100	90	80				Strong reddish brown fine to medium SANDSTONE. <i>Horizontal to vertical medium spaced planar smooth to rough tight to open clean.</i>	7
		8.00 - 9.50	11							<i>Horizontal to oblique (50°) closely to medium spaced planar to stepped rough tight to partly open clean.</i> <u>Grey below 8.00m bgl</u>	8
			4	93	82	71				<i>Horizontal to vertical very close to medium spaced undulating to stepped rough tight to partly open clean.</i>	9
										<i>Horizontal to oblique (30°) closely to medium spaced undulating to stepped rough partly open to open clean.</i>	10

Continued on Next Sheet

Remarks

Inspection pit dug to 1.20m bgl. Depth to groundwater not identified due to drilling flush. Drilling run 11 (15.50m to 17.00m bgl) became stuck in the core barrel due to the presence of sand resulting in the extensive drilling fractures below 15.88m bgl.





Rotary Core Log

Borehole No.

RC01

Sheet 3 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433745.00 - 550470.00

Location: Houghton le Spring

Level: 71.73

Scale
1:25

Client: Hellens Group

Dates: 20/06/2022 - 20/07/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00	3	95	87	83	12.50	59.23		Strong reddish brown fine to medium SANDSTONE.	11
		11.00 - 12.50	3	97	97	91				<i>Horizontal to sub-horizontal (10°) closely to medium spaced undulating rough tight to partly open clean.</i> <i>Thinly laminated between 11.13m and 11.50m bgl</i>	
		12.50 - 14.00	9	97	61	41				Weak to strong reddish brown fine to medium SANDSTONE. <i>Horizontal to oblique (80°) closely spaced undulating to stepped rough partly open clean.</i>	13
			12							<i>Horizontal to vertical very closely to closely spaced undulating to stepped rough partly open to open clean.</i> <i>Destructively weathered between 13.70 and 13.90m bgl.</i>	
	14.00 - 15.50	5	90	85	79	14.00	57.73	Strong yellowish brown fine to coarse SANDSTONE. <i>Horizontal to oblique (45°) closely to medium spaced planar to undulating rough tight to partly open clean to soft clay infill with surface staining.</i>	14		
Continued on Next Sheet										15	

Remarks

Inspection pit dug to 1.20m bgl. Depth to groundwater not identified due to drilling flush. Drilling run 11 (15.50m to 17.00m bgl) became stuck in the core barrel due to the presence of sand resulting in the extensive drilling fractures below 15.88m bgl.





Rotary Core Log

Borehole No.

RC01

Sheet 4 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433745.00 - 550470.00

Location: Houghton le Spring

Level: 71.73

Scale
1:25

Client: Hellens Group

Dates: 20/06/2022 - 20/07/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
	▼						15.50	56.23		Strong yellowish brown fine to coarse SANDSTONE.
		15.50 - 17.00	9	65	21	12				Weak to moderately strong reddish brown fine to medium SANDSTONE <i>Horizontal to vertical closely spaced stepped to undulating rough tight to partly open clean.</i>
							17.00	54.73		End of Borehole at 17.00m

Remarks
Inspection pit dug to 1.20m bgl. Depth to groundwater not identified due to drilling flush. Drilling run 11 (15.50m to 17.00m bgl) became stuck in the core barrel due to the presence of sand resulting in the extensive drilling fractures below 15.88m bgl.





Rotary Core Log

Borehole No.

RC02

Sheet 1 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433749.00 - 550448.00

Location: Houghton le Spring

Level: 71.92

Scale
1:25

Client: Hellens Group

Dates: 21/06/2022 - 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.10 - 0.20	ES				0.30	71.62		Scrub grass over TOPSOIL: Stiff brown sandy gravelly CLAY with moderate root content. Gravel is angular to sub-round fine to coarse and includes brick, coal, sandstone and mudstone.	
		0.80 - 0.90	ES							MADE GROUND: Stiff brown sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-round fine to coarse and includes brick, concrete, coal, mudstone and sandstone. Cobbles are angular to sub-angular small to large of concrete, brick and sandstone.	1
		1.50 - 1.60 1.20 - 2.00	ES								2
		2.00 - 3.50									3
		3.50 - 5.00									4
											5

Continued on Next Sheet

Remarks

Inspection pit dug to 1.20m bgl. No recovery below 12.50m bgl due to destructive weathering of sandstone bedrock. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC02

Sheet 2 of 4
Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433749.00 - 550448.00

Location: Houghton le Spring

Level: 71.92

Scale
1:25

Client: Hellens Group

Dates: 21/06/2022 - 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.50 - 5.60	ES							MADE GROUND: Stiff brown sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-round fine to coarse and includes brick, concrete, coal, mudstone and sandstone. Cobbles are angular to sub-angular small to large of concrete, brick and sandstone.	6
		5.00 - 6.50									
		6.50 - 8.00	ES				7.80	64.12		Weak reddish brown partly weathered MUDSTONE.	8
		7.53 - 7.64									
		8.00 - 9.50	10	91	47	37	8.23	63.69		Strong greyish brown fine to coarse SANDSTONE. <i>Horizontal to sub-horizontal (10°) very closely spaced undulating to stepped rough partly open to moderately wide clean to soft clay infill.</i> <i>Sub-horizontal (10°) to vertical closely to moderately spaced planar smooth to rough tight to open clean.</i>	9
			6								
			11							<i>Horizontal to oblique (40° to 65°) closely to medium spaced planar to undulating smooth to rough partly open to open clean.</i> <i>Yellowish brown below 9.70m bgl.</i>	10

Continued on Next Sheet

Remarks

Inspection pit dug to 1.20m bgl. No recovery below 12.50m bgl due to destructive weathering of sandstone bedrock. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC02

Sheet 3 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433749.00 - 550448.00

Location: Houghton le Spring

Level: 71.92

Scale
1:25

Client: Hellens Group

Dates: 21/06/2022 - 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00	3	91	83	77	12.50	59.42		Strong greyish brown fine to coarse SANDSTONE. <i>Sub-horizontal (10°) to oblique (20° to 70°) closely to medium spaced planar to stepped rough very tight to partly open clean.</i>	11
		11.00 - 12.50	5	96	34	18				<i>Horizontal to sub-horizontal (10°) very close to closely spaced planar to stepped rough tight to partly open clean with occasional black surface staining.</i>	
			10							<i>Horizontal to oblique (50°) very close to closely spaced planar to stepped rough very tight to open clean.</i>	12
		12.50 - 14.00								Weak reddish brown fine to coarse destructively weathered SANDSTONE with ~0.50m thick bands of sand.	
	14.00 - 15.50								14		
										Continued on Next Sheet	15

Remarks

Inspection pit dug to 1.20m bgl. No recovery below 12.50m bgl due to destructive weathering of sandstone bedrock. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC02

Sheet 4 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433749.00 - 550448.00

Location: Houghton le Spring

Level: 71.92

Scale
1:25

Client: Hellens Group

Dates: 21/06/2022 - 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00								Weak reddish brown fine to coarse destructively weathered SANDSTONE with ~0.50m thick bands of sand.	16
							17.00	54.92		End of Borehole at 17.00m	17
											18
											19
											20

Remarks

Inspection pit dug to 1.20m bgl. No recovery below 12.50m bgl due to destructive weathering of sandstone bedrock. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC03

Sheet 1 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433770.00 - 550470.00

Location: Houghton le Spring

Level: 71.99

Scale
1:25

Client: Hellens Group

Dates: 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.30					71.69		Scrub grass over TOPSOIL: Stiff brown sandy slightly gravelly CLAY with high root content. Gravel is angular to sun-angular fine to medium and includes coal, mudstone and chert.		
		1.30 - 1.40	ES						MADE GROUND: Stiff greyish brown sandy gravelly CLAY with bands of clayey sand and gravel with moderate cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse and includes tarmacadam, concrete, brick and coal. Cobbles are angular to sub-round small to large of sandstone.	1	
		1.20 - 2.00									
		2.00 - 3.50									
		3.50 - 5.00									
		5.00					66.99				
Continued on Next Sheet										5	

Remarks

Inspection pit dug to 1.20m bgl. Groundwater encountered at 7.00m bgl.





Rotary Core Log

Borehole No.

RC03

Sheet 2 of 4
Hole Type
RC

Project Name:	Newbottle Street, Houghton le Spring	Project No.:	2585	Co-ords:	433770.00 - 550470.00
Location:	Houghton le Spring	Level:	71.99	Scale	1:25
Client:	Hellens Group	Dates:	22/06/2022	Logged By	TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description
				TCR	SCR	RQD				
		5.10 - 5.20	ES				5.80	66.19		Stiff greyish brown slightly sandy slightly gravelly CLAY. gravel is angular to sub-angular fine to medium and includes coal and mudstone.
		5.00 - 6.50								<i>Reddish brown below 5.60m bgl.</i>
		6.50 - 6.60	ES				8.88	63.11		Stiff thinly laminated brown mottled yellowish brown sandy slightly gravelly CLAY. Sand is fine grained and appears as a dusting on laminations. Gravel angular to sub-angular fine to medium and includes sandstone, mudstone and coal.
	▼	6.50 - 8.00								<i>Massive below 8.00m bgl.</i>
		8.15 - 8.25	ES							
		8.00 - 9.50			97	41	24			Weak reddish brown mottled grey SILTSTONE. <i>Horizontal to sub-horizontal (10°) very closely to medium spaced undulating rough tight to partly open clean.</i>
			4				9.93	62.06		
										Continued on Next Sheet

Remarks
Inspection pit dug to 1.20m bgl. Groundwater encountered at 7.00m bgl.





Rotary Core Log

Borehole No.

RC03

Sheet 3 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433770.00 - 550470.00

Location: Houghton le Spring

Level: 71.99

Scale
1:25

Client: Hellens Group

Dates: 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00		100	25	25				Weak pinky grey fine to medium distinctly to destructively weathered SANDSTONE.	
		11.17 - 11.27	5 ES							<i>Horizontal closely spaced planar smooth tight clean.</i>	11
		11.00 - 12.50	9	100	43	37				<i>Horizontal closely undulating smooth tight clean.</i>	12
		12.50 - 14.00	10	27	12	7				<i>Horizontal closely planar smooth tight clean.</i>	13
		14.00 - 15.50	15	13	7					<i>Horizontal very closely undulating rough open clean.</i>	14
										Continued on Next Sheet	15

Remarks
Inspection pit dug to 1.20m bgl. Groundwater encountered at 7.00m bgl.





Rotary Core Log

Borehole No.

RC03

Sheet 4 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433770.00 - 550470.00

Location: Houghton le Spring

Level: 71.99

Scale
1:25

Client: Hellens Group

Dates: 22/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00	8	89	75	63	17.00	54.99		Weak pinky grey fine to medium distinctly to destructively weathered SANDSTONE. <i>Horizontal to vertical very closely to medium planar to undulating smooth tight to open clean. Reddish brown below 15.5m bgl.</i>	16
										End of Borehole at 17.00m	17
											18
											19
											20

Remarks
Inspection pit dug to 1.20m bgl. Groundwater encountered at 7.00m bgl.





Rotary Core Log

Borehole No.

RC04

Sheet 1 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433795.00 - 550400.00

Location: Houghton le Spring

Level: 73.03

Scale
1:25

Client: Hellens Group

Dates: 23/06/2022 - 24/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.30	72.73		Scrub grass over TOPSOIL: Stiff brown sandy slightly gravelly CLAY with high root content. Gravel is angular to sun-round fine to medium and includes brick, concrete and sandstone.	
		1.20 - 2.00								MADE GROUND: Grey mottle pink clayey SANDY and GRAVEL with high cobble content and low metal content. Sand is fine to coarse. Gavel is angular to sub-angular fine to coarse and includes brick and concrete. Cobbles are angular small to large of brick and concrete.	1
		2.00 - 3.50									2
		3.50 - 5.00									3
							5.00	68.03			4
										Continued on Next Sheet	5

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 17.9m bgl.





Rotary Core Log

Borehole No.

RC04

Sheet 2 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433795.00 - 550400.00

Location: Houghton le Spring

Level: 73.03

Scale
1:25

Client: Hellens Group

Dates: 23/06/2022 - 24/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50								VOID	6
		6.50 - 8.00				6.50	66.53			Stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-round fine to coarse and includes coal and mudstone.	7
		8.00 - 9.50								No Recovery	8
											9
											10

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 17.9m bgl.





Rotary Core Log

Borehole No.

RC04

Sheet 3 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433795.00 - 550400.00

Location: Houghton le Spring

Level: 73.03

Scale
1:25

Client: Hellens Group

Dates: 23/06/2022 - 24/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00								Stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to sub-round fine to coarse and includes coal and mudstone.	11
		11.00 - 12.50	12	67	52	31	11.60	61.43		Weak reddish brown partly weathered SILTSTONE. <i>Horizontal oblique (45°) closely spaced planar to undulating rough tight to open clean to stiff reddish brown clay.</i> <i>Incipient fractures</i>	12
		12.50 - 14.00								<i>Incipient fractures</i>	13
		14.00 - 15.50	9	100	21	8	14.00	59.03		<i>Sub-horizontal (5°-10°) very closely to closely spaced undulating rough tight to partly open clean.</i>	14
				53						Weak to mod strong reddish fine to coarse partly weathered SANDSTONE	15
										Continued on Next Sheet	

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 17.9m bgl.





Rotary Core Log

Borehole No.

RC04

Sheet 4 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433795.00 - 550400.00

Location: Houghton le Spring

Level: 73.03

Scale
1:25

Client: Hellens Group

Dates: 23/06/2022 - 24/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00		27					Weak to mod strong reddish fine to coarse partly weathered SANDSTONE		
									<i>Yellowish brown below 15.5m bgl.</i>	16	
		17.00 - 18.50	9	80	20	9			<i>Horizontal closely planar to undulating smooth to rough partly open to open clean.</i>	17	
		18.50 - 20.00	9	61	29	19			<i>Horizontal closely spaced planar to undulating rough partly open clean.</i>	18	
										19	
										20	

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 17.9m bgl.





Rotary Core Log

Borehole No.

RC04

Sheet 5 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433795.00 - 550400.00

Location: Houghton le Spring

Level: 73.03

Scale
1:25

Client: Hellens Group

Dates: 23/06/2022 - 24/06/2022

Logged By
TJS

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		20.00 - 21.50	14	90	48	45	21.43 21.50	51.60 51.53		Weak to mod strong reddish fine to coarse partly weathered SANDSTONE <i>Horizontal to vertical closely to medium spaced planar to undulating smooth to rough very tight to partly open clean.</i>	21
		21.50 - 23.00		44						COAL Weak to moderate strong grey MUDSTONE.	22
		23.00 - 24.50	7	100	93	71	24.50	48.53		<i>Horizontal to oblique (30°) very closely to medium planar to stepped rough very tight to partly open clean.</i>	23 24
										End of Borehole at 24.50m	25

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 17.9m bgl.





Rotary Core Log

Borehole No.

RC05

Sheet 1 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433780.00 - 550362.00

Location: Houghton le Spring

Level: 72.59

Scale
1:25

Client: Hellens Group

Dates: 24/06/2022 - 27/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.10 - 0.20	D				0.30	72.29		Scrub grass over TOPSOIL: Stiff brown sandy slightly gravelly CLAY with high root content. Gravel is angular to sun-round fine to medium and includes brick, concrete and sandstone.	
		1.00 - 1.20	D							MADE GROUND: Dark grey clayey SAND and GRAVEL with high cobble content and low metal content. Sand is fine to coarse. Gavel is angular to sub-angular fine to coarse and includes brick and concrete. Cobbles are angular small to large of brick and concrete.	1
		1.20 - 2.00									
		2.00 - 3.50								No Recovery	2
		3.50 - 5.00								No Recovery	3
											4
											5

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 15.70m bgl.





Rotary Core Log

Borehole No.

RC05

Sheet 2 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433780.00 - 550362.00

Location: Houghton le Spring

Level: 72.59

Scale
1:25

Client: Hellens Group

Dates: 24/06/2022 - 27/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50							MADE GROUND: Dark grey clayey SAND and GRAVEL with high cobble content and low metal content. Sand is fine to coarse. Gavel is angular to sub-angular fine to coarse and includes brick and concrete. Cobbles are angular small to large of brick and concrete.	6	
		6.50 - 8.00								7	
		8.50 - 8.70	D				8.50	64.09	Firm to Stiff brown sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone, siltstone and mudstone.	8	
		8.00 - 9.50								9	
		9.40 - 9.50	D							10	
Continued on Next Sheet											

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 15.70m bgl.





Rotary Core Log

Borehole No.

RC05

Sheet 3 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433780.00 - 550362.00

Location: Houghton le Spring

Level: 72.59

Scale
1:25

Client: Hellens Group

Dates: 24/06/2022 - 27/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00							Firm to Stiff brown sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone, siltstone and mudstone.	11	
		11.00 - 12.50						12			
		12.50 - 14.00						13			
		14.00 - 15.50						14			
										15	

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 15.70m bgl.





Rotary Core Log

Borehole No.

RC05

Sheet 4 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433780.00 - 550362.00

Location: Houghton le Spring

Level: 72.59

Scale
1:25

Client: Hellens Group

Dates: 24/06/2022 - 27/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
	▼	15.50 - 17.00		40	39	35	15.90 16.10	56.69 56.49		Firm to Stiff brown sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone, siltstone and mudstone. Weak reddish brown destructively weathered fine to coarse grained SANDSTONE. Weak greyish brown destructively weathered SILTSTONE.	16
		17.00 - 18.50	2	98	98	95				<i>Horizontal oblique (45°) closely spaced planar to undulating rough tight to open clean to stiff reddish brown clay.</i>	17
		18.50 - 20.00	7	90	43	31	18.40	54.19		Weak to moderately strong yellowish brown fine to coarse grained SANDSTONE. <i>Horizontal closely planar to undulating smooth to rough partly open to open clean.</i>	18 19
			2								20

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 15.70m bgl.





Rotary Core Log

Borehole No.

RC05

Sheet 5 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433780.00 - 550362.00

Location: Houghton le Spring

Level: 72.59

Scale
1:25

Client: Hellens Group

Dates: 24/06/2022 - 27/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		20.00 - 21.50	8	95	92	80	21.50	51.09	Weak to moderately strong yellowish brown fine to coarse grained SANDSTONE.	21
		21.50 - 23.00	5	97	73	70	21.50	51.09	xxxxxx	Weak to moderately strong greyish brown SILTSTONE.	22
			2						Horizontal to vertical closely spaced stepped to undulating rough tight to partly open clean.		
		23.00 - 24.50	10	94	82	77	24.50	48.09	xxxxxx		23
											24
											25
										End of Borehole at 25.00m	25

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 15.70m bgl.





Rotary Core Log

Borehole No.

RC06

Sheet 1 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433826.00 - 550371.00

Location: Houghton le Spring

Level: 73.34

Scale
1:25

Client: Hellens Group

Dates: 28/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.10 - 0.20	D							Scrub grass over TOPSOIL: Stiff brown sandy gravelly CLAY with moderate root content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick and mudstone.	
		0.40 - 0.50	D				0.40	72.94		Dark grey/black clayey SAND and GRAVEL with low cobble content. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse and includes brick, coal, sandstone, terram, plastic and mudstone. Cobbles are angular small to large of brick, sandstone and mudstone. MADE GROUND	1
		1.00 - 1.20	D							<i>Recovered as angular cobbles of brick, concrete and sandstone.</i>	
		1.20 - 2.00									
		2.00 - 2.20	D				2.00	71.34		Reddish brown silty gravelly SAND with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone, and siltstone. MADE GROUND	2
		2.00 - 3.50									
		3.50 - 5.00					3.50 3.60	69.84 69.74		Weak light grey SILTSTONE. (destructively weathered) MADE GROUND Weak grey SANDSTONE. (destructively weathered) MADE GROUND <i>Recovered as angular gravels in a sandy clay matrix.</i> <i>Recovered as angular coarse cobbles of sandstone with plastic.</i>	4
		5.00 - 5.20	D				5.00	68.34			5

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl .Groundwater encountered at 19.4m bgl.





Rotary Core Log

Borehole No.

RC06

Sheet 2 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433826.00 - 550371.00

Location: Houghton le Spring

Level: 73.34

Scale
1:25

Client: Hellens Group

Dates: 28/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50				6.40	66.94		Firm light brown/ grey very sandy gravelly CLAY with low cobble content. Gravel is angular to sub-angular fine to medium and includes coal, mudstone and coal. Cobbles are angular small to large of sandstone	6	
		6.50 - 8.00							Weak yellowish brown fine to coarse grained SANDSTONE. (Highly weathered) <i>Recovered as angular cobbles of sandstone.</i>	7	
		8.00 - 9.50				8.00	65.34		Yellowish brown silty fine to medium grained SAND. <i>No Recovery</i>	8	
										9	
										10	

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl .Groundwater encountered at 19.4m bgl.





Rotary Core Log

Borehole No.

RC06

Sheet 3 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433826.00 - 550371.00

Location: Houghton le Spring

Level: 73.34

Scale
1:25

Client: Hellens Group

Dates: 28/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00								Yellowish brown silty fine to medium grained SAND.	
		11.00 - 12.50				11.00	62.34			Stiff greyish brown slightly sandy gravelly clay with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone, mudstone and coal. Cobbles are angular small to large of sandstone.	11
		12.50 - 14.00									12
		14.00 - 15.50									13
						14.20	59.14			COAL	14
						14.30	59.04			Stiff grey sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone. Cobbles are angular small to large sandstone.	
						14.70	58.64			Stiff reddish brown slightly gravelly sandy CLAY. Gravel is angular to sub-angular fine to medium and includes sandstone.	
						15.00	58.34			Continued on Next Sheet	15

Remarks

Inspection pit dug to 1.2m bgl .Groundwater encountered at 19.4m bgl.





Rotary Core Log

Borehole No.

RC06

Sheet 4 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433826.00 - 550371.00

Location: Houghton le Spring

Level: 73.34

Scale
1:25

Client: Hellens Group

Dates: 28/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							15.20	58.14		Light brown fine to coarse grained silty SAND.	
							15.50	57.84		Moderately strong to strong yellow SANDSTONE (partly weathered) <i>Horizontal oblique (45°) closely spaced planar to undulating rough tight to open clean to silty sand.</i>	
		15.50 - 17.00		50	33	23				Weak yellow fine to coarse grained SANDSTONE. Recovered as angular coarse gravels in a sandy clay matrix. GLACIAL TILL <i>No recovery</i>	16
			5				16.50	56.84		Weak thinly laminated partly weathered MUDSTONE.	
							16.70	56.64		<i>Horizontal to sub-horizontal (10°) closely to medium spaced planar to undulating smooth to rough very tight to open clean.</i>	
							17.00	56.34		COAL	17
							17.18	56.16		Weak greyish brown highly weathered SILTSTONE. <i>Sub-horizontal (5°-10°) very closely to closely spaced undulating rough tight to partly open clean.</i>	18
		17.00 - 18.50	7	96	76	66					
		18.50 - 20.00	8	98	80	64					19
										Continued on Next Sheet	20

Remarks

Inspection pit dug to 1.2m bgl .Groundwater encountered at 19.4m bgl.





Rotary Core Log

Borehole No.

RC07

Sheet 1 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433799.00 - 550344.00

Location: Houghton le Spring

Level: 72.87

Scale
1:25

Client: Hellens Group

Dates: 29/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.30					72.57		Scrub grass over TOPSOIL: Stiff brown sandy gravelly CLAY with moderate root content. Gravel is angular to sub-angular fine to coarse and incudes sandstone, brick, mudstone and concrete.		
		1.20 - 2.00							Soft to Firm brown sandy very gravelly CLAY. Gravel is angular to sub-angular fine to coarse and incudes sandstone, brick, mudstone and concrete.		1
		2.00 - 3.50							MADE GROUND		2
		3.50 - 5.00									3
											4
											5

No Recovery
No Recovery.

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 16.6m bgl.





Rotary Core Log

Borehole No.

RC07

Sheet 2 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433799.00 - 550344.00

Location: Houghton le Spring

Level: 72.87

Scale
1:25

Client: Hellens Group

Dates: 29/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50					6.50	66.37		Soft to Firm brown sandy very gravelly CLAY. Gravel is angular to sub-angular fine to coarse and incudes sandstone, brick, mudstone and concrete. MADE GROUND	6
		6.50 - 8.00					6.50	66.37		Black slightly clayey SAND and GRAVEL. Sand is fine to coarse. Gravel is angular to sub-angular fine to coarse and includes brick, sandstone and coal. MADE GROUND <i>Poor Recovery</i>	7
		8.00 - 9.50					8.00	64.87		Yellowish brown fine to coarse COBBLES with low gravel content. Gravels are cobbles are angular of weak sandstone. MADE GROUND	8
										<i>Poor recovery</i>	9
											10

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 16.6m bgl.





Rotary Core Log

Borehole No.

RC07

Sheet 3 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433799.00 - 550344.00

Location: Houghton le Spring

Level: 72.87

Scale
1:25

Client: Hellens Group

Dates: 29/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00					11.00	61.87		Yellowish brown fine to coarse COBBLES with low gravel content. Gravels are cobbles are angular of weak sandstone. MADE GROUND	
		11.00 - 12.50								Firm to stiff dark brown sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone. Cobbles are angular small to large of sandstone. <i>Poor recovery</i>	11
		12.50 - 14.00									12
		14.00 - 15.50									13
											14
											15

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 16.6m bgl.





Rotary Core Log

Borehole No.

RC07

Sheet 4 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433799.00 - 550344.00

Location: Houghton le Spring

Level: 72.87

Scale
1:25

Client: Hellens Group

Dates: 29/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00								Firm to stiff dark brown sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone. Cobbles are angular small to large of sandstone.	16
	▼	17.00 - 18.50		46	32	10	17.80	55.07		Weak dark grey destructively weathered MUDSTONE. <i>Horizontal to vertical very close to closely spaced planar rough to smooth very tight to open clean.</i>	18
			4				18.30	54.57		Weak light brown destructively weathered SILTSTONE.	
							18.50	54.37		End of Borehole at 18.50m	19
											20

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 16.6m bgl.





Rotary Core Log

Borehole No.

RC08

Sheet 1 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433847.00 - 550351.00

Location: Houghton le Spring

Level: 73.17

Scale
1:25

Client: Hellens Group

Dates: 30/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
Well 1		0.10 - 0.20	D				0.30	72.87		Scrub grass over TOPSOIL: Stiff brown sandy gravelly silty CLAY with moderate root content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, mudstone and concrete.	
		1.00 - 1.10	D				1.10	72.07		Dark grey/ black clayey very sandy GRAVEL with low cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, mudstone, clinker and coal. MADE GROUND	1
		1.20 - 2.00								Grey/Reddish brown fine to coarse gravel with low cobble content. Gravel and cobbles are angular to sub-rounded of sandstone, clinker and mudstone. MADE GROUND	
		2.00 - 3.50					2.00	71.17		Dark grey gravelly COBBLES. Gravel is fine to coarse, angular to subangular of sandstone, clinker, slag, mudstone and coal. Cobbles are angular and includes sandstone. MADE GROUND	2
		3.50 - 5.00								Weak grey weathered SANDSTONE (destructively weathered)	3
									No Recovery		4
							4.80	68.37		Weak grey weathered SANDSTONE (destructively weathered)	5
Continued on Next Sheet											

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 2.90m bgl and 15.2m bgl.





Rotary Core Log

Borehole No.

RC08

Sheet 2 of 4
Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433847.00 - 550351.00

Location: Houghton le Spring

Level: 73.17

Scale
1:25

Client: Hellens Group

Dates: 30/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.60 - 5.70 5.00 - 6.50	D				5.45	67.72		Weak grey weathered SANDSTONE (destructively weathered) MADE GROUND	
		6.50 - 6.60	D				6.50	66.67		Weak black MUDSTONE (completely deteriorated) MADE GROUND	6
		6.50 - 8.00								Soft to firm greyish brown silty sandy very gravelly CLAY with high cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone. Cobbles are angular small to large of sandstone.	7
		8.00 - 9.50								No recovery	8
											9
											10

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 2.90m bgl and 15.2m bgl.





Rotary Core Log

Borehole No.

RC08

Sheet 3 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433847.00 - 550351.00

Location: Houghton le Spring

Level: 73.17

Scale
1:25

Client: Hellens Group

Dates: 30/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00								Soft to firm greyish brown silty sandy very gravelly CLAY with high cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone. Cobbles are angular small to large of sandstone.	11
		11.00 - 12.50									12
		12.50 - 14.00	2	76	43	40	12.85	60.32		Weak reddish brown fine to coarse SANDSTONE. (distinctly to destructively weathered) <i>Horizontal closely spaced planar smooth tight clean.</i>	13
			2								
		14.00 - 15.50		56	53	33	14.60	58.57		Weak dark grey/black thinly laminated MUDSTONE (destructively weathered)	15
Continued on Next Sheet											

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 2.90m bgl and 15.2m bgl.





Rotary Core Log

Borehole No.

RC08

Sheet 4 of 4

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433847.00 - 550351.00

Location: Houghton le Spring

Level: 73.17

Scale
1:25

Client: Hellens Group

Dates: 30/06/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description		
				TCR	SCR	RQD						
1	▼	15.50 - 17.00	2							Weak dark grey/black thinly laminated MUDSTONE (destructively weathered)	16	
			5				16.00	57.17		Horizontal to vertical very close to closely spaced planar rough to smooth very tight to open clean.		
		17.00 - 18.50					16.10	57.07	COAL	Weak dark grey/black thinly laminated MUDSTONE (destructively weathered)	17	
			5	98	96	83	16.35	56.82		Weak light greyish brown SILTSTONE (highly weathered)		
		18.50 - 20.00	3								Horizontal to vertical closely to medium spaced planar to undulating smooth to rough very tight to partly open clean.	18
			5	96	76	63						
		18.50 - 20.00	4									19
			4	98	60	52				Horizontal to oblique (30°) very closely to medium planar to stepped rough very tight to partly open clean.		
												20
							20.00	53.17		End of Borehole at 20.00m		

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 2.90m bgl and 15.2m bgl.





Rotary Core Log

Borehole No.

RC09

Sheet 1 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433822.00 - 550323.00

Location: Houghton le Spring

Level: 72.85

Scale
1:25

Client: Hellens Group

Dates: 01/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.10 - 0.20	D				0.30	72.55		Scrub grass over TOPSOIL: Firm to Stiff friable brown sandy gravelly CLAY with high root content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, glass and mudstone.	
		0.60 - 0.70	D				0.80	72.05		Stiff brown sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone and brick. Cobbles are angular small to large of brick and sandstone.	
		1.20 - 2.00								Reddish brown sandy GRAVEL. Gravel is angular to sub-angular fine to coarse and includes sandstone and brick	1
		2.00 - 3.50					2.00	70.85		Very weak black destructively weathered MUDSTONE. Recovered as angular gravels and cobbles in a sandy clay matrix.	2
		3.50 - 5.00									3
											4
											5

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 19.5m bgl.





Rotary Core Log

Borehole No.

RC09

Sheet 2 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433822.00 - 550323.00

Location: Houghton le Spring

Level: 72.85

Scale
1:25

Client: Hellens Group

Dates: 01/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50								Very weak black destructively weathered MUDSTONE. Recovered as angular gravels and cobbles in a sandy clay matrix.	6
		6.50 - 8.00						7			
		8.00 - 9.50				8.00	64.85	8			Dark grey gravelly COBBLES. Cobbles are angular small to large of sandstone and mudstone.
						9.50	63.35			Weak dark grey distinctly to destructively weathered MUDSTONE. Recovered in a clayey matrix.	9
											10

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 19.5m bgl.





Rotary Core Log

Borehole No.

RC09

Sheet 3 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433822.00 - 550323.00

Location: Houghton le Spring

Level: 72.85

Scale
1:25

Client: Hellens Group

Dates: 01/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00				10.80	62.05		Weak dark grey distinctly to destructively weathered MUDSTONE. Recovered in a clayey matrix.		
		11.00 - 12.50							Firm to stiff greyish brown slightly sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and incudes sandstone, mudstone and coal.	11	
		12.50 - 14.00								12	
		14.00 - 15.50								13	
										14	
										15	

Continued on Next Sheet

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 19.5m bgl.





Rotary Core Log

Borehole No.

RC09

Sheet 4 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433822.00 - 550323.00

Location: Houghton le Spring

Level: 72.85

Scale
1:25

Client: Hellens Group

Dates: 01/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00								Firm to stiff greyish brown slightly sandy gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and incudes sandstone, mudstone and coal.	16
		17.00 - 18.50						17			
		18.50 - 20.00						18			
	▼					19.80	53.05	19			
									Weak yellowish brown and grey brown distinctly to destructively weathered	20	
Continued on Next Sheet											

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 19.5m bgl.





Rotary Core Log

Borehole No.

RC09

Sheet 5 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton
le Spring

Project No.
2585

Co-ords: 433822.00 - 550323.00

Location: Houghton le Spring

Level: 72.85

Scale
1:25

Client: Hellens Group

Dates: 01/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		20.00 - 21.50	22	96	90	63			Weak yellowish brown and grey brown distinctly to destructively weathered SILTSTONE. Horizontal closely spaced planar to undulating rough partly open clean. Sub-horizontal (5°-10°) very closely to closely spaced undulating rough tight to partly open clean.	21	
		21.50 - 23.00	7	94	46	26				22	
		23.00 - 24.50	5	92	48	20				23	
		24.50					48.35			24	
		End of Borehole at 25.00m									25

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 19.5m bgl.





Rotary Core Log

Borehole No.

RC10

Sheet 1 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433952.00 - 550330.00

Location: Houghton le Spring

Level: 72.89

Scale
1:25

Client: Hellens Group

Dates: 04/07/2022 - 05/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		0.10 - 0.20	D				0.30	72.59		Scrub grass over TOPSOIL: Soft to Firm friable brown sandy gravelly CLAY with high root content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, concrete and mudstone.	
		0.60 - 0.70	D							Soft to Firm dark grey/ black sandy gravelly CLAY with low cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, coal, concrete, plastic and mudstone. Cobbles are angular small to large of brick and sandstone.	1
		1.20 - 2.00									2
		2.00 - 3.50									3
	▼	3.30 - 3.50	D								
		3.50 - 5.00									4
		5.00 - 5.20	D				5.00	67.89			5

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 3.5m bgl and 13.6m bgl. Barrel jammed inside of casing due to running sands.





Rotary Core Log

Borehole No.

RC10

Sheet 2 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433952.00 - 550330.00

Location: Houghton le Spring

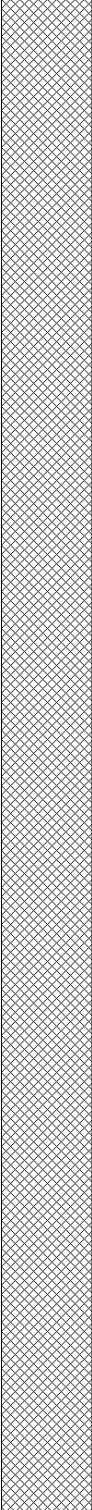
Level: 72.89

Scale
1:25

Client: Hellens Group

Dates: 04/07/2022 - 05/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50								Soft black slightly sandy silty gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, plastic and metal. Cobbles are angular small to large of brick and sandstone.	6
		6.50 - 8.00						No Recovery		7	
		8.00 - 9.50						No recovery		8	
								No recovery		9	
										Continued on Next Sheet	10

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 3.5m bgl and 13.6m bgl. Barrel jammed inside of casing due to running sands.





Rotary Core Log

Borehole No.

RC10

Sheet 3 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433952.00 - 550330.00

Location: Houghton le Spring

Level: 72.89

Scale
1:25

Client: Hellens Group

Dates: 04/07/2022 - 05/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00					11.00	61.89		Soft black slightly sandy silty gravelly CLAY with moderate cobble content. Gravel is angular to sub-angular fine to coarse and includes sandstone, brick, plastic and metal. Cobbles are angular small to large of brick and sandstone.	11
		11.00 - 12.50								Firm to Stiff greyish brown sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone and mudstone	12
		12.50 - 14.00									13
		14.00 - 15.50									14
										Continued on Next Sheet	15

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 3.5m bgl and 13.6m bgl. Barrel jammed inside of casing due to running sands.





Rotary Core Log

Borehole No.

RC10

Sheet 4 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433952.00 - 550330.00

Location: Houghton le Spring

Level: 72.89

Scale
1:25

Client: Hellens Group

Dates: 04/07/2022 - 05/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		15.50 - 17.00					17.00	55.89		Firm to Stiff greyish brown sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone and mudstone	16
		17.00 - 18.50					18.20	54.69		Brown silty fine to medium grained SAND.	17
							18.40	54.49		Soft to firm sandy gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone and siltstone.	
			3							Weak yellowish brown distinctly to destructively weathered SANDSTONE.	19
		18.50 - 20.00		97	73	56	19.30	53.59		Weak dark grey destructively weathered thinly laminated MUDSTONE.	20
			10								
Continued on Next Sheet											

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 3.5m bgl and 13.6m bgl. Barrel jammed inside of casing due to running sands.





Rotary Core Log

Borehole No.

RC10

Sheet 5 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No.
2585

Co-ords: 433952.00 - 550330.00

Location: Houghton le Spring

Level: 72.89

Scale
1:25

Client: Hellens Group

Dates: 04/07/2022 - 05/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		20.00 - 21.50	9	66	46	13				Weak dark grey destructively weathered thinly laminated MUDSTONE.	21
		21.50 - 23.00	6	66	33	20				Horizontal to oblique (30°) very closely to medium planar to stepped rough very tight to partly open clean. Horizontal to oblique (30°) very closely to medium planar to stepped rough very tight to partly open clean.	22
		23.00 - 24.50	5	64	35	30				Horizontal to vertical very close to closely spaced planar rough to smooth very tight to open clean.	23
							24.50	48.39			24
										End of Borehole at 25.00m	25

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 3.5m bgl and 13.6m bgl. Barrel jammed inside of casing due to running sands.





Rotary Core Log

Borehole No.

RC11

Sheet 1 of 3

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433877.00 - 550383.00

Location: Houghton le Spring

Level: 73.40

Scale
1:25

Client: Hellens Group

Dates: 06/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.20	73.20		Soft friable brown sandy gravelly clayey TOPSOIL. Gravel is angular to sub-angular fine to coarse and includes brick, sandstone, mudstone and coal.	
		1.20 - 2.00				1.30	72.10		Soft to firm friable brown sandy very gravelly CLAY. Gravel is angular to sub-angular fine to coarse and includes sandstone, bricks, metal, plastic and concrete.	1	
										Brown/Red coarse slightly clayey fine to coarse gravel with high cobble content. Gravel and cobbles are angular to subrounded of weak to strong brick, concrete, sandstone, clinker and tarmacadam.	
		2.00 - 3.50								<i>Poor Recovery</i>	2
		3.50 - 5.00								<i>Poor Recovery</i>	3
						5.00	68.40				4
										Continued on Next Sheet	5

Remarks
Inspection pit dug to 1.2m bgl. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC11

Sheet 2 of 3

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433877.00 - 550383.00

Location: Houghton le Spring

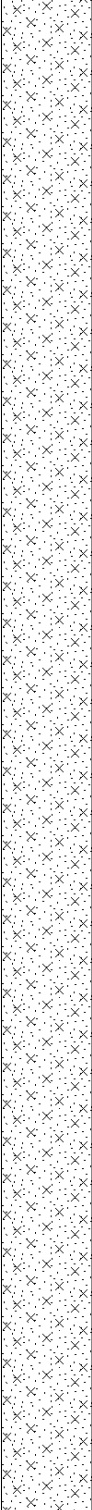
Level: 73.40

Scale
1:25

Client: Hellens Group

Dates: 06/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50								Brown silty fine to medium grained SAND. <i>No Recovery</i>	6
		6.50 - 8.00						<i>No Recovery</i>		7	
		8.00 - 9.50						<i>No Recovery</i>		8	
											9
											10

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC11

Sheet 3 of 3

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433877.00 - 550383.00

Location: Houghton le Spring

Level: 73.40

Scale
1:25

Client: Hellens Group

Dates: 06/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00								Brown silty fine to medium grained SAND.	
		11.00 - 12.50								<i>No Recovery</i>	
		12.50 - 14.00								<i>No Recovery</i>	
						14.00	59.40			End of Borehole at 14.00m	

Remarks
Inspection pit dug to 1.2m bgl. Depth to groundwater not identified due to drilling flush.





Rotary Core Log

Borehole No.

RC12

Sheet 1 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433816.00 - 550423.00

Location: Houghton le Spring

Level: 73.19

Scale
1:25

Client: Hellens Group

Dates: 07/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							0.20	72.99		Soft friable brown sandy gravelly TOPSOIL with root content. Gravel is angular to sub-round fine to coarse and includes , sandstone, brick, concrete and metal.	
		1.20 - 2.00				1.60	71.59		Soft to firm brown sandy gravelly CLAY with occasional cobble content. Gravel is angular to sub-round fine to coarse and includes bricks, concrete, sandstone, chert and flint.	1	
						2.00	71.19		Brown slightly clayey sandy GRAVELS with moderate cobble content. Gravel is angular to sub-round fine to coarse and includes brick, sandstone, limestone and coal.	2	
		2.00 - 3.50							Weak light greyish brown/ pinkish brown MUDSTONE. (destructively weathered) Recovered as angular gravels in a clayey matrix.	3	
		3.50 - 5.00								4	
										5	

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 18.0m bgl.





Rotary Core Log

Borehole No.

RC12

Sheet 2 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433816.00 - 550423.00

Location: Houghton le Spring

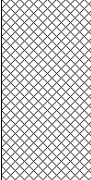


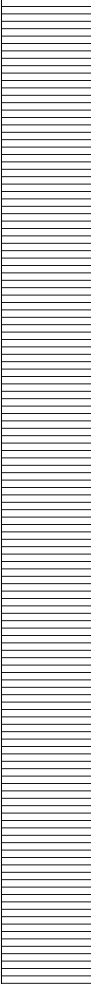


Level: 73.19

Scale
1:25

Client: Hellens Group

Dates: 07/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		5.00 - 6.50		60	10	6	5.60 5.70	67.59 67.49		Weak light greyish brown/ pinkish brown MUDSTONE. (destructively weathered) Recovered as angular gravels in a clayey matrix.	
										COAL	
										Weak to very weak dark grey thinly laminated MUDSTONE (destructively weathered)	6
		6.50 - 8.00	8	98	80	70				<i>Horizontal to vertical very close to closely spaced planar rough to smooth very tight to open clean</i>	7
		8.00 - 9.50	6	93	90	80				Weak to moderately strong reddish brown SANDSTONE with quartzite veins.	8
							9.75	63.44			9
											10

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 18.0m bgl.





Rotary Core Log

Borehole No.

RC12

Sheet 3 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433816.00 - 550423.00

Location: Houghton le Spring

Level: 73.19

Scale
1:25

Client: Hellens Group

Dates: 07/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		9.50 - 11.00	7	98	94	86				Weak to moderately strong reddish brown SANDSTONE with quartzite veins. <i>Horizontal to sub-horizontal (10°) closely to medium spaced planar to undulating smooth to rough very tight to open clean.</i>	11
		11.00 - 12.50	13	98	90	84	11.80	61.39			
		12.50 - 14.00	8	94	78	62				Weak reddish brown MUDSTONE (destructively weathered) <i>Horizontal to vertical very close to medium spaced undulating to stepped rough tight to partly open clean.</i>	12
		14.00 - 15.50	10	100	93	80	14.00	59.19		Moderately strong to strong reddish brown SANDSTONE.	14
										Continued on Next Sheet	15

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 18.0m bgl.





Rotary Core Log

Borehole No.

RC12

Sheet 4 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433816.00 - 550423.00

Location: Houghton le Spring

Level: 73.19

Scale
1:25

Client: Hellens Group

Dates: 07/07/2022

Logged By
RK

Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
							15.50	57.69		Moderately strong to strong reddish brown SANDSTONE.	
		15.50 - 17.00	6	100	90	83				Moderately to strong light yellowish brown SANDSTONE.	16
										<i>Horizontal to vertical medium spaced planar smooth to rough tight to open clean</i>	17
	▼	17.00 - 18.50	5	98	94	88					18
		18.50 - 20.00	6	100	96	84				<i>Horizontal to vertical very closely to closely spaced undulating to stepped rough partly open to open clean.</i>	19
											20

Continued on Next Sheet

Remarks

Inspection pit dug to 1.2m bgl. Groundwater encountered at 18.0m bgl.





Rotary Core Log

Borehole No.

RC12

Sheet 5 of 5

Hole Type
RC

Project Name: Newbottle Street, Houghton le Spring

Project No. 2585

Co-ords: 433816.00 - 550423.00

Location: Houghton le Spring

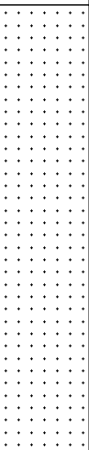
Level: 73.19

Scale
1:25

Client: Hellens Group

Dates: 07/07/2022

Logged By
RK

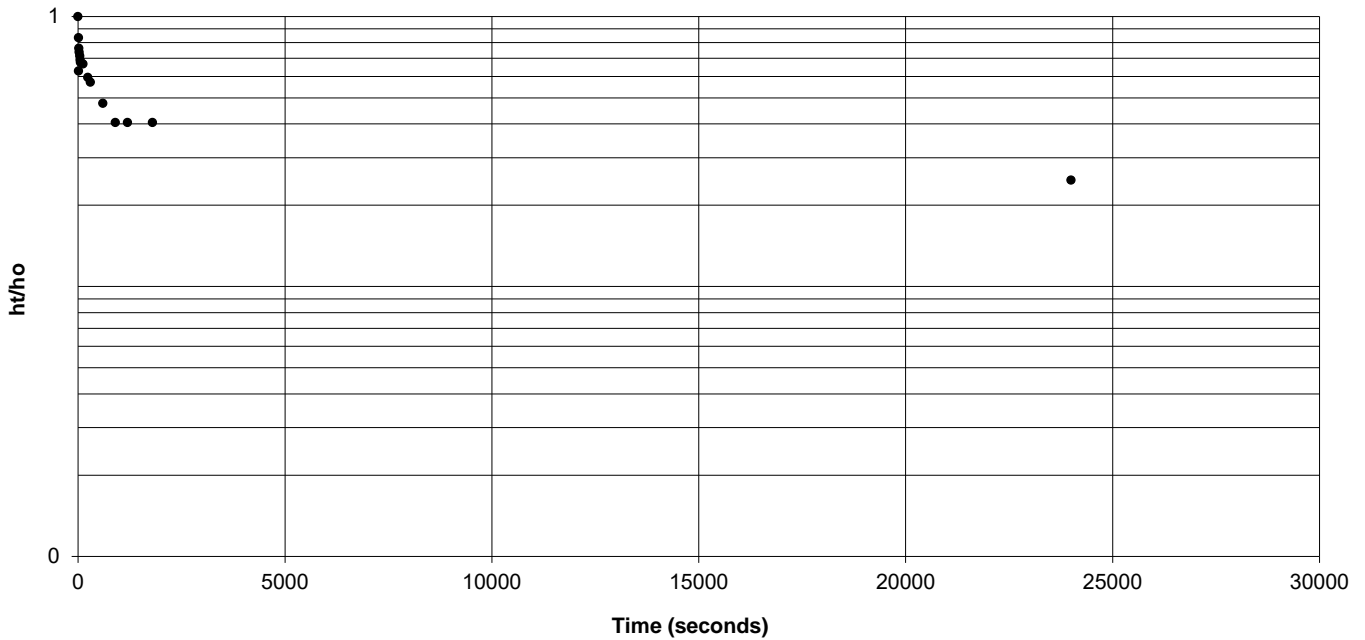
Well	Water Strikes	Depth (m)	Type /FI	Coring			Depth (m)	Level (m)	Legend	Stratum Description	
				TCR	SCR	RQD					
		20.00 - 21.50	3	100	95	90	21.50	51.69	 <p>Moderately to strong light yellowish brown SANDSTONE. <i>Horizontal to oblique (45°) closely to medium spaced planar to undulating rough tight to partly open clean to soft clay infill with surface staining.</i></p>	21	
									End of Borehole at 21.50m	22	
										23	
										24	
										25	

Remarks
Inspection pit dug to 1.2m bgl. Groundwater encountered at 18.0m bgl.



VARIABLE HEAD PERMEABILITY TEST

BOREHOLE No.: CP-01	TEST No.: 1
FALLING HEAD TEST IN BOREHOLE	DEPTH (m) 8.00 DATE 07/08/2019 SHEET 1



Time Elapsed (secs)	Depth of water below Top of Casing d _t (m)	h (m) (d _i -d _t)	h _t /h ₀	
0	2.500	2.1	1.00	Depth of Test Section 2.50m to 8.00m
10	2.850	1.750	0.83	Borehole Depth 8.00m Borehole Diameter 86mm
20	3.000	1.600	0.76	Casing Depth .00m
30	3.050	1.550	0.74	Depth to Standing Water Level bgl (d ₁) 4.60m
40	3.100	1.500	0.71	Height of casing agl (h _c) .00m
50	3.150	1.450	0.69	Height of top of casing above water table 4.60m
60	3.180	1.420	0.68	Depth to Water at Start of Test below casing level (d ₀) 2.50m
120	3.200	1.400	0.67	Depth to Water at End of Test below casing level 3.750
10	3.280	1.320	0.63	Depth to Filter at Start of Test
240	3.350	1.250	0.60	Depth to Filter at End of Test
300	3.400	1.200	0.57	Response Zone (L) = 5.50m
600	3.600	1.000	0.48	Borehole Diameter in Test Section (D) = 0.09m
900	3.750	0.850	0.40	Cross-sectional Area of Borehole (A) = 0.0058m ²
1200	3.750	0.850	0.40	Intake factor (BS5930 p50): Figure D (F) = 7.123257815
1800	3.750	0.850	0.40	Basic Time Lag = (T) s or t ₁ = 30 s. h ₁ = 1.750m
				t ₂ = 24000 s. h ₂ = 4.080m
24000	4.080	0.520	0.25	Coefficient of Permeability (k) ms ⁻¹ =
				$k = \frac{A}{F(t_2 - t_1)}$
				$\log_e \frac{h_1}{h_2} = 2.88E-08$
				Remarks Rate extrapolated to derive t ₂ value.
				Geology of Test Section Colliery Spoil

Compiled By IM Date 10/08/2019
 Checked By RP Date 10/08/2019

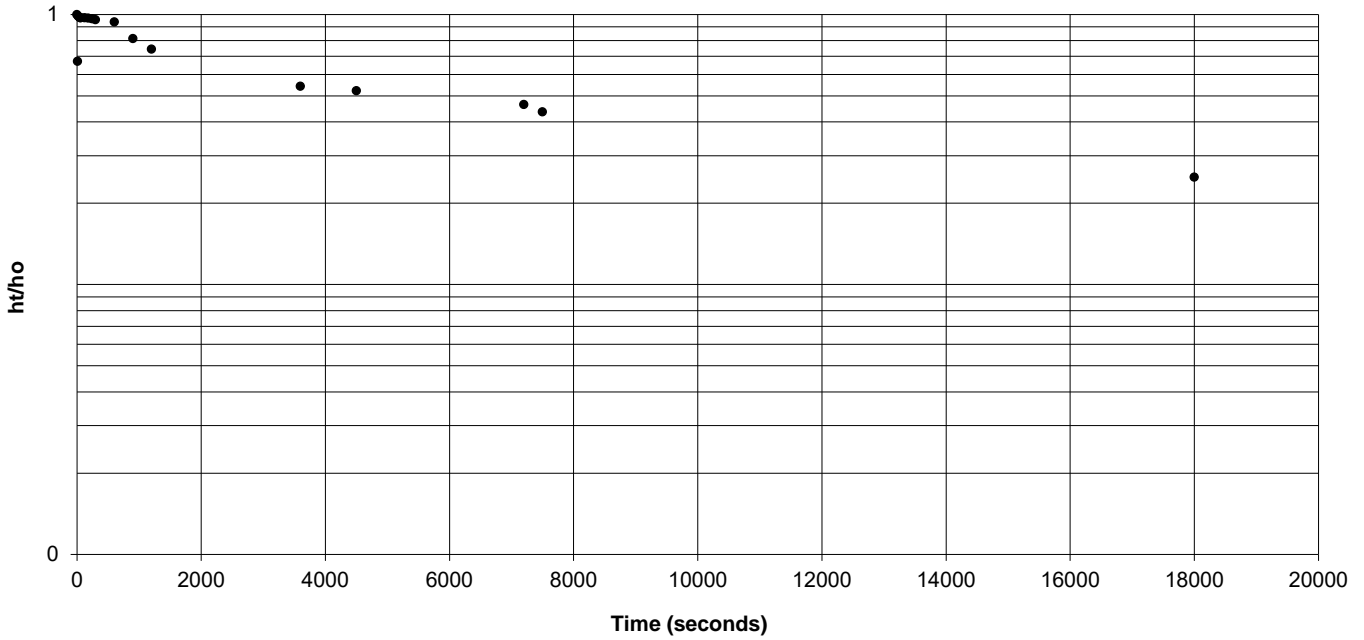


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PROJECT No.:	2585
PROJECT NAME:	Houghton le Spring Colliery
CLIENT:	Hellens Group
FIGURE No.:	

VARIABLE HEAD PERMEABILITY TEST

BOREHOLE No.: CP-16B	TEST No.: 1
FALLING HEAD TEST IN BOREHOLE	DEPTH (m) 6.00 DATE 07/08/2019 SHEET 1



Time Elapsed (secs)	Depth of water below Top of Casing d _t (m)	h (m) (d ₁ -d _t)	h _t /h ₀	
0	2.000	7.000	1.00	Depth of Test Section 2.00m to 9.00m
10	2.100	4.700	0.67	Borehole Depth 9.00m Borehole Diameter 86mm
20	2.100	6.900	0.99	Casing Depth .00m
30		9.000	1.29	Depth to Standing Water Level bgl (d ₁) 9.00m
40	2.160	6.840	0.98	Height of casing agl (h _c) .00m
50	2.200	6.800	0.97	Height of top of casing above water table 9.00m
60	2.200	6.800	0.97	Depth to Water at Start of Test below casing level (d ₀) 2.000
120	2.200	6.800	0.97	Depth to Water at End of Test below casing level 5.950
180	2.220	6.780	0.97	Depth to Filter at Start of Test
240	2.250	6.750	0.96	Depth to Filter at End of Test
300	2.310	6.690	0.96	Response Zone (L) = 7.00m
600	2.440	6.560	0.94	Borehole Diameter in Test Section (D) = 0.086
900	3.300	5.700	0.81	Cross-sectional Area of Borehole (A) = 0.0058m ²
1200	3.790	5.210	0.74	Intake factor (BS5930 p50): Figure D (F) = 8.636675671
3600	5.200	3.800	0.54	Basic Time Lag = (T) s or t ₁ = 1150 s. h ₁ 3.750m t ₂ = 18000 s. h ₂ 7.250m
4500	5.350	3.650	0.52	
7200	5.750	3.250	0.46	Coefficient of Permeability (k) ms ⁻¹ = k = $\frac{A}{F(t_2-t_1)}$ log _e $\frac{h_1}{h_2}$ = 2.631E-08
7500	5.950	3.050	0.44	
18000	7.250	1.750	0.25	
				Remarks Rate extrapolated to derive t ₂ value.
				Geology of Test Section Colliery Spoil

Compiled By IM Date 10/08/2019
 Checked By RP Date 10/08/2019

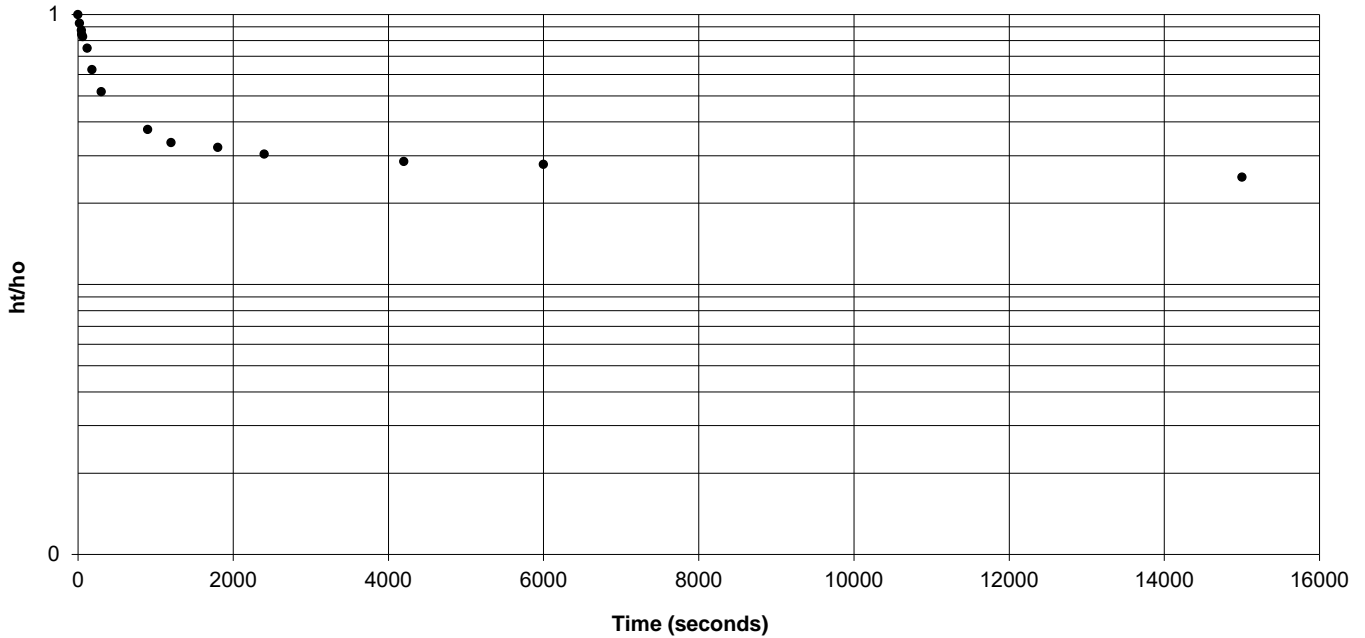


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PROJECT No.:	2585
PROJECT NAME:	Houghton le Spring Colliery
CLIENT:	Hellens Group
FIGURE No.:	

VARIABLE HEAD PERMEABILITY TEST

BOREHOLE No.: CP-04	TEST No.: 1
FALLING HEAD TEST IN BOREHOLE	DEPTH (m) 9.00
	DATE 07/08/2019
	SHEET 1



Time Elapsed (secs)	Depth of water below Top of Casing d_t (m)	h (m) ($d_1 - d_t$)	h_t/h_0	
0	5.900	2.800	1.00	Depth of Test Section 5.90m to 8.70m
10	6.000	2.700		Borehole Depth 8.70m Borehole Diameter 86mm
20	6.100	2.600	0.93	Casing Depth .00m
30	6.200	2.500		Depth to Standing Water Level bgl (d_1) (Assumed) 8.70m
45	6.250	2.450	0.88	Height of casing agl (h_c) .00m
50	6.340	2.360	0.84	Height of top of casing above water table 8.70m
60	6.380	2.320	0.83	Depth to Water at Start of Test below casing level (d_0) 5.90m
120	6.600	2.100	0.75	Depth to Water at End of Test below casing level 7.920
180	6.950	1.750	0.63	Depth to Filter at Start of Test
240	7.150	1.550		Depth to Filter at End of Test
300	7.250	1.450	0.52	Response Zone (L) = 2.80m
600	7.500	1.200		Borehole Diameter in Test Section (D) = 0.09m
900	7.650	1.050	0.38	Cross-sectional Area of Borehole (A) = 0.0058m ²
1200	7.760	0.940	0.34	Intake factor (BS5930 p50): Figure D (F) = 4.212449791
1800	7.800	0.900	0.32	Basic Time Lag = (T) s or t_1 = 120 s. h_1 = 6.600m
2400	7.850	0.850	0.30	t_2 = 15000 s. h_2 = 8.000m
4200	7.900	0.800	0.29	Coefficient of Permeability (k) ms ⁻¹ =
6000	7.920	0.780	0.28	$k = \frac{A}{F(t_2 - t_1)}$ $\log_e \frac{h_1}{h_2} = 1.783E-08$
15000	8.000	0.700	0.25	
				Remarks Rate extrapolated to derive t_2 value.
				Geology of Test Section Colliery Spoil

Compiled By IM Date 10/08/2019
 Checked By RP Date 10/08/2019







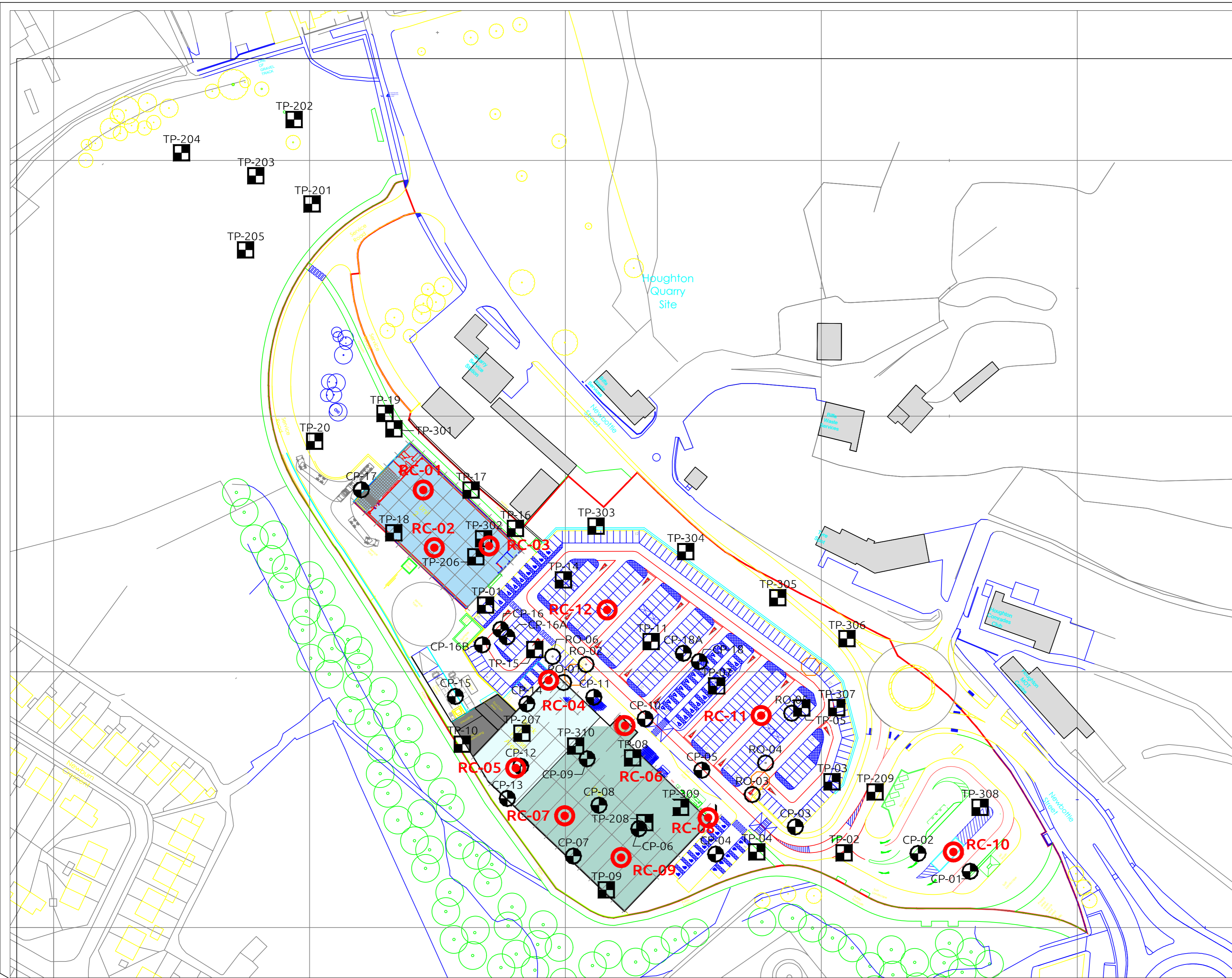
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PROJECT No.:	2585
PROJECT NAME:	Houghton le Spring Colliery
CLIENT:	Hellens Group
FIGURE No.:	

DO NOT SCALE

GENERAL NOTES

-  Proposed Rotary Borehole
-  Trial Pit
-  Cable Percussive Borehole
-  Rotary Borehole



Rev	Description	By	Ckd	Date
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Drawing Status: PRELIMINARY

Client: Hellens Group

Project: Houghton Colliery
Houghton le Spring

Drawing Title: Exploratory Hole Location Plan
Supplemental Ground Investigation

Drawing No: 2585 - 205 Rev: -

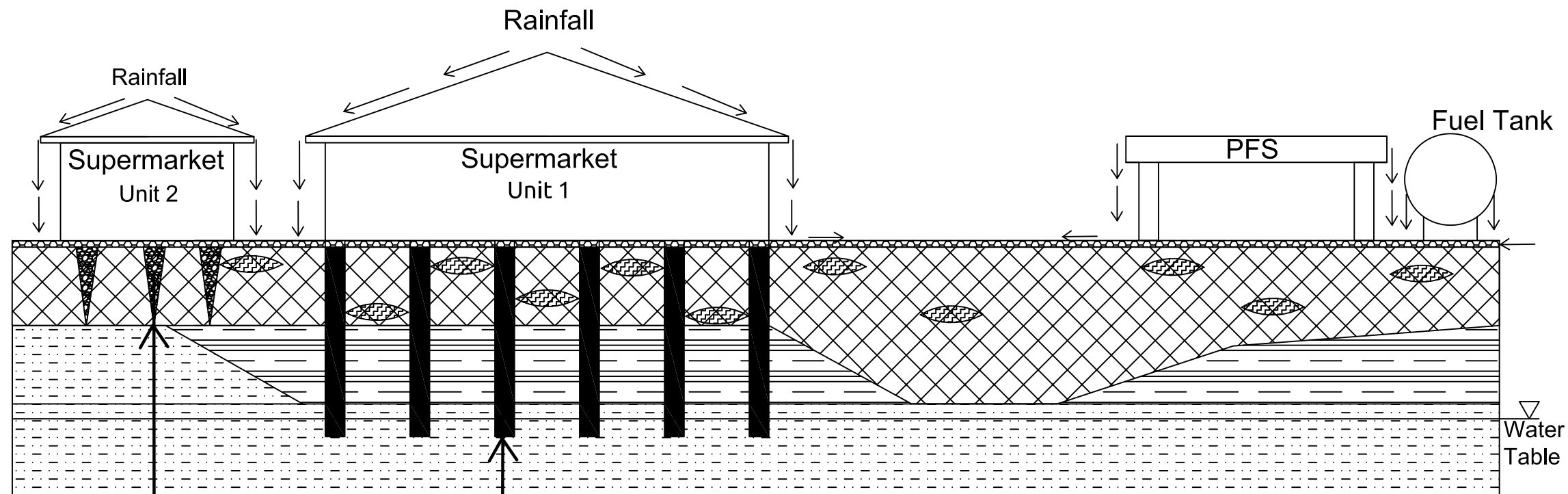
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DO NOT SCALE






GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER INFORMATION BY RELEVANT PARTIES CLASSED AS DESIGNERS UNDER THE CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015.
2. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. THE CONTRACTOR IS TO CHECK ALL DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.



Stone Column Foundations into Underlying Clay/Rock

Piled Foundations into Underlying Rock

-  Hard Standing
-  Made Ground
-  Low Permeability Clay
-  Mudstone / Sandstone
-  Pockets of Leachate / Soil Contamination

Typical Stone Column Length 6m
 Typical Pile Length 15 m
 Typical Depth to Water Table 13 - 18m Below Ground Level

B	Updated Following further Information	TJS	MT	22/09/22
A	Updated Following further Investigation	GH	MT	25/08/22
Rev	Description	By	Ckd	Date



Drawing Status: **PRELIMINARY**

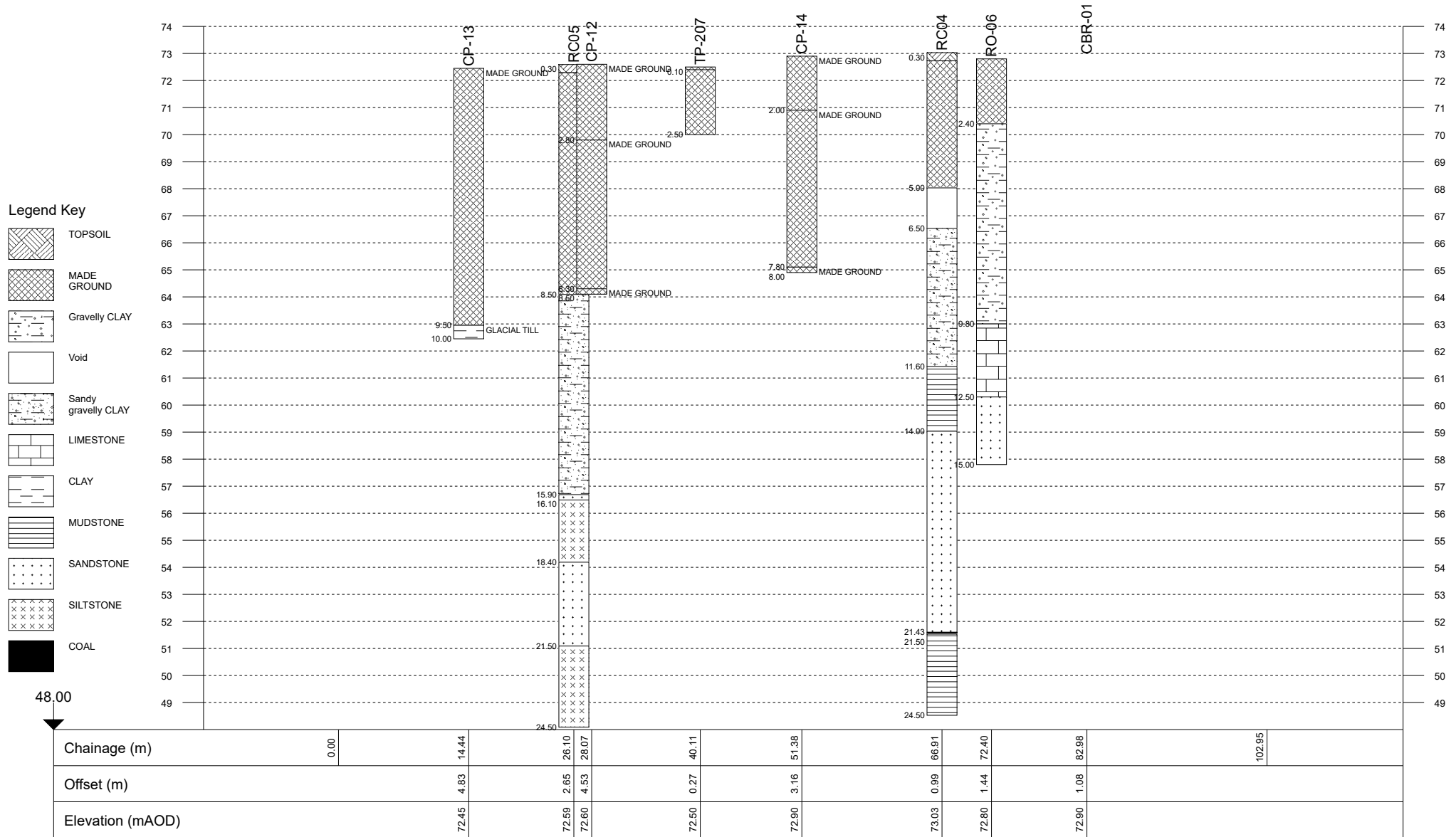
Project: **Houghton Colliery**

Drawing No: **2585E - 201** Rev: **B**

Client: **Hellens Group**

Drawing Title: **Conceptual Site Model**








Scale: **As indicated @ A3** By: **DRW** Ckd: **CKD** Date: **Jan 2022**



Project Id: 2585
Project Title: Newbottle Street, Houghton le Spring
Location: Houghton le Spring
Client: Hellens Group

Title: Site Plan
Scale: 1:2500
Engineer: Shadbolt Group
Contractor:

Legend Key

-  Sections - Section line 1
-  Locations By Type - Empty
-  Locations By Type - CBR
-  Locations By Type - CP
-  Locations By Type - RC
-  Locations By Type - RO
-  Locations By Type - TP



Project Id: 2585

Project Title: Newbottle Street, Houghton le Spring

Location: Houghton le Spring

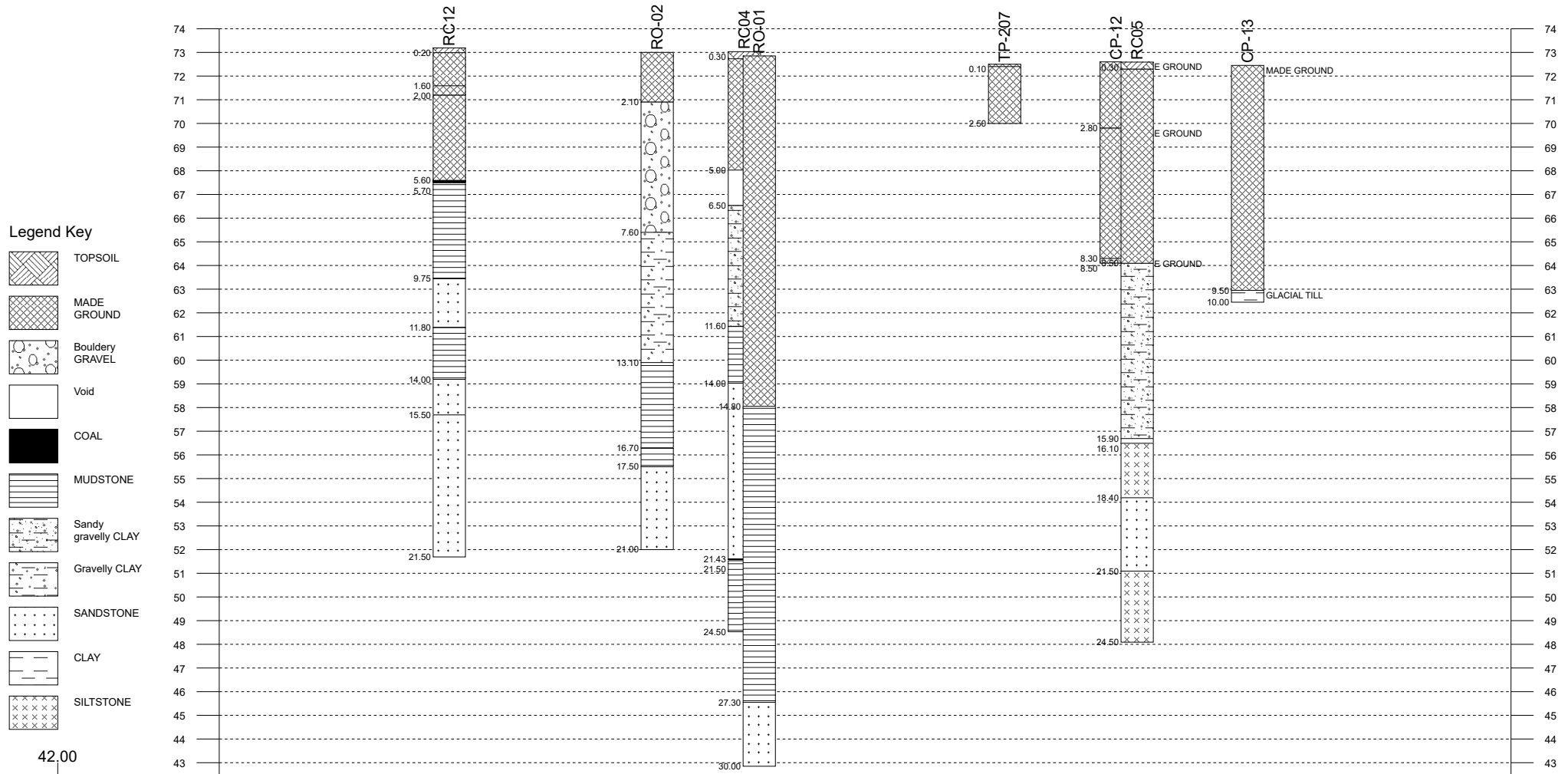
Client: Hellens Group

Title: Section line 2

Vertical Scale: 1:245

Horizontal Scale: 1:597

Engineer: Shadbolt Group










42.00

Chainage (m)	0.00	8.72	30.13	39.11	40.64	65.90	77.39	79.55	90.92	102.93
Offset (m)		2.28	5.33	4.56	1.19	3.09	2.91	1.24	4.59	
Elevation (mAOD)		73.19	73.00	73.03	72.85	72.50	72.60	72.59	72.45	

Project Id: 2585
Project Title: Newbottle Street, Houghton le Spring
Location: Houghton le Spring
Client: Hellens Group

Title: Site Plan
Scale: 1:2500
Engineer: Shadbolt Group
Contractor:

Legend Key

-  Sections - Section line 2
-  Locations By Type - Empty
-  Locations By Type - CBR
-  Locations By Type - CP
-  Locations By Type - RC
-  Locations By Type - RO
-  Locations By Type - TP



Project Id: 2585

Project Title: Newbottle Street, Houghton le Spring

Location: Houghton le Spring

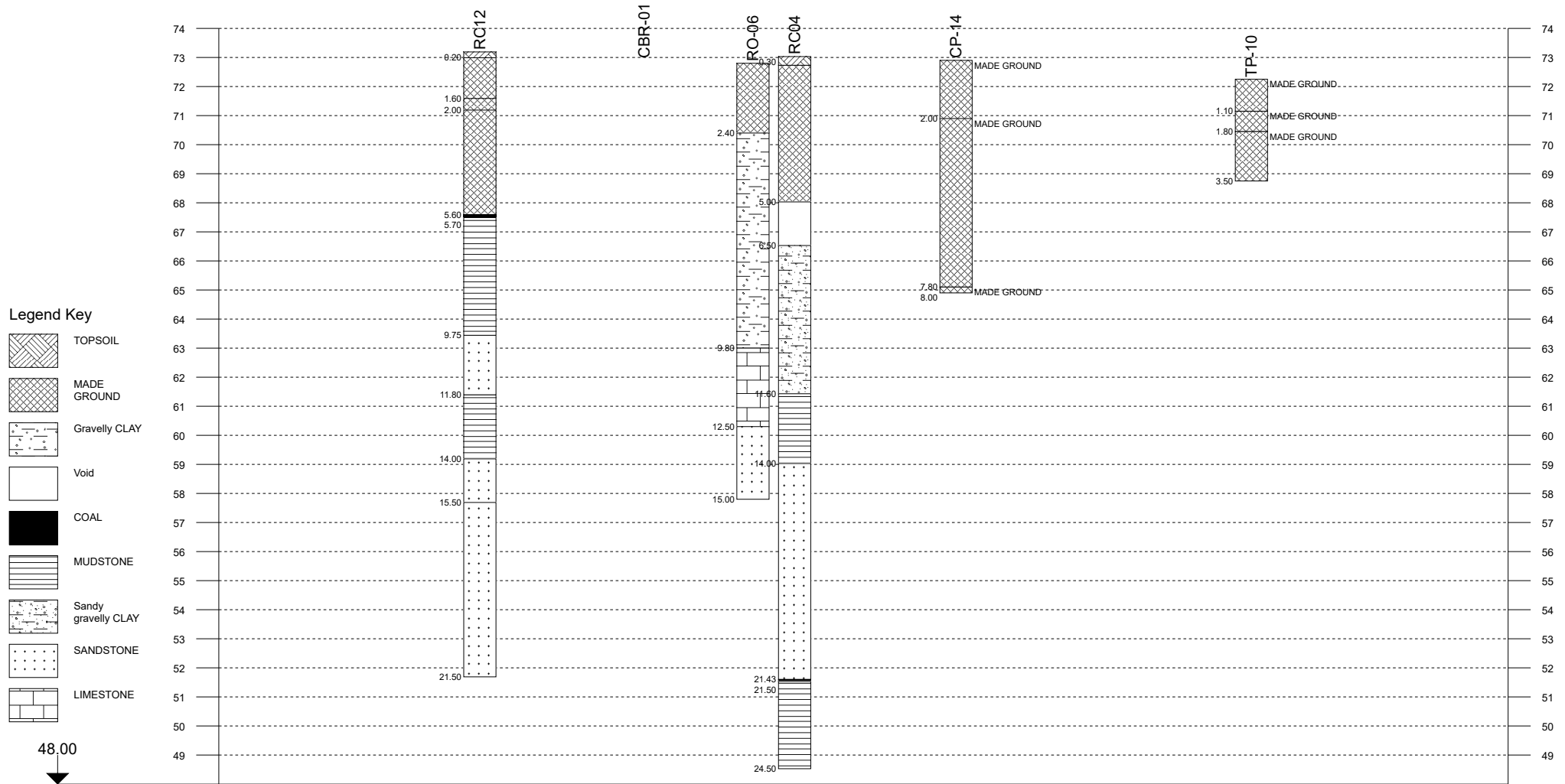
Client: Hellens Group

Title: Section line 3

Vertical Scale: 1:199

Horizontal Scale: 1:571

Engineer: Shadbolt Group



Legend Key








- TOPSOIL
- MADE GROUND
- Gravelly CLAY
- Void
- COAL
- MUDSTONE
- Sandy gravelly CLAY
- SANDSTONE
- LIMESTONE

Chainage (m)	0.00	11.45	27.66	38.39	42.50	58.43	87.57	98.47
Offset (m)		1.10	2.70	0.90	3.47	5.70	0.10	
Elevation (mAOD)		73.19	72.90	72.80	73.03	72.90	72.25	

Project Id: 2585
Project Title: Newbottle Street, Houghton le Spring
Location: Houghton le Spring
Client: Hellens Group

Title: Site Plan
Scale: 1:2500
Engineer: Shadbolt Group
Contractor:

Legend Key

-  Sections - Section line 3
-  Locations By Type - Empty
-  Locations By Type - CBR
-  Locations By Type - CP
-  Locations By Type - RC
-  Locations By Type - RO
-  Locations By Type - TP



Project Id: 2585

Project Title: Newbottle Street, Houghton le Spring

Location: Houghton le Spring

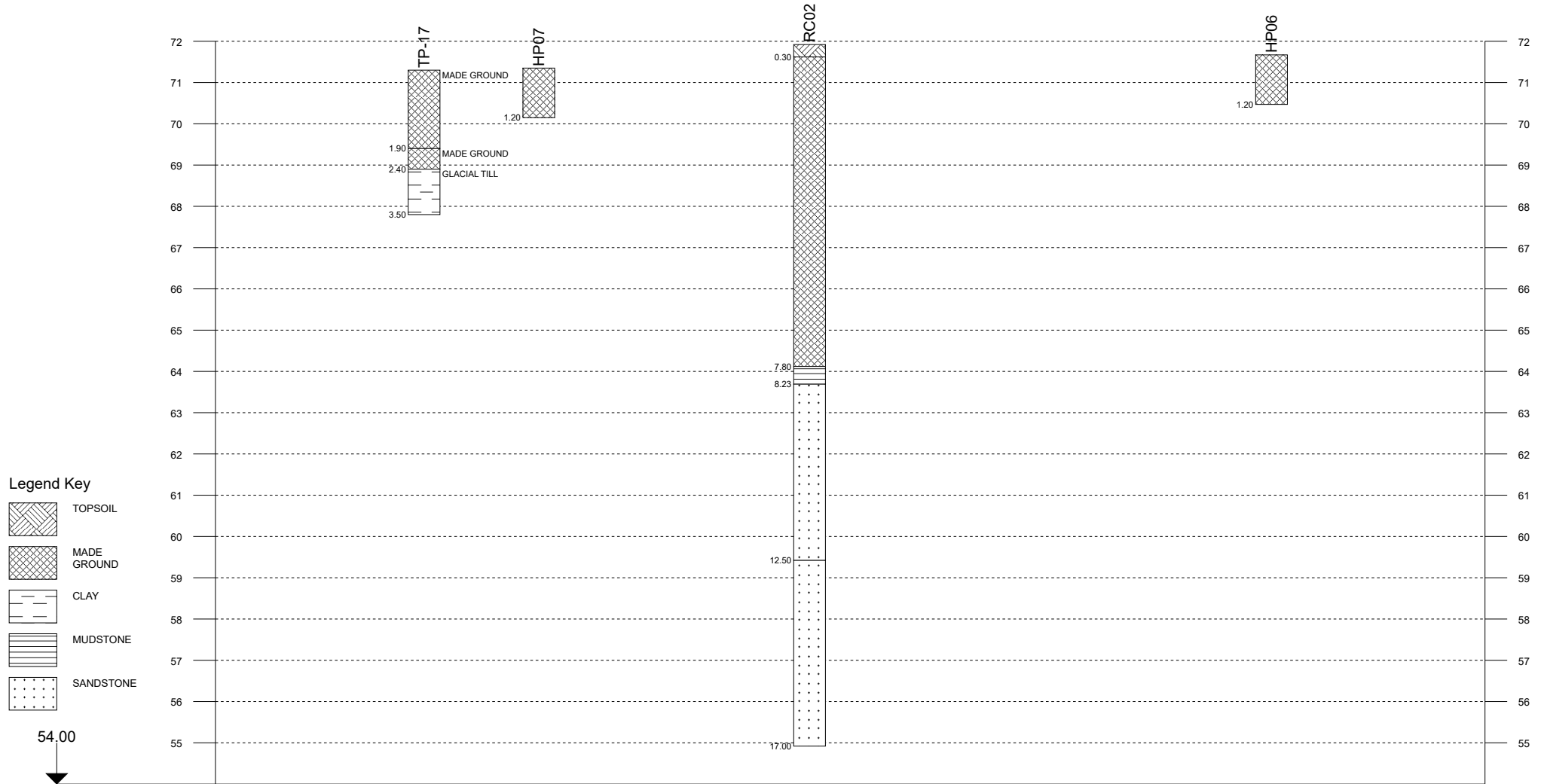
Client: Hellens Group

Title: Section line 4






Vertical Scale: 1:138

Horizontal Scale: 1:400

Engineer: Shadbolt Group



Legend Key

-  TOPSOIL
-  MADE GROUND
-  CLAY
-  MUDSTONE
-  SANDSTONE








Chainage (m)	0.00	4.62	12.67	31.68	64.10	69.05
Offset (m)		0.86	2.55	0.89	0.35	
Elevation (mAOD)		71.30	71.35	71.92	71.67	

Project Id: 2585
Project Title: Newbottle Street, Houghton le Spring
Location: Houghton le Spring
Client: Hellens Group

Title: Site Plan
Scale: 1:2500
Engineer: Shadbolt Group
Contractor:



Legend Key

-  Sections - Section line 4
-  Locations By Type - Empty
-  Locations By Type - CBR
-  Locations By Type - CP
-  Locations By Type - RC
-  Locations By Type - RO
-  Locations By Type - TP

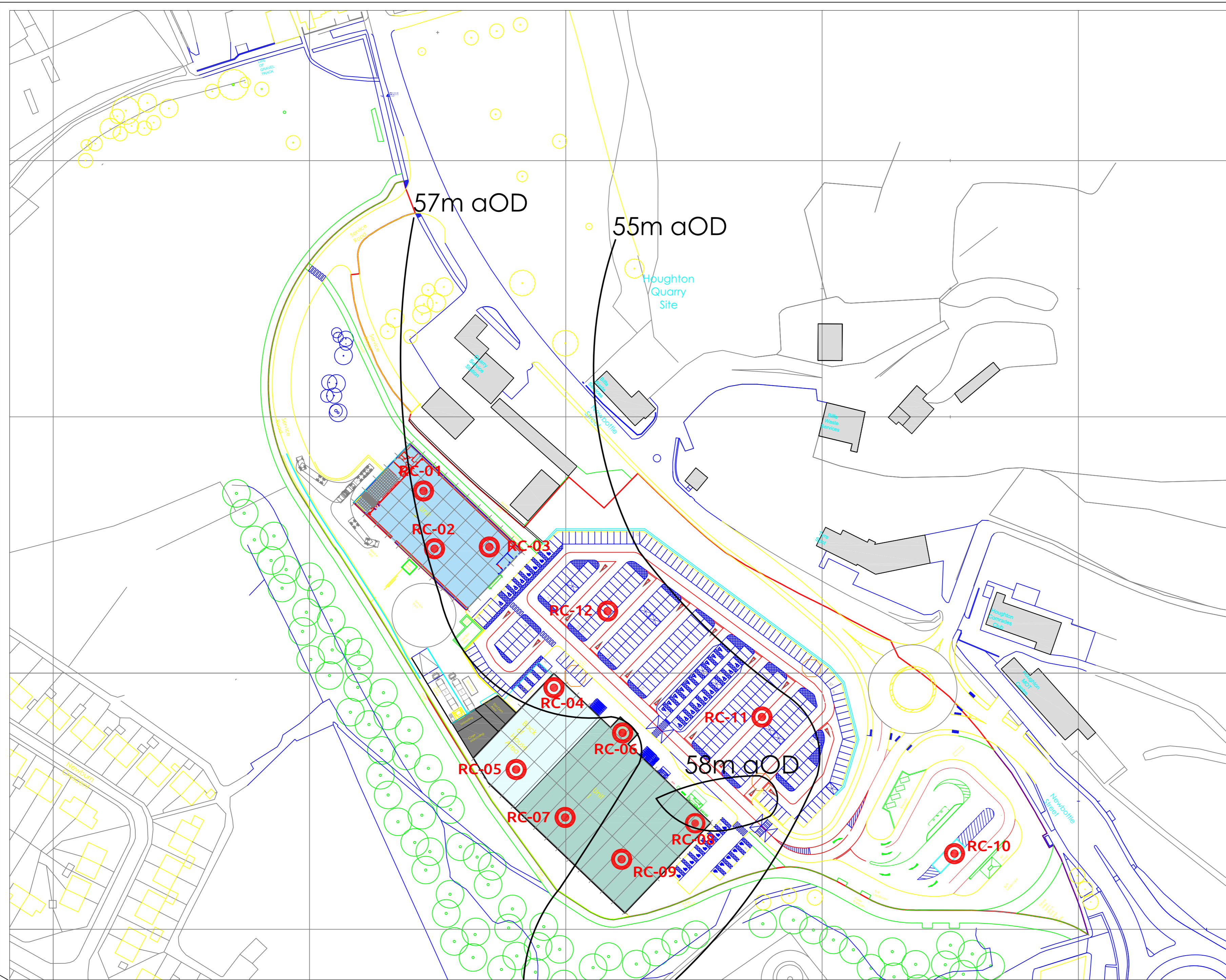


DO NOT SCALE

GENERAL NOTES

 Proposed Rotary Borehole

 Groundwater Level (m aOD)



Rev	Description	By	Ckd	Date
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Drawing Status: **PRELIMINARY**

Client: **Hellens Group**

Project: **Houghton Colliery
Houghton le Spring**

Drawing Title: **GROUNDWATER LEVEL
CONTOURS**

Drawing No: **2585 - 206** Rev: -

Scale: 1:1000 @ A2 By: TJS Ckd: MJT Date: Sept 22

18 Bewick Road, Gateshead, NE8 4DP • +44 (0) 191 478 3330 • www.shadboltgroup.net
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APPENDIX C

SHADBOLT ENVIRONMENTAL TIER 1 SCREENING VALUES

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Before using Atkins ATRISK SSVs users should read the accompanying Notes for Use.

Commercial				
Contaminant	1% SOM Sand		6% SOM Sandy Loam	
	SSV (mg/kg)	Saturation Limit (mg/kg)	SSV (mg/kg)	Saturation Limit (mg/kg)
Metals & Metalloids				
Antimony	4650		4650	
Arsenic (C4SL)	635		635	
Barium	22000		22000	
Beryllium	14		14	
Cadmium (C4SL)	410		410	
Chromium III	208000		208000	
Chromium VI (C4SL)	49.1		49.1	
Chromium VI (MRL)	19.7		19.7	
Copper	106000		106000	
Lead (C4SL)	2310		2310	
Mercury, elemental	-		-	
Mercury, inorganic	-		-	
Mercury, methyl	-		-	
Molybdenum	17600		17600	
Nickel	1770		1770	
Selenium	13000		13000	
Vanadium	7490		7490	
Zinc	1100000		1100000	
Polycyclic Aromatic Hydrocarbons				
Acenaphthene	83600	156.80 (sol)	106000	
Anthracene	535000		544000	
Fluoranthene	72200		72600	
Fluorene	66500		72000	
Naphthalene	90.1	75.0 (sol)	1050	432 (sol)
Pyrene	54100		54400	
Benzo[a]pyrene (C4SL)	76.3		76.3	
Benzo[a]pyrene (MRL)	26.1		26.2	
Total Petroleum Hydrocarbons				
TPH aromatic C5-C7 (Benzene)	12.5		98	
TPH aromatic C7-C8 (Toluene)	27900	834 (vap)	183000	4360 (vap)
TPH aromatic C8-C10	2210	613 (sol)	20800	3600 (sol)
TPH aromatic C10-C12	12300	369 (sol)	53800	2190 (sol)
TPH aromatic C12-C16	41300	155 (vap)	65400	
TPH aromatic C16-C21	28400		28400	
TPH aromatic C21-C35	28400		28400	
TPH aliphatic C5-C6	4490	327 (vap)	29400	1100 (vap)
TPH aliphatic C6-C8	10400	157 (vap)	98200	769 (vap)
TPH aliphatic C8-C10	1370	82.4 (sol)	14800	476 (sol)
TPH aliphatic C10-C12	7900	49.9 (sol)	69500	297 (sol)
TPH aliphatic C12-C16	34000	20.9 (vap)	139000	126 (vap)
TPH aliphatic C16-C35	3620000		3620000	
BTEX				
Benzene (C4SL)	12.5		98	
Toluene	27900	834 (vap)	183000	4360 (vap)
Ethylbenzene	7660	507 (vap)	63100	2840 (vap)
Xylene, o-	3030	467 (sol)	32700	2620 (sol)
Xylene, m-	2830	612 (vap)	30900	3460 (vap)
Xylene, p-	2720	564 (sol)	29700	3170 (sol)
Methyl tert-butyl ether	3140		22400	

- Notes
1. The benzo(a)pyrene C4SL has been published in lieu of other genotoxic PAH constituents based on the adoption of the surrogate marker approach. Users should confirm that their PAH profile falls within the upper and lower ratio's as published by the Defra C4SL Project Methodology.
 2. Where the combined indoor and outdoor vapour pathway exceeds 10% of the total exposure, the respective saturation limit has been reported and annotated as '(sol)' if limited by solubility or '(vap)' if limited vapour saturation. Users should confirm that free product if not observed where measured concentrations exceed this value.
 3. To account for conservatism in the partitioning of hydrocarbons from soil into vapour phase, a soil to indoor air correction factor of 10 has been applied to TPH aromatic >C5-C16 aromatic and >C5-C16 aliphatic fractions, benzene, ethylbenzene, toluene, and xylenes.
 4. The sum of all xylene isomers in soil should be compared against the lower xylene SSV or the relevant isomer for the xylene source as per the SGV documentation.

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Before using Atkins ATRISK SSVs users should read the accompanying Notes for Use.

Commercial				
Contaminant	1% SOM Sand		6 % SOM Sandy Loam	
	SSV (mg/kg)	Saturation Limit (mg/kg)	SSV (mg/kg)	Saturation Limit (mg/kg)
VOCS				
Chlorobenzene (mono)	502		5460	
Chloroform	45.2		357	
1,1,2-Trichloroethane	40.1		382	
1,1-Dichloroethane	115		803	
1,1-Dichloroethene	11.9		86.6	
1,2-Dichloropropane	1.34		11.1	
2,4-Dimethylphenol	11800	1327 (vap)	29800	7184 (vap)
2,4-Dinitrotoluene	3730		3760	
2,6-Dinitrotoluene	1840		1880	
2-Chloronaphthalene	176	112 (vap)	2090	667 (vap)
2-Methylphenol	155000	14166 (sol)	182000	
4-Methylphenol	156000	25771 (sol)	182000	
3-Methylphenol	166000	25259 (sol)	184000	
Bromobenzene	42.1		485	
Bromoform	327		2970	
Butyl benzyl phthalate	940000		945000	
Chloroethane	436		1970	
Chloromethane	0.452		1.49	
Cis 1,2 Dichloroethene	6		44.4	
Dichloromethane	109		526	
Bromodichloromethane	0.854		7.12	
Diethyl Phthalate	108000	12.8 (vap)	280000	65 (vap)
Di-n-butyl phthalate	70800		15400	
Di-n-octyl phthalate	89000		89000	
Hexachloroethane	9.41	8.13 (vap)	110	48.0 (vap)
Trans 1,2 Dichloroethene	9.51		76.1	
Bis (2-ethylhexyl) phthalate	85100		86000	
Trichloroethene	0.149		1.49	
Vinyl chloride	0.0309		0.117	
1,1,1,2-Tetrachloroethane	204		1930	
1,1,2,2-Tetrachloroethanes	426		3910	
Tetrachloroethene	71.4		777	
1,1,1-trichloroethane	306		2950	
1,2-dichloroethane	0.854		5.09	
Carbon tetrachloride	14.8		152	
Carbon disulphide	10.9		94.5	
Trichloromethylbenzene	0.025		0.247	
Formaldehyde	436		1350	
2,6-bis(1,1-dimethyl)-4-(1-methylpropyl)-phenol	2160		2240	
Iso-propylbenzene	5760	387 (sol)	53500	2254 (sol)
Propylbenzene	16200	399 (sol)	103000	2332 (sol)
Styrene	9670	607(sol)	20400	3347 (sol)
Biphenyl	42400	34.1 (vap)	67900	
1,2,4-Trimethylbenzene	165		1030	
2,4-Dichloro-o-cresol	54700		58600	
Dibromochloromethane	9.27		92.1	
Phenol	685		3170	

Notes

- For phenol the SSV presented is protective of localised dermal contact in sensitised individuals as per the methodology set out in the Environment Agency SGV for phenol.
- For methylphenols (cresols) the sum of 2-,3- and 4-methylphenol isomers in soil should be compared against the lower of 2-, 3-, and 4-methylphenol SSVs as per the CL:AIRE-EIC GAC documentation.
- To account for conservatism in the partitioning of hydrocarbons from soil into vapour phase, a soil to indoor air correction factor of 10 has been applied to isopropylbenzene, propylbenzene, styrene, biphenyl, and 1,2,4-trimethylbenzene.

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Before using Atkins ATRISK SSVs users should read the accompanying Notes for Use.

Commercial				
Contaminant	1% SOM Sand		6 % SOM Sandy Loam	
	SSV (mg/kg)	Saturation Limit (mg/kg)	SSV (mg/kg)	Saturation Limit (mg/kg)
Pesticides				
Dinoseb	7.1		68.7	
Prochloraz	12400		12500	
DDD	983		988	
PCBs				
Total PCDDs, PCDFs and dioxin-like PCBs	0.184		0.184	
Other Contaminants				
Nicotine	855		860	
Tributyl tin oxide	119		199	
Free Cyanide	373		373	

Notes

8. The SSV for Total PCDDs, PCDFs and dioxin-like PCBs is based on the distribution of these congeners from the UK Soil Herbage Survey (SHS) data as set out in the Environment Agency SGV methodology. Users should not use this value where their specific source of PCBs could differ from that of the UK SHS.

9. The SSV for free cyanide is based on a predicted acute exposure scenario involving a 16-65 year old adult who may ingest a bolus of contaminated soil.

Derivation of Screening Values

In assessing risks to human health arising from materials present on site, environmental testing results are compared to Shadbolt Group Tier 1 Screening Values (TSVs).

These screening values are drawn from a range of sources including government guidance, research bodies, industry publications and modelling software.

On-going research by the Environment Agency (EA) is being undertaken to produce toxicology reports (TOX series) for each of the contaminants identified within the CLR framework and then to produce published Soil Guideline Values (SGVs) using the Contaminated Land Exposure Assessment (CLEA) Model. Parallel to the work being undertaken by the EA is research being undertaken by Land Quality Management Limited and the Chartered Institute of Environmental Health (CIEH) to produce similar General Assessment Criteria (GAC) using the CLEA Model. To date, SGVs and GACs have been published for over 80 No. contaminants with SGVs / GACs derived for each contaminant for three different land use scenarios namely:

- a) Residential
- b) Allotment
- c) Commercial

In addition, Shadbolt Environmental (The Shadbolt Group) have derived screening values for **Parks, Playing Fields** and **Open Spaces** based on current guidance.

Shadbolt Environmental TSV's are based on the SGVs and GACs which are scientifically based generic assessment criteria that can be used to simplify the assessment of human health risks arising from long-term and on-site exposure to chemical contamination in soil.

SGVs and GACs are a screening tool for the generic quantitative risk assessment of land contamination (Defra and Environment Agency, 2004). They are not (unless clearly stated otherwise) relevant for assessing risks to human health from short-term exposure to chemicals in soil including injury arising from direct bodily contact and do not take account of other types of risks to humans such as explosion or suffocation risks (associated with the build-up of gases such as methane and carbon dioxide) or aesthetic issues such as odour or colour. SGVs and GACs do not take account of other non-soil based sources of contamination such as contamination in groundwater, surface waters or drinking waters. They cannot be used to evaluate risks to non-human receptors such as controlled waters, ecosystems, buildings and services, domestic pets or garden plants. Where, for example, phytotoxic effects are an important consideration in the current or future intended land use further investigation should be undertaken.

SGVs are guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to human health. They represent "trigger values" – indicators to a risk assessor that soil concentrations above this level **may** pose a possibility of *significant harm* to human health (Defra, 2008b).

Significance is linked to:

- a) **Margin** of exceedance;
- b) **Duration** and frequency of exposure;
- c) **Other site-specific factors** that the enforcing authority may wish to take into account.

SGVs do not of themselves represent the threshold at which there is a *significant possibility of significant harm* (SPOSH). Nor do they automatically represent an unacceptable intake in the context of Part 2A of the Environmental Protection Act 1990. However, they can be a useful starting point for such an assessment.

In order to assess the soil analyses results with regard to potential human health risks, Shadbolt Environmental TSVs have been derived in accordance with the UK framework set out in the most recent CLR (Contaminated Land Report) documents (EA/DEFRA, 2009) and LQM/CIEH Generic Assessment Criteria for Human Health Risk Assessment 2nd Edition 2009 and are “in line” with industry standards.

Assessment Framework

The CLEA model states that, ‘the contamination is assumed to be at or within 1m of the surface’. It is considered that at depths greater than 1.00m, the probability of human exposure via the direct contact pathways are significantly reduced, leaving inhalation of volatile compounds as the dominant pathway with regard to human health risks. Typically, volatile compounds only significantly affect the indoor inhalation pathway.

Statistical Analysis

The CLEA guidelines also state that for each contaminant, the upper 95th percentile of the mean measured concentration (95%UCL) should be calculated and this value should be compared to the TSV.

The objective of maximum value tests is to decide whether the maximum concentration observed should be treated as an outlier or whether it can reasonably be considered to come from the same underlying population as the other samples.

It is known that contaminant concentrations often demonstrate lognormal or other distribution forms. Therefore, in order to calculate what are considered to be more representative 95%UCL values, the contaminant concentrations have first been assessed to determine if each contaminant distribution is closer to a normal or lognormal distribution.

If a dataset was found to be log normally distributed, the geometric mean was used to calculate the 95%UCL, for those that were found to be normally distributed; the arithmetic mean was used to calculate the 95%UCL. Constituent non-detects were assigned a value equal to the reported analytical laboratory limit of detection, considered reasonably conservative. Any identified outliers are excluded from the datasets used in calculation of the 95%UCL value.

Shadbolt Group’s Tier 1 Screening Values used in the production of this report are presented below.

APPENDIX D
CHEMICAL LABORATORY
RESULTS



Emmanuel Barreto

The Shadbolt Group
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Gateshead
NE8 4DP

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

e: emmanuelb@shadboltgroup.net

Analytical Report Number : 19-51682

Project / Site name:	Newbottle Street, Houghton le Spring	Samples received on:	25/07/2019
Your job number:	2585	Samples instructed on:	25/07/2019
Your order number:		Analysis completed by:	01/08/2019
Report Issue Number:	1	Report issued on:	01/08/2019
Samples Analysed:	24 soil samples		

Signed: 

Rexona Rahman
Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :	soils	- 4 weeks from reporting
	leachates	- 2 weeks from reporting
	waters	- 2 weeks from reporting
	asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number			1276910	1276911	1276912	1276913	1276914
Sample Reference			TP-14	TP-17	TP-19	TP-20	TP-18
Sample Number			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)			1.50	2.20	2.00	0.70	0.50
Date Sampled			16/07/2019	16/07/2019	16/07/2019	16/07/2019	16/07/2019
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	18	11	9.5
Total mass of sample received	kg	0.001	NONE	0.66	0.65	1.0	0.80

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.7	7.9	7.7	8.6	7.8
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.18	0.061	0.26	0.54	0.99
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	182	61.1	261	540	993

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	3.2	0.38	0.55	1.4	1.5
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.28	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.30	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	4.9	0.96	1.7	2.5	1.3
Anthracene	mg/kg	0.05	MCERTS	0.32	< 0.05	0.26	0.34	0.26
Fluoranthene	mg/kg	0.05	MCERTS	1.5	0.22	2.1	2.7	1.1
Pyrene	mg/kg	0.05	MCERTS	1.3	0.21	1.7	2.3	0.96
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.89	< 0.05	0.97	1.4	0.76
Chrysene	mg/kg	0.05	MCERTS	0.98	< 0.05	0.90	0.94	0.71
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.84	< 0.05	0.78	0.94	0.66
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.24	< 0.05	0.47	0.42	0.31
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.49	< 0.05	0.78	0.76	0.55
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.25	< 0.05	0.34	0.31	0.23
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.43	< 0.05	0.57	0.54	0.37

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	15.3	1.77	11.7	14.6	8.76

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	22	41	4.2	25	14
Boron (water soluble)	mg/kg	0.2	MCERTS	2.2	1.6	0.4	2.6	2.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.7	< 0.2	< 0.2	0.5	0.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	13	15	15	28	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	180	50	15	71	59
Lead (aqua regia extractable)	mg/kg	1	MCERTS	120	53	26	98	69
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.7	< 0.3	< 0.3	0.4	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	55	26	16	48	40
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	1.7	< 1.0	2.6	2.7
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	310	40	55	190	160

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276910	1276911	1276912	1276913	1276914
Sample Reference	TP-14	TP-17	TP-19	TP-20	TP-18
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.50	2.20	2.00	0.70	0.50
Date Sampled	16/07/2019	16/07/2019	16/07/2019	16/07/2019	16/07/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1276910	1276911	1276912	1276913	1276914
Benzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Toluene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
o-xylene	µg/kg	1	MCERTS	-	-	< 1.0	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	< 1.0	-	-

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1276910	1276911	1276912	1276913	1276914
TPH C10 - C40	mg/kg	10	MCERTS	260	< 10	71	250	87
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	0.48	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	0.26	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	< 1.0	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	< 2.0	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	< 8.0	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	< 8.0	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	< 10	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	< 0.001	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	< 1.0	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	8.2	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	16	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	36	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	61	-	-

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Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276915		1276916		1276917		1276918		1276919	
Sample Reference	TP-10		TP-02		TP-08		TP-04		TP-11	
Sample Number	None Supplied		None Supplied		None Supplied		None Supplied		None Supplied	
Depth (m)	2.00		1.20		0.50		1.50		2.20	
Date Sampled	16/07/2019		16/07/2019		16/07/2019		16/07/2019		16/07/2019	
Time Taken	None Supplied		None Supplied		None Supplied		None Supplied		None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status							
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	8.7	9.8	9.1	12	12	12	12
Total mass of sample received	kg	0.001	NONE	0.87	0.81	0.72	0.72	0.72	0.85	0.85

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.5	8.1	8.0	7.9	8.0
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	2.1	0.050	0.038	2.4	0.13
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	2070	49.8	38.2	2440	129

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	2.1	1.0	0.81	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.34	< 0.05	0.29
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.34	< 0.05	0.33
Phenanthrene	mg/kg	0.05	MCERTS	0.45	1.7	3.8	1.9	2.4
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.62	0.30	0.42
Fluoranthene	mg/kg	0.05	MCERTS	0.50	< 0.05	4.2	2.4	2.5
Pyrene	mg/kg	0.05	MCERTS	0.48	< 0.05	3.3	2.0	2.0
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.35	< 0.05	2.8	2.1	1.1
Chrysene	mg/kg	0.05	MCERTS	0.27	< 0.05	2.1	1.5	0.79
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.28	< 0.05	2.8	1.9	0.98
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.20	< 0.05	0.95	0.87	0.56
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.27	< 0.05	2.0	1.5	1.0
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.91	0.67	0.49
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.42	0.34	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	1.4	1.1	0.81

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	2.80	3.75	26.9	17.3	13.6

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	15	14	19	28	6.1
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	1.2	1.4	2.6	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.3	< 0.2	0.5	1.8	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	19	17	19	18	30
Copper (aqua regia extractable)	mg/kg	1	MCERTS	51	67	120	92	26
Lead (aqua regia extractable)	mg/kg	1	MCERTS	38	86	220	180	30
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.5	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	34	29	32	42	29
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	1.2
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	54	83	260	400	68

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Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276915			1276916		1276917		1276918		1276919	
Sample Reference	TP-10			TP-02		TP-08		TP-04		TP-11	
Sample Number	None Supplied			None Supplied		None Supplied		None Supplied		None Supplied	
Depth (m)	2.00			1.20		0.50		1.50		2.20	
Date Sampled	16/07/2019			16/07/2019		16/07/2019		16/07/2019		16/07/2019	
Time Taken	None Supplied			None Supplied		None Supplied		None Supplied		None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status								

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1276915	1276916	1276917	1276918	1276919
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH C10 - C40	Units	Limit of detection	Accreditation Status	1276915	1276916	1276917	1276918	1276919
TPH C10 - C40	mg/kg	10	MCERTS	< 10	< 10	290	210	190

TPH-CWG - Aliphatic > EC5 - EC6	Units	Limit of detection	Accreditation Status	1276915	1276916	1276917	1276918	1276919
TPH-CWG - Aliphatic > EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic > EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic > EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic > EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic > EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic > EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic > EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH-CWG - Aromatic > EC5 - EC7	Units	Limit of detection	Accreditation Status	1276915	1276916	1276917	1276918	1276919
TPH-CWG - Aromatic > EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic > EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic > EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic > EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic > EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic > EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic > EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

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Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276920				1276921		1276922		1276923		1276924	
Sample Reference	TP-01				TP-07		TP-17		TP-04		TP-14	
Sample Number	None Supplied				None Supplied		None Supplied		None Supplied		None Supplied	
Depth (m)	1.00				2.30		0.20		0.20		0.20	
Date Sampled	16/07/2019				16/07/2019		16/07/2019		16/07/2019		16/07/2019	
Time Taken	None Supplied				None Supplied		None Supplied		None Supplied		None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status									
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	
Moisture Content	%	N/A	NONE	8.0	6.4	6.8	12	7.9				
Total mass of sample received	kg	0.001	NONE	0.77	0.82	0.75	0.69	0.73				

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.3	8.7	11.0	7.9	7.9
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.34	0.076	0.097	0.13	0.019
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	344	75.9	96.8	127	18.9

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	1.3	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	7.5	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	11	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	130	0.30	0.35	0.31	0.38
Anthracene	mg/kg	0.05	MCERTS	30	< 0.05	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	160	0.51	0.41	0.25	0.48
Pyrene	mg/kg	0.05	MCERTS	130	0.49	0.33	0.25	0.44
Benzo(a)anthracene	mg/kg	0.05	MCERTS	69	0.34	0.28	< 0.05	0.41
Chrysene	mg/kg	0.05	MCERTS	44	0.25	0.26	< 0.05	0.34
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	49	0.40	0.30	< 0.05	0.38
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	15	0.13	0.11	< 0.05	0.24
Benzo(a)pyrene	mg/kg	0.05	MCERTS	40	0.33	0.21	< 0.05	0.34
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	20	0.20	< 0.05	< 0.05	0.16
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	6.4	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	21	0.27	< 0.05	< 0.05	0.26

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	742	3.22	2.25	0.81	3.43

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	10	2.1	8.2	8.3	5.8
Boron (water soluble)	mg/kg	0.2	MCERTS	1.4	0.5	1.0	1.0	1.2
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	0.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	23	4.5	21	26	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	40	14	28	29	31
Lead (aqua regia extractable)	mg/kg	1	MCERTS	77	25	38	27	48
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	11	21	30	23
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	2.3	1.8	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	30	82	69	93

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276920			1276921			1276922			1276923			1276924		
Sample Reference	TP-01			TP-07			TP-17			TP-04			TP-14		
Sample Number	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Depth (m)	1.00			2.30			0.20			0.20			0.20		
Date Sampled	16/07/2019			16/07/2019			16/07/2019			16/07/2019			16/07/2019		
Time Taken	None Supplied			None Supplied			None Supplied			None Supplied			None Supplied		
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status												

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1276920	1276921	1276922	1276923	1276924
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

TPH C10 - C40	Units	Limit of detection	Accreditation Status	1276920	1276921	1276922	1276923	1276924
TPH C10 - C40	mg/kg	10	MCERTS	2800	48	49	44	85

TPH-CWG - Aliphatic >EC5 - EC6	Units	Limit of detection	Accreditation Status	1276920	1276921	1276922	1276923	1276924
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

TPH-CWG - Aromatic >EC5 - EC7	Units	Limit of detection	Accreditation Status	1276920	1276921	1276922	1276923	1276924
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number			1276925	1276926	1276927	1276928	1276929
Sample Reference			TP-02	TP-18	TP-09	TP-08	TP-16
Sample Number			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)			0.20	0.20	0.20	0.20	0.20
Date Sampled			16/07/2019	16/07/2019	16/07/2019	16/07/2019	16/07/2019
Time Taken			None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status				
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	8.6	9.5	13	8.4
Total mass of sample received	kg	0.001	NONE	0.73	0.73	0.76	0.77

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	Not-detected

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	7.8	7.8	7.7	7.7	7.7
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	< 1
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.017	0.013	0.032	0.014	0.039
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	17.3	12.6	32.2	14.4	38.5

Speciated PAHs

Naphthalene	mg/kg	0.05	MCERTS	0.24	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.47	< 0.05	0.61	< 0.05	0.55
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	0.11	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.60	< 0.05	1.2	< 0.05	0.88
Pyrene	mg/kg	0.05	MCERTS	0.53	< 0.05	0.97	< 0.05	0.80
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.52	< 0.05	0.62	< 0.05	0.52
Chrysene	mg/kg	0.05	MCERTS	0.39	< 0.05	0.64	< 0.05	0.54
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.49	< 0.05	0.64	< 0.05	0.66
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.39	< 0.05	0.38	< 0.05	0.27
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.56	< 0.05	0.51	< 0.05	0.50
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.24	< 0.05	0.24	< 0.05	0.23
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.39	< 0.05	0.26	< 0.05	0.27

Total PAH

Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	4.82	< 0.80	6.15	< 0.80	5.22
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Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	9.3	4.8	10	3.9	6.7
Boron (water soluble)	mg/kg	0.2	MCERTS	1.2	0.6	1.5	0.7	1.0
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	0.2	< 0.2	< 0.2	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	26	26	25	24
Copper (aqua regia extractable)	mg/kg	1	MCERTS	26	25	39	27	29
Lead (aqua regia extractable)	mg/kg	1	MCERTS	43	25	46	21	52
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	24	29	28	27	22
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	2.3
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	85	62	110	87	88

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276925	1276926	1276927	1276928	1276929
Sample Reference	TP-02	TP-18	TP-09	TP-08	TP-16
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.20	0.20	0.20	0.20	0.20
Date Sampled	16/07/2019	16/07/2019	16/07/2019	16/07/2019	16/07/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1276925	1276926	1276927	1276928	1276929
Benzene	µg/kg	1	MCERTS	-	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-	-

Petroleum Hydrocarbons

Parameter	Units	Limit of detection	Accreditation Status	1276925	1276926	1276927	1276928	1276929
TPH C10 - C40	mg/kg	10	MCERTS	100	< 10	43	41	77
TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-	-

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number				1276930	1276931	1276932	1276933	
Sample Reference				TP-20	TP-19	TP-10	TP-01	
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)				0.20	0.20	0.20	0.20	
Date Sampled				16/07/2019	16/07/2019	16/07/2019	16/07/2019	
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status					
				Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	N/A	NONE	7.6	14	12	12	
Total mass of sample received	kg	0.001	NONE	0.81	0.92	0.81	0.70	
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected	Not-detected	
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.9	7.6	7.8	7.5	
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1	< 1	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.014	0.055	0.021	0.019	
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	14.1	55.2	21.4	18.7	
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	0.25	0.23	0.20	
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	0.55	< 0.05	< 0.05	
Fluorene	mg/kg	0.05	MCERTS	< 0.05	0.74	< 0.05	< 0.05	
Phenanthrene	mg/kg	0.05	MCERTS	0.40	8.3	0.40	1.4	
Anthracene	mg/kg	0.05	MCERTS	< 0.05	1.6	< 0.05	0.26	
Fluoranthene	mg/kg	0.05	MCERTS	0.65	13	0.62	2.2	
Pyrene	mg/kg	0.05	MCERTS	0.54	11	0.51	1.8	
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.37	5.7	0.37	1.3	
Chrysene	mg/kg	0.05	MCERTS	0.36	5.5	0.36	0.99	
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.42	6.0	0.51	1.5	
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.26	3.3	0.15	0.49	
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.38	5.2	0.39	1.2	
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.18	2.2	0.17	0.53	
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	0.74	< 0.05	0.19	
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.21	2.5	0.21	0.61	
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	3.77	66.9	3.92	12.6	
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	7.2	7.7	11	6.2	
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	2.5	1.5	0.9	
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2	< 0.2	
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	30	25	39	43	
Copper (aqua regia extractable)	mg/kg	1	MCERTS	22	43	41	32	
Lead (aqua regia extractable)	mg/kg	1	MCERTS	26	57	74	31	
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	0.6	< 0.3	
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	27	22	29	41	
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	62	97	92	72	

Analytical Report Number: 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Lab Sample Number	1276930	1276931	1276932	1276933	
Sample Reference	TP-20	TP-19	TP-10	TP-01	
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	
Depth (m)	0.20	0.20	0.20	0.20	
Date Sampled	16/07/2019	16/07/2019	16/07/2019	16/07/2019	
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status		

Monoaromatics & Oxygenates

Compound	Units	Limit of detection	Accreditation Status	1276930	1276931	1276932	1276933
Benzene	µg/kg	1	MCERTS	-	-	-	-
Toluene	µg/kg	1	MCERTS	-	-	-	-
Ethylbenzene	µg/kg	1	MCERTS	-	-	-	-
p & m-xylene	µg/kg	1	MCERTS	-	-	-	-
o-xylene	µg/kg	1	MCERTS	-	-	-	-
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	-	-	-	-

Petroleum Hydrocarbons

TPH C10 - C40	mg/kg	Limit of detection	Accreditation Status	1276930	1276931	1276932	1276933
TPH C10 - C40	mg/kg	10	MCERTS	29	350	55	100

TPH-CWG - Aliphatic > EC5 - EC6	mg/kg	Limit of detection	Accreditation Status	1276930	1276931	1276932	1276933
TPH-CWG - Aliphatic > EC5 - EC6	mg/kg	0.001	MCERTS	-	-	-	-
TPH-CWG - Aliphatic > EC6 - EC8	mg/kg	0.001	MCERTS	-	-	-	-
TPH-CWG - Aliphatic > EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-
TPH-CWG - Aliphatic > EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-
TPH-CWG - Aliphatic > EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-
TPH-CWG - Aliphatic > EC16 - EC21	mg/kg	8	MCERTS	-	-	-	-
TPH-CWG - Aliphatic > EC21 - EC35	mg/kg	8	MCERTS	-	-	-	-
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-

TPH-CWG - Aromatic > EC5 - EC7	mg/kg	Limit of detection	Accreditation Status	1276930	1276931	1276932	1276933
TPH-CWG - Aromatic > EC5 - EC7	mg/kg	0.001	MCERTS	-	-	-	-
TPH-CWG - Aromatic > EC7 - EC8	mg/kg	0.001	MCERTS	-	-	-	-
TPH-CWG - Aromatic > EC8 - EC10	mg/kg	0.001	MCERTS	-	-	-	-
TPH-CWG - Aromatic > EC10 - EC12	mg/kg	1	MCERTS	-	-	-	-
TPH-CWG - Aromatic > EC12 - EC16	mg/kg	2	MCERTS	-	-	-	-
TPH-CWG - Aromatic > EC16 - EC21	mg/kg	10	MCERTS	-	-	-	-
TPH-CWG - Aromatic > EC21 - EC35	mg/kg	10	MCERTS	-	-	-	-
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	-	-	-	-



Analytical Report Number : 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1276910	TP-14	None Supplied	1.50	Black clay and sand with coal.
1276911	TP-17	None Supplied	2.20	Brown clay and sand with gravel.
1276912	TP-19	None Supplied	2.00	Grey clay and sand with gravel.
1276913	TP-20	None Supplied	0.70	Brown loam and sand with gravel and brick.
1276914	TP-18	None Supplied	0.50	Brown clay and sand with gravel and coal.
1276915	TP-10	None Supplied	2.00	Brown loam and clay with gravel.
1276916	TP-02	None Supplied	1.20	Brown loam and clay with gravel.
1276917	TP-08	None Supplied	0.50	Brown loam and clay with gravel.
1276918	TP-04	None Supplied	1.50	Brown loam and clay with gravel.
1276919	TP-11	None Supplied	2.20	Brown clay and sand with gravel and vegetation.
1276920	TP-01	None Supplied	1.00	Brown clay and sand with gravel and vegetation.
1276921	TP-07	None Supplied	2.30	Brown sandy gravel. **
1276922	TP-17	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276923	TP-04	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276924	TP-14	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276925	TP-02	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276926	TP-18	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276927	TP-09	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276928	TP-08	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276929	TP-16	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276930	TP-20	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276931	TP-19	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276932	TP-10	None Supplied	0.20	Brown loam and clay with gravel and vegetation.
1276933	TP-01	None Supplied	0.20	Brown loam and clay with gravel and vegetation.

** Non MCerts Matrix

Analytical Report Number : 19-51682

Project / Site name: Newbottle Street, Houghton le Spring

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L0738-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically.	In-house method based on BS1377 Part 2, 1990, Chemical and Electrochemical Tests	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	W	MCERTS
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/cleanup.	L088/76-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Sample Deviation Report



Sample ID	Other_ID	Sample Type	Job	Sample Number	Sample Deviation Code	test_name	test_ref	Test Deviation code
TP-01		S	19-51682	1276920	c	Total cyanide in soil	L080-PL	c
TP-01		S	19-51682	1276933	c	Total cyanide in soil	L080-PL	c
TP-02		S	19-51682	1276916	c	Total cyanide in soil	L080-PL	c
TP-02		S	19-51682	1276925	c	Total cyanide in soil	L080-PL	c
TP-04		S	19-51682	1276918	c	Total cyanide in soil	L080-PL	c
TP-04		S	19-51682	1276923	c	Total cyanide in soil	L080-PL	c
TP-07		S	19-51682	1276921	c	Total cyanide in soil	L080-PL	c
TP-08		S	19-51682	1276917	c	Total cyanide in soil	L080-PL	c
TP-08		S	19-51682	1276928	c	Total cyanide in soil	L080-PL	c
TP-09		S	19-51682	1276927	c	Total cyanide in soil	L080-PL	c
TP-10		S	19-51682	1276915	c	Total cyanide in soil	L080-PL	c
TP-10		S	19-51682	1276932	c	Total cyanide in soil	L080-PL	c
TP-11		S	19-51682	1276919	c	Total cyanide in soil	L080-PL	c
TP-14		S	19-51682	1276910	c	Total cyanide in soil	L080-PL	c
TP-14		S	19-51682	1276924	c	Total cyanide in soil	L080-PL	c
TP-16		S	19-51682	1276929	c	Total cyanide in soil	L080-PL	c
TP-17		S	19-51682	1276911	c	Total cyanide in soil	L080-PL	c
TP-17		S	19-51682	1276922	c	Total cyanide in soil	L080-PL	c
TP-18		S	19-51682	1276914	c	Total cyanide in soil	L080-PL	c
TP-18		S	19-51682	1276926	c	Total cyanide in soil	L080-PL	c
TP-19		S	19-51682	1276912	bc	BTEX and MTBE in soil (Monoaromatics)	L073B-PL	b
TP-19		S	19-51682	1276912	bc	TPHCWG (Soil)	L088/76-PL	b
TP-19		S	19-51682	1276912	bc	Total cyanide in soil	L080-PL	c
TP-19		S	19-51682	1276931	c	Total cyanide in soil	L080-PL	c
TP-20		S	19-51682	1276913	c	Total cyanide in soil	L080-PL	c
TP-20		S	19-51682	1276930	c	Total cyanide in soil	L080-PL	c



ANALYTICAL TEST REPORT

Contract no: 88051
Contract name: Houghton-le-Spring
Client reference: 2585
Clients name: Shadbolt Consulting
Clients address: 18 Bewick Road
Gateshead
Tyne and Wear
NE8 4DP

Samples received: 04 August 2020
Analysis started: 04 August 2020
Analysis completed: 11 August 2020
Report issued: 11 August 2020

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

John Campbell
Director

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
88051-1	TP201	1.20	Clayey Sand With Gravel	-	-	12.3
88051-2	TP202	0.10	Clayey Sand With Gravel & roots	-	-	12.3
88051-3	TP202	2.00	Clayey Sand With Gravel	-	-	14.2
88051-4	TP203	2.50	Clayey Sand With Gravel	-	-	14.0
88051-5	TP204	0.50-1.00	Clayey Sand With Gravel	-	-	10.6
88051-6	TP204	1.90-2.20	Sandy Clay with Gravel	-	-	14.9
88051-7	TP205	0.05-0.15	Clayey Sand With Gravel & roots	-	-	9.0
88051-9	TP206	1.00-1.30	Clayey Sand With Gravel	-	-	11.9
88051-10	TP207	0.20-0.60	Clayey Sand With Gravel	-	-	11.9
88051-12	TP208	1.00-1.50	Clayey Sand With Gravel	-	-	10.9
88051-13	TP208	2.50-3.00	Clayey Sand With Gravel	-	-	11.5

Chemtech Environmental Limited

SOILS

Lab number			88051-1	88051-2	88051-3	88051-4	88051-5	88051-6
Sample id			TP201	TP202	TP202	TP203	TP204	TP204
Depth (m)			1.20	0.10	2.00	2.50	0.50-1.00	1.90-2.20
Date sampled			31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	16	9.5	17	20	12	-
Boron (water soluble)	CE063 ^M	mg/kg B	1.1	1.0	1.2	1.3	<0.5	-
Cadmium (total)	CE127 ^M	mg/kg Cd	0.4	0.4	0.5	<0.2	0.3	-
Chromium (total)	CE127 ^M	mg/kg Cr	26	16	30	17	20	-
Copper (total)	CE127 ^M	mg/kg Cu	44	27	55	69	58	-
Lead (total)	CE127 ^M	mg/kg Pb	140	114	173	48	52	-
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	-
Nickel (total)	CE127 ^M	mg/kg Ni	29	21	37	22	33	-
Selenium (total)	CE127 ^M	mg/kg Se	2.0	1.9	2.7	2.9	2.2	-
Zinc (total)	CE127 ^M	mg/kg Zn	140	91	175	61	100	-
pH	CE004 ^M	units	8.6	8.0	8.4	7.8	6.3	-
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	85	97	243	233	101	-
Cyanide (total)	CE077	mg/kg CN	<1	<1	<1	<1	<1	-
Calorific value	CE069	kJ/kg	-	-	-	-	-	-
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02	0.33	0.92	1.91	-
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	0.37	<0.02	<0.02	-
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	-
Fluorene	CE087 ^U	mg/kg	0.29	<0.02	<0.02	<0.02	<0.02	-
Phenanthrene	CE087 ^M	mg/kg	3.91	0.66	2.28	2.26	2.86	-
Anthracene	CE087 ^U	mg/kg	1.31	<0.02	0.73	0.79	0.24	-
Fluoranthene	CE087 ^M	mg/kg	9.70	2.03	7.43	2.35	1.87	-
Pyrene	CE087 ^M	mg/kg	7.05	1.79	6.22	1.72	1.71	-
Benzo(a)anthracene	CE087 ^U	mg/kg	4.07	1.12	3.71	0.91	0.93	-
Chrysene	CE087 ^M	mg/kg	4.01	1.23	3.95	1.03	1.16	-
Benzo(b)fluoranthene	CE087 ^M	mg/kg	5.19	2.04	5.66	1.21	1.54	-
Benzo(k)fluoranthene	CE087 ^M	mg/kg	2.08	0.87	2.52	0.50	0.66	-
Benzo(a)pyrene	CE087 ^U	mg/kg	3.60	1.49	4.22	0.81	1.09	-
Indeno(123cd)pyrene	CE087 ^M	mg/kg	1.89	0.80	2.07	0.36	0.66	-
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.61	0.26	0.68	<0.02	<0.02	-
Benzo(ghi)perylene	CE087 ^M	mg/kg	1.70	0.76	2.01	0.34	0.70	-
PAH (total of USEPA 16)	CE087	mg/kg	45.4	13.1	42.2	13.2	15.3	-
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	-	-	-	-	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	-	-	-	-	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	-	-	-	-	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	-	-	-	-	3
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	-	-	-	-	5
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	-	-	-	-	11
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	-	-	-	-	4
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	-	-	-	-	<1

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SOILS

Lab number			88051-1	88051-2	88051-3	88051-4	88051-5	88051-6
Sample id			TP201	TP202	TP202	TP203	TP204	TP204
Depth (m)			1.20	0.10	2.00	2.50	0.50-1.00	1.90-2.20
Date sampled			31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
Test	Method	Units						
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	-	-	-	-	<0.1
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	-	-	-	-	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	-	-	-	-	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	-	-	-	-	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	-	-	-	-	43
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	-	-	-	-	219
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	-	-	-	-	30
EPH (>C10-C40)	CE033 ^M	mg/kg	87	155	289	191	3188	-
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	-

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SOILS

Lab number			88051-7	88051-9	88051-10	88051-12	88051-13
Sample id			TP205	TP206	TP207	TP208	TP208
Depth (m)			0.05-0.15	1.00-1.30	0.20-0.60	1.00-1.50	2.50-3.00
Date sampled			31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
Test	Method	Units					
Arsenic (total)	CE127 ^M	mg/kg As	17	-	-	-	-
Boron (water soluble)	CE063 ^M	mg/kg B	1.0	-	-	-	-
Cadmium (total)	CE127 ^M	mg/kg Cd	0.5	-	-	-	-
Chromium (total)	CE127 ^M	mg/kg Cr	22	-	-	-	-
Copper (total)	CE127 ^M	mg/kg Cu	72	-	-	-	-
Lead (total)	CE127 ^M	mg/kg Pb	90	-	-	-	-
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	-	-	-	-
Nickel (total)	CE127 ^M	mg/kg Ni	37	-	-	-	-
Selenium (total)	CE127 ^M	mg/kg Se	2.2	-	-	-	-
Zinc (total)	CE127 ^M	mg/kg Zn	154	-	-	-	-
pH	CE004 ^M	units	7.0	-	-	-	-
Sulphate (2:1 water soluble)	CE061 ^M	mg/l SO ₄	55	-	-	-	-
Cyanide (total)	CE077	mg/kg CN	<1	-	-	-	-
Calorific value	CE069	kJ/kg	-	4560	-	-	4096
PAH							
Naphthalene	CE087 ^M	mg/kg	1.05	-	-	-	-
Acenaphthylene	CE087 ^M	mg/kg	<0.02	-	-	-	-
Acenaphthene	CE087 ^M	mg/kg	<0.02	-	-	-	-
Fluorene	CE087 ^U	mg/kg	0.25	-	-	-	-
Phenanthrene	CE087 ^M	mg/kg	2.57	-	-	-	-
Anthracene	CE087 ^U	mg/kg	1.16	-	-	-	-
Fluoranthene	CE087 ^M	mg/kg	4.28	-	-	-	-
Pyrene	CE087 ^M	mg/kg	6.01	-	-	-	-
Benzo(a)anthracene	CE087 ^U	mg/kg	4.62	-	-	-	-
Chrysene	CE087 ^M	mg/kg	8.96	-	-	-	-
Benzo(b)fluoranthene	CE087 ^M	mg/kg	9.06	-	-	-	-
Benzo(k)fluoranthene	CE087 ^M	mg/kg	3.14	-	-	-	-
Benzo(a)pyrene	CE087 ^U	mg/kg	3.57	-	-	-	-
Indeno(123cd)pyrene	CE087 ^M	mg/kg	1.26	-	-	-	-
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.51	-	-	-	-
Benzo(ghi)perylene	CE087 ^M	mg/kg	1.07	-	-	-	-
PAH (total of USEPA 16)	CE087	mg/kg	47.5	-	-	-	-
TPH							
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	-	<0.01	<0.01	<0.01	-
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	-	<0.01	<0.01	<0.01	-
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	-	<0.01	<0.01	<0.01	-
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	-	<1	<1	<1	-
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	-	1	1	2	-
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	-	6	1	3	-
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	-	5	1	2	-
EPH Aromatic (>EC35-EC44)	CE068	mg/kg	-	<1	<1	<1	-

Chemtech Environmental Limited

SOILS

Lab number			88051-7	88051-9	88051-10	88051-12	88051-13
Sample id			TP205	TP206	TP207	TP208	TP208
Depth (m)			0.05-0.15	1.00-1.30	0.20-0.60	1.00-1.50	2.50-3.00
Date sampled			31/07/2020	31/07/2020	31/07/2020	31/07/2020	31/07/2020
Test	Method	Units					
VPH Aliphatic (>C5-C6)	CE067	mg/kg	-	<0.1	<0.1	<0.1	-
VPH Aliphatic (>C6-C8)	CE067	mg/kg	-	<0.1	<0.1	<0.1	-
VPH Aliphatic (>C8-C10)	CE067	mg/kg	-	<0.1	<0.1	<0.1	-
EPH Aliphatic (>C10-C12)	CE068	mg/kg	-	<4	<4	<4	-
EPH Aliphatic (>C12-C16)	CE068	mg/kg	-	10	10	20	-
EPH Aliphatic (>C16-C35)	CE068	mg/kg	-	116	194	53	-
EPH Aliphatic (>C35-C44)	CE068	mg/kg	-	23	43	<10	-
EPH (>C10-C40)	CE033 ^M	mg/kg	751	-	-	-	-
Subcontracted analysis							
Asbestos (qualitative)	\$	-	NAD	-	-	-	-

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PREPARED LEACHATES

Lab number			88051-8L	88051-11L	88051-14L	88051-15L
Sample id			TP205	TP208	TP209	TP209
Depth (m)			2.50	0.30-0.50	1.50	2.00-2.50
Test	Method	Units				
Arsenic (dissolved)	CE128 ^u	µg/l As	0.09	0.17	2.76	3.21
Boron (dissolved)	CE128 ^u	µg/l B	41	67	31	24
Cadmium (dissolved)	CE128 ^u	µg/l Cd	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 ^u	µg/l Cr	0.3	<0.2	2.0	2.2
Copper (dissolved)	CE128 ^u	µg/l Cu	0.4	0.8	2.7	3.1
Lead (dissolved)	CE128 ^u	µg/l Pb	<0.2	<0.2	0.4	0.7
Mercury (dissolved)	CE128 ^u	µg/l Hg	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 ^u	µg/l Ni	0.9	0.5	<0.5	<0.5
Selenium (dissolved)	CE128 ^u	µg/l Se	7.64	0.79	0.87	0.91
Zinc (dissolved)	CE128 ^u	µg/l Zn	<1	4	<1	<1
pH	CE213 ^u	units	7.7	7.7	8.0	7.9
Ammonia	CE012 ^u	µg/l N	<10	29	>10	<10
Sulphate	CE049 ^u	mg/l SO ₄	13	233	32	14
Sulphur (dissolved)	CE128 ^u	mg/l S	5.1	79.7	8.2	5.7
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20
PAH						
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	0.2	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	0.4	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	1.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	0.9	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	0.3	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	0.4	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	0.6	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	0.3	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	0.3	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	0.2	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	4.8	<1.6
TPH						
EPH (>C10-C40)	CE052	µg/l	<10	<10	21	<10

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE063	Boron (water soluble)	Hot water extract, ICP-OES	Dry	M	0.5	mg/kg B
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE061	Sulphate (2:1 water soluble)	Aqueous extraction, ICP-OES	Dry	M	10	mg/l SO ₄
CE077	Cyanide (total)	Extraction, Continuous Flow Colorimetry	As received		1	mg/kg CN
CE069	Calorific value	Combustion, Carbon analyser	Dry		100	kJ/kg
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID	As received		10	mg/kg
CE033	EPH (>C10-C40)	Solvent extraction, GC-FID	As received	M	10	mg/kg
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

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METHOD DETAILS

METHOD	PREPARED LEACHATES	METHOD SUMMARY	STATUS	LOD	UNITS
CE002	Leachate preparation (EA)	L:S 10:1		-	-
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE012	Ammonia	Colorimetry	U	10	µg/l N
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO ₄
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE052	EPH (>C10-C40)	Solvent extraction, GC-FID		10	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
88051-1	TP201	1.20	N	
88051-2	TP202	0.10	N	
88051-3	TP202	2.00	N	
88051-4	TP203	2.50	N	
88051-5	TP204	0.50-1.00	N	
88051-6	TP204	1.90-2.20	N	
88051-7	TP205	0.05-0.15	N	
88051-8	TP205	2.50	N	
88051-9	TP206	1.00-1.30	N	
88051-10	TP207	0.20-0.60	N	
88051-11	TP208	0.30-0.50	N	
88051-12	TP208	1.00-1.50	N	
88051-13	TP208	2.50-3.00	N	
88051-14	TP209	1.50	N	
88051-15	TP209	2.00-2.50	N	



2531



ANALYTICAL TEST REPORT

Contract no: 90731
Contract name: Houghton-le-Spring
Client reference: 2585
Clients name: Shadbolt Group
Clients address: 18 Bewick Road
Gateshead
Tyne & Wear
NE8 4DP

Samples received: 02 November 2020
Analysis started: 03 November 2020
Analysis completed: 10 November 2020
Report issued: 10 November 2020

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing

Approved by:

John Campbell
Director

Chemtech Environmental Limited

SOILS

Lab number			90731-3	90731-4	90731-5	90731-6	90731-7	90731-8
Sample id			HP01	HP02	HP03	HP04	HP05	HP06
Depth (m)			0.60-1.20	0.60	0.50-1.20	0.60-0.80	0.60-1.20	0.50
Date sampled			02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020	02/11/2020
Test	Method	Units						
BTEX								
Benzene	CE192 ^u	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Toluene	CE192 ^u	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ethylbenzene	CE192 ^u	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
m & p-Xylene	CE192 ^u	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
o-Xylene	CE192 ^u	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

Chemtech Environmental Limited

SOILS

Lab number	90731-9		
Sample id	HP07		
Depth (m)	0.50-1.00		
Date sampled	02/11/2020		
Test	Method	Units	
BTEX			
Benzene	CE192 ^u	mg/kg	<0.01
Toluene	CE192 ^u	mg/kg	<0.01
Ethylbenzene	CE192 ^u	mg/kg	<0.01
m & p-Xylene	CE192 ^u	mg/kg	<0.02
o-Xylene	CE192 ^u	mg/kg	<0.01

Chemtech Environmental Limited

WATERS

Lab number			90731-1	90731-2
Sample id			BH03	BH04
Depth (m)			-	-
Date sampled			02/11/2020	02/11/2020
Time sampled			-	-
Test	Method	Units		
Arsenic (dissolved)	CE128 ^u	µg/l As	1.97	2.41
Boron (dissolved)	CE128 ^u	µg/l B	709	1563
Cadmium (dissolved)	CE128 ^u	µg/l Cd	<0.07	0.13
Chromium (dissolved)	CE128 ^u	µg/l Cr	1.4	<0.2
Copper (dissolved)	CE128 ^u	µg/l Cu	0.4	0.9
Lead (dissolved)	CE128 ^u	µg/l Pb	<0.2	<0.2
Mercury (dissolved)	CE128 ^u	µg/l Hg	0.037	0.031
Nickel (dissolved)	CE128 ^u	µg/l Ni	16.8	6.3
Selenium (dissolved)	CE128 ^u	µg/l Se	11.50	60.01
Zinc (dissolved)	CE128 ^u	µg/l Zn	9	16
pH	CE213 ^u	units	7.1	7.1
Ammonia	CE012 ^u	µg/l N	47	47
Sulphate	CE049 ^u	mg/l SO ₄	370	1175
Sulphur (dissolved)	CE128 ^u	mg/l S	156.8	501.2
Cyanide (total)	CE147	µg/l CN	<20	<20
PAH				
Naphthalene	CE051	µg/l	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6
BTEX & TPH				
MTBE	CE057 ^u	µg/l	<2	<2
Benzene	CE057 ^u	µg/l	<1	<1
Toluene	CE057 ^u	µg/l	<1	<1
Ethylbenzene	CE057 ^u	µg/l	<1	<1
m & p-Xylene	CE057 ^u	µg/l	<2	<2
o-Xylene	CE057 ^u	µg/l	<1	<1

Chemtech Environmental Limited

WATERS

Lab number			90731-1	90731-2
Sample id			BH03	BH04
Depth (m)			-	-
Date sampled			02/11/2020	02/11/2020
Time sampled			-	-
Test	Method	Units		
VPH Aromatic (>EC5-EC7)	CE175	µg/l	<1	<1
VPH Aromatic (>EC7-EC8)	CE175	µg/l	<1	<1
VPH Aromatic (>EC8-EC10)	CE175	µg/l	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1
VPH Aliphatic (>C5-C6)	CE175	µg/l	<1	<1
VPH Aliphatic (>C6-C8)	CE175	µg/l	<1	<1
VPH Aliphatic (>C8-C10)	CE175	µg/l	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	3
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1
EPH (>C10-C40)	CE052	µg/l	<10	<10
Volatiles				
Dichlorodifluoromethane	CE066	µg/l	<1	<1
Chloromethane	CE066	µg/l	<1	<1
Vinyl chloride	CE066	µg/l	<1	<1
Bromomethane	CE066	µg/l	<3	<3
Chloroethane	CE066	µg/l	<1	<1
Trichlorofluoromethane	CE066	µg/l	<1	<1
1,1-Dichloroethene	CE066	µg/l	<1	<1
Trans-1,2-Dichloroethene	CE066	µg/l	<1	<1
1,1-Dichloroethane	CE066	µg/l	<1	<1
2,2-Dichloropropane	CE066	µg/l	<1	<1
Cis-1,2-Dichloroethene	CE066	µg/l	<1	<1
Bromochloromethane	CE066	µg/l	<1	<1
Chloroform	CE066	µg/l	<1	<1
1,1,1-Trichloroethane	CE066	µg/l	<1	<1
Carbon tetrachloride	CE066	µg/l	<1	<1
1,1-Dichloro-1-propene	CE066	µg/l	<1	<1
1,2-Dichloroethane	CE066	µg/l	<1	<1
Trichloroethene	CE066	µg/l	<1	<1
1,2-Dichloropropane	CE066	µg/l	<1	<1
Dibromomethane	CE066	µg/l	<1	<1
Bromodichloromethane	CE066	µg/l	<1	<1
cis-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1
trans-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1

Chemtech Environmental Limited

WATERS

Lab number			90731-1	90731-2
Sample id			BH03	BH04
Depth (m)			-	-
Date sampled			02/11/2020	02/11/2020
Time sampled			-	-
Test	Method	Units		
1,1,2-Trichloroethane	CE066	µg/l	<1	<1
Tetrachloroethene	CE066	µg/l	<1	<1
1,3-Dichloropropane	CE066	µg/l	<1	<1
Dibromochloromethane	CE066	µg/l	<1	<1
1,2-Dibromoethane	CE066	µg/l	<1	<1
Chlorobenzene	CE066	µg/l	<1	<1
1,1,1,2-Tetrachloroethane	CE066	µg/l	<1	<1
Styrene	CE066	µg/l	<1	<1
Tribromomethane	CE066	µg/l	<1	<1
Isopropylbenzene	CE066	µg/l	<1	<1
Bromobenzene	CE066	µg/l	<1	<1
1,1,2,2-Tetrachloroethane	CE066	µg/l	<1	<1
1,2,3-Trichloropropane	CE066	µg/l	<1	<1
Propylbenzene	CE066	µg/l	<1	<1
2-Chlorotoluene	CE066	µg/l	<1	<1
4-Chlorotoluene	CE066	µg/l	<1	<1
1,3,5-Trimethylbenzene	CE066	µg/l	<1	<1
tert-Butylbenzene	CE066	µg/l	<1	<1
1,2,4-Trimethylbenzene	CE066	µg/l	<1	<1
sec-Butylbenzene	CE066	µg/l	<1	<1
1,3-Dichlorobenzene	CE066	µg/l	<1	<1
4-Isopropyltoluene	CE066	µg/l	<1	<1
1,4-Dichlorobenzene	CE066	µg/l	<1	<1
1,2-Dichlorobenzene	CE066	µg/l	<1	<1
Butylbenzene	CE066	µg/l	<1	<1
1,2-Dibromo-3-chloropropane	CE066	µg/l	<1	<1
1,2,4-Trichlorobenzene	CE066	µg/l	<1	<1
Hexachloro-1,3-butadiene	CE066	µg/l	<1	<1
1,2,3-Trichlorobenzene	CE066	µg/l	<1	<1

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE192	Benzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Toluene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	Ethylbenzene	Headspace GC-FID	As received	U	0.01	mg/kg
CE192	m & p-Xylene	Headspace GC-FID	As received	U	0.02	mg/kg
CE192	o-Xylene	Headspace GC-FID	As received	U	0.01	mg/kg

Chemtech Environmental Limited

METHOD DETAILS

METHOD	WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE012	Ammonia	Colorimetry	U	10	µg/l N
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO ₄
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE057	MTBE	Headspace GC-FID	U	2	µg/l
CE057	Benzene	Headspace GC-FID	U	1	µg/l
CE057	Toluene	Headspace GC-FID	U	1	µg/l
CE057	Ethylbenzene	Headspace GC-FID	U	1	µg/l
CE057	m & p-Xylene	Headspace GC-FID	U	2	µg/l
CE057	o-Xylene	Headspace GC-FID	U	1	µg/l
CE175	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE161	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE161	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID		1	µg/l
CE175	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE161	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID		1	µg/l
CE052	EPH (>C10-C40)	Solvent extraction, GC-FID		10	µg/l
CE066	Dichlorodifluoromethane	Headspace GC-MS		1	µg/l
CE066	Chloromethane	Headspace GC-MS		1	µg/l
CE066	Vinyl chloride	Headspace GC-MS		1	µg/l
CE066	Bromomethane	Headspace GC-MS		3	µg/l
CE066	Chloroethane	Headspace GC-MS		1	µg/l
CE066	Trichlorofluoromethane	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Trans-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	2,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Cis-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Bromochloromethane	Headspace GC-MS		1	µg/l
CE066	Chloroform	Headspace GC-MS		1	µg/l
CE066	1,1,1-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Carbon tetrachloride	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	Trichloroethene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromomethane	Headspace GC-MS		1	µg/l
CE066	Bromodichloromethane	Headspace GC-MS		1	µg/l
CE066	cis-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	trans-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,1,2-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Tetrachloroethene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromochloromethane	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromoethane	Headspace GC-MS		1	µg/l
CE066	Chlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,1,1,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	Styrene	Headspace GC-MS		1	µg/l
CE066	Tribromomethane	Headspace GC-MS		1	µg/l
CE066	Isopropylbenzene	Headspace GC-MS		1	µg/l
CE066	Bromobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE066	1,1,2,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichloropropane	Headspace GC-MS		1	µg/l
CE066	Propylbenzene	Headspace GC-MS		1	µg/l
CE066	2-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	4-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	1,3,5-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	tert-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	sec-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	4-Isopropyltoluene	Headspace GC-MS		1	µg/l
CE066	1,4-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromo-3-chloropropane	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Hexachloro-1,3-butadiene	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichlorobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

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Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
90731-1	BH03	-	N	
90731-2	BH04	-	N	
90731-3	HP01	0.60-1.20	N	
90731-4	HP02	0.60	N	
90731-5	HP03	0.50-1.20	N	
90731-6	HP04	0.60-0.80	N	
90731-7	HP05	0.60-1.20	N	
90731-8	HP06	0.50	N	
90731-9	HP07	0.50-1.00	N	



2531



ANALYTICAL TEST REPORT

Contract no: 90765
Contract name: Houghton-le-Spring
Client reference: 2585
Clients name: Shadbolt Group
Clients address: 18 Bewick Road
Gateshead
Tyne & Wear
NE8 4DP

Samples received: 03 November 2020
Analysis started: 03 November 2020
Analysis completed: 10 November 2020
Report issued: 10 November 2020

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing

Approved by:

John Campbell
Director

Chemtech Environmental Limited

WATERS

Lab number			90765-1	90765-2	90765-3
Sample id			BH01	BH02	BH10
Depth (m)			-	-	-
Date sampled			03/11/2020	03/11/2020	03/11/2020
Time sampled			-	-	-
Test	Method	Units			
Arsenic (dissolved)	CE128 ^u	µg/l As	0.88	1.38	0.26
Boron (dissolved)	CE128 ^u	µg/l B	622	572	399
Cadmium (dissolved)	CE128 ^u	µg/l Cd	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 ^u	µg/l Cr	2.9	2.8	1.2
Copper (dissolved)	CE128 ^u	µg/l Cu	2.3	0.6	0.6
Lead (dissolved)	CE128 ^u	µg/l Pb	<0.2	<0.2	<0.2
Mercury (dissolved)	CE128 ^u	µg/l Hg	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 ^u	µg/l Ni	5.4	9.2	2.0
Selenium (dissolved)	CE128 ^u	µg/l Se	5.93	1.24	0.95
Zinc (dissolved)	CE128 ^u	µg/l Zn	11	9	7
pH	CE213 ^u	units	7.3	7.2	7.3
Ammonia	CE012 ^u	µg/l N	311	79	47
Sulphate	CE049 ^u	mg/l SO ₄	504	239	262
Sulphur (dissolved)	CE128 ^u	mg/l S	133.5	85.7	93.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20
PAH					
Naphthalene	CE051	µg/l	<0.1	<0.1	0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	0.3	<0.1	0.2
Anthracene	CE051	µg/l	0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	0.3	0.2	0.3
Pyrene	CE051	µg/l	0.2	0.2	0.2
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	0.2
Chrysene	CE051	µg/l	<0.1	<0.1	0.2
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	0.2
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	0.4
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	1.8
BTEX & TPH					
MTBE	CE057 ^u	µg/l	<2	<2	<2
Benzene	CE057 ^u	µg/l	<1	<1	<1
Toluene	CE057 ^u	µg/l	<1	<1	<1
Ethylbenzene	CE057 ^u	µg/l	<1	<1	<1
m & p-Xylene	CE057 ^u	µg/l	<2	<2	<2
o-Xylene	CE057 ^u	µg/l	<1	<1	<1

Chemtech Environmental Limited

WATERS

Lab number			90765-1	90765-2	90765-3
Sample id			BH01	BH02	BH10
Depth (m)			-	-	-
Date sampled			03/11/2020	03/11/2020	03/11/2020
Time sampled			-	-	-
Test	Method	Units			
VPH Aromatic (>EC5-EC7)	CE175	µg/l	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE175	µg/l	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE175	µg/l	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE175	µg/l	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE175	µg/l	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE175	µg/l	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	1	2
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	2	2
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	<1	<1
EPH (>C10-C40)	CE052	µg/l	<10	<10	<10
Volatiles					
Dichlorodifluoromethane	CE066	µg/l	<1	<1	<1
Chloromethane	CE066	µg/l	<1	<1	<1
Vinyl chloride	CE066	µg/l	<1	<1	<1
Bromomethane	CE066	µg/l	<3	<3	<3
Chloroethane	CE066	µg/l	<1	<1	<1
Trichlorofluoromethane	CE066	µg/l	<1	<1	<1
1,1-Dichloroethene	CE066	µg/l	<1	<1	<1
Trans-1,2-Dichloroethene	CE066	µg/l	<1	<1	<1
1,1-Dichloroethane	CE066	µg/l	<1	<1	<1
2,2-Dichloropropane	CE066	µg/l	<1	<1	<1
Cis-1,2-Dichloroethene	CE066	µg/l	<1	<1	<1
Bromochloromethane	CE066	µg/l	<1	<1	<1
Chloroform	CE066	µg/l	<1	<1	<1
1,1,1-Trichloroethane	CE066	µg/l	<1	<1	<1
Carbon tetrachloride	CE066	µg/l	<1	<1	<1
1,1-Dichloro-1-propene	CE066	µg/l	<1	<1	<1
1,2-Dichloroethane	CE066	µg/l	<1	<1	<1
Trichloroethene	CE066	µg/l	<1	<1	<1
1,2-Dichloropropane	CE066	µg/l	<1	<1	<1
Dibromomethane	CE066	µg/l	<1	<1	<1
Bromodichloromethane	CE066	µg/l	<1	<1	<1
cis-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1	<1
trans-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1	<1

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WATERS

Lab number			90765-1	90765-2	90765-3
Sample id			BH01	BH02	BH10
Depth (m)			-	-	-
Date sampled			03/11/2020	03/11/2020	03/11/2020
Time sampled			-	-	-
Test	Method	Units			
1,1,2-Trichloroethane	CE066	µg/l	<1	<1	<1
Tetrachloroethene	CE066	µg/l	<1	<1	<1
1,3-Dichloropropane	CE066	µg/l	<1	<1	<1
Dibromochloromethane	CE066	µg/l	<1	<1	<1
1,2-Dibromoethane	CE066	µg/l	<1	<1	<1
Chlorobenzene	CE066	µg/l	<1	<1	<1
1,1,1,2-Tetrachloroethane	CE066	µg/l	<1	<1	<1
Styrene	CE066	µg/l	<1	<1	<1
Tribromomethane	CE066	µg/l	<1	<1	<1
Isopropylbenzene	CE066	µg/l	<1	<1	<1
Bromobenzene	CE066	µg/l	<1	<1	<1
1,1,2,2-Tetrachloroethane	CE066	µg/l	<1	<1	<1
1,2,3-Trichloropropane	CE066	µg/l	<1	<1	<1
Propylbenzene	CE066	µg/l	<1	<1	<1
2-Chlorotoluene	CE066	µg/l	<1	<1	<1
4-Chlorotoluene	CE066	µg/l	<1	<1	<1
1,3,5-Trimethylbenzene	CE066	µg/l	<1	<1	<1
tert-Butylbenzene	CE066	µg/l	<1	<1	<1
1,2,4-Trimethylbenzene	CE066	µg/l	<1	<1	<1
sec-Butylbenzene	CE066	µg/l	<1	<1	<1
1,3-Dichlorobenzene	CE066	µg/l	<1	<1	<1
4-Isopropyltoluene	CE066	µg/l	<1	<1	<1
1,4-Dichlorobenzene	CE066	µg/l	<1	<1	<1
1,2-Dichlorobenzene	CE066	µg/l	<1	<1	<1
Butylbenzene	CE066	µg/l	<1	<1	<1
1,2-Dibromo-3-chloropropane	CE066	µg/l	<1	<1	<1
1,2,4-Trichlorobenzene	CE066	µg/l	<1	<1	<1
Hexachloro-1,3-butadiene	CE066	µg/l	<1	<1	<1
1,2,3-Trichlorobenzene	CE066	µg/l	<1	<1	<1

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METHOD DETAILS

METHOD	WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE012	Ammonia	Colorimetry	U	10	µg/l N
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO ₄
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE057	MTBE	Headspace GC-FID	U	2	µg/l
CE057	Benzene	Headspace GC-FID	U	1	µg/l
CE057	Toluene	Headspace GC-FID	U	1	µg/l
CE057	Ethylbenzene	Headspace GC-FID	U	1	µg/l
CE057	m & p-Xylene	Headspace GC-FID	U	2	µg/l
CE057	o-Xylene	Headspace GC-FID	U	1	µg/l
CE175	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE161	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE161	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID		1	µg/l
CE175	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE161	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID		1	µg/l
CE052	EPH (>C10-C40)	Solvent extraction, GC-FID		10	µg/l
CE066	Dichlorodifluoromethane	Headspace GC-MS		1	µg/l
CE066	Chloromethane	Headspace GC-MS		1	µg/l
CE066	Vinyl chloride	Headspace GC-MS		1	µg/l
CE066	Bromomethane	Headspace GC-MS		3	µg/l
CE066	Chloroethane	Headspace GC-MS		1	µg/l
CE066	Trichlorofluoromethane	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Trans-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	2,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Cis-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Bromochloromethane	Headspace GC-MS		1	µg/l
CE066	Chloroform	Headspace GC-MS		1	µg/l
CE066	1,1,1-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Carbon tetrachloride	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	Trichloroethene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromomethane	Headspace GC-MS		1	µg/l
CE066	Bromodichloromethane	Headspace GC-MS		1	µg/l
CE066	cis-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	trans-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,1,2-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Tetrachloroethene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromochloromethane	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromoethane	Headspace GC-MS		1	µg/l
CE066	Chlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,1,1,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	Styrene	Headspace GC-MS		1	µg/l
CE066	Tribromomethane	Headspace GC-MS		1	µg/l
CE066	Isopropylbenzene	Headspace GC-MS		1	µg/l
CE066	Bromobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE066	1,1,2,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichloropropane	Headspace GC-MS		1	µg/l
CE066	Propylbenzene	Headspace GC-MS		1	µg/l
CE066	2-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	4-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	1,3,5-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	tert-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	sec-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	4-Isopropyltoluene	Headspace GC-MS		1	µg/l
CE066	1,4-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromo-3-chloropropane	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Hexachloro-1,3-butadiene	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichlorobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
90765-1	BH01	-	N	
90765-2	BH02	-	N	
90765-3	BH10	-	N	



ANALYTICAL TEST REPORT

Contract no: 103880

Contract name: Houghton (Colliery)

Client reference: 2585

Clients name: Shadbolt Group Ltd

Clients address: 18 Bewick Road
Gateshead
Tyne and Wear
NE8 4DP

Samples received: 16 December 2021

Analysis started: 16 December 2021

Analysis completed: 23 December 2021

Report issued: 23 December 2021

Key

- U UKAS accredited test
- M MCERTS & UKAS accredited test
- \$ Test carried out by an approved subcontractor
- I/S Insufficient sample to carry out test
- N/S Sample not suitable for testing

Approved by:

A handwritten signature in black ink, appearing to read 'R. Burton', written over a horizontal line.

Rachael Burton

Reporting Team Lead

Chemtech Environmental Limited

GROUNDWATERS

Lab number			103880-1	103880-2	103880-3	103880-4	103880-5
Sample id			BH01	BH02	BH03	BH04	BH10
Depth (m)			-	-	-	-	-
Date sampled			15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
Time sampled			12:00	13:00	13:30	14:00	15:00
Test	Method	Units					
Arsenic (dissolved)	CE128 ^u	µg/l As	0.52	2.65	0.66	1.54	0.60
Boron (dissolved)	CE128 ^u	µg/l B	653	565	301	1024	548
Cadmium (dissolved)	CE128 ^u	µg/l Cd	0.08	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 ^u	µg/l Cr	0.6	0.4	0.3	0.9	0.4
Copper (dissolved)	CE128 ^u	µg/l Cu	1.2	<0.4	<0.4	<0.4	0.8
Lead (dissolved)	CE128 ^u	µg/l Pb	0.5	0.4	0.2	<0.2	<0.2
Mercury (dissolved)	CE128 ^u	µg/l Hg	<0.008	<0.008	<0.008	<0.008	<0.008
Nickel (dissolved)	CE128 ^u	µg/l Ni	5.9	6.1	3.7	7.1	5.3
Selenium (dissolved)	CE128 ^u	µg/l Se	13.29	1.19	5.65	43.90	15.37
Zinc (dissolved)	CE128 ^u	µg/l Zn	10	3	2	3	4
pH	CE213 ^u	units	7.4	7.4	7.5	7.4	7.3
Ammonia	CE012 ^u	µg/l N	864	231	151	162	133
Sulphate	CE049 ^u	mg/l SO ₄	259	137	199	891	21
Sulphur (dissolved)	CE128 ^u	mg/l S	92.3	42.3	79.4	343.5	113.1
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20
PAH							
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6
TPH							
VPH Aromatic (>EC5-EC7)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aromatic (>EC7-EC8)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aromatic (>EC8-EC10)	CE175	µg/l	<1	<1	<1	<1	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	<1	<1	<1

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GROUNDWATERS

Lab number			103880-1	103880-2	103880-3	103880-4	103880-5
Sample id			BH01	BH02	BH03	BH04	BH10
Depth (m)			-	-	-	-	-
Date sampled			15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
Time sampled			12:00	13:00	13:30	14:00	15:00
Test	Method	Units					
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	<1	<1	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aliphatic (>C6-C8)	CE175	µg/l	<1	<1	<1	<1	<1
VPH Aliphatic (>C8-C10)	CE175	µg/l	<1	<1	<1	<1	<1
EPH Aliphatic (>C10-C12)	CE161	µg/l	20	11	<1	6	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	49	45	11	13	1
EPH Aliphatic (>C16-C35)	CE161	µg/l	<1	217	12	51	<1
EPH Aliphatic (>C35-C44)	CE161	µg/l	<1	75	<1	<1	<1
EPH (>C10-C40)	CE052	µg/l	35	319	30	71	<10
Volatiles							
MTBE	CE057 ^u	µg/l	<2	<2	<2	<2	<2
Benzene	CE057 ^u	µg/l	<1	<1	<1	<1	<1
Toluene	CE057 ^u	µg/l	<1	<1	<1	<1	<1
Ethylbenzene	CE057 ^u	µg/l	<1	<1	<1	<1	<1
m & p-Xylene	CE057 ^u	µg/l	<2	<2	<2	<2	<2
o-Xylene	CE057 ^u	µg/l	<1	<1	<1	<1	<1
Dichlorodifluoromethane	CE066	µg/l	<1	<1	<1	<1	<1
Chloromethane	CE066	µg/l	<1	<1	<1	<1	<1
Vinyl chloride	CE066	µg/l	<1	<1	<1	<1	<1
Bromomethane	CE066	µg/l	<1	<1	<1	<1	<1
Chloroethane	CE066	µg/l	<1	<1	<1	<1	<1
Trichlorofluoromethane	CE066	µg/l	<1	<1	<1	<1	<1
1,1-Dichloroethene	CE066	µg/l	<1	<1	<1	<1	<1
Trans-1,2-Dichloroethene	CE066	µg/l	<1	<1	<1	<1	<1
1,1-Dichloroethane	CE066	µg/l	<1	<1	<1	<1	<1
2,2-Dichloropropane	CE066	µg/l	<1	<1	<1	<1	<1
Cis-1,2-Dichloroethene	CE066	µg/l	<1	<1	<1	<1	<1
Bromochloromethane	CE066	µg/l	<1	<1	<1	<1	<1
Chloroform	CE066	µg/l	<1	<1	<1	<1	<1
1,1,1-Trichloroethane	CE066	µg/l	<1	<1	<1	<1	<1
Carbon tetrachloride	CE066	µg/l	<1	<1	<1	<1	<1
1,1-Dichloro-1-propene	CE066	µg/l	<1	<1	<1	<1	<1
1,2-Dichloroethane	CE066	µg/l	<1	<1	<1	<1	<1
Trichloroethene	CE066	µg/l	<1	<1	<1	<1	<1
1,2-Dichloropropane	CE066	µg/l	<1	<1	<1	<1	<1
Dibromomethane	CE066	µg/l	<1	<1	<1	<1	<1
Bromodichloromethane	CE066	µg/l	<1	<1	<1	<1	<1
cis-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1	<1	<1	<1
trans-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1	<1	<1	<1

Chemtech Environmental Limited

GROUNDWATERS

Lab number			103880-1	103880-2	103880-3	103880-4	103880-5
Sample id			BH01	BH02	BH03	BH04	BH10
Depth (m)			-	-	-	-	-
Date sampled			15/12/2021	15/12/2021	15/12/2021	15/12/2021	15/12/2021
Time sampled			12:00	13:00	13:30	14:00	15:00
Test	Method	Units					
1,1,2-Trichloroethane	CE066	µg/l	<1	<1	<1	<1	<1
Tetrachloroethene	CE066	µg/l	<1	<1	<1	<1	<1
1,3-Dichloropropane	CE066	µg/l	<1	<1	<1	<1	<1
Dibromochloromethane	CE066	µg/l	<1	<1	<1	<1	<1
1,2-Dibromoethane	CE066	µg/l	<1	<1	<1	<1	<1
Chlorobenzene	CE066	µg/l	<1	<1	<1	<1	<1
1,1,1,2-Tetrachloroethane	CE066	µg/l	<1	<1	<1	<1	<1
Ethylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
Tribromomethane	CE066	µg/l	<1	<1	<1	<1	<1
Isopropylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
Bromobenzene	CE066	µg/l	<1	<1	<1	<1	<1
1,1,2,2-Tetrachloroethane	CE066	µg/l	<1	<1	<1	<1	<1
1,2,3-Trichloropropane	CE066	µg/l	<1	<1	<1	<1	<1
Propylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
2-Chlorotoluene	CE066	µg/l	<1	<1	<1	<1	<1
4-Chlorotoluene	CE066	µg/l	<1	<1	<1	<1	<1
1,3,5-Trimethylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
tert-Butylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
1,2,4-Trimethylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
sec-Butylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	CE066	µg/l	<1	<1	<1	<1	<1
4-Isopropyltoluene	CE066	µg/l	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	CE066	µg/l	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	CE066	µg/l	<1	<1	<1	<1	<1
Butylbenzene	CE066	µg/l	<1	<1	<1	<1	<1
1,2-Dibromo-3-chloropropane	CE066	µg/l	<1	<1	<1	<1	<1
1,2,4-Trichlorobenzene	CE066	µg/l	<1	<1	<1	<1	<1
Hexachloro-1,3-butadiene	CE066	µg/l	<1	<1	<1	<1	<1
1,2,3-Trichlorobenzene	CE066	µg/l	<1	<1	<1	<1	<1

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METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE012	Ammonia	Colorimetry	U	10	µg/l N
CE049	Sulphate	Ion Chromatography	U	1.7	mg/l SO ₄
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE175	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE161	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID		1	µg/l
CE175	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE161	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE161	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID		1	µg/l
CE052	EPH (>C10-C40)	Solvent extraction, GC-FID		10	µg/l
CE057	MTBE	Headspace GC-FID	U	2	µg/l
CE057	Benzene	Headspace GC-FID	U	1	µg/l
CE057	Toluene	Headspace GC-FID	U	1	µg/l
CE057	Ethylbenzene	Headspace GC-FID	U	1	µg/l
CE057	m & p-Xylene	Headspace GC-FID	U	2	µg/l
CE057	o-Xylene	Headspace GC-FID	U	1	µg/l
CE066	Dichlorodifluoromethane	Headspace GC-MS		1	µg/l
CE066	Chloromethane	Headspace GC-MS		1	µg/l
CE066	Vinyl chloride	Headspace GC-MS		1	µg/l
CE066	Bromomethane	Headspace GC-MS		3	µg/l
CE066	Chloroethane	Headspace GC-MS		1	µg/l
CE066	Trichlorofluoromethane	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Trans-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	2,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Cis-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Bromochloromethane	Headspace GC-MS		1	µg/l
CE066	Chloroform	Headspace GC-MS		1	µg/l
CE066	1,1,1-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Carbon tetrachloride	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	Trichloroethene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromomethane	Headspace GC-MS		1	µg/l
CE066	Bromodichloromethane	Headspace GC-MS		1	µg/l
CE066	cis-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	trans-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,1,2-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Tetrachloroethene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromochloromethane	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromoethane	Headspace GC-MS		1	µg/l
CE066	Chlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,1,1,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	Styrene	Headspace GC-MS		1	µg/l
CE066	Tribromomethane	Headspace GC-MS		1	µg/l
CE066	Isopropylbenzene	Headspace GC-MS		1	µg/l
CE066	Bromobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	GROUNDWATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE066	1,1,2,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichloropropane	Headspace GC-MS		1	µg/l
CE066	Propylbenzene	Headspace GC-MS		1	µg/l
CE066	2-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	4-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	1,3,5-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	tert-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	sec-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	4-Isopropyltoluene	Headspace GC-MS		1	µg/l
CE066	1,4-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromo-3-chloropropane	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Hexachloro-1,3-butadiene	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichlorobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
103880-1	BH01	-	N	-
103880-2	BH02	-	N	-
103880-3	BH03	-	N	-
103880-4	BH04	-	N	-
103880-5	BH10	-	N	-

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ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.



ANALYTICAL TEST REPORT

Contract no: 104157

Contract name: Houghton (Colliery)

Client reference: 2585

Clients name: Shadbolt Group

Clients address: 18 Bewick Road
Gateshead
Tyne & Wear
NE8 4DP

Samples received: 22 December 2021

Analysis started: 22 December 2021

Analysis completed: 10 January 2022

Report issued: 10 January 2022

Key

- U UKAS accredited test
- M MCERTS & UKAS accredited test
- \$ Test carried out by an approved subcontractor
- I/S Insufficient sample to carry out test
- N/S Sample not suitable for testing

Approved by:

A handwritten signature in black ink, appearing to read 'R. Burton', written over a horizontal line.

Rachael Burton

Reporting Team Lead

Chemtech Environmental Limited

SURFACE WATERS

Lab number			104157-1	104157-2	104157-3	104157-4	104157-5
Sample id			BH01	BH02	BH03	BH04	BH10
Depth (m)			-	-	-	-	-
Date sampled			21/12/2021	21/12/2021	21/12/2021	21/12/2021	21/12/2021
Time sampled			16:00	16:01	16:02	16:03	16:04
Test	Method	Units					
Arsenic (dissolved)	CE128 ^u	µg/l As	0.81	0.89	1.46	1.77	0.79
Boron (dissolved)	CE128 ^u	µg/l B	623	606	1207	2093	699
Cadmium (dissolved)	CE128 ^u	µg/l Cd	<0.07	<0.07	<0.07	<0.07	<0.07
Chromium (dissolved)	CE128 ^u	µg/l Cr	1.2	0.6	3.9	1.7	0.9
Copper (dissolved)	CE128 ^u	µg/l Cu	2.6	3.4	3.3	1.1	2.7
Lead (dissolved)	CE128 ^u	µg/l Pb	<0.2	<0.2	1.0	0.2	<0.2
Mercury (dissolved)	CE128 ^u	µg/l Hg	0.019	0.015	0.028	0.010	0.013
Nickel (dissolved)	CE128 ^u	µg/l Ni	7.3	4.4	31.0	6.0	4.4
Selenium (dissolved)	CE128 ^u	µg/l Se	15.86	2.73	16.13	53.43	13.33
Zinc (dissolved)	CE128 ^u	µg/l Zn	11	11	49	4	4
pH	CE213 ^u	units	7.8	7.6	8.0	7.8	7.5
Ammonia	CE012 ^u	µg/l N	123	83	140	149	108
Sulphate	CE049	mg/l SO ₄	262	182	185	I/S	284
Sulphur (dissolved)	CE128 ^u	mg/l S	81.6	54.7	143.4	351.4	87.3
Cyanide (total)	CE147	µg/l CN	<20	<20	<20	<20	<20
PAH							
Naphthalene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(k)fluoranthene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Indeno(123cd)pyrene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenz(ah)anthracene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(ghi)perylene	CE051	µg/l	<0.1	<0.1	<0.1	<0.1	<0.1
PAH (total of USEPA 16)	CE051	µg/l	<1.6	<1.6	<1.6	<1.6	<1.6
BTEX & TPH							
Benzene	CE057 ^u	µg/l	<1	<1	I/S	I/S	<1
Toluene	CE057 ^u	µg/l	<1	<1	I/S	I/S	<1
Ethylbenzene	CE057 ^u	µg/l	<1	<1	I/S	I/S	<1
m & p-Xylene	CE057 ^u	µg/l	<2	<2	I/S	I/S	<2
o-Xylene	CE057 ^u	µg/l	<1	<1	I/S	I/S	<1

Chemtech Environmental Limited

SURFACE WATERS

Lab number			104157-1	104157-2	104157-3	104157-4	104157-5
Sample id			BH01	BH02	BH03	BH04	BH10
Depth (m)			-	-	-	-	-
Date sampled			21/12/2021	21/12/2021	21/12/2021	21/12/2021	21/12/2021
Time sampled			16:00	16:01	16:02	16:03	16:04
Test	Method	Units					
VPH Aromatic (>EC5-EC7)	CE175	µg/l	<1	<1	I/S	I/S	<1
VPH Aromatic (>EC7-EC8)	CE175	µg/l	<1	<1	I/S	I/S	<1
VPH Aromatic (>EC8-EC10)	CE175	µg/l	<1	<1	I/S	I/S	<1
EPH Aromatic (>EC10-EC12)	CE161	µg/l	<1	<1	I/S	I/S	<1
EPH Aromatic (>EC12-EC16)	CE161	µg/l	<1	<1	I/S	I/S	<1
EPH Aromatic (>EC16-EC21)	CE161	µg/l	<1	<1	I/S	I/S	<1
EPH Aromatic (>EC21-EC35)	CE161	µg/l	<1	<1	I/S	I/S	<1
EPH Aromatic (>EC35-EC44)	CE161	µg/l	<1	<1	I/S	I/S	<1
VPH Aliphatic (>C5-C6)	CE175	µg/l	<1	<1	I/S	I/S	<1
VPH Aliphatic (>C6-C8)	CE175	µg/l	<1	<1	I/S	I/S	<1
VPH Aliphatic (>C8-C10)	CE175	µg/l	4	<1	I/S	I/S	6
EPH Aliphatic (>C10-C12)	CE161	µg/l	<1	<1	I/S	I/S	<1
EPH Aliphatic (>C12-C16)	CE161	µg/l	<1	<1	I/S	I/S	<1
EPH Aliphatic (>C16-C35)	CE161	µg/l	84	112	I/S	I/S	25
EPH Aliphatic (>C35-C44)	CE161	µg/l	21	26	I/S	I/S	31
Volatiles							
Dichlorodifluoromethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Chloromethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Vinyl chloride	CE066	µg/l	<1	<1	I/S	I/S	<1
Bromomethane	CE066	µg/l	<3	<3	I/S	I/S	<3
Chloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Trichlorofluoromethane	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1-Dichloroethene	CE066	µg/l	<1	<1	I/S	I/S	<1
Trans-1,2-Dichloroethene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1-Dichloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1
2,2-Dichloropropane	CE066	µg/l	<1	<1	I/S	I/S	<1
Cis-1,2-Dichloroethene	CE066	µg/l	<1	<1	I/S	I/S	<1
Bromochloromethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Chloroform	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1,1-Trichloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Carbon tetrachloride	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1-Dichloro-1-propene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2-Dichloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Trichloroethene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2-Dichloropropane	CE066	µg/l	<1	<1	I/S	I/S	<1
Dibromomethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Bromodichloromethane	CE066	µg/l	<1	<1	I/S	I/S	<1
cis-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1	I/S	I/S	<1
trans-1,3-Dichloro-1-propene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1,2-Trichloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1

Chemtech Environmental Limited

SURFACE WATERS

Lab number			104157-1	104157-2	104157-3	104157-4	104157-5
Sample id			BH01	BH02	BH03	BH04	BH10
Depth (m)			-	-	-	-	-
Date sampled			21/12/2021	21/12/2021	21/12/2021	21/12/2021	21/12/2021
Time sampled			16:00	16:01	16:02	16:03	16:04
Test	Method	Units					
Tetrachloroethene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,3-Dichloropropane	CE066	µg/l	<1	<1	I/S	I/S	<1
Dibromochloromethane	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2-Dibromoethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Chlorobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1,1,2-Tetrachloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Styrene	CE066	µg/l	<1	<1	I/S	I/S	<1
Tribromomethane	CE066	µg/l	<1	<1	I/S	I/S	<1
Isopropylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
Bromobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,1,1,2-Tetrachloroethane	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2,3-Trichloropropane	CE066	µg/l	<1	<1	I/S	I/S	<1
Propylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
2-Chlorotoluene	CE066	µg/l	<1	<1	I/S	I/S	<1
4-Chlorotoluene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,3,5-Trimethylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
tert-Butylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2,4-Trimethylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
sec-Butylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,3-Dichlorobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
4-Isopropyltoluene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,4-Dichlorobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2-Dichlorobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
Butylbenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2-Dibromo-3-chloropropane	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2,4-Trichlorobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1
Hexachloro-1,3-butadiene	CE066	µg/l	<1	<1	I/S	I/S	<1
1,2,3-Trichlorobenzene	CE066	µg/l	<1	<1	I/S	I/S	<1

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SURFACE WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE128	Arsenic (dissolved)	ICP-MS	U	0.06	µg/l As
CE128	Boron (dissolved)	ICP-MS	U	8	µg/l B
CE128	Cadmium (dissolved)	ICP-MS	U	0.07	µg/l Cd
CE128	Chromium (dissolved)	ICP-MS	U	0.2	µg/l Cr
CE128	Copper (dissolved)	ICP-MS	U	0.4	µg/l Cu
CE128	Lead (dissolved)	ICP-MS	U	0.2	µg/l Pb
CE128	Mercury (dissolved)	ICP-MS	U	0.008	µg/l Hg
CE128	Nickel (dissolved)	ICP-MS	U	0.5	µg/l Ni
CE128	Selenium (dissolved)	ICP-MS	U	0.07	µg/l Se
CE128	Zinc (dissolved)	ICP-MS	U	1	µg/l Zn
CE213	pH	Based on BS 1377, pH Meter	U	-	units
CE012	Ammonia	Colorimetry	U	10	µg/l N
CE049	Sulphate	Ion Chromatography		1.7	mg/l SO ₄
CE128	Sulphur (dissolved)	ICP-MS	U	0.2	mg/l S
CE147	Cyanide (total)	Continuous Flow Colorimetry		20	µg/l CN
CE051	Naphthalene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Acenaphthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluorene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Phenanthrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Chrysene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(b)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(k)fluoranthene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(a)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Indeno(123cd)pyrene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Dibenz(ah)anthracene	Solvent extraction, GC-MS		0.1	µg/l
CE051	Benzo(ghi)perylene	Solvent extraction, GC-MS		0.1	µg/l
CE051	PAH (total of USEPA 16)	Solvent extraction, GC-MS		1.6	µg/l
CE057	Benzene	Headspace GC-FID	U	1	µg/l
CE057	Toluene	Headspace GC-FID	U	1	µg/l
CE057	Ethylbenzene	Headspace GC-FID	U	1	µg/l
CE057	m & p-Xylene	Headspace GC-FID	U	2	µg/l
CE057	o-Xylene	Headspace GC-FID	U	1	µg/l
CE175	VPH Aromatic (>EC5-EC7)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC7-EC8)	Headspace GC-FID		1	µg/l
CE175	VPH Aromatic (>EC8-EC10)	Headspace GC-FID		1	µg/l
CE161	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SURFACE WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE161	EPH Aromatic (>EC35-EC44)	Solvent extraction, GC-FID		1	µg/l
CE175	VPH Aliphatic (>C5-C6)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C6-C8)	Headspace GC-FID		1	µg/l
CE175	VPH Aliphatic (>C8-C10)	Headspace GC-FID		1	µg/l
CE161	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID		1	µg/l
CE161	EPH Aliphatic (>C35-C44)	Solvent extraction, GC-FID		1	µg/l
CE066	Dichlorodifluoromethane	Headspace GC-MS		1	µg/l
CE066	Chloromethane	Headspace GC-MS		1	µg/l
CE066	Vinyl chloride	Headspace GC-MS		1	µg/l
CE066	Bromomethane	Headspace GC-MS		3	µg/l
CE066	Chloroethane	Headspace GC-MS		1	µg/l
CE066	Trichlorofluoromethane	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Trans-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	2,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Cis-1,2-Dichloroethene	Headspace GC-MS		1	µg/l
CE066	Bromochloromethane	Headspace GC-MS		1	µg/l
CE066	Chloroform	Headspace GC-MS		1	µg/l
CE066	1,1,1-Trichloroethane	Headspace GC-MS		1	µg/l
CE066	Carbon tetrachloride	Headspace GC-MS		1	µg/l
CE066	1,1-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloroethane	Headspace GC-MS		1	µg/l
CE066	Trichloroethene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromomethane	Headspace GC-MS		1	µg/l
CE066	Bromodichloromethane	Headspace GC-MS		1	µg/l
CE066	cis-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	trans-1,3-Dichloro-1-propene	Headspace GC-MS		1	µg/l
CE066	1,1,1,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	Tetrachloroethene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichloropropane	Headspace GC-MS		1	µg/l
CE066	Dibromochloromethane	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromoethane	Headspace GC-MS		1	µg/l
CE066	Chlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,1,1,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	Styrene	Headspace GC-MS		1	µg/l
CE066	Tribromomethane	Headspace GC-MS		1	µg/l
CE066	Isopropylbenzene	Headspace GC-MS		1	µg/l
CE066	Bromobenzene	Headspace GC-MS		1	µg/l
CE066	1,1,1,2,2-Tetrachloroethane	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichloropropane	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

METHOD DETAILS

METHOD	SURFACE WATERS	METHOD SUMMARY	STATUS	LOD	UNITS
CE066	Propylbenzene	Headspace GC-MS		1	µg/l
CE066	2-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	4-Chlorotoluene	Headspace GC-MS		1	µg/l
CE066	1,3,5-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	tert-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trimethylbenzene	Headspace GC-MS		1	µg/l
CE066	sec-Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,3-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	4-Isopropyltoluene	Headspace GC-MS		1	µg/l
CE066	1,4-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Butylbenzene	Headspace GC-MS		1	µg/l
CE066	1,2-Dibromo-3-chloropropane	Headspace GC-MS		1	µg/l
CE066	1,2,4-Trichlorobenzene	Headspace GC-MS		1	µg/l
CE066	Hexachloro-1,3-butadiene	Headspace GC-MS		1	µg/l
CE066	1,2,3-Trichlorobenzene	Headspace GC-MS		1	µg/l

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
104157-1	BH01	-	N	
104157-2	BH02	-	N	
104157-3	BH03	-	Y	Ammonia (EHT), Cyanide (NCF, IC)
104157-4	BH04	-	Y	Ammonia (EHT), Cyanide (NCF, IC)
104157-5	BH10	-	N	

Chemtech Environmental Limited

ADDITIONAL INFORMATION

Notes

Opinions and interpretations expressed herein are outside the UKAS accreditation scope.

Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.

All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.

Methods, procedures and performance data are available on request.

Results reported herein relate only to the material supplied to the laboratory.

This report shall not be reproduced except in full, without prior written approval.

Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

BTEX compounds are identified by retention time only and may include interference from co-eluting compounds.



DETS

Certificate of Analysis

Certificate Number 22-08745

Issued: 18-May-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-08745

Client Reference (not supplied)

Order No 2585

Contract Title 2585 Houghton Colliery

Description 11 Soil samples.

Date Received 09-May-22

Date Started 09-May-22

Date Completed 18-May-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
.Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Preparation										
Stones >20mm	DETSC 1003*	1	% m/m	16	29	24	33	37	21	< 1.0
Moisture Content	DETSC 1004	0.1	%	8.7	9.4	17	12	11	13	3.5
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	7.2	4.2	26	4.0	11	13	3.0
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.4	0.5	0.8	0.6	1.6	1.2	0.8
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.3	2.8	0.2	0.4	0.8	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	21	18	15	5.5	16	5.0	3.7
Copper	DETSC 2301#	0.2	mg/kg	32	13	200	24	67	54	13
Lead	DETSC 2301#	0.3	mg/kg	38	51	540	45	100	110	22
Mercury	DETSC 2325#	0.05	mg/kg	0.08	< 0.05	0.55	0.07	0.14	0.10	< 0.05
Nickel	DETSC 2301#	1	mg/kg	27	22	48	15	32	17	9.7
Selenium	DETSC 2301#	0.5	mg/kg	0.7	< 0.5	0.8	0.6	0.7	1.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	110	61	610	37	120	160	9.5
Inorganics										
pH	DETSC 2008#		pH	8.1	8.9	7.8	8.6	8.6	7.8	8.6
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	4.4	0.3	14	1.4	8.0	23	0.1
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	32	46	78	150	100	72	65

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
.Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units								
Petroleum Hydrocarbons											
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	
Aliphatic >EC10-EC12	DETSC 3521#	1.5	mg/kg								
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	2.8	< 1.2	< 1.2	< 1.2	
Aliphatic >EC12-EC16	DETSC 3521#	1.2	mg/kg								
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	11	< 1.5	< 1.5	< 1.5	
Aliphatic >EC16-EC21	DETSC 3521#	1.5	mg/kg								
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	38	< 3.4	< 3.4	< 3.4	
Aliphatic >EC21-EC35	DETSC 3521#	3.4	mg/kg								
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	51	< 10	< 10	< 10	
Aliphatic C5-C35	DETSC 3521*	10	mg/kg								
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	
Aromatic >EC10-EC12	DETSC 3521#	0.9	mg/kg								
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	
Aromatic >EC12-EC16	DETSC 3521#	0.5	mg/kg								
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	
Aromatic >EC16-EC21	DETSC 3521#	0.6	mg/kg								
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	
Aromatic >EC21-EC35	DETSC 3521#	1.4	mg/kg								
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10	< 10	
Aromatic C5-C35	DETSC 3521*	10	mg/kg								
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	51	< 10	< 10	< 10	
TPH Ali/Aro Total C5-C35	DETSC 3521*	10	mg/kg								
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	96	< 10	48	95	< 10	
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	0.04	< 0.03	0.05	< 0.03	< 0.03	0.13	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	0.32	< 0.03	0.08	0.27	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	0.07	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	0.44	< 0.03	0.07	0.07	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	0.07	< 0.03	0.38	< 0.03	0.06	0.06	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	0.20	< 0.03	0.05	0.04	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.29	< 0.03	0.15	0.07	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.05	< 0.03	0.41	< 0.03	0.17	0.05	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.13	< 0.03	0.06	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.26	< 0.03	0.12	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.11	< 0.03	0.04	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.11	< 0.03	0.05	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	0.38	< 0.10	2.8	< 0.10	< 0.76	0.69	< 0.10

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
.Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units								
VOCs											
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	

Summary of Chemical Analysis Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
.Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
.Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
SVOCs										
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	0.2	< 0.1	0.3	< 0.1	0.1	1.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	0.2	< 0.1	< 0.1	0.4	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1



Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006194	2006195	2006196	2006197	2006198	2006199	2006200
.Sample ID	TP-301	TP-302	TP-303	TP-304	TP-305	TP-307	TP-307
Depth	1.00-1.20	2.50	2.00-3.00	3.20-3.50	3.50	1.20-1.30	3.70
Other ID							
Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
.Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Preparation							
Stones >20mm	DETSC 1003*	1	% m/m	38	19	21	24
Moisture Content	DETSC 1004	0.1	%	10	20	9.6	16
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	9.0	38	7.1	16
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.8	1.1	2.5	1.2
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	1.2	0.4	0.6
Chromium	DETSC 2301#	0.15	mg/kg	14	15	12	18
Copper	DETSC 2301#	0.2	mg/kg	35	66	39	83
Lead	DETSC 2301#	0.3	mg/kg	230	150	46	110
Mercury	DETSC 2325#	0.05	mg/kg	0.08	0.06	< 0.05	0.15
Nickel	DETSC 2301#	1	mg/kg	16	29	35	27
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	1.3	< 0.5	0.6
Zinc	DETSC 2301#	1	mg/kg	79	130	110	170
Inorganics							
pH	DETSC 2008#		pH	8.6	8.3	8.0	9.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	4.5	18	3.9	9.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	59	74	90	290

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg				
Aliphatic >EC10-EC12	DETSC 3521#	1.5	mg/kg	< 1.50	< 1.50	< 1.50	< 1.50
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg				
Aliphatic >EC12-EC16	DETSC 3521#	1.2	mg/kg	< 1.20	< 1.20	< 1.20	< 1.20
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg				
Aliphatic >EC16-EC21	DETSC 3521#	1.5	mg/kg	< 1.50	< 1.50	< 1.50	< 1.50
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg				
Aliphatic >EC21-EC35	DETSC 3521#	3.4	mg/kg	< 3.40	< 3.40	< 3.40	< 3.40
Aliphatic C5-C35	DETSC 3072*	10	mg/kg				
Aliphatic C5-C35	DETSC 3521*	10	mg/kg	< 10.00	< 10.00	< 10.00	< 10.00
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg				
Aromatic >EC10-EC12	DETSC 3521#	0.9	mg/kg	< 0.90	< 0.90	< 0.90	< 0.90
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg				
Aromatic >EC12-EC16	DETSC 3521#	0.5	mg/kg	< 0.50	< 0.50	< 0.50	< 0.50
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg				
Aromatic >EC16-EC21	DETSC 3521#	0.6	mg/kg	2.95	< 0.60	< 0.60	< 0.60
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg				
Aromatic >EC21-EC35	DETSC 3521#	1.4	mg/kg	120.8	< 1.40	< 1.40	< 1.40
Aromatic C5-C35	DETSC 3072*	10	mg/kg				
Aromatic C5-C35	DETSC 3521*	10	mg/kg	123.8	< 10.00	< 10.00	< 10.00
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg				
TPH Ali/Aro Total C5-C35	DETSC 3521*	10	mg/kg	123.8	< 10.00	< 10.00	< 10.00
EPH (C10-C40)	DETSC 3311#	10	mg/kg	130	< 10	< 10	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	0.06
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.20	< 0.03	0.05	0.25
Anthracene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03	0.04
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.37	< 0.03	< 0.03	0.21
Pyrene	DETSC 3303#	0.03	mg/kg	0.29	< 0.03	< 0.03	0.17
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.14	< 0.03	< 0.03	0.06
Chrysene	DETSC 3303	0.03	mg/kg	0.16	< 0.03	< 0.03	0.12
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.19	< 0.03	< 0.03	0.11
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.08	< 0.03	< 0.03	0.05
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.14	< 0.03	< 0.03	0.06
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	< 0.03	0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.12	< 0.03	< 0.03	0.04
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	1.9	< 0.10	< 0.10	1.1

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
.Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
VOCs							
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
.Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
.Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
SVOCs							
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	0.2	0.2	< 0.1	0.3
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	2006201	2006202	2006203	2006204
.Sample ID	TP-308	TP-309	TP-309	TP-310
Depth	3.50	1.20-1.30	4.20	3.50
Other ID				
Sample Type	SOIL	SOIL	SOIL	SOIL
Sampling Date	03/05/2022	03/05/2022	03/05/2022	03/05/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Asbestos Analysis

Soil Samples

Our Ref 22-08745

Client Ref

Contract Title 2585 Houghton Colliery

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2006194	TP-301 1.00-1.20	SOIL	NAD	none	Keith Wilson
2006195	TP-302 2.50	SOIL	NAD	none	Keith Wilson
2006196	TP-303 2.00-3.00	SOIL	NAD	none	Keith Wilson
2006197	TP-304 3.20-3.50	SOIL	NAD	none	Keith Wilson
2006198	TP-305 3.50	SOIL	NAD	none	Keith Wilson
2006199	TP-307 1.20-1.30	SOIL	NAD	none	Keith Wilson
2006200	TP-307 3.70	SOIL	NAD	none	Keith Wilson
2006201	TP-308 3.50	SOIL	NAD	none	Keith Wilson
2006202	TP-309 1.20-1.30	SOIL	NAD	none	Keith Wilson
2006203	TP-309 4.20	SOIL	NAD	none	Keith Wilson
2006204	TP-310 3.50	SOIL	NAD	none	Keith Wilson

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 22-08745
 Client Ref
 Contract 2585 Houghton Colliery

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2006194	TP-301 1.00-1.20 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006195	TP-302 2.50 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006196	TP-303 2.00-3.00 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006197	TP-304 3.20-3.50 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006198	TP-305 3.50 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006199	TP-307 1.20-1.30 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006200	TP-307 3.70 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006201	TP-308 3.50 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006202	TP-309 1.20-1.30 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006203	TP-309 4.20 SOIL	03/05/22	GJ 250ml, GJ 60ml		
2006204	TP-310 3.50 SOIL	03/05/22	GJ 250ml, GJ 60ml		

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, inappropriate containers etc 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

End of Report



Certificate of Analysis

Certificate Number 22-12615

Issued: 14-Jul-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-12615

Client Reference 2585

Order No 2585

Contract Title Houghton Le Spring

Description 6 Soil samples, 6 Leachate samples.

Date Received 04-Jul-22

Date Started 04-Jul-22

Date Completed 14-Jul-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "K. Bridgewood".

Kirk Bridgewood
General Manager



Summary of Chemical Analysis Soil Samples

Our Ref 22-12615
Client Ref 2585
Contract Title Houghton Le Spring

Lab No	2028404	2028405	2028406	2028407	2028408	2028409
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028404	2028405	2028406	2028407	2028408	2028409
Preparation									
Stones >20mm	DETSC 1003*	1	% m/m	< 1.0	8.0	< 1.0	< 1.0	< 1.0	< 1.0
Moisture Content	DETSC 1004	0.1	%	11	11	17	12	43	17
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	6.0	14	2.1	4.0	4.1	3.4
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	0.5	0.4	3.3	0.2	14	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.2	0.4	0.2	0.2	0.8	0.1
Chromium	DETSC 2301#	0.15	mg/kg	16	16	13	25	9.1	11
Copper	DETSC 2301#	0.2	mg/kg	18	74	12	27	17	8.5
Lead	DETSC 2301#	0.3	mg/kg	25	120	45	19	35	52
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	0.22	< 0.05	< 0.05	0.12	< 0.05
Nickel	DETSC 2301#	1	mg/kg	24	27	11	34	8.5	11
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.6	< 0.5	9.1	< 0.5
Zinc	DETSC 2301#	1	mg/kg	59	130	43	65	18	50
Inorganics									
pH	DETSC 2008#		pH	7.5	7.7	8.6	8.1	7.5	8.1
Cyanide, Total	DETSC 2130#	0.1	mg/kg	0.3	< 0.1	0.1	< 0.1	< 0.1	0.7
Organic matter	DETSC 2002#	0.1	%	1.1	5.2	0.6	2.6	8.5	0.6
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	1100	35	200	160	150	49
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	0.39	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	2.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	93	< 10	< 10	49	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis Soil Samples

Our Ref 22-12615
Client Ref 2585
Contract Title Houghton Le Spring

Lab No	2028404	2028405	2028406	2028407	2028408	2028409
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	0.09	< 0.03	< 0.03	< 0.03	< 0.03	
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03	
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.03	< 0.03	< 0.03	< 0.03	< 0.03	
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	0.06	< 0.03	< 0.03	< 0.03	< 0.03	
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.86	< 0.03	< 0.03	< 0.03	< 0.03	
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	0.12	< 0.03	< 0.03	< 0.03	< 0.03	
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	1.7	< 0.03	< 0.03	< 0.03	< 0.03	
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	1.5	< 0.03	< 0.03	< 0.03	< 0.03	
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.58	< 0.03	< 0.03	< 0.03	< 0.03	
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	0.67	< 0.03	< 0.03	< 0.03	< 0.03	
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.70	< 0.03	< 0.03	< 0.03	< 0.03	
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	0.21	< 0.03	< 0.03	< 0.03	< 0.03	
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.41	< 0.03	< 0.03	0.12	< 0.03	
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	0.19	< 0.03	< 0.03	< 0.03	< 0.03	
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	0.06	< 0.03	< 0.03	< 0.03	< 0.03	
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	0.23	< 0.03	< 0.03	< 0.03	< 0.03	
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	7.5	< 0.10	< 0.10	< 0.10	< 0.10	

Summary of Chemical Analysis

Soil Samples

Our Ref 22-12615
 Client Ref 2585
 Contract Title Houghton Le Spring

Lab No	2028404	2028405	2028406	2028407	2028408	2028409
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028404	2028405	2028406	2028407	2028408	2028409
VOCs									
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-12615

Client Ref 2585

Contract Title Houghton Le Spring

Lab No	2028404	2028405	2028406	2028407	2028408	2028409
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028404	2028405	2028406	2028407	2028408	2028409
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
SVOCs									
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	0.9	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	0.4	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 22-12615
Client Ref 2585
Contract Title Houghton Le Spring

Lab No	2028404	2028405	2028406	2028407	2028408	2028409
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028404	2028405	2028406	2028407	2028408	2028409
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	< 0.1	0.2	< 0.1	< 0.1	< 0.1	< 0.1



Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12615
 Client Ref 2585
 Contract Title Houghton Le Spring

Lab No	2028410	2028411	2028412	2028413	2028414	2028415
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Preparation									
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y	Y	Y	Y
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	1.1	0.72	1.0	0.37	0.50	1.6
Boron, Dissolved	DETSC 2306*	12	ug/l	43	13	110	< 12	61	23
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	< 0.03	< 0.03	< 0.03	0.05	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.81	1.3	4.6	1.0	1.3	3.2
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.9	2.4	2.0	1.3	1.4	4.8
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	1.2	7.9	0.26	2.2	9.2
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.6	1.5	2.7	1.3	1.6	3.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.38	0.30	1.2	0.47	< 0.25	0.58
Zinc, Dissolved	DETSC 2306	1.3	ug/l	< 1.3	2.2	5.0	< 1.3	1.7	11
Inorganics									
pH	DETSC 2008		pH	6.3	6.7	7.2	6.6	6.7	7.0
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Sulphate as SO4	DETSC 2055	0.1	mg/l	120	6.4	11	14	1.6	6.4
Total Organic Carbon	DETSC 2085	1	mg/l	1.5	2.6	7.3	1.6	2.3	5.4
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	1.0	1.9	2.5	< 0.1	1.7
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	1.8	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	41	19	11	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	3.4	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	44	21	17	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	1.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	6.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	24	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	34	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	77	21	18	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12615
 Client Ref 2585
 Contract Title Houghton Le Spring

Lab No	2028410	2028411	2028412	2028413	2028414	2028415
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	0.05	0.12
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.03
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	0.02
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	0.02	0.09
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
Fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01	0.01	< 0.01	< 0.01	0.14
Pyrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01	0.12
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.06
Chrysene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.06
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.13
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.03
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.06
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.05
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.99

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12615
 Client Ref 2585
 Contract Title Houghton Le Spring

Lab No	2028410	2028411	2028412	2028413	2028414	2028415
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028410	2028411	2028412	2028413	2028414	2028415
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12615

Client Ref 2585

Contract Title Houghton Le Spring

Lab No	2028410	2028411	2028412	2028413	2028414	2028415
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs									
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12615

Client Ref 2585

Contract Title Houghton Le Spring

Lab No	2028410	2028411	2028412	2028413	2028414	2028415
Sample ID	RC05	RC06	RC06	RC07	RC08	RC08
Depth	9.40-9.50	1.00-1.20	5.00-5.20	11.00-11.20	5.60-5.70	6.50-6.60
Other ID	4	3	5	3	3	4
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	27/06/2022	28/06/2022	28/06/2022	29/06/2022	30/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028410	2028411	2028412	2028413	2028414	2028415
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Asbestos Analysis Soil Samples

Our Ref 22-12615

Client Ref 2585

Contract Title Houghton Le Spring

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2028404	RC05 4 9.40-9.50	SOIL	NAD	none	Lee Kerridge
2028405	RC06 3 1.00-1.20	SOIL	Chrysotile	Chrysotile present as bundle	Lee Kerridge
2028406	RC06 5 5.00-5.20	SOIL	NAD	none	Lee Kerridge
2028407	RC07 3 11.00-11.20	SOIL	NAD	none	Lee Kerridge
2028408	RC08 3 5.60-5.70	SOIL	NAD	none	Lee Kerridge
2028409	RC08 4 6.50-6.60	SOIL	NAD	none	Lee Kerridge

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 22-12615
 Client Ref 2585
 Contract Houghton Le Spring

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Hold time exceeded for tests	Inappropriate container for tests
2028404	RC05 9.40-9.50 SOIL	27/06/22	GJ 250ml x2, PT 1L		
2028405	RC06 1.00-1.20 SOIL	28/06/22	GJ 250ml x2, PT 1L		
2028406	RC06 5.00-5.20 SOIL	28/06/22	GJ 250ml x2, PT 1L		
2028407	RC07 11.00-11.20 SOIL	29/06/22	GJ 250ml x2, PT 1L		
2028408	RC08 5.60-5.70 SOIL	30/06/22	GJ 250ml x2, PT 1L		
2028409	RC08 6.50-6.60 SOIL	30/06/22	GJ 250ml x2, PT 1L		
2028410	RC05 9.40-9.50 LEACHATE	27/06/22	GJ 250ml x2, PT 1L		
2028411	RC06 1.00-1.20 LEACHATE	28/06/22	GJ 250ml x2, PT 1L		
2028412	RC06 5.00-5.20 LEACHATE	28/06/22	GJ 250ml x2, PT 1L		
2028413	RC07 11.00-11.20 LEACHATE	29/06/22	GJ 250ml x2, PT 1L		
2028414	RC08 5.60-5.70 LEACHATE	30/06/22	GJ 250ml x2, PT 1L		
2028415	RC08 6.50-6.60 LEACHATE	30/06/22	GJ 250ml x2, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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, inappropriate containers etc 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

End of Report



Certificate of Analysis

Certificate Number 22-12616

Issued: 14-Jul-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-12616

Client Reference 2585

Order No 2585

Contract Title HOUGHTON COLLIERY

Description 5 Soil samples, 5 Leachate samples.

Date Received 04-Jul-22

Date Started 04-Jul-22

Date Completed 14-Jul-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "K. Bridgewood".

Kirk Bridgewood
General Manager



Summary of Chemical Analysis

Soil Samples

Our Ref 22-12616
 Client Ref 2585
 Contract Title HOUGHTON COLLIERY

Lab No	2028416	2028417	2028418	2028419	2028420
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Preparation								
Stones >20mm	DETSC 1003*	1	% m/m	< 1.0	6.0	68	< 1.0	< 1.0
Moisture Content	DETSC 1004	0.1	%	11	9.6	110	14	12
Metals								
Arsenic	DETSC 2301#	0.2	mg/kg	3.3	2.3	0.6	2.3	1.9
Boron, Water Soluble	DETSC 2311#	0.2	mg/kg	2.6	0.6	0.4	0.3	0.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.9	0.1	< 0.1	0.2	< 0.1
Chromium	DETSC 2301#	0.15	mg/kg	36	14	8.7	8.1	8.4
Copper	DETSC 2301#	0.2	mg/kg	54	17	9.5	14	11
Lead	DETSC 2301#	0.3	mg/kg	100	15	4.1	14	7.6
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	39	20	8.2	13	12
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	0.7	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	330	53	13	45	29
Inorganics								
pH	DETSC 2008#		pH	7.8	8.3	8.5	8.6	8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1	0.2	< 0.1	< 0.1	< 0.1
Organic matter	DETSC 2002#	0.1	%	< 0.1	1.1	2.2	0.7	1.4
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	2200	160	68	65	76
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.11	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.6	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	< 1.4	< 1.4	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311#	10	mg/kg	< 10	< 10	< 10	22	< 10
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-12616
 Client Ref 2585
 Contract Title HOUGHTON COLLIERY

Lab No	2028416	2028417	2028418	2028419	2028420
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAHs								
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10

Summary of Chemical Analysis

Soil Samples

Our Ref 22-12616

Client Ref 2585

Contract Title HOUGHTON COLLIERY

Lab No	2028416	2028417	2028418	2028419	2028420
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028416	2028417	2028418	2028419	2028420
VOCs								
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-12616

Client Ref 2585

Contract Title HOUGHTON COLLIERY

Lab No	2028416	2028417	2028418	2028419	2028420
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028416	2028417	2028418	2028419	2028420
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	0.05	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	0.02	< 0.01	< 0.01	< 0.01
SVOCs								
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 22-12616

Client Ref 2585

Contract Title HOUGHTON COLLIERY

Lab No	2028416	2028417	2028418	2028419	2028420
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Diphenylamine	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4-Bromophenylphenylether	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Hexachlorobenzene	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Pentachlorophenol	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-butylphthalate	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Butylbenzylphthalate	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Di-n-octylphthalate	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,4-Dinitrobenzene	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dimethylphthalate	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,3-Dinitrobenzene	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1,2-Dinitrobenzene	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azobenzene	DETS 3433	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Carbazole	DETS 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12616
 Client Ref 2585
 Contract Title HOUGHTON COLLIERY

Lab No	2028421	2028422	2028423	2028424	2028425
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Preparation								
NRA Leachate Preparation	DETSC 1009*			Y	Y	Y	Y	Y
Metals								
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.52	0.20	0.20	0.24	< 0.16
Boron, Dissolved	DETSC 2306*	12	ug/l	24	19	21	20	22
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.06	< 0.03	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	1.0	< 0.25	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.8	0.7	0.9	1.6	0.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.3	< 0.09	< 0.09	0.16	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.04	< 0.01	< 0.01	0.27	0.03
Nickel, Dissolved	DETSC 2306	0.5	ug/l	0.6	< 0.5	< 0.5	< 0.5	< 0.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.3	0.42	0.27	0.34	< 0.25
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.6	< 1.3	2.1	< 1.3	< 1.3
Inorganics								
pH	DETSC 2008		pH	7.0	6.9	6.7	6.6	6.6
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40
Sulphate as SO4	DETSC 2055	0.1	mg/l	4.1	3.7	3.6	9.9	6.6
Total Organic Carbon	DETSC 2085	1	mg/l	1.9	1.3	< 1.0	1.7	1.2
Petroleum Hydrocarbons								
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	2.0	1.8	2.6	2.8	2.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	29	< 10	< 10	69	< 10
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12616
 Client Ref 2585
 Contract Title HOUGHTON COLLIERY

Lab No	2028421	2028422	2028423	2028424	2028425
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
PAHs								
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	0.04	< 0.01	0.02	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12616
 Client Ref 2585
 Contract Title HOUGHTON COLLIERY

Lab No	2028421	2028422	2028423	2028424	2028425
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028421	2028422	2028423	2028424	2028425
VOCs								
Dichlorodifluoromethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETS 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETS 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETS 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETS 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4
Chloroform	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Benzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETS 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETS 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Toluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETS 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Styrene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Bromoform	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12616
 Client Ref 2585
 Contract Title HOUGHTON COLLIERY

Lab No	2028421	2028422	2028423	2028424	2028425
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	2	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1
SVOCs								
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-12616

Client Ref 2585

Contract Title HOUGHTON COLLIERY

Lab No	2028421	2028422	2028423	2028424	2028425
Sample ID	RC01	RC01	RC01	RC02	RC02
Depth	4.76-4.89	6.23-6.40	6.80-7.00	5.50-5.60	7.53-7.65
Other ID	3	4	5	4	5
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	20/06/2022	20/06/2022	20/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2028421	2028422	2028423	2028424	2028425
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Asbestos Analysis Soil Samples

Our Ref 22-12616

Client Ref 2585

Contract Title HOUGHTON COLLIERY

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2028416	RC01 3 4.76-4.89	SOIL	NAD	none	Lee Kerridge
2028417	RC01 4 6.23-6.40	SOIL	NAD	none	Lee Kerridge
2028418	RC01 5 6.80-7.00	SOIL	NAD	none	Lee Kerridge
2028419	RC02 4 5.50-5.60	SOIL	NAD	none	Lee Kerridge
2028420	RC02 5 7.53-7.65	SOIL	NAD	none	Lee Kerridge

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 22-12616
 Client Ref 2585
 Contract HOUGHTON COLLIERY

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2028416	RC01 4.76-4.89 SOIL	20/06/22	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2028417	RC01 6.23-6.40 SOIL	20/06/22	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2028418	RC01 6.80-7.00 SOIL	20/06/22	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2028419	RC02 5.50-5.60 SOIL	20/06/22	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2028420	RC02 7.53-7.65 SOIL	20/06/22	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2028421	RC01 4.76-4.89 LEACHATE	20/06/22	GJ 250ml x2, PT 1L		
2028422	RC01 6.23-6.40 LEACHATE	20/06/22	GJ 250ml x2, PT 1L		
2028423	RC01 6.80-7.00 LEACHATE	20/06/22	GJ 250ml x2, PT 1L		
2028424	RC02 5.50-5.60 LEACHATE	20/06/22	GJ 250ml x2, PT 1L		
2028425	RC02 7.53-7.65 LEACHATE	20/06/22	GJ 250ml x2, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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, inappropriate containers etc 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

End of Report



Certificate of Analysis

Certificate Number 22-13076

Issued: 01-Aug-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-13076

Client Reference 2585

Order No (not supplied)

Contract Title HOUGHTON

Description 5 Soil samples.

Date Received 11-Jul-22

Date Started 11-Jul-22

Date Completed 01-Aug-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

A handwritten signature in black ink, appearing to read "Kirk Bridgewood".

Kirk Bridgewood
General Manager

Summary of Chemical Analysis

Soil Samples

Our Ref 22-13076
 Client Ref 2585
 Contract Title HOUGHTON

Lab No	2030784	2030785	2030786	2030787	2030788
Sample ID	RC01	RC02	RC05	RC06	RC08
Depth	0.10-0.20	0.10-0.20	0.10-0.20	0.10-0.20	0.10-0.20
Other ID	1	1	1	1	1
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	27/06/2022	28/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
OCPs								
alpha-BHC	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
gamma-BHC (Lindane)	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
beta-BHC	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
delta-BHC	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Heptachlor	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aldrin	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Heptachlor epoxide	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
gamma-Chlordane	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulphan I & Alpha-chlorodane	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4,4-DDE	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Dieldrin	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulphan II & 4,4-DDD	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin aldehyde	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
4,4-DDT	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endosulphan sulphate	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Methoxychlor	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Endrin ketone	DETSC 3441*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
OPPs								
Dichlorvos	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Mevinphos	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Demeton-O	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ethoprop	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Naled	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Phorate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Demeton-S	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Diazinon	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Disulfoton	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Methylparathion	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ronnel	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fenthion	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Chlopyrifos	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Trichlorinate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Merphos	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Stirofos	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Tokuthion	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Fensulfothion	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Bolstar	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Azinphos methyl	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Coumaphos	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Triazines								
Atraton	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 22-13076

Client Ref 2585

Contract Title HOUGHTON

Lab No	2030784	2030785	2030786	2030787	2030788
Sample ID	RC01	RC02	RC05	RC06	RC08
Depth	0.10-0.20	0.10-0.20	0.10-0.20	0.10-0.20	0.10-0.20
Other ID	1	1	1	1	1
Sample Type	ES	ES	ES	ES	ES
Sampling Date	20/06/2022	20/06/2022	27/06/2022	28/06/2022	30/06/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units					
Prometon	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Simazine	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Atrazine	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Propazine	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Terbutylazine	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Secbumeton	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Symetryn	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Ametryn	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Prometryne	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Terbutryn	DETSC 3445*	0.1	mg/kg	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1

Information in Support of the Analytical Results

Our Ref 22-13076
 Client Ref 2585
 Contract HOUGHTON

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2030779	RC01 0.10-0.20 SOIL	20/06/22	GJ 250ml x2, PT 1L		
2030780	RC02 0.10-0.20 SOIL	20/06/22	GJ 250ml x2, PT 1L		
2030781	RC05 0.10-0.20 SOIL	27/06/22	GJ 250ml x2, PT 1L		
2030782	RC06 0.10-0.20 SOIL	28/06/22	GJ 250ml x2, PT 1L		
2030783	RC08 0.10-0.20 SOIL	30/06/22	GJ 250ml x2, PT 1L		
2030784	RC01 0.10-0.20 SOIL	20/06/22	GJ 250ml x2, PT 1L	OP Pesticides (14 days), Triazines (14 days)	
2030785	RC02 0.10-0.20 SOIL	20/06/22	GJ 250ml x2, PT 1L	OP Pesticides (14 days), Triazines (14 days)	
2030786	RC05 0.10-0.20 SOIL	27/06/22	GJ 250ml x2, PT 1L		
2030787	RC06 0.10-0.20 SOIL	28/06/22	GJ 250ml x2, PT 1L		
2030788	RC08 0.10-0.20 SOIL	30/06/22	GJ 250ml x2, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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, inappropriate containers etc 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

End of Report



DETS

Certificate of Analysis

Certificate Number 22-13580

Issued: 26-Jul-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-13580

Client Reference 2585

Order No PO-2205

Contract Title Houghton Colliery

Description 11 Water samples.

Date Received 18-Jul-22

Date Started 18-Jul-22

Date Completed 26-Jul-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033545	2033546	2033547	2033548	2033549	2033550	2033551
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06	RC07
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
Metals										
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.21	0.40	0.18	1.7	0.40	0.84	0.89
Boron, Dissolved	DETSC 2306*	12	ug/l	120	170	190	780	680	700	94
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.10	< 0.03	0.03	0.15	0.09	0.07
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.26	< 0.25	< 0.25	13	0.71	0.75	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	< 0.4	< 0.4	1.0	6.4	1.0	2.0	2.2
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	< 0.09	< 0.09	0.22	0.12	0.58	0.67
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.03	0.02	< 0.01	0.02	< 0.01	0.05	0.03
Nickel, Dissolved	DETSC 2306	0.5	ug/l	5.5	13	1.6	8.8	5.1	5.5	12
Selenium, Dissolved	DETSC 2306	0.25	ug/l	2.3	9.7	4.6	27	2.8	11	11
Zinc, Dissolved	DETSC 2306	1.3	ug/l	32	34	42	65	57	41	53
Inorganics										
pH	DETSC 2008		pH	7.6	7.4	7.4	7.1	7.3	7.5	7.3
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40	< 40
Sulphate as S	DETSC 2055	0.0334	mg/l	69	71	110	410	590	210	690
Total Organic Carbon	DETSC 2085	1	mg/l	40	34	5.8	14	58	4.9	5.1
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	3.4	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	4.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	9.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	99	< 1.0	< 1.0	42	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	120	< 10	< 10	43	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	1.5	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	3.8	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	120	< 10	< 10	43	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	150	40	< 10	35	22	20	39
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033545	2033546	2033547	2033548	2033549	2033550	2033551
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06	RC07
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
PAHs										
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.02	< 0.01	0.02	0.04	0.06	< 0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	0.01	0.02	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	0.04	< 0.01	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	0.17	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	0.27	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PCBs										
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 3.0	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 3.0	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 6.0	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033545	2033546	2033547	2033548	2033549	2033550	2033551
.Sample ID	RC01	RC02	RC03	RC04	RC05	RC06	RC07
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units								
VOCs											
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27	< 27	
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4	< 4	
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4	< 4	
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2	< 2	
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1	

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033545	2033546	2033547	2033548	2033549	2033550	2033551
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06	RC07
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
1,2,3-trichloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETS 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETS 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs										
Phenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Aniline	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2-Chlorophenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Benzyl Alcohol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2-Methylphenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Bis(2-chloroisopropyl)ether	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
3&4-Methylphenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Bis(2-chloroethoxy)methane	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,4-Dimethylphenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,4-Dichlorophenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
1,2,4-Trichlorobenzene	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
4-Chloro-3-methylphenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2-Methylnaphthalene	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Hexachlorocyclopentadiene	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,4,6-Trichlorophenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,4,5-Trichlorophenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2-Chloronaphthalene	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2-Nitroaniline	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,4-Dinitrotoluene	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
3-Nitroaniline	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
4-Nitrophenol	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Dibenzofuran	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,6-Dinitrotoluene	DETS 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033545	2033546	2033547	2033548	2033549	2033550	2033551
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06	RC07
Depth							
Other ID							
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units							
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Diphenylamine	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	3.3
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Azobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
Carbazole	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 10.0	< 10.0	< 3.3	< 2.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033553	2033554	2033555	2033556
Sample ID	RC09	RC10	RC11	RC12
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Metals							
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.30	1.2	0.39	0.42
Boron, Dissolved	DETSC 2306*	12	ug/l	89	730	350	130
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.08	< 0.03	< 0.03	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	0.70	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.9	0.8	2.5	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	< 0.09	0.36	< 0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	0.02	0.03	0.05
Nickel, Dissolved	DETSC 2306	0.5	ug/l	3.4	3.2	5.4	4.8
Selenium, Dissolved	DETSC 2306	0.25	ug/l	6.9	6.4	2.7	0.95
Zinc, Dissolved	DETSC 2306	1.3	ug/l	51	29	63	24
Inorganics							
pH	DETSC 2008		pH	7.2	8.1	7.5	7.8
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40
Sulphate as S	DETSC 2055	0.0334	mg/l	140	98	130	120
Total Organic Carbon	DETSC 2085	1	mg/l	5.8	19	56	< 1.0
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	120
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	120
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	120
EPH (C10-C40)	DETSC 3311	10	ug/l	58	58	64	410
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033553	2033554	2033555	2033556
Sample ID	RC09	RC10	RC11	RC12
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
PAHs							
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	7.7
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.54
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.04	0.01	2.8
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	0.02	< 0.01	4.0
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.06	0.04	27
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01	2.9
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.02	0.05	15
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	0.03	0.08	20
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	9.7
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.01	7.6
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	7.7
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	0.04	4.3
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	7.2
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	3.8
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.96
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	3.0
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	0.24	120
PCBs							
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 3.0	< 3.0
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 2.0
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 3.0	< 3.0
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 6.0	< 6.0
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 2.0
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 2.0
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 2.0	< 2.0
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033553	2033554	2033555	2033556
.Sample ID	RC09	RC10	RC11	RC12
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
VOCs							
Dichlorodifluoromethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Chloromethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Vinyl Chloride	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromomethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Chloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETS 3432*	1	ug/l	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Methylene Chloride	DETS 3432*	27	ug/l	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETS 3432*	2	ug/l	< 2	< 2	< 2	< 2
Bromochloromethane	DETS 3432	4	ug/l	< 4	< 4	< 4	< 4
Chloroform	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Benzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Trichloroethylene	DETS 3432*	1	ug/l	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Dibromomethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromodichloromethane	DETS 3432	4	ug/l	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Toluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Dibromochloromethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Chlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Ethylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
m+p-Xylene	DETS 3432	2	ug/l	< 2	< 2	< 2	< 2
o-Xylene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Styrene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromoform	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Isopropylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Bromobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033553	2033554	2033555	2033556
Sample ID	RC09	RC10	RC11	RC12
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
1,2,3-trichloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
n-propylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
2-chlorotoluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
4-chlorotoluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
sec-butylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETS 3432	2	ug/l	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
n-butylbenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETS 3432	1	ug/l	< 1	< 1	< 1	< 1
MTBE	DETS 3432*	1	ug/l	< 1	< 1	< 1	< 1
SVOCs							
Phenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Aniline	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2-Chlorophenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Benzyl Alcohol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2-Methylphenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Bis(2-chloroisopropyl)ether	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
3&4-Methylphenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Bis(2-chloroethoxy)methane	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,4-Dimethylphenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,4-Dichlorophenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
1,2,4-Trichlorobenzene	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
4-Chloro-3-methylphenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2-Methylnaphthalene	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Hexachlorocyclopentadiene	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,4,6-Trichlorophenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,4,5-Trichlorophenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2-Chloronaphthalene	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2-Nitroaniline	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,4-Dinitrotoluene	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
3-Nitroaniline	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
4-Nitrophenol	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Dibenzofuran	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,6-Dinitrotoluene	DETS 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-13580

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2033553	2033554	2033555	2033556
Sample ID	RC09	RC10	RC11	RC12
Depth				
Other ID				
Sample Type	WATER	WATER	WATER	WATER
Sampling Date	14/07/2022	14/07/2022	14/07/2022	14/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Diphenylamine	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	18
Pentachlorophenol	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 2.0	< 2.0	41	43
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Azobenzene	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
Carbazole	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 2.0	< 2.0	< 10.0	< 10.0

Information in Support of the Analytical Results

Our Ref 22-13580
 Client Ref 2585
 Contract Houghton Colliery

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Holding time exceeded for tests	Inappropriate container for tests
		Sampled	Containers Received		
2033545	RC01 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033546	RC02 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033547	RC03 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033548	RC04 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033549	RC05 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033550	RC06 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033551	RC07 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033552	RC08 WATER	14/07/22	GB 1L, PB 1L		
2033553	RC09 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033554	RC10 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033555	RC11 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	
2033556	RC12 WATER	14/07/22	GB 1L, PB 1L	pH/Cond/TDS (1 days)	

Key: G-Glass P-Plastic B-Bottle

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, inappropriate containers etc 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.

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

End of Report



DETS

Certificate of Analysis

Certificate Number 22-14010

Issued: 29-Jul-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-14010

Client Reference 2585

Order No (not supplied)

Contract Title Houghton le Spring

Description 4 Soil samples, 2 Leachate samples.

Date Received 21-Jul-22

Date Started 21-Jul-22

Date Completed 29-Jul-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Soil Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036019	2036020	2036021	2036022
Sample ID	RC-11	RC-11	RC-12	RC-12
Depth	0.10-0.20	0.40-0.50	0.10-0.20	0.50-0.60
Other ID	1	2	1	2
Sample Type	ES	ES	ES	ES
Sampling Date	06/07/2022	06/07/2022	07/07/2022	07/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units			
Preparation						
Stones >20mm	DETS 1003*	1	% m/m	< 1.0		< 1.0
Moisture Content	DETS 1004	0.1	%	12		7.6
Metals						
Arsenic	DETS 2301#	0.2	mg/kg	12		9.0
Boron, Water Soluble	DETS 2311#	0.2	mg/kg	1.5		0.6
Cadmium	DETS 2301#	0.1	mg/kg	0.5		0.3
Chromium	DETS 2301#	0.15	mg/kg	18		20
Copper	DETS 2301#	0.2	mg/kg	49		42
Lead	DETS 2301#	0.3	mg/kg	93		54
Mercury	DETS 2325#	0.05	mg/kg	0.12		0.06
Nickel	DETS 2301#	1	mg/kg	22		24
Selenium	DETS 2301#	0.5	mg/kg	0.6		< 0.5
Zinc	DETS 2301#	1	mg/kg	160		99
Inorganics						
pH	DETS 2008#		pH	7.0		7.8
Cyanide, Total	DETS 2130#	0.1	mg/kg	0.4		0.2
Organic matter	DETS 2002#	0.1	%	13		5.6
Sulphate Aqueous Extract as SO4	DETS 2076#	10	mg/l	91		94
Petroleum Hydrocarbons						
Aliphatic C5-C6	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01
Aliphatic C6-C8	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01
Aliphatic C8-C10	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01
Aliphatic C10-C12	DETS 3072#	1.5	mg/kg	2.2		< 1.5
Aliphatic C12-C16	DETS 3072#	1.2	mg/kg	2.5		< 1.2
Aliphatic C16-C21	DETS 3072#	1.5	mg/kg	5.2		< 1.5
Aliphatic C21-C35	DETS 3072#	3.4	mg/kg	40		42
Aliphatic C5-C35	DETS 3072*	10	mg/kg	50		44
Aromatic C5-C7	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01
Aromatic C7-C8	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01
Aromatic C8-C10	DETS 3321*	0.01	mg/kg	< 0.01		< 0.01
Aromatic C10-C12	DETS 3072#	0.9	mg/kg	< 0.9		1.1
Aromatic C12-C16	DETS 3072#	0.5	mg/kg	1.4		4.3
Aromatic C16-C21	DETS 3072#	0.6	mg/kg	9.4		19
Aromatic C21-C35	DETS 3072#	1.4	mg/kg	84		160
Aromatic C5-C35	DETS 3072*	10	mg/kg	95		180
TPH Ali/Aro Total C5-C35	DETS 3072*	10	mg/kg	140		220
EPH (C10-C40)	DETS 3311#	10	mg/kg	170		290
Benzene	DETS 3321#	0.01	mg/kg	< 0.01		< 0.01
Ethylbenzene	DETS 3321#	0.01	mg/kg	< 0.01		< 0.01
Toluene	DETS 3321#	0.01	mg/kg	< 0.01		< 0.01
Xylene	DETS 3321#	0.01	mg/kg	< 0.01		< 0.01

Summary of Chemical Analysis

Soil Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036019	2036020	2036021	2036022
Sample ID	RC-11	RC-11	RC-12	RC-12
Depth	0.10-0.20	0.40-0.50	0.10-0.20	0.50-0.60
Other ID	1	2	1	2
Sample Type	ES	ES	ES	ES
Sampling Date	06/07/2022	06/07/2022	07/07/2022	07/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units			
MTBE	DETS 3321	0.01	mg/kg	< 0.01		< 0.01
PAHs						
Naphthalene	DETS 3303#	0.03	mg/kg	0.09		< 0.03
Acenaphthylene	DETS 3303#	0.03	mg/kg	0.09		0.05
Acenaphthene	DETS 3303#	0.03	mg/kg	0.04		0.05
Fluorene	DETS 3303	0.03	mg/kg	0.05		0.07
Phenanthrene	DETS 3303#	0.03	mg/kg	0.68		1.4
Anthracene	DETS 3303	0.03	mg/kg	0.21		0.37
Fluoranthene	DETS 3303#	0.03	mg/kg	1.5		2.6
Pyrene	DETS 3303#	0.03	mg/kg	1.4		2.0
Benzo(a)anthracene	DETS 3303#	0.03	mg/kg	1.3		1.6
Chrysene	DETS 3303	0.03	mg/kg	0.89		0.98
Benzo(b)fluoranthene	DETS 3303#	0.03	mg/kg	1.7		1.5
Benzo(k)fluoranthene	DETS 3303#	0.03	mg/kg	0.53		0.60
Benzo(a)pyrene	DETS 3303#	0.03	mg/kg	0.98		1.1
Indeno(1,2,3-c,d)pyrene	DETS 3303#	0.03	mg/kg	0.41		0.35
Dibenzo(a,h)anthracene	DETS 3303#	0.03	mg/kg	0.14		0.14
Benzo(g,h,i)perylene	DETS 3303#	0.03	mg/kg	0.46		0.37
PAH - USEPA 16, Total	DETS 3303	0.1	mg/kg	11		< 12.05
OCPs						
alpha-BHC	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
gamma-BHC (Lindane)	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
beta-BHC	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
delta-BHC	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Heptachlor	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Aldrin	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Heptachlor epoxide	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
gamma-Chlordane	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Endosulphan I & Alpha-chlorodane	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
4,4-DDE	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Dieldrin	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Endrin	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Endosulphan II & 4,4-DDD	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Endrin aldehyde	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
4,4-DDT	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Endosulphan sulphate	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Methoxychlor	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
Endrin ketone	DETS 3441*	0.1	mg/kg		< 0.1	< 0.1
OPPs						
Dichlorvos	DETS 3433*	0.1	mg/kg		< 0.1	< 0.1
Mevinphos	DETS 3433*	0.1	mg/kg		< 0.1	< 0.1
Demeton-O	DETS 3433*	0.1	mg/kg		< 0.1	< 0.1

Summary of Chemical Analysis Soil Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036019	2036020	2036021	2036022
Sample ID	RC-11	RC-11	RC-12	RC-12
Depth	0.10-0.20	0.40-0.50	0.10-0.20	0.50-0.60
Other ID	1	2	1	2
Sample Type	ES	ES	ES	ES
Sampling Date	06/07/2022	06/07/2022	07/07/2022	07/07/2022
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Ethoprop	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Naled	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Phorate	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Demeton-S	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Diazinon	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Disulfoton	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Methylparathion	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Ronnel	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Fenthion	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Chlopyrifos	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Trichlorinate	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Merphos	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Stirofos	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Tokuthion	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Fensulfothion	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Bolstar	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Azinphos methyl	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Coumaphos	DETSC 3433*	0.1	mg/kg		< 0.1	< 0.1	
Triazines							
Atraton	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Prometon	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Simazine	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Atrazine	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Propazine	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Terbutylazine	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Secbumeton	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Symetryn	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Ametryn	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Prometryne	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	
Terbutryn	DETSC 3445*	0.1	mg/kg		< 0.1	< 0.1	

Summary of Chemical Analysis

Soil VOC/SVOC Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036019	2036022
Sample ID	RC-11	RC-12
Depth	0.10-0.20	0.50-0.60
Other ID	1	2
Sample Type	ES	ES
Sampling Date	06/07/2022	07/07/2022
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
VOCs					
Vinyl Chloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1 Dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trans-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Cis-1,2-dichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chloroform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Carbon tetrachloride	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Benzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Trichloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromomethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromodichloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
cis-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Toluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
trans-1,3-dichloropropene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,2-trichloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tetrachloroethylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Dibromochloromethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromoethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Chlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,1,1,2-tetrachloroethane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Ethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
m+p-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
o-Xylene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Styrene	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
Bromoform	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Isopropylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Bromobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-propylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
2-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3,5-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
4-chlorotoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Tert-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trimethylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01

Summary of Chemical Analysis Soil VOC/SVOC Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036019	2036022
Sample ID	RC-11	RC-12
Depth	0.10-0.20	0.50-0.60
Other ID	1	2
Sample Type	ES	ES
Sampling Date	06/07/2022	07/07/2022
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
sec-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
p-isopropyltoluene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,3-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,4-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
n-butylbenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2-dibromo-3-chloropropane	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,4-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
Hexachlorobutadiene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
1,2,3-trichlorobenzene	DETSC 3431	0.01	mg/kg	< 0.01	< 0.01
MTBE	DETSC 3431*	0.01	mg/kg	< 0.01	< 0.01
SVOCs					
Phenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Aniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Benzyl Alcohol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis(2-chloroisopropyl)ether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
3&4-Methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4-Dimethylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Bis-(dichloroethoxy)methane	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4-Dichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,2,4-Trichlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chloro-3-methylphenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Methylnaphthalene	DETSC 3433	0.1	mg/kg	0.3	0.1
Hexachlorocyclopentadiene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4,6-Trichlorophenol	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,4,5-Trichlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Chloronaphthalene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,4-Dinitrotoluene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
3-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dibenzofuran	DETSC 3433	0.1	mg/kg	0.2	< 0.1
2,6-Dinitrotoluene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
2,3,4,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Chlorophenylphenylether	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
4-Nitroaniline	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2-Methyl-4,6-Dinitrophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Diphenylamine	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
4-Bromophenylphenylether	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1

Summary of Chemical Analysis Soil VOC/SVOC Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036019	2036022
Sample ID	RC-11	RC-12
Depth	0.10-0.20	0.50-0.60
Other ID	1	2
Sample Type	ES	ES
Sampling Date	06/07/2022	07/07/2022
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Hexachlorobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Pentachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Di-n-butylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Butylbenzylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Bis(2-ethylhexyl)phthalate	DETSC 3433	0.1	mg/kg	0.3	0.2
Di-n-octylphthalate	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,4-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Dimethylphthalate	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
1,3-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
1,2-Dinitrobenzene	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
2,3,5,6-Tetrachlorophenol	DETSC 3433*	0.1	mg/kg	< 0.1	< 0.1
Azobenzene	DETSC 3433	0.1	mg/kg	< 0.1	< 0.1
Carbazole	DETSC 3433*	0.1	mg/kg	0.2	< 0.1

Summary of Chemical Analysis

Leachate Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	2036023	2036024
Sample ID	RC-11	RC-12
Depth	0.10-0.20	0.50-0.60
Other ID	1	2
Sample Type	ES	ES
Sampling Date	06/07/2022	07/07/2022
Sampling Time	n/s	n/s

Test	Method	LOD	Units		
Preparation					
Leachate 2:1 250g Non-WAC	DETSC 1009*			Y	Y
Metals					
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	4.1	1.1
Boron, Dissolved	DETSC 2306*	12	ug/l	26	14
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	< 0.03	0.04
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.61
Copper, Dissolved	DETSC 2306	0.4	ug/l	7.5	5.7
Lead, Dissolved	DETSC 2306	0.09	ug/l	1.6	3.9
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	1.2	1.2
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.32	0.29
Zinc, Dissolved	DETSC 2306	1.3	ug/l	2.0	4.6
Inorganics					
pH	DETSC 2008		pH	6.6	6.6
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40
Sulphate as S	DETSC 2055	0.0334	mg/l	0.78	1.6
Total Organic Carbon	DETSC 2085	1	mg/l	49	59
Petroleum Hydrocarbons					
EPH (C10-C40)	DETSC 3311	10	ug/l	120	97
PAHs					
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.01	0.02
Anthracene	DETSC 3304	0.01	ug/l	0.01	0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.01	0.02
Pyrene	DETSC 3304	0.01	ug/l	0.01	0.02
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20

Summary of Asbestos Analysis

Soil Samples

Our Ref 22-14010

Client Ref 2585

Contract Title Houghton le Spring

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2036019	RC-11 1 0.10-0.20	SOIL	NAD	none	Keith Wilson
2036022	RC-12 2 0.50-0.60	SOIL	NAD	none	Keith Wilson

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 22-14010
 Client Ref 2585
 Contract Houghton le Spring

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2036019	RC-11 0.10-0.20 SOIL	06/07/22	GJ 250ml x2, PT 1L	Aliphatics/Aromatics (14 days), BTEX (14 days), Naphthalene (14 days), PAH MS (14 days), pH + Conductivity (7 days), Cyanide/Mono pHoh (14 days), SVOC (14 days), EPH/TPH (14 days)	
2036020	RC-11 0.40-0.50 SOIL	06/07/22	GJ 250ml x2, PT 1L	OP Pesticides (14 days), Triazines (14 days)	
2036021	RC-12 0.10-0.20 SOIL	07/07/22	GJ 250ml x2, PT 1L		
2036022	RC-12 0.50-0.60 SOIL	07/07/22	GJ 250ml x2, PT 1L	pH + Conductivity (7 days), VOC (7 days)	
2036023	RC-11 0.10-0.20 LEACHATE	06/07/22	GJ 250ml x2, PT 1L		
2036024	RC-12 0.50-0.60 LEACHATE	07/07/22	GJ 250ml x2, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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, inappropriate containers etc 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

End of Report



DETS

Certificate of Analysis

Certificate Number 22-15537

Issued: 18-Aug-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-15537

Client Reference 2585

Order No PO-2205

Contract Title Houghton Colliery

Description 12 Water samples.

Date Received 10-Aug-22

Date Started 10-Aug-22

Date Completed 18-Aug-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044077	2044078	2044079	2044080	2044081	2044082
Sample ID	RC1	RC2	RC3	RC4	RC5	RC6
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.34	0.54	0.34	0.44	0.62	0.37
Boron, Dissolved	DETSC 2306*	12	ug/l	120	190	720	810	750	740
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.06	0.07	0.03	< 0.03	0.18	0.05
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	0.30	< 0.25	0.63	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	1.5	1.6	2.7	2.4	1.6	1.9
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.26	0.29	0.18	0.29	0.13	0.12
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.10	0.02	0.01	0.01	< 0.01	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	12	3.1	2.4	3.1	3.5	3.9
Selenium, Dissolved	DETSC 2306	0.25	ug/l	6.0	4.0	18	30	3.1	8.0
Zinc, Dissolved	DETSC 2306	1.3	ug/l	57	19	69	71	59	98
Inorganics									
pH	DETSC 2008		pH	6.7	6.9	6.9	7.0	7.1	7.2
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Sulphate as S	DETSC 2055	0.0334	mg/l	79	120	520	420	610	270
Total Organic Carbon	DETSC 2085	1	mg/l	130	140	72	110	150	18
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	15000	1400	1100	830	110	150
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044077	2044078	2044079	2044080	2044081	2044082
Sample ID	RC1	RC2	RC3	RC4	RC5	RC6
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	0.03	< 0.01	< 0.01	< 0.01	0.06	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	0.01	< 0.01	< 0.01	< 0.01	0.02	0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PCBs									
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0



Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044077	2044078	2044079	2044080	2044081	2044082
Sample ID	RC1	RC2	RC3	RC4	RC5	RC6
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units	2044077	2044078	2044079	2044080	2044081	2044082
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	3
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044077	2044078	2044079	2044080	2044081	2044082
Sample ID	RC1	RC2	RC3	RC4	RC5	RC6
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs									
Phenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Aniline	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044077	2044078	2044079	2044080	2044081	2044082
Sample ID	RC1	RC2	RC3	RC4	RC5	RC6
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Diphenylamine	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	3.0	2.2
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Azobenzene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
Carbazole	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 10.0	< 10.0	< 10.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044083	2044084	2044085	2044086	2044087	2044088
Sample ID	RC7	RC8	RC9	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.51	0.52	0.30	4.1	0.46	0.78
Boron, Dissolved	DETSC 2306*	12	ug/l	73	550	54	780	480	99
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.11	0.08	0.15	< 0.03	0.05	< 0.03
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.9	3.1	0.8	< 0.4	3.4	< 0.4
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.15	0.13	0.12	0.45	0.09	< 0.09
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	0.02	0.15
Nickel, Dissolved	DETSC 2306	0.5	ug/l	9.4	3.9	4.0	2.3	15	19
Selenium, Dissolved	DETSC 2306	0.25	ug/l	1.9	16	0.92	3.0	0.89	3.4
Zinc, Dissolved	DETSC 2306	1.3	ug/l	47	72	54	24	46	42
Inorganics									
pH	DETSC 2008		pH	7.3	7.2	7.2	8.1	7.4	7.6
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Sulphate as S	DETSC 2055	0.0334	mg/l	770	210	200	130	130	70
Total Organic Carbon	DETSC 2085	1	mg/l	120	92	75	68	250	160
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	< 100.0	< 20.0	< 100.0	< 20.0	2400	5800
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044083	2044084	2044085	2044086	2044087	2044088
Sample ID	RC7	RC8	RC9	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.03	0.06	0.02
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.02	0.12	0.02
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	0.15	0.03
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.06	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.06	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.05	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.02	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.04	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	0.03	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	0.71	< 0.20
PCBs									
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537
 Client Ref 2585
 Contract Title Houghton Colliery

Lab No	2044083	2044084	2044085	2044086	2044087	2044088
Sample ID	RC7	RC8	RC9	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units	2044083	2044084	2044085	2044086	2044087	2044088
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	11	6	3	13	5	2
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	1	< 1	< 1	2	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044083	2044084	2044085	2044086	2044087	2044088
Sample ID	RC7	RC8	RC9	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

SVOCs									
Phenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Aniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-15537

Client Ref 2585

Contract Title Houghton Colliery

Lab No	2044083	2044084	2044085	2044086	2044087	2044088
Sample ID	RC7	RC8	RC9	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022	09/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Diphenylamine	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	1.9	< 1.0	7.3	< 5.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Azobenzene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
Carbazole	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 5.0

Information in Support of the Analytical Results

Our Ref 22-15537
 Client Ref 2585
 Contract Houghton Colliery

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2044077	RC1 WATER	09/08/22	GB 1L, GV, PB 1L		
2044078	RC2 WATER	09/08/22	GB 1L, GV, PB 1L		
2044079	RC3 WATER	09/08/22	GB 1L, GV, PB 1L		
2044080	RC4 WATER	09/08/22	GB 1L, GV, PB 1L		
2044081	RC5 WATER	09/08/22	GB 1L, GV, PB 1L		
2044082	RC6 WATER	09/08/22	GB 1L, GV, PB 1L		
2044083	RC7 WATER	09/08/22	GB 1L, GV, PB 1L		
2044084	RC8 WATER	09/08/22	GB 1L, GV, PB 1L		
2044085	RC9 WATER	09/08/22	GB 1L, GV, PB 1L		
2044086	RC10 WATER	09/08/22	GB 1L, GV, PB 1L		
2044087	RC11 WATER	09/08/22	GB 1L, GV, PB 1L		
2044088	RC12 WATER	09/08/22	GB 1L, GV, PB 1L		

Key: G-Glass P-Plastic B-Bottle V-Vial

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, inappropriate containers etc 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.

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

End of Report



DETS

Interim Report of Analysis

Certificate Number 22-16368

Issued: 26-Aug-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-16368

Client Reference 2585

Order No PO-2254

Contract Title 2585 Houghton Colliery

Description 12 Water samples.

Date Received 19-Aug-22

Date Started 19-Aug-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



2139

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETS 2306	0.16	ug/l	0.25	0.27	0.20	0.22	0.68	0.29
Boron, Dissolved	DETS 2306*	12	ug/l	170	150	160	710	730	640
Cadmium, Dissolved	DETS 2306	0.03	ug/l	0.07	0.20	< 0.03	< 0.03	0.11	0.04
Chromium, Dissolved	DETS 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	0.29	< 0.25
Copper, Dissolved	DETS 2306	0.4	ug/l	4.4	0.4	1.0	0.5	1.1	2.2
Lead, Dissolved	DETS 2306	0.09	ug/l	0.48	0.12	0.11	< 0.09	0.28	0.24
Mercury, Dissolved	DETS 2306	0.01	ug/l	0.06	0.01	< 0.01	< 0.01	0.03	< 0.01
Nickel, Dissolved	DETS 2306	0.5	ug/l	9.7	14	2.6	0.7	2.0	3.2
Selenium, Dissolved	DETS 2306	0.25	ug/l	6.5	6.4	1.4	25	4.0	6.2
Zinc, Dissolved	DETS 2306	1.3	ug/l	91	70	51	43	68	76
Inorganics									
pH	DETS 2008		pH	7.5	7.5	7.2	7.1	7.2	7.2
Cyanide, Total	DETS 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Ammoniacal Nitrogen as NH3	DETS 2207	0.015	mg/l	0.71	0.13	0.066	0.13	0.51	0.057
Sulphate as SO4	DETS 2055	0.1	mg/l	170	150	290	840	1200	680
Sulphur as S, Total	DETS 2320*	10	mg/l	72	45	130	390	590	200
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETS 3072*	1	ug/l	< 1.0	22	12	9.8	7.8	15
Aliphatic C21-C35	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.0
Aliphatic C5-C35	DETS 3072*	10	ug/l	< 10	23	12	11	< 10	18
Aromatic C5-C7	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETS 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETS 3072*	10	ug/l	< 10	23	12	11	< 10	18
EPH (C10-C40)	DETS 3311	10	ug/l	8100	35000	1200	2200	770	1600
Benzene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.01	< 0.01	0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PCBs									
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs									
Phenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Aniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Chlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Benzyl Alcohol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Methylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
3&4-Methylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Methylnaphthalene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Chloronaphthalene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Nitroaniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
3-Nitroaniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Nitrophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Dibenzofuran	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Diethylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Nitroaniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Diphenylamine	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Hexachlorobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Pentachlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Di-n-butylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Butylbenzylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Di-n-octylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Dimethylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Azobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Carbazole	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1-Methylnaphthalene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETS 2306	0.16	ug/l	0.26	0.37	0.25	6.6	0.48	0.45
Boron, Dissolved	DETS 2306*	12	ug/l	48	630	54	820	620	99
Cadmium, Dissolved	DETS 2306	0.03	ug/l	0.14	0.08	0.14	< 0.03	0.05	0.04
Chromium, Dissolved	DETS 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETS 2306	0.4	ug/l	0.6	1.7	2.1	0.5	4.1	0.8
Lead, Dissolved	DETS 2306	0.09	ug/l	0.10	0.15	< 0.09	0.19	0.12	0.11
Mercury, Dissolved	DETS 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.04
Nickel, Dissolved	DETS 2306	0.5	ug/l	4.7	2.9	3.1	1.8	10	9.5
Selenium, Dissolved	DETS 2306	0.25	ug/l	0.71	16	1.1	1.6	0.78	1.8
Zinc, Dissolved	DETS 2306	1.3	ug/l	70	86	52	31	50	48
Inorganics									
pH	DETS 2008		pH	7.1	7.1	7.1	8.5	7.0	7.5
Cyanide, Total	DETS 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Ammoniacal Nitrogen as NH3	DETS 2207	0.015	mg/l	0.049	0.047	0.062	6.9	0.10	0.25
Sulphate as SO4	DETS 2055	0.1	mg/l	490	460	350	280	360	190
Sulphur as S, Total	DETS 2320*	10	mg/l	170	200	150	120	160	76
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETS 3072*	1	ug/l	25	29	34	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETS 3072*	1	ug/l	4.8	13	29	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETS 3072*	10	ug/l	30	42	63	< 10	< 10	< 10
Aromatic C5-C7	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETS 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETS 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETS 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETS 3072*	10	ug/l	30	43	64	< 10	< 10	< 10
EPH (C10-C40)	DETS 3311	10	ug/l	1400	3800	1200	3100	5300	4000
Benzene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETS 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units							
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	
PAHs										
Naphthalene	DETSC 3304	0.05	ug/l	t/f	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	
Acenaphthylene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Acenaphthene	DETSC 3304	0.01	ug/l	t/f	0.02	< 0.01	< 0.01	< 0.01	0.02	
Fluorene	DETSC 3304	0.01	ug/l	t/f	0.02	< 0.01	< 0.01	< 0.01	< 0.01	
Phenanthrene	DETSC 3304	0.01	ug/l	t/f	0.03	0.02	< 0.01	0.04	0.02	
Anthracene	DETSC 3304	0.01	ug/l	t/f	0.03	< 0.01	< 0.01	0.02	< 0.01	
Fluoranthene	DETSC 3304	0.01	ug/l	t/f	0.03	< 0.01	< 0.01	0.07	0.03	
Pyrene	DETSC 3304	0.01	ug/l	t/f	0.06	< 0.01	< 0.01	0.10	0.03	
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	t/f	0.03	< 0.01	< 0.01	0.02	< 0.01	
Chrysene	DETSC 3304	0.01	ug/l	t/f	0.03	< 0.01	< 0.01	0.02	< 0.01	
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	t/f	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
PAH Total	DETSC 3304	0.2	ug/l	t/f	0.26	< 0.20	< 0.20	0.26	< 0.20	
PCBs										
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	
PCB 52	DETSC 3402	0.2	ug/l		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
PCB 101	DETSC 3402	0.3	ug/l		< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l		< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	
PCB 138	DETSC 3402	0.2	ug/l		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
PCB 153	DETSC 3402	0.2	ug/l		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
PCB 180	DETSC 3402	0.2	ug/l		< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	
PCB 7 Total	DETSC 3402	1	ug/l		< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units	2048437	2048438	2048439	2048440	2048441	2048442
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs									
Phenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Aniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Chlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Benzyl Alcohol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Methylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
3&4-Methylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Methylnaphthalene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Chloronaphthalene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2-Nitroaniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
3-Nitroaniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Nitrophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Dibenzofuran	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Diethylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Nitroaniline	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Diphenylamine	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Hexachlorobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Pentachlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Di-n-butylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Butylbenzylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Di-n-octylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Dimethylphthalate	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Azobenzene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
Carbazole	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f
1-Methylnaphthalene	DETSC 3434*	1	ug/l	t/f	t/f	t/f	t/f	t/f	t/f

Information in Support of the Analytical Results

Our Ref 22-16368
 Client Ref 2585
 Contract 2585 Houghton Colliery

Containers Received & Deviating Samples

Lab No	Sample ID	Date		Containers Received	Holding time exceeded for tests	Inappropriate container for tests
		Sampled				
2048431	RC01 WATER	18/08/22		GB 1L, GV, PB 1L		
2048432	RC02 WATER	18/08/22		GB 1L, GV, PB 1L		
2048433	RC03 WATER	18/08/22		GB 1L, GV, PB 1L		
2048434	RC04 WATER	18/08/22		GB 1L, GV, PB 1L		
2048435	RC05 WATER	18/08/22		GB 1L, GV, PB 1L		
2048436	RC06 WATER	18/08/22		GB 1L, GV, PB 1L		
2048437	RC07 WATER	18/08/22		GB 1L, GV, PB 1L		
2048438	RC08 WATER	18/08/22		GB 1L, GV, PB 1L		
2048439	RC09 WATER	18/08/22		GB 1L, GV, PB 1L		
2048440	RC10 WATER	18/08/22		GB 1L, GV, PB 1L		
2048441	RC11 WATER	18/08/22		GB 1L, GV, PB 1L		
2048442	RC12 WATER	18/08/22		GB 1L, GV, PB 1L		

Key: G-Glass P-Plastic B-Bottle V-Vial

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, inappropriate containers etc 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.

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

End of Report



DETS

Certificate of Analysis

Certificate Number 22-16368

Issued: 31-Aug-22

Client Shadbolt Group
18 Bewick Road
Gateshead
NE8 4DP

Our Reference 22-16368

Client Reference 2585

Order No PO-2254

Contract Title 2585 Houghton Colliery

Description 12 Water samples.

Date Received 19-Aug-22

Date Started 19-Aug-22

Date Completed 31-Aug-22

Test Procedures Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the laboratory's scope of ISO 17025 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. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.25	0.27	0.20	0.22	0.68	0.29
Boron, Dissolved	DETSC 2306*	12	ug/l	170	150	160	710	730	640
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.07	0.20	< 0.03	< 0.03	0.11	0.04
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	0.29	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	4.4	0.4	1.0	0.5	1.1	2.2
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.48	0.12	0.11	< 0.09	0.28	0.24
Mercury, Dissolved	DETSC 2306	0.01	ug/l	0.06	0.01	< 0.01	< 0.01	0.03	< 0.01
Nickel, Dissolved	DETSC 2306	0.5	ug/l	9.7	14	2.6	0.7	2.0	3.2
Selenium, Dissolved	DETSC 2306	0.25	ug/l	6.5	6.4	1.4	25	4.0	6.2
Zinc, Dissolved	DETSC 2306	1.3	ug/l	91	70	51	43	68	76
Inorganics									
pH	DETSC 2008		pH	7.5	7.5	7.2	7.1	7.2	7.2
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.71	0.13	0.066	0.13	0.51	0.057
Sulphate as SO4	DETSC 2055	0.1	mg/l	170	150	290	840	1200	680
Sulphur as S, Total	DETSC 2320*	10	mg/l	72	45	130	390	590	200
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	22	12	9.8	7.8	15
Aliphatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	2.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	< 10	23	12	11	< 10	18
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	< 10	23	12	11	< 10	18
EPH (C10-C40)	DETSC 3311	10	ug/l	8100	35000	1200	2200	770	1600
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluorene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	< 0.01	0.01	0.01	< 0.01	0.01	< 0.01
Anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
PCBs									
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units	2048431	2048432	2048433	2048434	2048435	2048436
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs									
Phenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048431	2048432	2048433	2048434	2048435	2048436
Sample ID	RC01	RC02	RC03	RC04	RC05	RC06
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	0900	0915	0930	0945	1000	1015

Test	Method	LOD	Units						
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Diphenylamine	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	5.3	< 5.0	< 5.0	< 5.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Azobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Carbazole	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
Metals									
Arsenic, Dissolved	DETSC 2306	0.16	ug/l	0.26	0.37	0.25	6.6	0.48	0.45
Boron, Dissolved	DETSC 2306*	12	ug/l	48	630	54	820	620	99
Cadmium, Dissolved	DETSC 2306	0.03	ug/l	0.14	0.08	0.14	< 0.03	0.05	0.04
Chromium, Dissolved	DETSC 2306	0.25	ug/l	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25	< 0.25
Copper, Dissolved	DETSC 2306	0.4	ug/l	0.6	1.7	2.1	0.5	4.1	0.8
Lead, Dissolved	DETSC 2306	0.09	ug/l	0.10	0.15	< 0.09	0.19	0.12	0.11
Mercury, Dissolved	DETSC 2306	0.01	ug/l	< 0.01	< 0.01	< 0.01	0.01	< 0.01	0.04
Nickel, Dissolved	DETSC 2306	0.5	ug/l	4.7	2.9	3.1	1.8	10	9.5
Selenium, Dissolved	DETSC 2306	0.25	ug/l	0.71	16	1.1	1.6	0.78	1.8
Zinc, Dissolved	DETSC 2306	1.3	ug/l	70	86	52	31	50	48
Inorganics									
pH	DETSC 2008		pH	7.1	7.1	7.1	8.5	7.0	7.5
Cyanide, Total	DETSC 2130	40	ug/l	< 40	< 40	< 40	< 40	< 40	< 40
Ammoniacal Nitrogen as NH3	DETSC 2207	0.015	mg/l	0.049	0.047	0.062	6.9	0.10	0.25
Sulphate as SO4	DETSC 2055	0.1	mg/l	490	460	350	280	360	190
Sulphur as S, Total	DETSC 2320*	10	mg/l	170	200	150	120	160	76
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C6-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aliphatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic C16-C21	DETSC 3072*	1	ug/l	25	29	34	< 1.0	< 1.0	< 1.0
Aliphatic C21-C35	DETSC 3072*	1	ug/l	4.8	13	29	< 1.0	< 1.0	< 1.0
Aliphatic C5-C35	DETSC 3072*	10	ug/l	30	42	63	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C7-C8	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C8-C10	DETSC 3322	0.1	ug/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Aromatic C10-C12	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C12-C16	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C16-C21	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C21-C35	DETSC 3072*	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic C5-C35	DETSC 3072*	10	ug/l	< 10	< 10	< 10	< 10	< 10	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	ug/l	30	43	64	< 10	< 10	< 10
EPH (C10-C40)	DETSC 3311	10	ug/l	1400	3800	1200	3100	5300	4000
Benzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Xylene	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
MTBE	DETSC 3322	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
PAHs									
Naphthalene	DETSC 3304	0.05	ug/l	< 0.50	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthylene	DETSC 3304	0.01	ug/l	0.12	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Acenaphthene	DETSC 3304	0.01	ug/l	0.66	0.02	< 0.01	< 0.01	< 0.01	0.02
Fluorene	DETSC 3304	0.01	ug/l	0.88	0.02	< 0.01	< 0.01	< 0.01	< 0.01
Phenanthrene	DETSC 3304	0.01	ug/l	1.3	0.03	0.02	< 0.01	0.04	0.02
Anthracene	DETSC 3304	0.01	ug/l	0.88	0.03	< 0.01	< 0.01	0.02	< 0.01
Fluoranthene	DETSC 3304	0.01	ug/l	1.0	0.03	< 0.01	< 0.01	0.07	0.03
Pyrene	DETSC 3304	0.01	ug/l	2.8	0.06	< 0.01	< 0.01	0.10	0.03
Benzo(a)anthracene	DETSC 3304*	0.01	ug/l	0.99	0.03	< 0.01	< 0.01	0.02	< 0.01
Chrysene	DETSC 3304	0.01	ug/l	0.78	0.03	< 0.01	< 0.01	0.02	< 0.01
Benzo(b)fluoranthene	DETSC 3304	0.01	ug/l	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(k)fluoranthene	DETSC 3304	0.01	ug/l	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(a)pyrene	DETSC 3304	0.01	ug/l	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Indeno(1,2,3-c,d)pyrene	DETSC 3304	0.01	ug/l	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Dibenzo(a,h)anthracene	DETSC 3304	0.01	ug/l	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo(g,h,i)perylene	DETSC 3304	0.01	ug/l	< 0.10	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
PAH Total	DETSC 3304	0.2	ug/l	9.4	0.26	< 0.20	< 0.20	0.26	< 0.20
PCBs									
PCB 28 + PCB 31	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 52	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 101	DETSC 3402	0.3	ug/l	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3	< 0.3
PCB 118 + PCB 123	DETSC 3402	0.6	ug/l	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6	< 0.6
PCB 138	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 153	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 180	DETSC 3402	0.2	ug/l	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
PCB 7 Total	DETSC 3402	1	ug/l	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units	2048437	2048438	2048439	2048440	2048441	2048442
VOCs									
Dichlorodifluoromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Vinyl Chloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichlorofluoromethane	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Methylene Chloride	DETSC 3432*	27	ug/l	< 27	< 27	< 27	< 27	< 27	< 27
Trans-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Cis-1,2-dichloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2,2-dichloropropane	DETSC 3432*	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
Bromochloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
Chloroform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Carbon tetrachloride	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Benzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Trichloroethylene	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromomethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromodichloromethane	DETSC 3432	4	ug/l	< 4	< 4	< 4	< 4	< 4	< 4
cis-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Toluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
trans-1,3-dichloropropene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2-trichloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tetrachloroethylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Dibromochloromethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromoethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Chlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,1,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Ethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
m+p-Xylene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
o-Xylene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Styrene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromoform	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Isopropylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,1,2,2-tetrachloroethane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Bromobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
1,2,3-trichloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-propylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
2-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3,5-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
4-chlorotoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Tert-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trimethylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
sec-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
p-isopropyltoluene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,3-dichlorobenzene	DETSC 3432	2	ug/l	< 2	< 2	< 2	< 2	< 2	< 2
1,4-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
n-butylbenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2-dibromo-3-chloropropane	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,4-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
Hexachlorobutadiene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
1,2,3-trichlorobenzene	DETSC 3432	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
MTBE	DETSC 3432*	1	ug/l	< 1	< 1	< 1	< 1	< 1	< 1
SVOCs									
Phenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Aniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2-Chlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Benzyl Alcohol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2-Methylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Bis(2-chloroisopropyl)ether	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
3&4-Methylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Bis(2-chloroethoxy)methane	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,4-Dimethylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,4-Dichlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
1,2,4-Trichlorobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
4-Chloro-3-methylphenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2-Methylnaphthalene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Hexachlorocyclopentadiene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,4,6-Trichlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,4,5-Trichlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2-Chloronaphthalene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2-Nitroaniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,4-Dinitrotoluene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
3-Nitroaniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
4-Nitrophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Dibenzofuran	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,6-Dinitrotoluene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0

Summary of Chemical Analysis

Water Samples

Our Ref 22-16368

Client Ref 2585

Contract Title 2585 Houghton Colliery

Lab No	2048437	2048438	2048439	2048440	2048441	2048442
Sample ID	RC07	RC08	RC09	RC10	RC11	RC12
Depth						
Other ID						
Sample Type	WATER	WATER	WATER	WATER	WATER	WATER
Sampling Date	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022	18/08/2022
Sampling Time	1030	1045	1100	1115	1130	1145

Test	Method	LOD	Units						
2,3,4,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Diethylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
4-Chlorophenylphenylether	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
4-Nitroaniline	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Diphenylamine	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
4-Bromophenylphenylether	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Hexachlorobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Bis(2-ethylhexyl)ester	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Pentachlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Di-n-butylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Butylbenzylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Bis(2-ethylhexyl)phthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Di-n-octylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
1,4-Dinitrobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Dimethylphthalate	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
1,3-Dinitrobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
2,3,5,6-Tetrachlorophenol	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Azobenzene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
Carbazole	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0
1-Methylnaphthalene	DETSC 3434*	1	ug/l	< 5.0	< 5.0	< 5.0	< 1.0	< 5.0	< 5.0

Information in Support of the Analytical Results

Our Ref 22-16368
 Client Ref 2585
 Contract 2585 Houghton Colliery

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2048431	RC01 WATER	18/08/22	GB 1L, GV, PB 1L		
2048432	RC02 WATER	18/08/22	GB 1L, GV, PB 1L		
2048433	RC03 WATER	18/08/22	GB 1L, GV, PB 1L		
2048434	RC04 WATER	18/08/22	GB 1L, GV, PB 1L		
2048435	RC05 WATER	18/08/22	GB 1L, GV, PB 1L		
2048436	RC06 WATER	18/08/22	GB 1L, GV, PB 1L		
2048437	RC07 WATER	18/08/22	GB 1L, GV, PB 1L		
2048438	RC08 WATER	18/08/22	GB 1L, GV, PB 1L		
2048439	RC09 WATER	18/08/22	GB 1L, GV, PB 1L		
2048440	RC10 WATER	18/08/22	GB 1L, GV, PB 1L		
2048441	RC11 WATER	18/08/22	GB 1L, GV, PB 1L		
2048442	RC12 WATER	18/08/22	GB 1L, GV, PB 1L		

Key: G-Glass P-Plastic B-Bottle V-Vial

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, inappropriate containers etc 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.

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

End of Report

APPENDIX E
GEOTECHNICAL LABORATORY RESULTS



TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



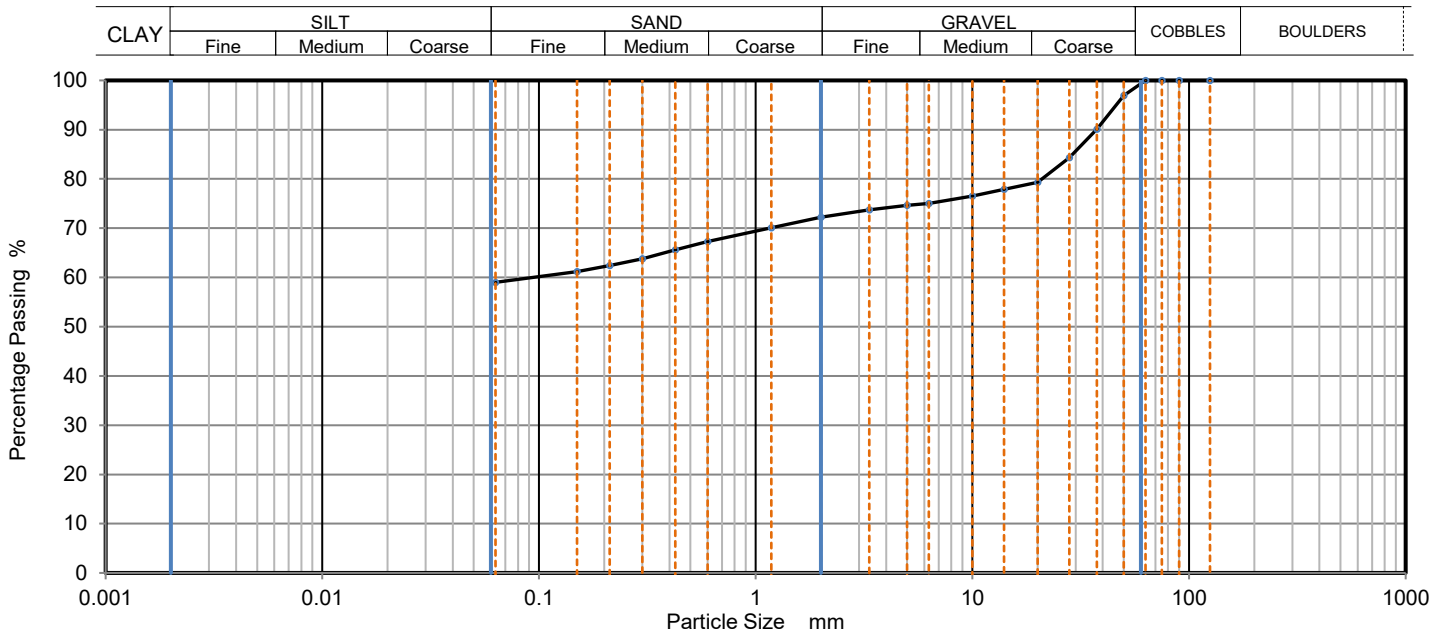
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead, NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276519
Hole No.: TP-02
Sample Reference: Not Given
Sample Description: Brown sandy gravelly CLAY

Depth Top [m]: 0.80
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	97		
37.5	90		
28	84		
20	79		
14	78		
10	77		
6.3	75		
5	75		
3.35	74		
2	72		
1.18	70		
0.6	67		
0.425	66		
0.3	64		
0.212	62		
0.15	61		
0.063	60		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	27.80
Sand	12.50
Fines <0.063mm	59.70

Grading Analysis		
D100	mm	63
D60	mm	0.0736
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 08/08/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 100.12

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TEST CERTIFICATE

Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Tested in Accordance with: BS 1377-2: 1990

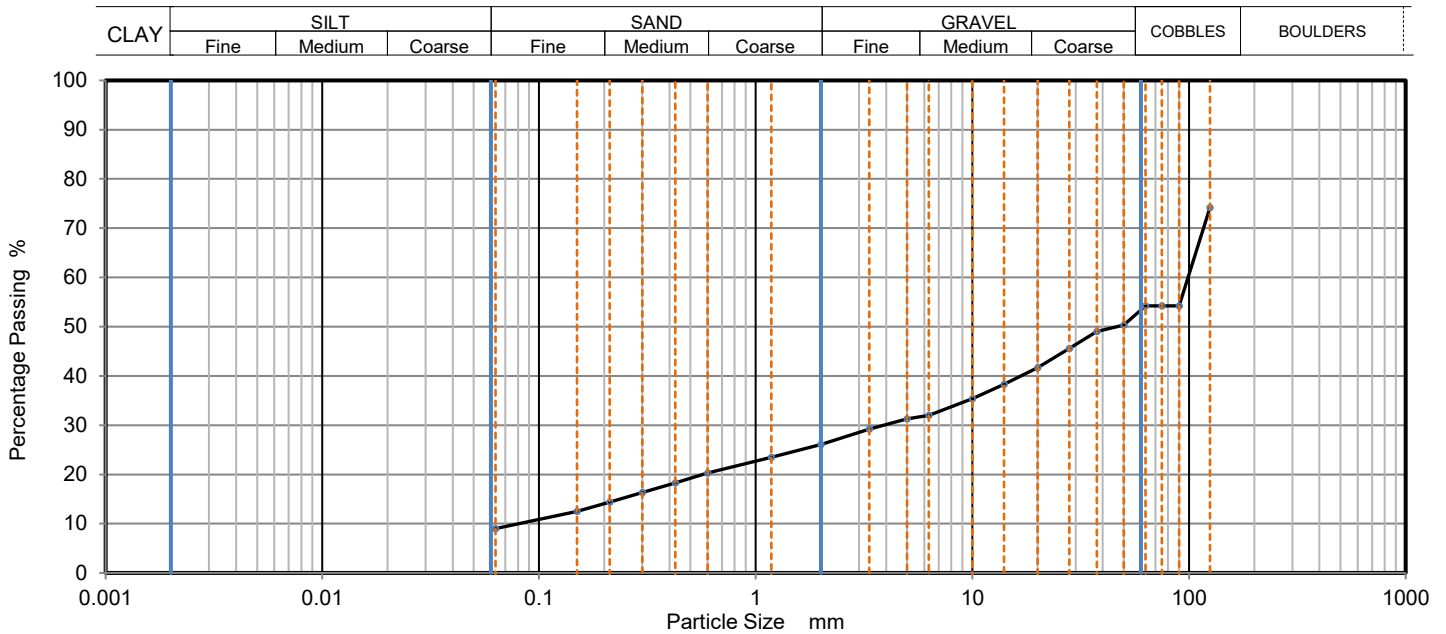
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead, NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276520
Hole No.: TP-04
Sample Reference: Not Given
Sample Description: Brown slightly clayey sandy GRAVEL with cobbles

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	74		
90	54		
75	54		
63	54		
50	50		
37.5	49		
28	46		
20	42		
14	38		
10	35		
6.3	32		
5	31		
3.35	29		
2	26		
1.18	24		
0.6	20		
0.425	18		
0.3	16		
0.212	14		
0.15	13		
0.063	10		

Sample Proportions	% dry mass
Very coarse	45.80
Gravel	28.10
Sand	16.60
Fines <0.063mm	9.60

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	1400
Curvature Coefficient	2.2

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

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PL Geotechnical Laboratory Manager
Date Reported: 08/08/2019

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TEST CERTIFICATE

Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Tested in Accordance with: BS 1377-2: 1990

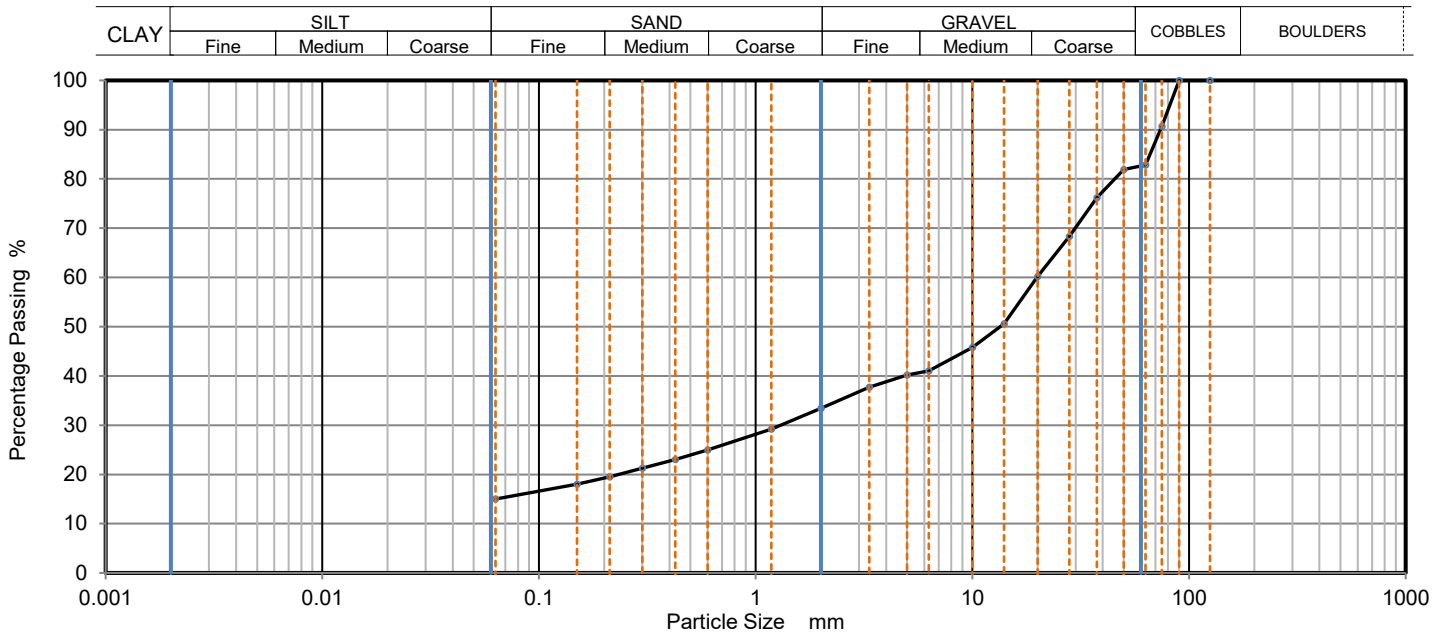
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276521
Hole No.: TP-09
Sample Reference: Not Given
Sample Description: Brown clayey sandy GRAVEL with cobbles

Depth Top [m]: 0.50
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	91		
63	83		
50	82		
37.5	76		
28	68		
20	60		
14	51		
10	46		
6.3	41		
5	40		
3.35	38		
2	33		
1.18	29		
0.6	25		
0.425	23		
0.3	21		
0.212	20		
0.15	18		
0.063	15		

Sample Proportions	% dry mass
Very coarse	17.20
Gravel	49.50
Sand	18.20
Fines <0.063mm	15.20

Grading Analysis		
D100	mm	90
D60	mm	19.9
D30	mm	1.3
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

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Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



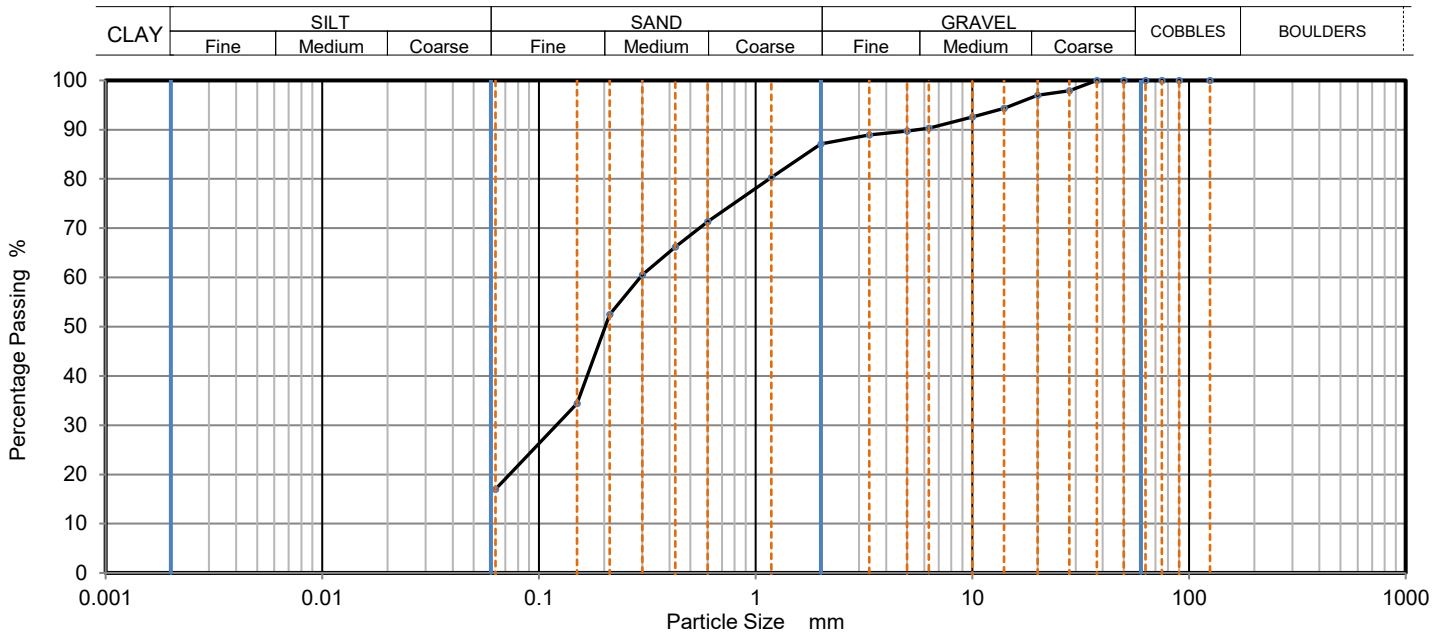
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276522
Hole No.: TP-08
Sample Reference: Not Given
Sample Description: Brown gravelly clayey SAND

Depth Top [m]: 1.50
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	98		
20	97		
14	94		
10	93		
6.3	90		
5	90		
3.35	89		
2	87		
1.18	80		
0.6	71		
0.425	66		
0.3	61		
0.212	53		
0.15	34		
0.063	17		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	12.90
Sand	69.70
Fines <0.063mm	17.40

Grading Analysis		
D100	mm	37.5
D60	mm	0.293
D30	mm	0.12
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

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PL Geotechnical Laboratory Manager
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Croxley Green Business Park
Watford Herts WD18 8YS



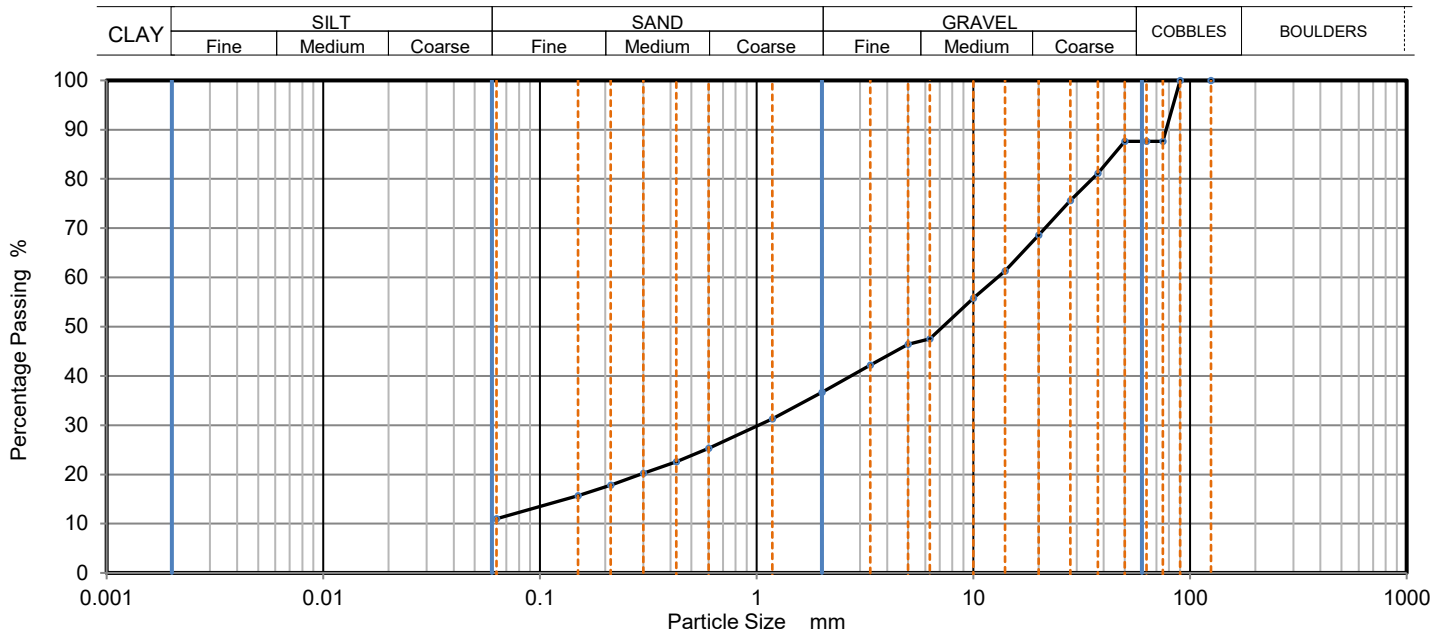
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead, NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276523
Hole No.: TP-10
Sample Reference: Not Given
Sample Description: Brown clayey sandy GRAVEL with cobbles

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	88		
63	88		
50	88		
37.5	81		
28	76		
20	69		
14	61		
10	56		
6.3	48		
5	46		
3.35	42		
2	37		
1.18	31		
0.6	25		
0.425	23		
0.3	20		
0.212	18		
0.15	16		
0.063	12		

Sample Proportions	% dry mass
Very coarse	12.40
Gravel	51.00
Sand	25.00
Fines <0.063mm	11.70

Grading Analysis		
D100	mm	90
D60	mm	12.9
D30	mm	1.02
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

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i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



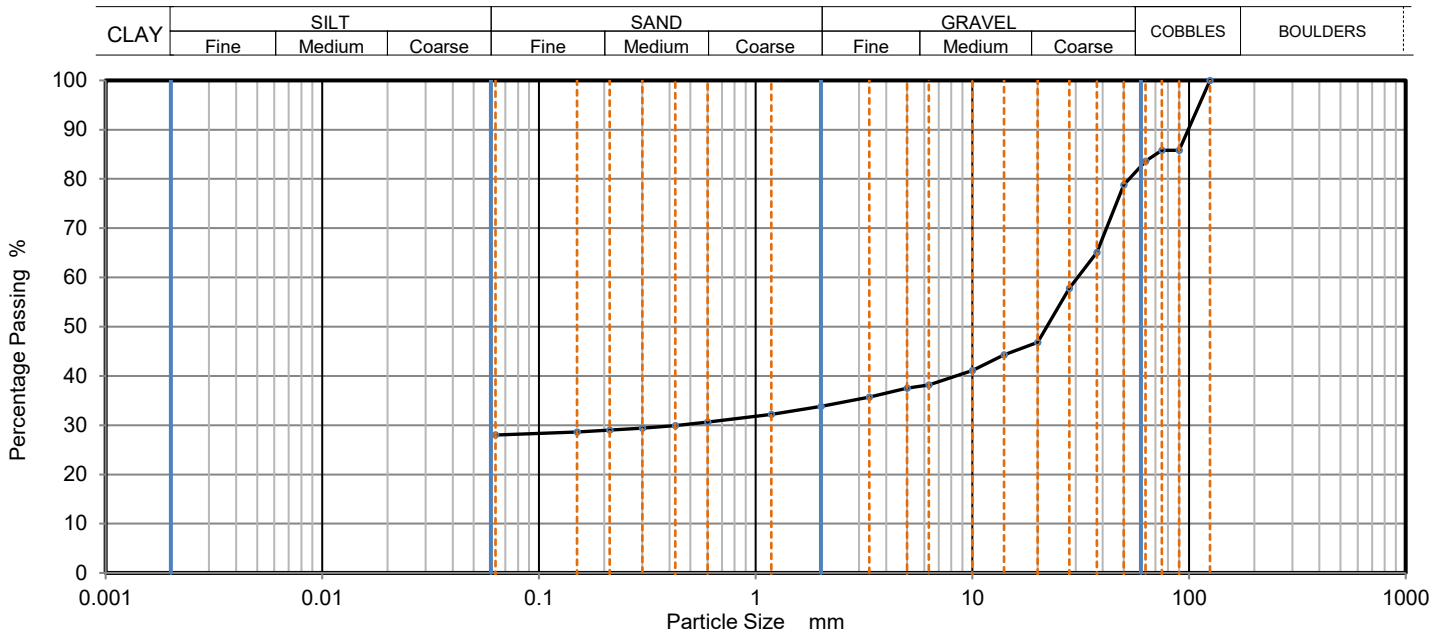
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead, NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276524
Hole No.: TP-10
Sample Reference: Not Given
Sample Description: Reddish brown slightly sandy clayey GRAVEL with cobbles

Depth Top [m]: 2.50
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	86		
75	86		
63	84		
50	79		
37.5	65		
28	58		
20	47		
14	44		
10	41		
6.3	38		
5	38		
3.35	36		
2	34		
1.18	32		
0.6	31		
0.425	30		
0.3	29		
0.212	29		
0.15	29		
0.063	28		

Sample Proportions	% dry mass
Very coarse	16.40
Gravel	49.90
Sand	5.70
Fines <0.063mm	28.00

Grading Analysis		
D100	mm	125
D60	mm	30.6
D30	mm	0.441
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

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Particle Size Distribution

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i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



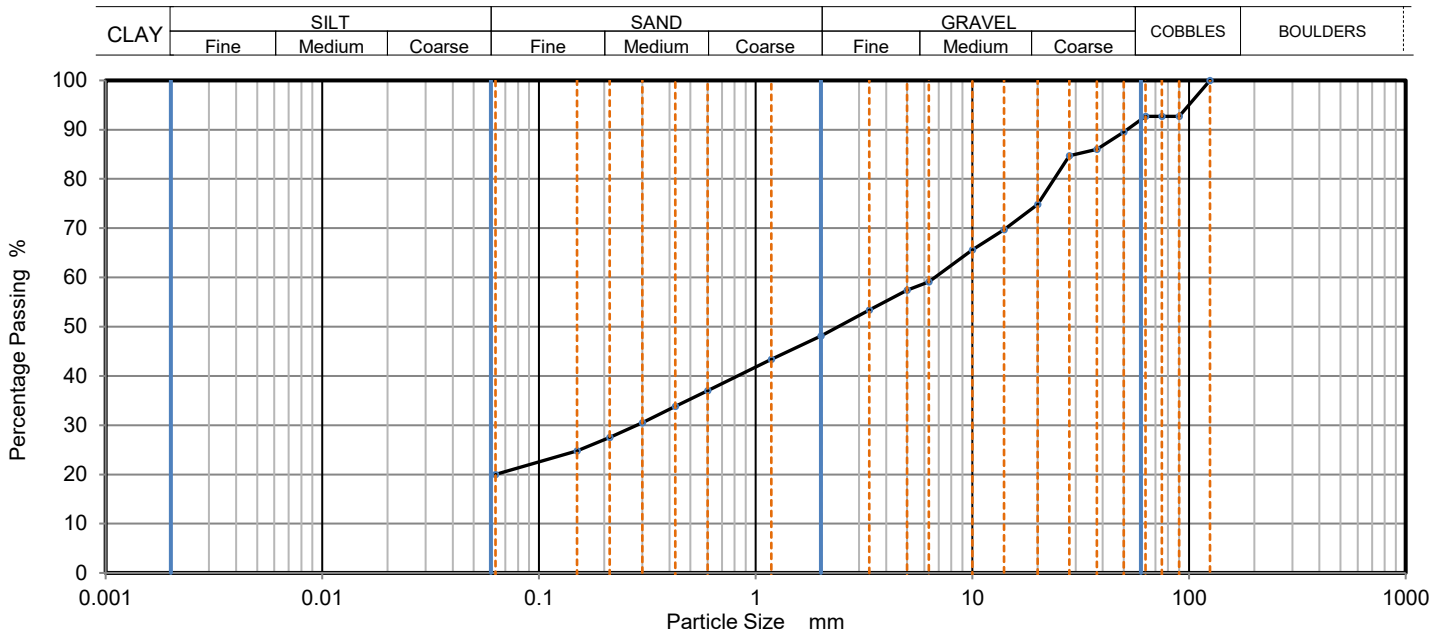
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276525
Hole No.: TP-20
Sample Reference: Not Given
Sample Description: Brown clayey sandy GRAVEL with cobbles

Depth Top [m]: 1.50
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	93		
75	93		
63	93		
50	90		
37.5	86		
28	85		
20	75		
14	70		
10	66		
6.3	59		
5	57		
3.35	53		
2	48		
1.18	43		
0.6	37		
0.425	34		
0.3	31		
0.212	28		
0.15	25		
0.063	21		

Sample Proportions	% dry mass
Very coarse	7.30
Gravel	44.60
Sand	27.50
Fines <0.063mm	20.60

Grading Analysis		
D100	mm	125
D60	mm	6.7
D30	mm	0.283
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

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Particle Size Distribution

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i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



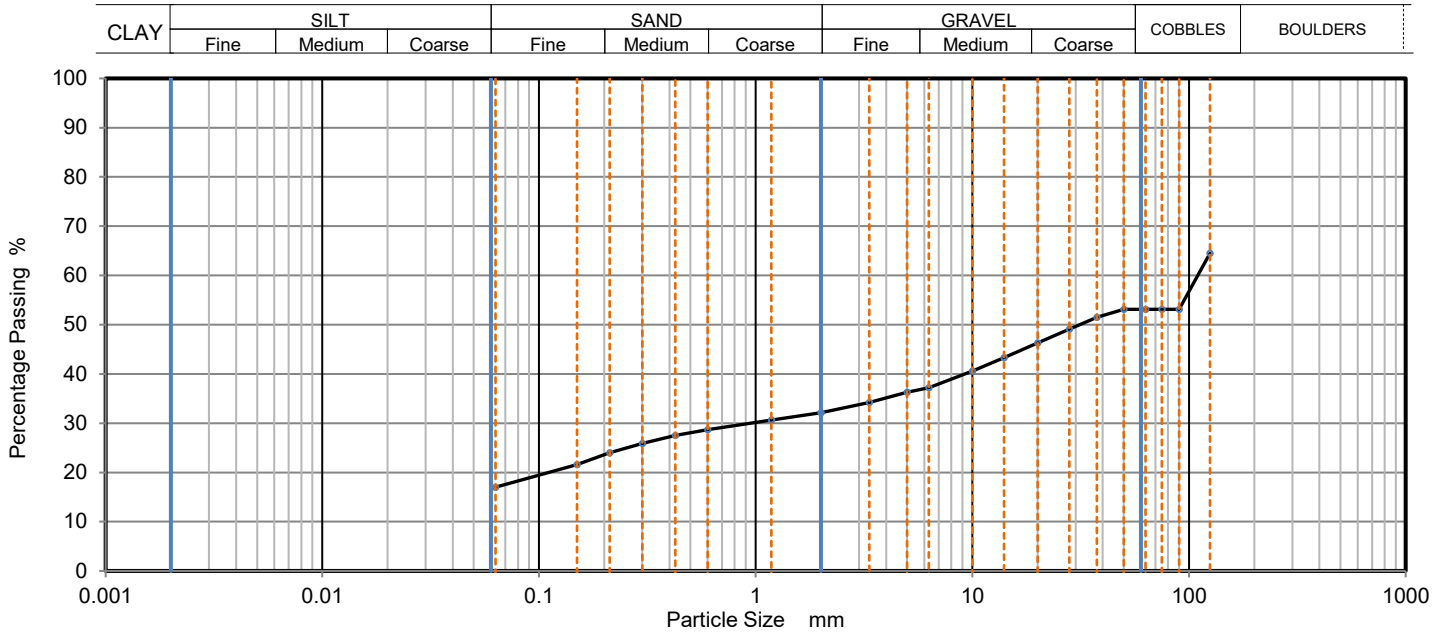
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276526
Hole No.: TP-19
Sample Reference: Not Given
Sample Description: Greyish brown sandy very clayey GRAVEL with cobbles

Depth Top [m]: 0.60
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	65		
90	53		
75	53		
63	53		
50	53		
37.5	52		
28	49		
20	46		
14	43		
10	41		
6.3	37		
5	36		
3.35	34		
2	32		
1.18	31		
0.6	29		
0.425	28		
0.3	26		
0.212	24		
0.15	22		
0.063	18		

Sample Proportions	% dry mass
Very coarse	46.90
Gravel	21.00
Sand	14.30
Fines <0.063mm	17.70

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Approved: Dariusz Piotrowski
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Particle Size Distribution

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



Tested in Accordance with: BS 1377-2: 1990

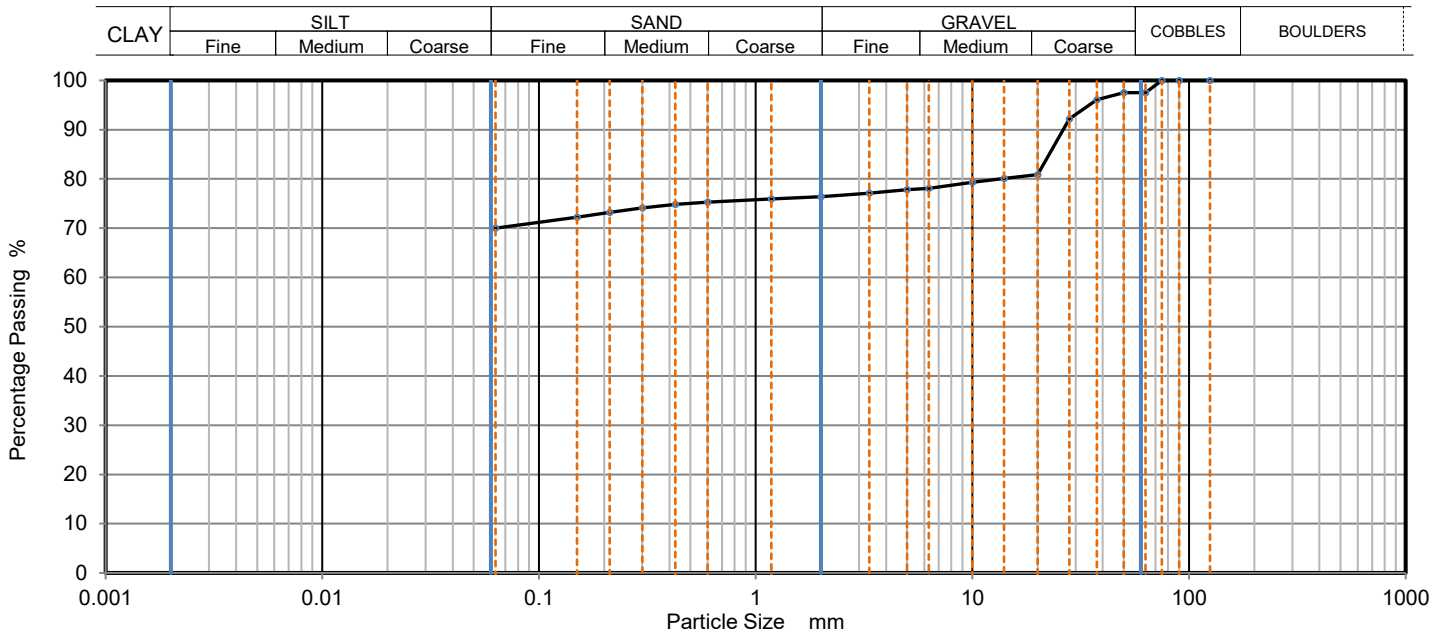
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead,
NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276527
Hole No.: TP-11
Sample Reference: Not Given
Sample Description: Brown slightly sandy gravelly CLAY with cobbles

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	100		
75	100		
63	98		
50	98		
37.5	96		
28	92		
20	81		
14	80		
10	79		
6.3	78		
5	78		
3.35	77		
2	76		
1.18	76		
0.6	75		
0.425	75		
0.3	74		
0.212	73		
0.15	72		
0.063	71		

Sample Proportions	% dry mass
Very coarse	2.50
Gravel	21.10
Sand	5.50
Fines <0.063mm	70.80

Grading Analysis		
D100	mm	75
D60	mm	
D30	mm	
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
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Particle Size Distribution

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i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



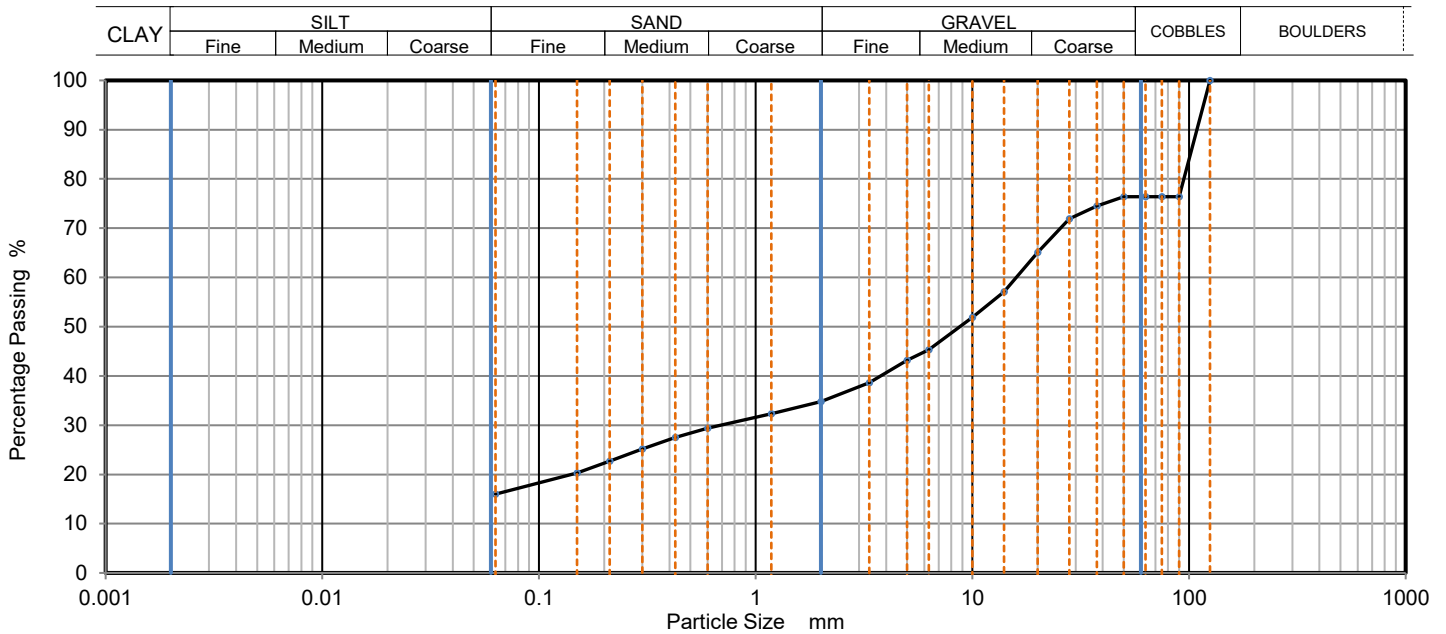
Client: The Shadbolt Group
Client Address: 18 Bewick Road, Gateshead, NE8 4DP
Contact: Iain McLean
Site Name: Newbottle Street, Houghton le Spring
Site Address: Not Given

Client Reference: 2585
Job Number: 19-51605
Date Sampled: Not Given
Date Received: 25/07/2019
Date Tested: 30/07/2019
Sampled By: Not Given

Test Results:

Laboratory Reference: 1276528
Hole No.: TP-01
Sample Reference: Not Given
Sample Description: Brown slightly sandy gravelly CLAY with cobbles

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
125	100		
90	76		
75	76		
63	76		
50	76		
37.5	75		
28	72		
20	65		
14	57		
10	52		
6.3	45		
5	43		
3.35	39		
2	35		
1.18	32		
0.6	29		
0.425	28		
0.3	25		
0.212	23		
0.15	20		
0.063	16		

Sample Proportions	% dry mass
Very coarse	23.60
Gravel	41.70
Sand	18.50
Fines <0.063mm	16.30

Grading Analysis		
D100	mm	125
D60	mm	15.9
D30	mm	0.693
D10	mm	
Uniformity Coefficient		
Curvature Coefficient		

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 08/08/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 100.12

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



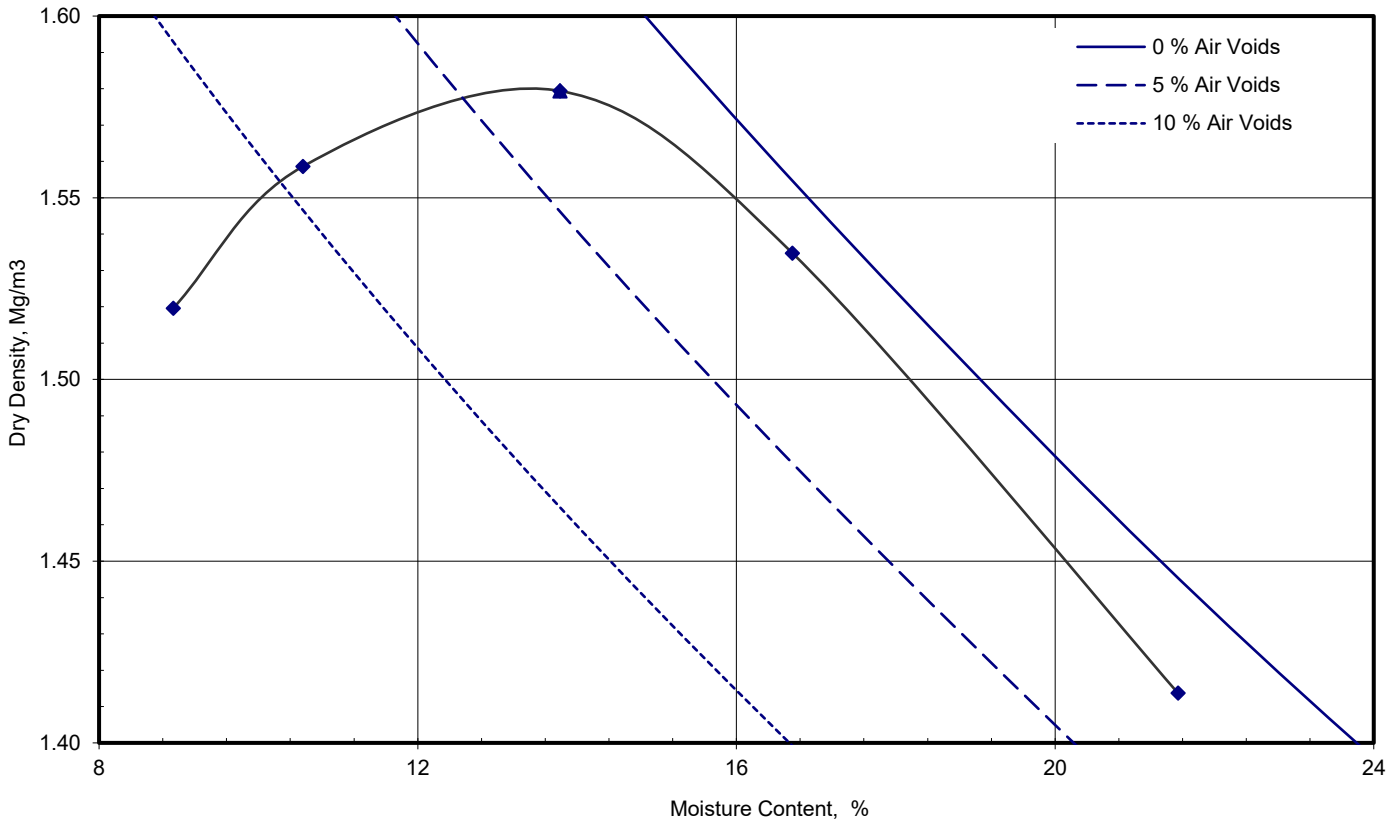
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276509
 Hole No.: TP-02
 Sample Reference: Not Given
 Sample Description: Black slightly clayey very gravelly SAND

Depth Top [m]: 1.50
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	2
Material Retained on 20.0 mm Sieve	%	5
Particle Density - Assumed	Mg/m ³	2.10
As received Moisture Content	%	22
Maximum Dry Density	Mg/m³	1.58
Optimum Moisture Content	%	14

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
Piotrowski
Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
D. Berrill
for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



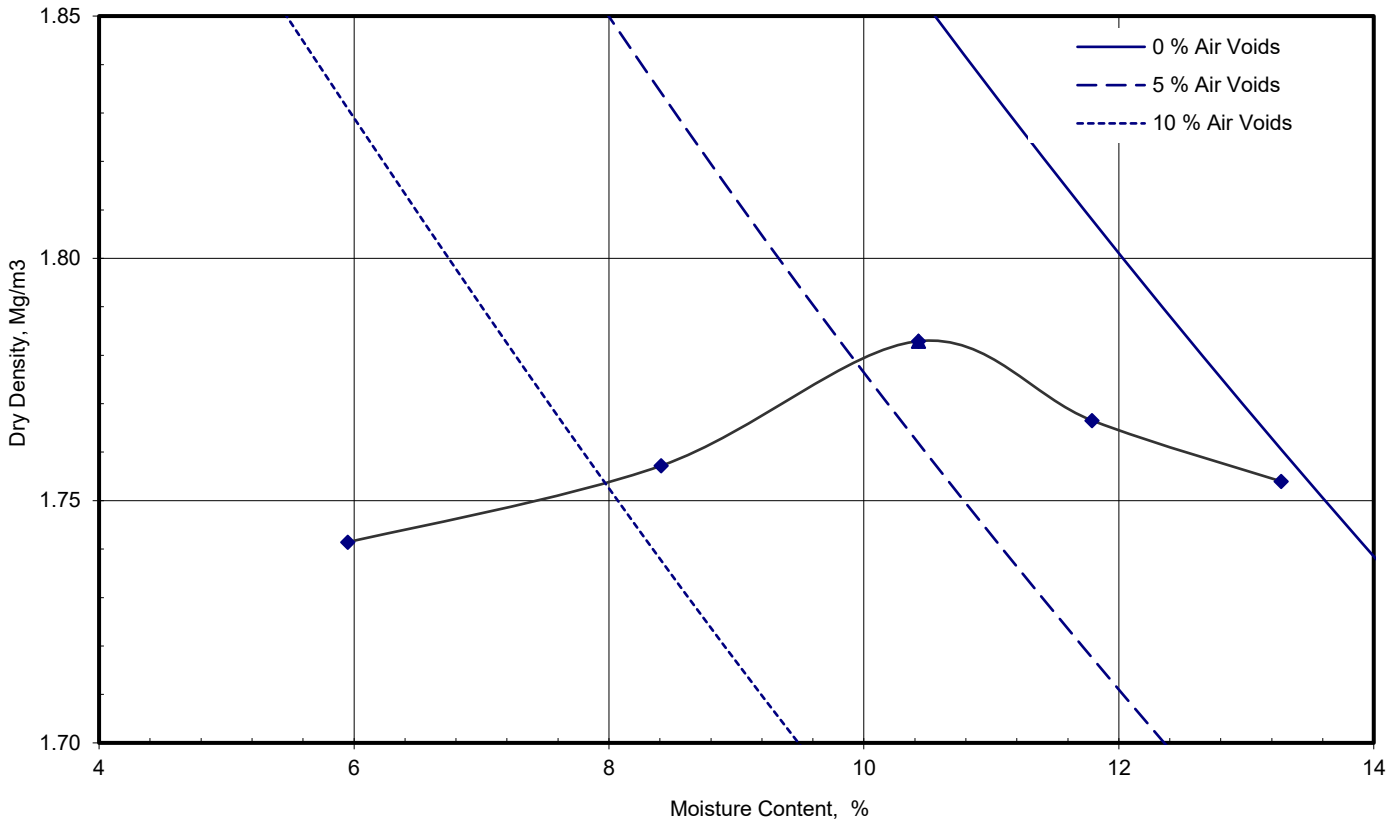
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276510
 Hole No.: TP-04
 Sample Reference: Not Given
 Sample Description: Dark grey very gravelly very clayey SAND

Depth Top [m]: 0.50
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	10
Material Retained on 20.0 mm Sieve	%	14
Particle Density - Assumed	Mg/m ³	2.30
As received Moisture Content	%	13
Maximum Dry Density	Mg/m³	1.78
Optimum Moisture Content	%	10

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Zone X - test carried out as per client request. Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
Piotrowski
Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
D. Berrill
for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



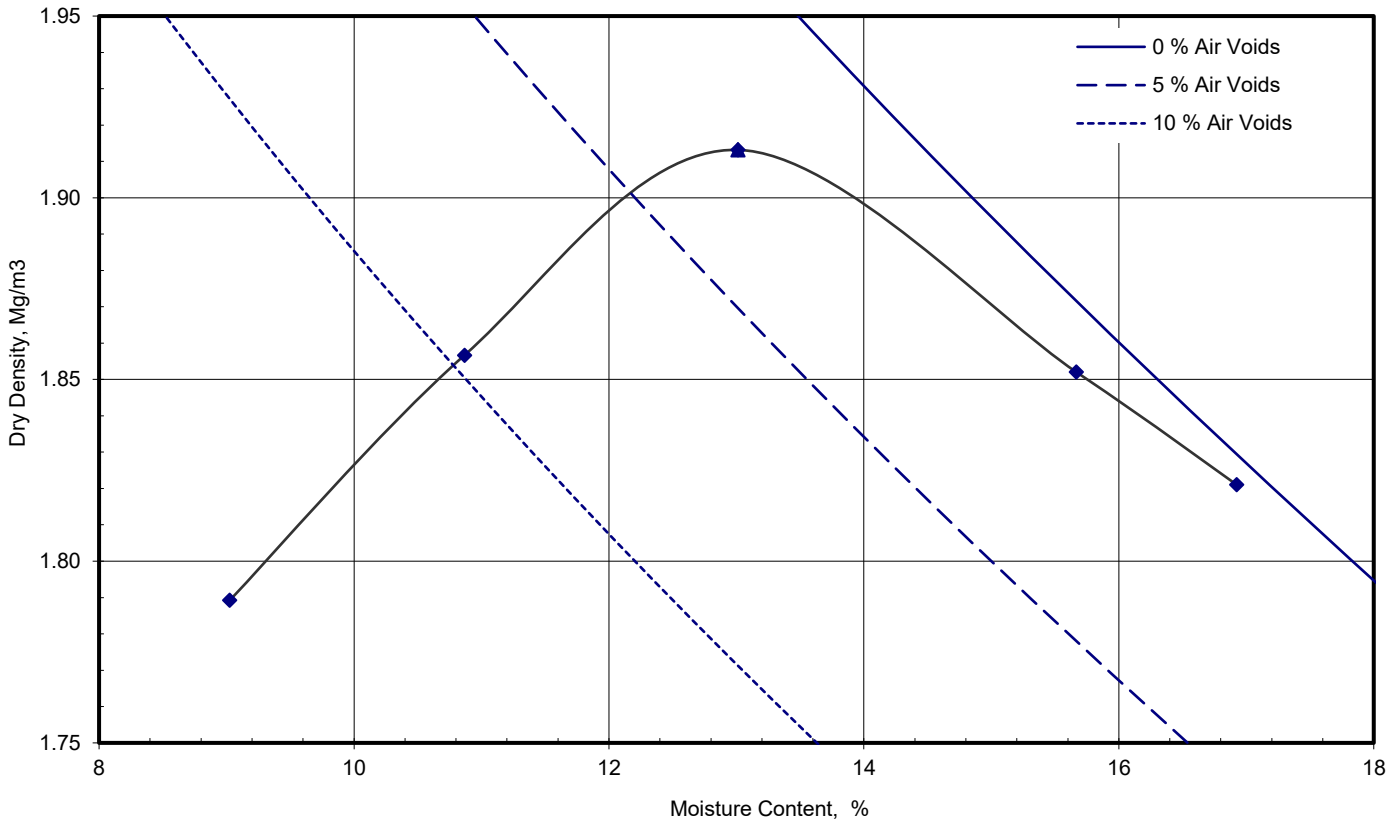
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276511
 Hole No.: TP-09
 Sample Reference: Not Given
 Sample Description: Reddish brown slightly clayey sandy GRAVEL

Depth Top [m]: 2.00
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	8
Material Retained on 20.0 mm Sieve	%	25
Particle Density - Assumed	Mg/m ³	2.65
As received Moisture Content	%	14
Maximum Dry Density	Mg/m³	1.91
Optimum Moisture Content	%	13

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Zone X - test carried out as per client request. Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



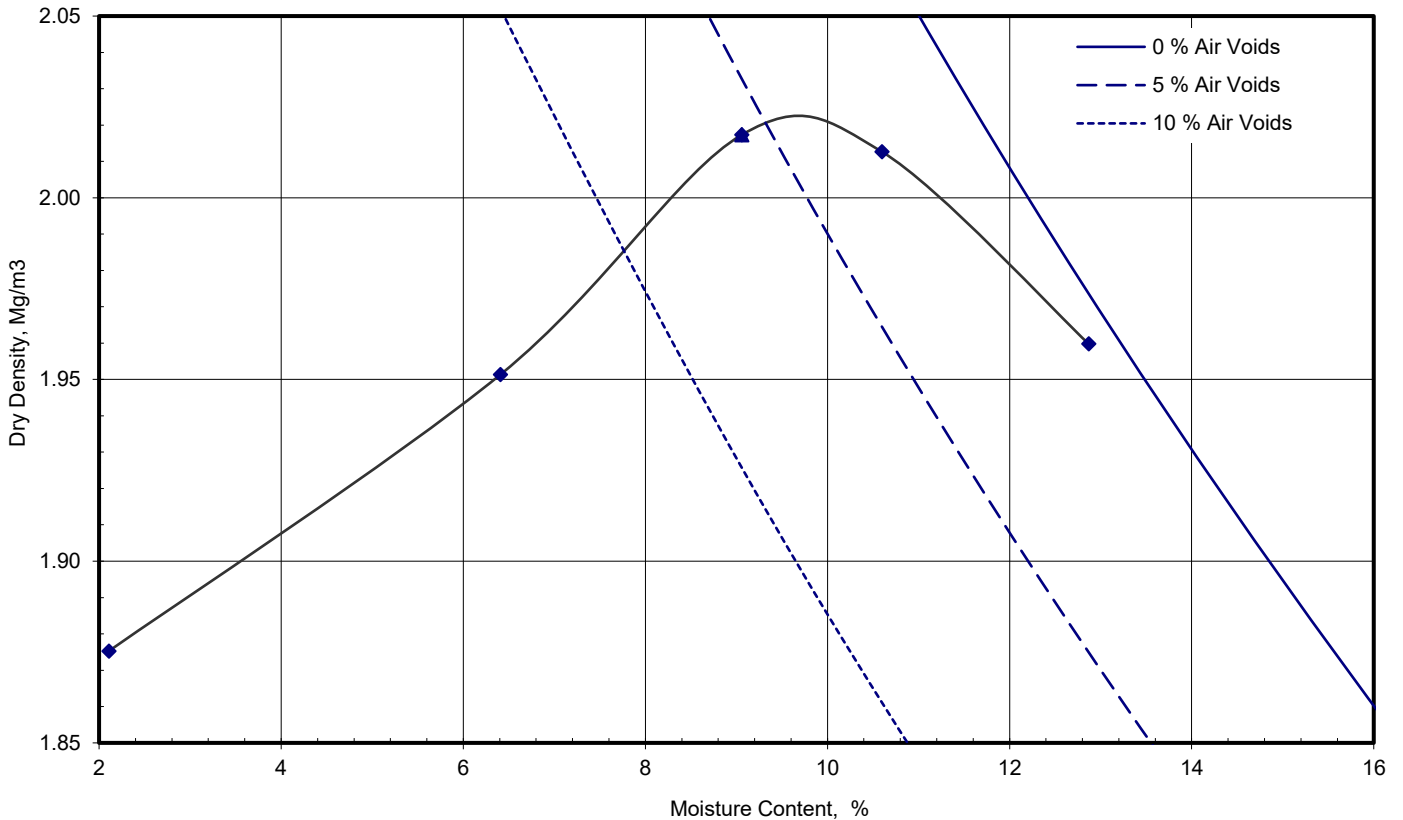
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276513
 Hole No.: TP-10
 Sample Reference: Not Given
 Sample Description: Yellowish brown sandy gravelly CLAY

Depth Top [m]: 2.50
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	4
Material Retained on 20.0 mm Sieve	%	8
Particle Density - Assumed	Mg/m ³	2.65
As received Moisture Content	%	22
Maximum Dry Density	Mg/m³	2.02
Optimum Moisture Content	%	9.1

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks:

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



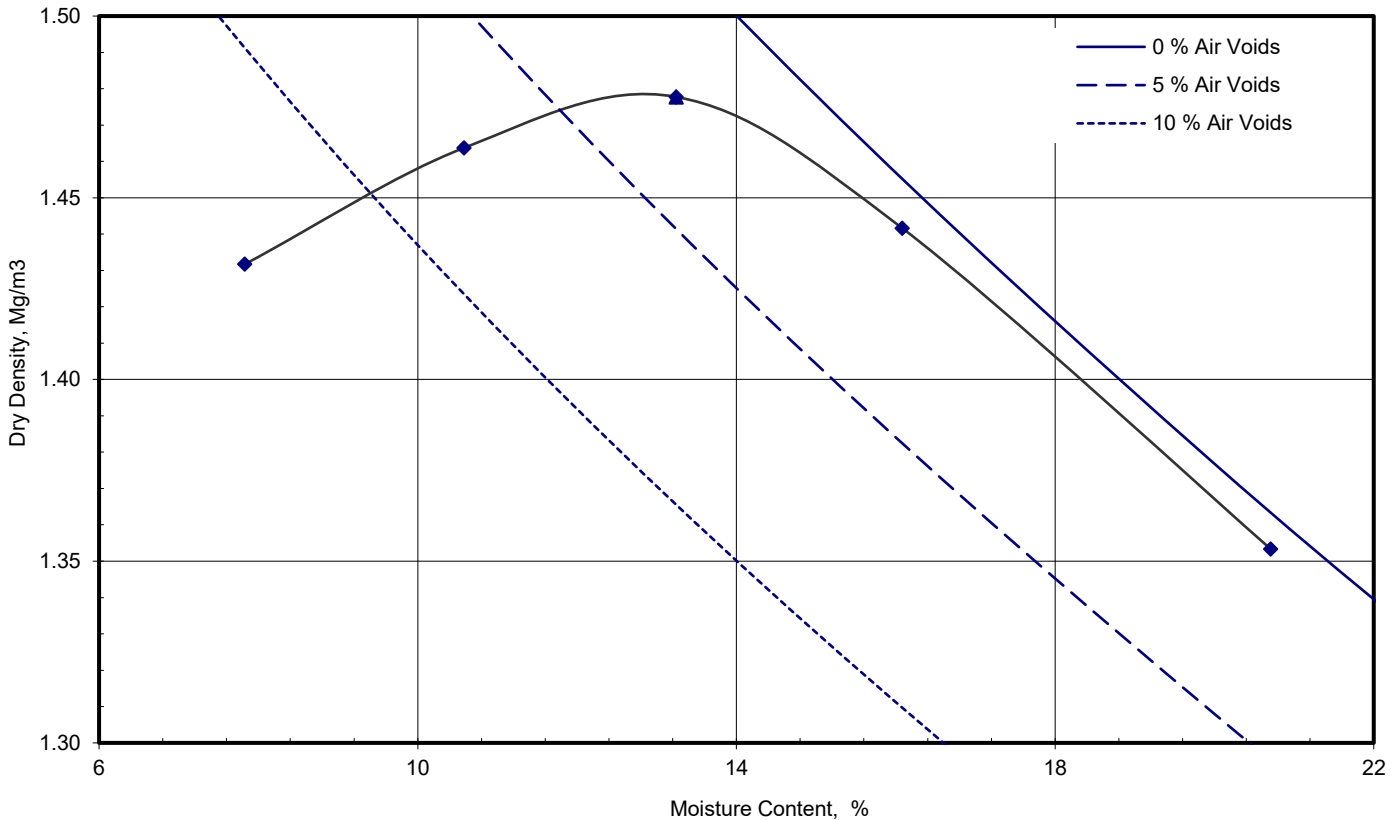
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276514
 Hole No.: TP-18
 Sample Reference: Not Given
 Sample Description: Black slightly clayey very gravelly COAL

Depth Top [m]: 1.50
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	36
Material Retained on 20.0 mm Sieve	%	42
Particle Density - Assumed	Mg/m ³	1.90
As received Moisture Content	%	21
Maximum Dry Density	Mg/m³	1.48
Optimum Moisture Content	%	13

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Zone X - test carried out as per client request. Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
Piotrowski
Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
D. Berrill
for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

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 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



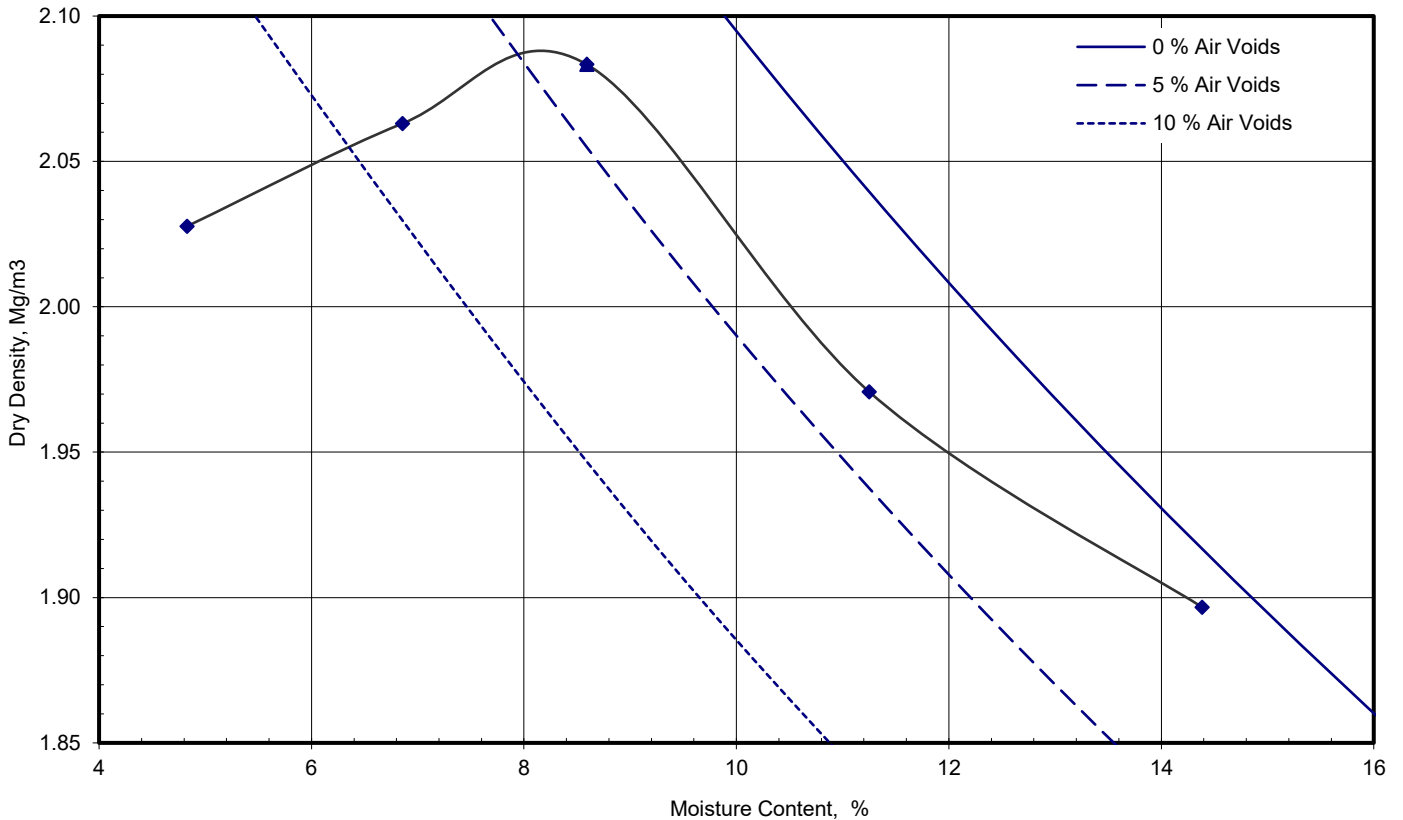
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 03/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276515
 Hole No.: TP-19
 Sample Reference: Not Given
 Sample Description: Brownish grey very clayey very sandy GRAVEL

Depth Top [m]: 2.00
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	2
Material Retained on 20.0 mm Sieve	%	18
Particle Density - Assumed	Mg/m ³	2.65
As received Moisture Content	%	14
Maximum Dry Density	Mg/m³	2.08
Optimum Moisture Content	%	8.6

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



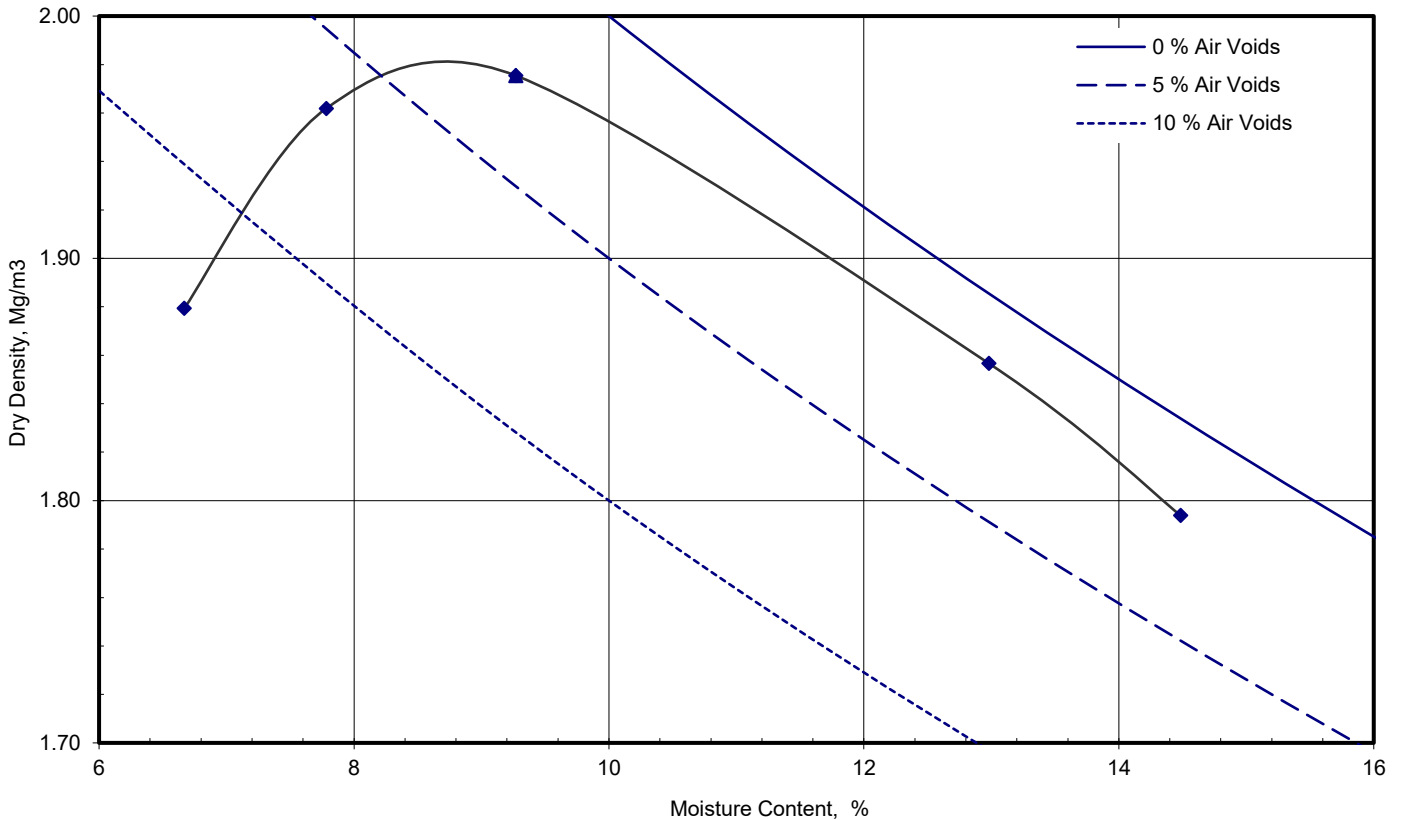
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276516
 Hole No.: TP-16
 Sample Reference: Not Given
 Sample Description: Reddish brown clayey very sandy GRAVEL

Depth Top [m]: 1.00
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	41
Material Retained on 20.0 mm Sieve	%	51
Particle Density - Assumed	Mg/m ³	2.50
As received Moisture Content	%	13
Maximum Dry Density	Mg/m³	1.98
Optimum Moisture Content	%	9.3

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Zone X - test carried out as per client request. Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



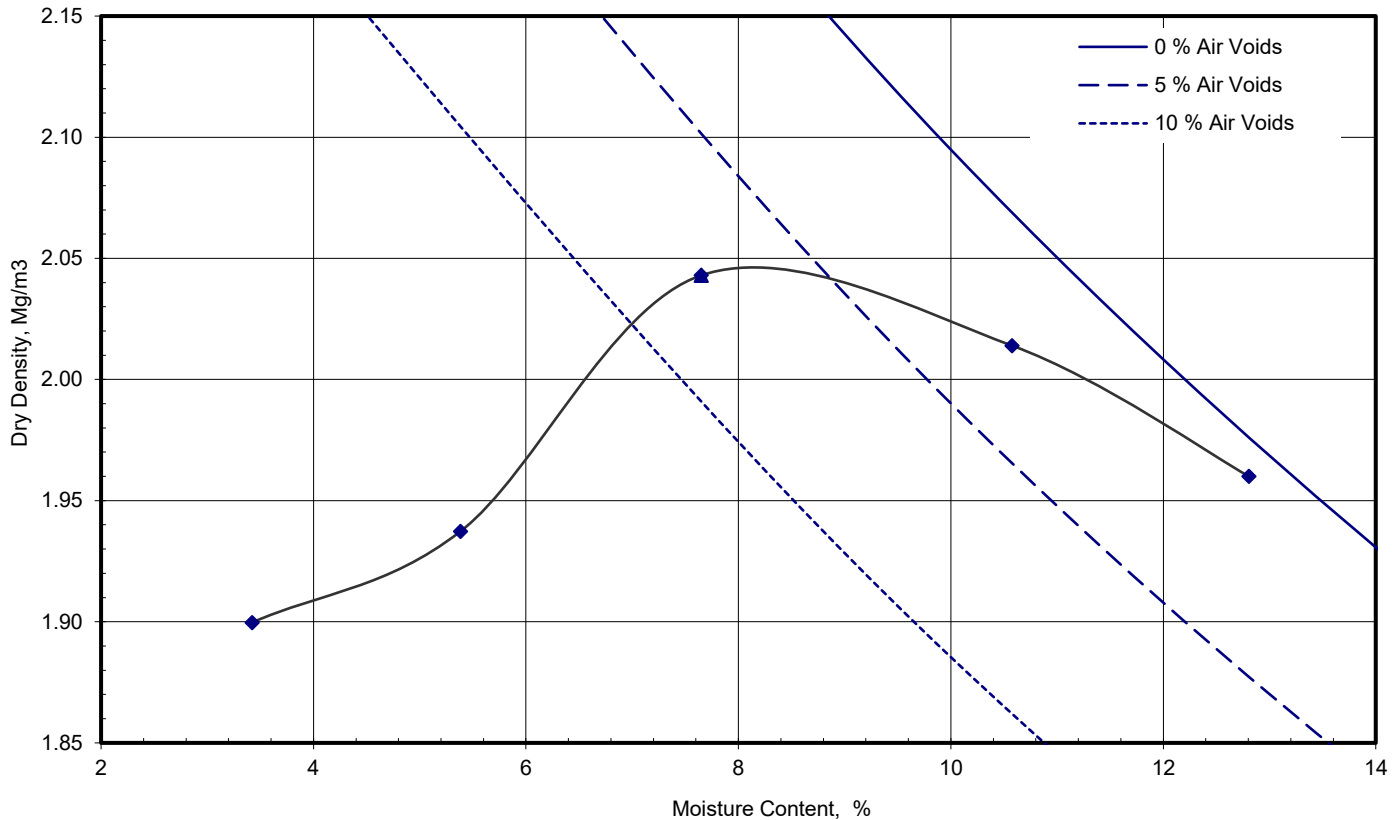
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 05/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276517
 Hole No.: TP-14
 Sample Reference: Not Given
 Sample Description: Dark brown gravelly very sandy CLAY

Depth Top [m]: 1.20
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	5
Material Retained on 20.0 mm Sieve	%	10
Particle Density - Assumed	Mg/m ³	2.65
As received Moisture Content	%	13
Maximum Dry Density	Mg/m³	2.04
Optimum Moisture Content	%	7.7

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks:

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 110.15

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TEST CERTIFICATE
Dry Density / Moisture Content
Relationship Heavy Compaction

Tested in Accordance with:
 BS 1377-4: 1990

i2 Analytical Ltd
 7 Woodshots Meadow
 Croxley Green Business Park
 Watford Herts WD18 8YS



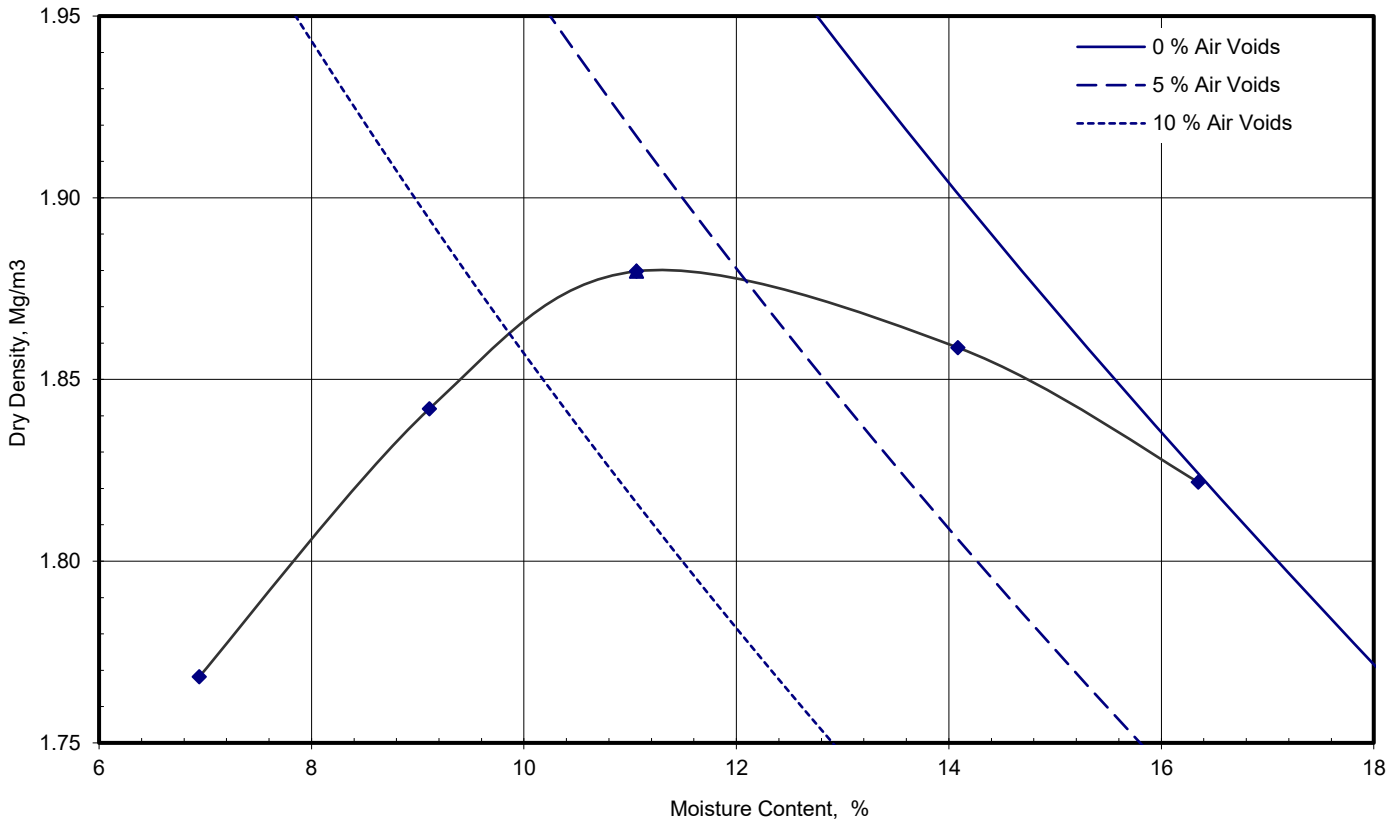
Client: The Shadbolt Group
 Client Address: 18 Bewick Road, Gateshead,
 NE8 4DP
 Contact: Iain McLean
 Site Name: Newbottle Street, Houghton le Spring
 Site Address: Not Given

Client Reference: 2585
 Job Number: 19-51605
 Date Sampled: Not Given
 Date Received: 25/07/2019
 Date Tested: 03/08/2019
 Sampled By: Not Given

Test Results:

Laboratory Reference: 1276518
 Hole No.: TP-03
 Sample Reference: Not Given
 Sample Description: Brownish grey very sandy very gravelly CLAY

Depth Top [m]: 1.50
 Depth Base [m]: Not Given
 Sample Type: B



Preparation		Material used was natural
Mould Type		1 Litre
Samples Used		Single sample tested
Material Retained on 37.5 mm Sieve	%	20
Material Retained on 20.0 mm Sieve	%	28
Particle Density - Assumed	Mg/m ³	2.60
As received Moisture Content	%	25
Maximum Dry Density	Mg/m³	1.88
Optimum Moisture Content	%	11

Note: Tested in Accordance with BS 1377-4: 1990: Clause 3.5 using 4.5kg [heavy] Rammer

Remarks: Zone X - test carried out as per client request. Insufficient amount of material - compacted in proctor mould

Approved: Dariusz Piotrowski
 PL Geotechnical Laboratory Manager
 Date Reported: 08/08/2019

Signed: Darren Berrill
 Geotechnical General Manager
 for and on behalf of i2 Analytical Ltd GF 110.15

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LABORATORY REPORT



4043

Contract Number: PSL20/2480

Report Date: 27 May 2020
Client's Reference: 2585
Client Name: The Shadbolt Group
18 Bewick Road
Gateshead
Tyne & Wear
NE8 4DP

For the attention of: Iain Mclean/Mike Taylor

Contract Title: Houghton Colliery, Houghton le Spring
Date Received: 20/5/2020
Date Commenced: 20/5/2020
Date Completed: 27/5/2020

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

R Gunson
(Director)

A Watkins
(Director)

R Berriman
(Quality Manager)

L Knight
(Senior Technician)

S Eyre
(Senior Technician)

S Royle
(Laboratory Manager)

5 – 7 Hexthorpe Road, Hexthorpe,
Doncaster DN4 0AR
tel: +44 (0)844 815 6641
fax: +44 (0)844 815 6642
e-mail: rgunson@prosoils.co.uk
awatkins@prosoils.co.uk

Page 1 of

SUMMARY OF LABORATORY SOIL DESCRIPTIONS

Hole Number	Sample Number	Sample Type	Top Depth m	Base Depth m	Description of Sample
CBR-01		B	0.50		Brown very sandy slightly clayey GRAVEL.
CBR-02		B	0.50		Brown very sandy slightly clayey GRAVEL.
CBR-03		B	0.50		Brown slightly gravelly sandy CLAY.
CBR-04		B	0.50		Brown slightly gravelly sandy CLAY.



Houghton Colliery, Houghton le Spring

Contract No:
PSL20/2480
Client Ref:
2585

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

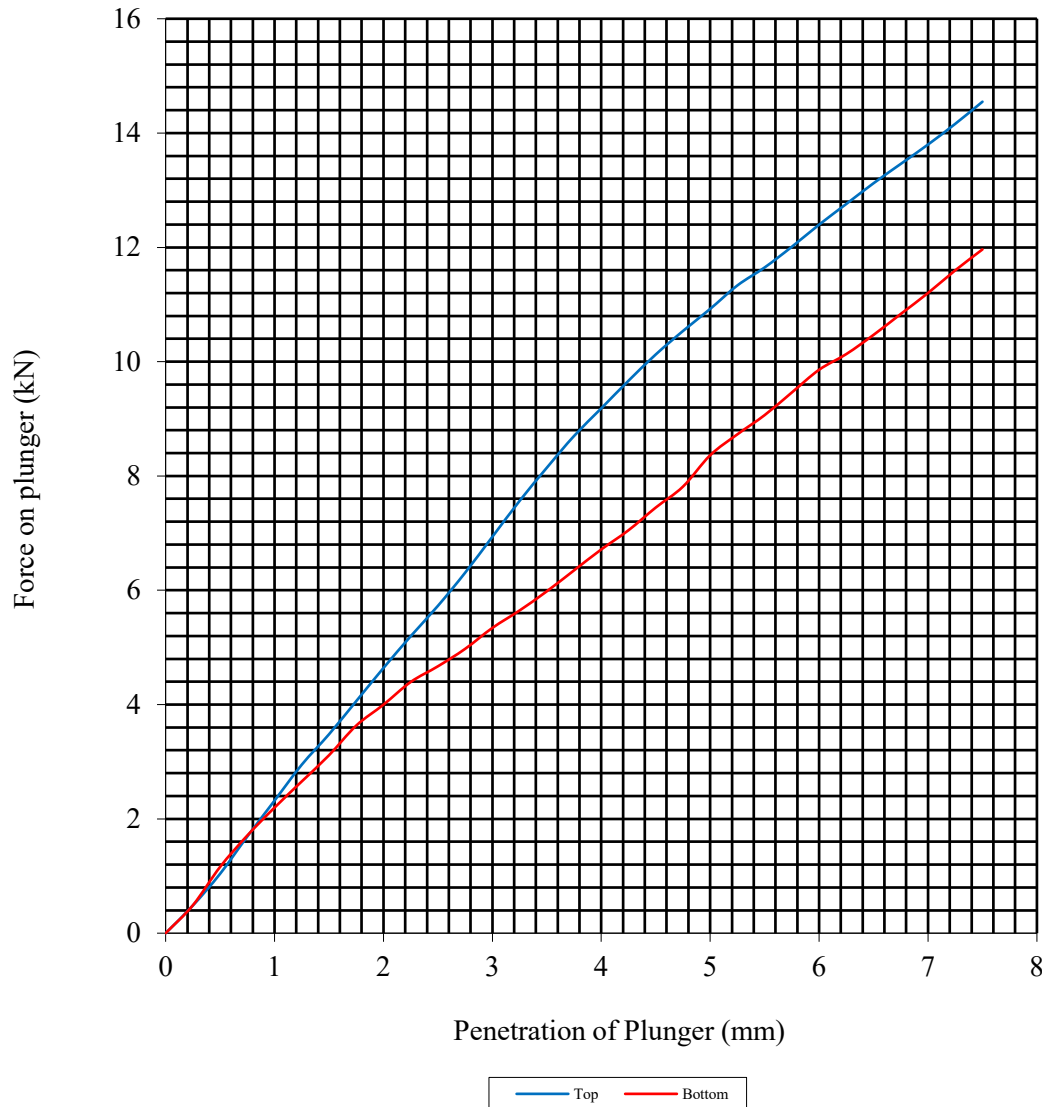
Hole Number: CBR-01

Top Depth (m): 0.50

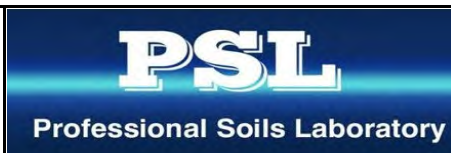
Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	9.0	Surcharge Kg:	4.20	Sample Top	8.8	Sample Top	54.6
Bulk Density Mg/m ³ :	2.00	Soaking Time hrs	0	Sample Bottom	9.2	Sample Bottom	41.8
Dry Density Mg/m ³ :	1.84	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:	18						
Compaction Conditions	2.5kg						



Houghton Colliery, Houghton le Spring

Contract No:
PSL20/2480
Client Ref:
2585

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

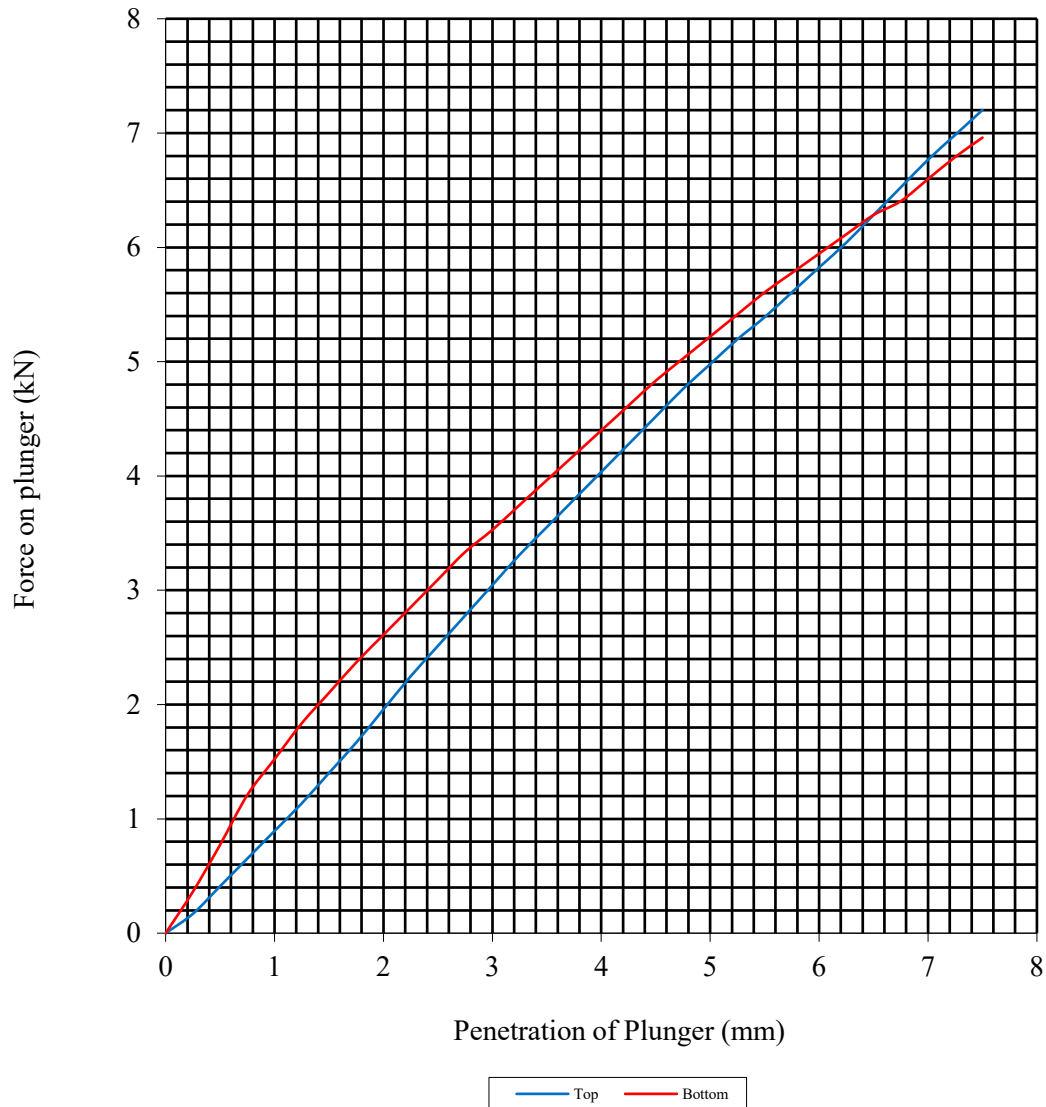
Hole Number: CBR-02

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	12	Surcharge Kg:	4.20	Sample Top	12	Sample Top	24.9
Bulk Density Mg/m ³ :	2.08	Soaking Time hrs	0	Sample Bottom	12	Sample Bottom	26.1
Dry Density Mg/m ³ :	1.85	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			15				
Compaction Conditions		2.5kg					



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Contract No:
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Client Ref:
2585

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

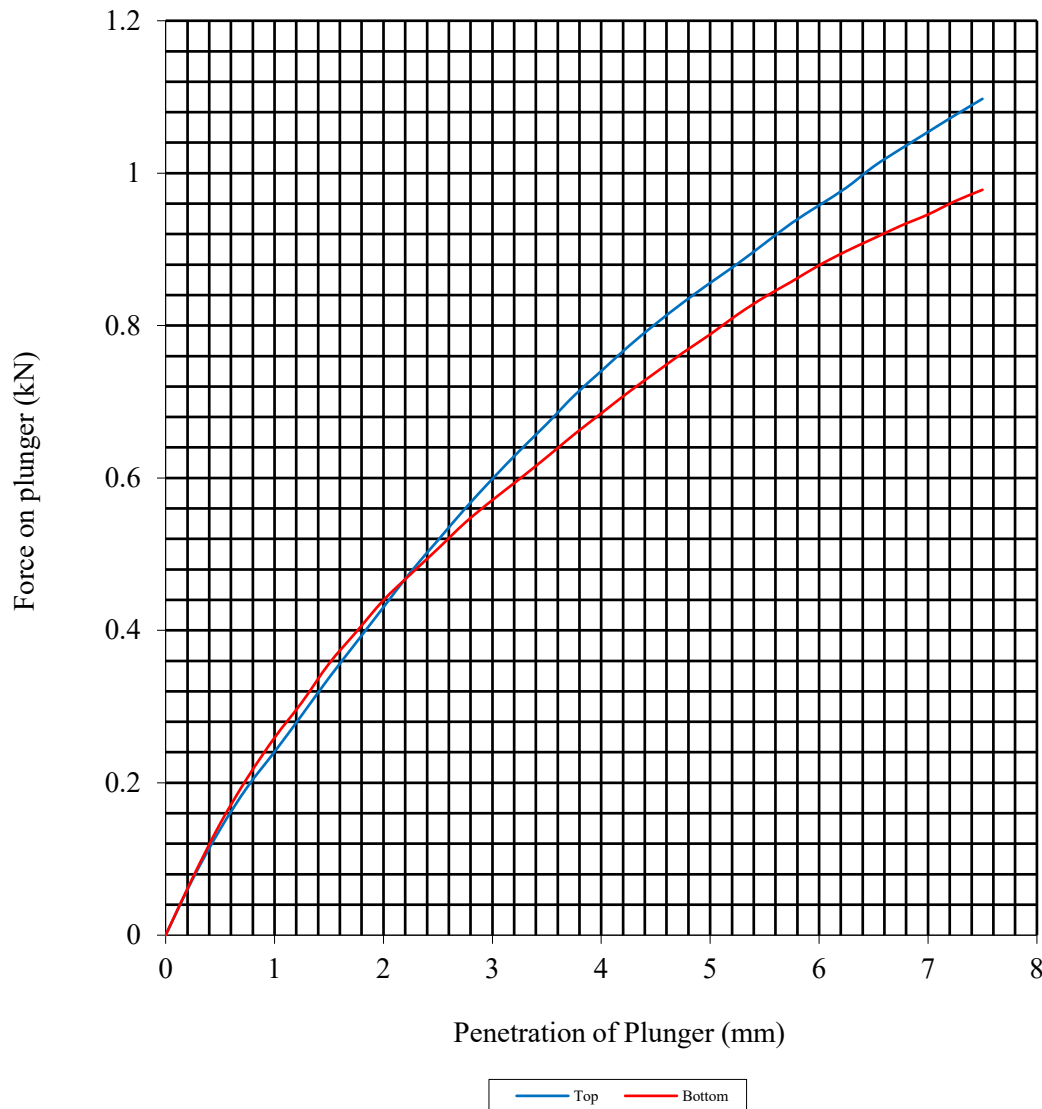
Hole Number: CBR-03

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	23	Surcharge Kg:	4.20	Sample Top	23	Sample Top	4.3
Bulk Density Mg/m ³ :	2.06	Soaking Time hrs	0	Sample Bottom	23	Sample Bottom	3.9
Dry Density Mg/m ³ :	1.67	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions	2.5kg						



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Contract No:
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2585

CALIFORNIA BEARING RATIO TEST

BS 1377 : Part 4 : 1990

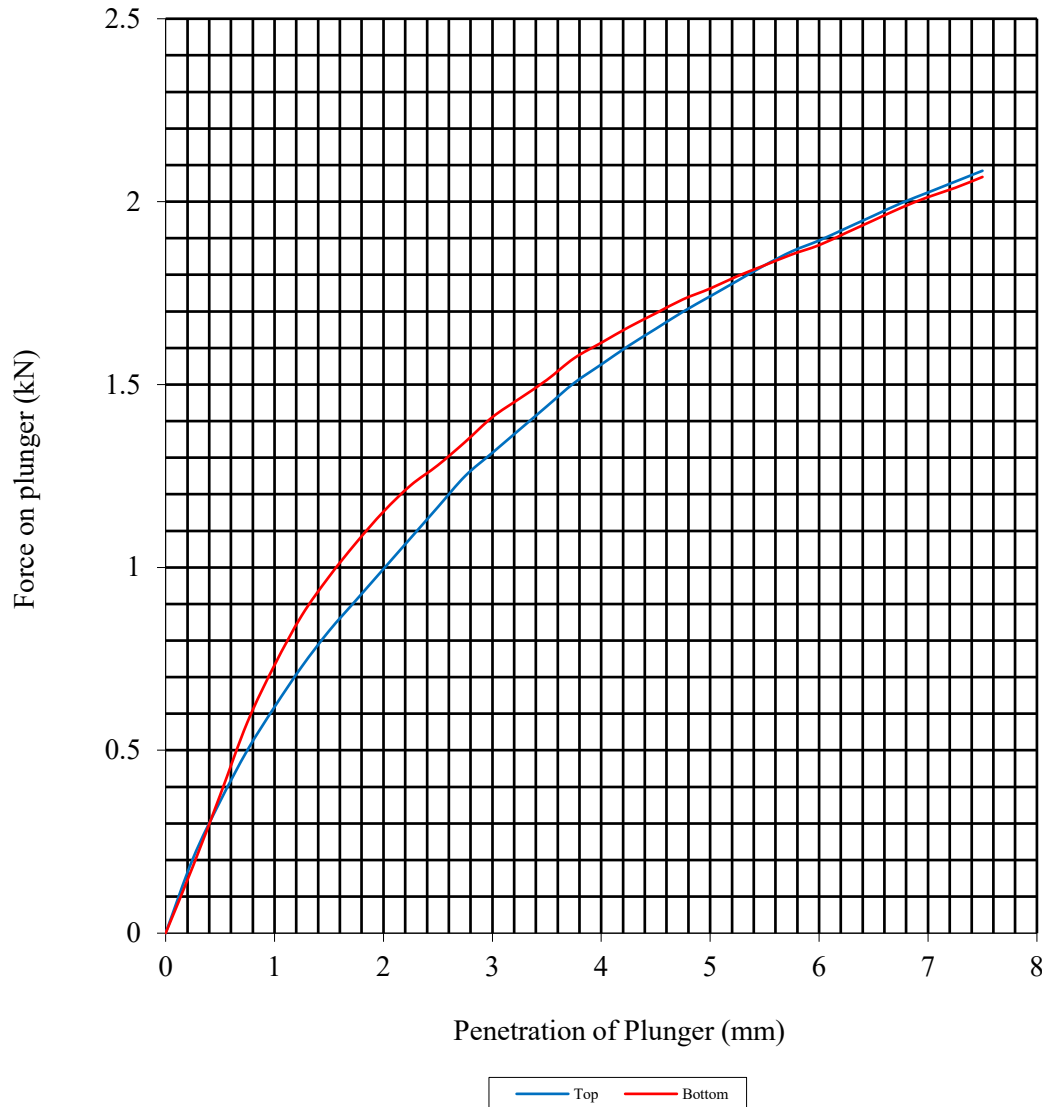
Hole Number: CBR-04

Top Depth (m): 0.50

Sample Number:

Base Depth (m):

Sample Type: B



Initial Sample Conditions		Sample Preparation		Final Moisture Content %		C.B.R. Value %	
Moisture Content:	20	Surcharge Kg:	4.20	Sample Top	20	Sample Top	8.8
Bulk Density Mg/m ³ :	2.06	Soaking Time hrs	0	Sample Bottom	20	Sample Bottom	9.7
Dry Density Mg/m ³ :	1.72	Swelling mm:	0	Remarks : See Summary of Soil Descriptions.			
Percentage retained on 20mm BS test sieve:			0				
Compaction Conditions	2.5kg						



PSL
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Contract No:
PSL20/2480
Client Ref:
2585



LABORATORY REPORT



4043

Contract Number: PSL19/5011

Report Date: 23 August 2019
Client's Reference: 2585
Client Name: The Shadbolt Group
18 Bewick Road
Gateshead
Tyne & Wear
NE8 4DP

For the attention of: Emmanuel Barreto

Contract Title: Newbottle Street, Houghton le Spring
Date Received: 19/8/2019
Date Commenced: 19/8/2019
Date Completed: 23/8/2019

Notes: Opinions and Interpretations are outside the UKAS Accreditation

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 other than in full, without the prior written approval of the laboratory.

Checked and Approved Signatories:

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Page 1 of

UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

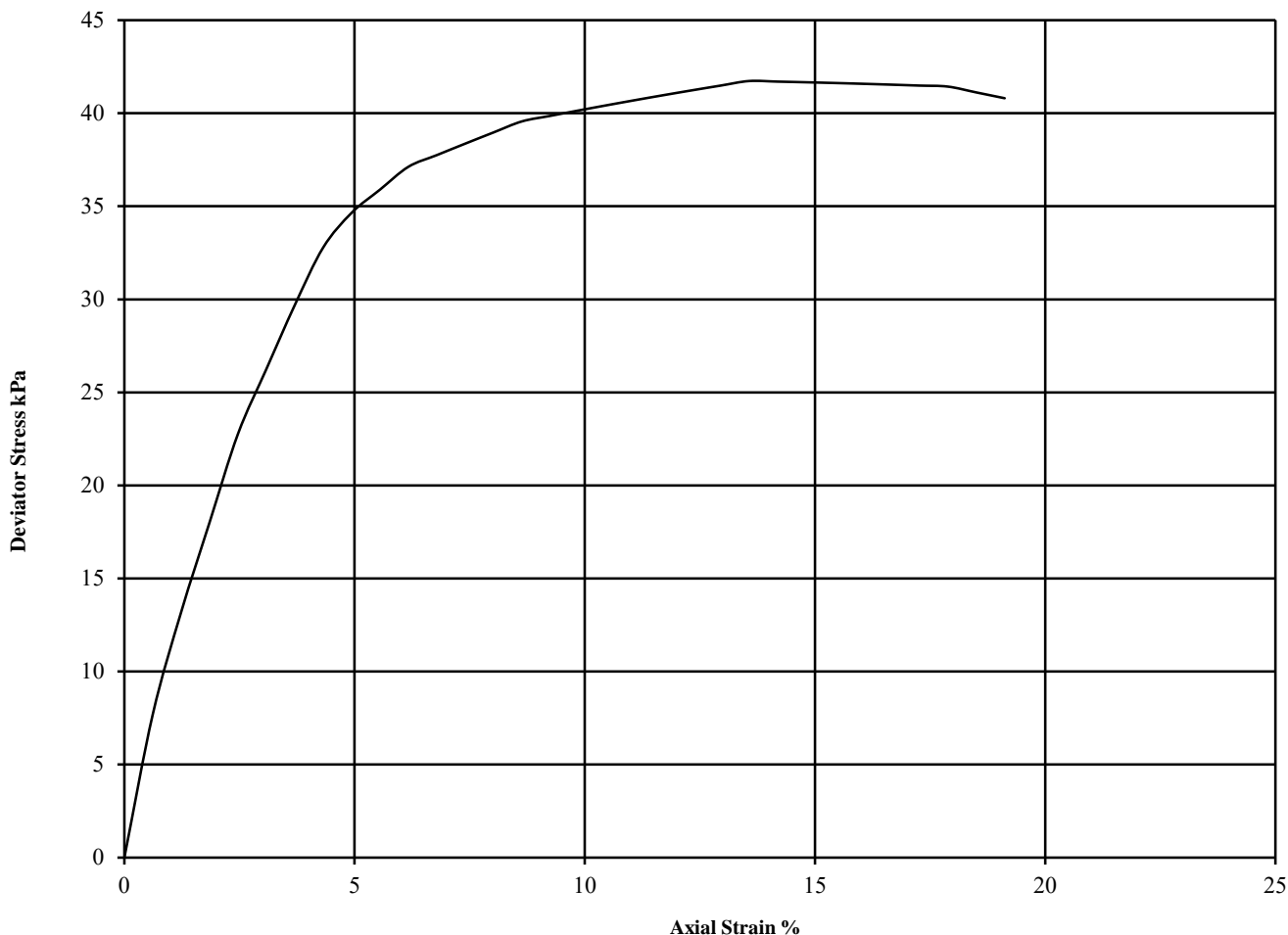
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: CP-10 Top Depth (m): 9.50

Sample Number: Base Depth (m): 9.95

Sample Type U



Diameter (mm):		103		Height (mm):		167		Test:		UU Single Stage		Remarks:	
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure					
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$							
1	23	1.93	1.57	190	42	21	13.6	Plastic					Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.34 See summary of soil descriptions



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UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION

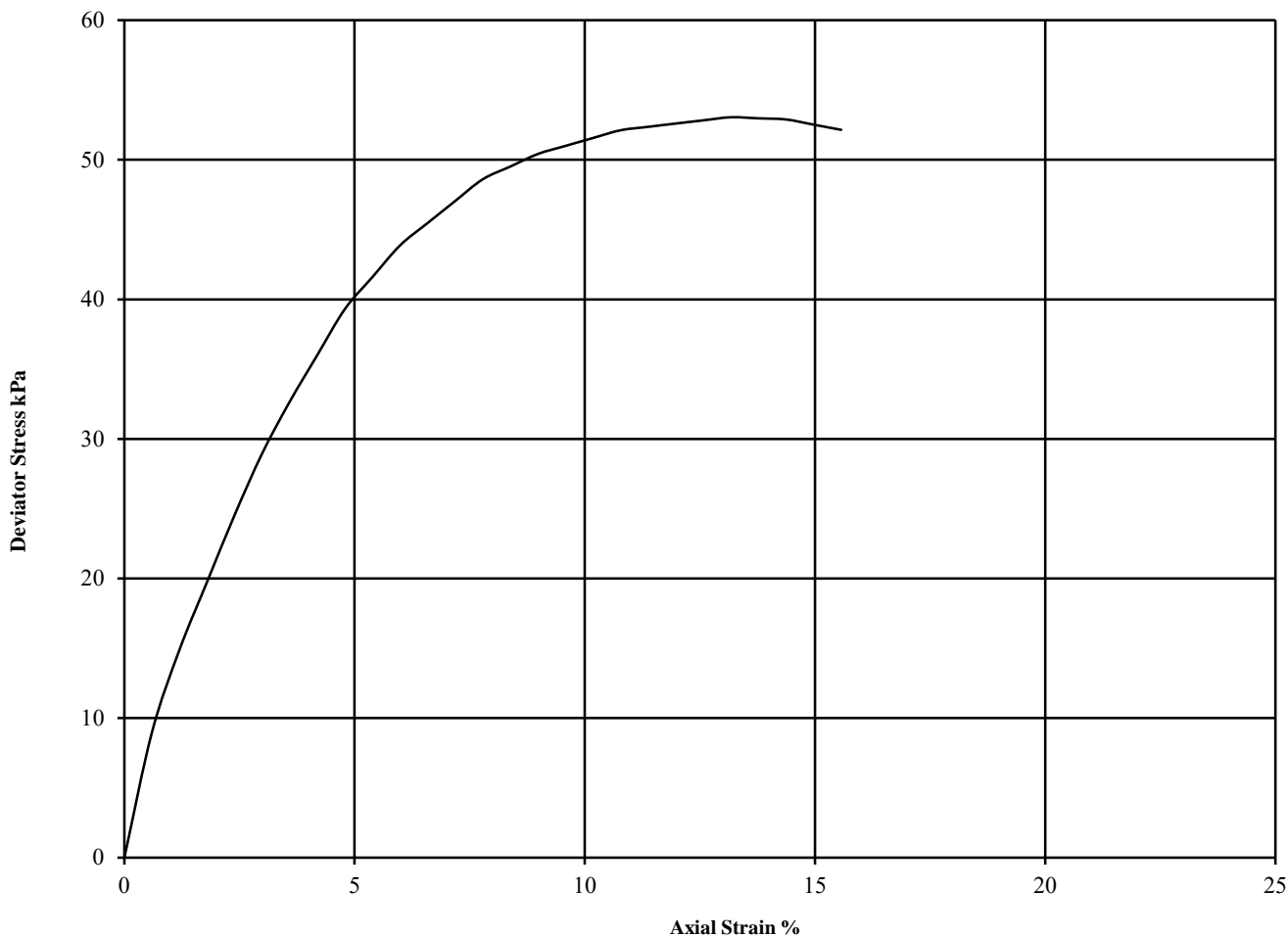
WITHOUT MEASUREMENT OF PORE PRESSURE

BS1377 : Part7 : 1990: Clause 8

Hole Number: CP-14 Top Depth (m): 3.00

Sample Number: Base Depth (m): 3.45

Sample Type U



Diameter (mm):		100		Height (mm):		167		Test:		UU Single Stage		Remarks:	
Specimen	Moisture Content (%)	Bulk Density (Mg/m ³)	Dry Density (Mg/m ³)	Cell Pressure (kPa)	Corr. Max. Deviator Stress (kPa)	Shear Strength Cu (kPa)	Failure Strain (%)	Mode of Failure					
				θ_3	$(\theta_1 - \theta_3)_f$	$\frac{1}{2}(\theta_1 - \theta_3)_f$							
1	20	2.05	1.71	60	53	27	13.2	Plastic					Undisturbed Sample Sample taken from top of tube Rate of strain = 2 %/min Latex Membrane used 0.2 mm thick, Correction applied 0.35 See summary of soil descriptions



4043

PSL
Professional Soils Laboratory

Newbottle Street, Houghton le Spring

Contract No:

PSL19/5011

Client Ref:

2585

APPENDIX F
GAS PROTECTION MEASURES ASSESSMENT TABLES
(BS8485:2015)
GAS AND GROUNDWATER MONITORING RESULTS

CIRIA C665 Characteristic Situation

Characteristic Situation (CIRIA 149)	Comparable Classification In DETER <i>et al</i> (1999)	Risk Classification	Gas Screening Value (GSV) (CH ₄ or CO ₂) (l/hr) ¹	Additional Factors	Typical source of generation
1	A	Very Low Risk	<0.07	Typically methane 1 % and/or carbon dioxide 5 %. Otherwise consider increase to Situation 2.	Natural soils with low organic content. "Typical" made ground
2	B	Low. Risk	<0.7	Borehole air flow rate not to exceed 70 l/hr. Otherwise consider increase to characteristic Situation 3	Natural soil, high peat/ organic content "Typical" made ground
3	C	Moderate Risk	<3.5		Old landfill, inert waste, mineworkings flooded
4	D	Moderate to high risk	<15	Quantitative risk assessment required to evaluate scope of protective measures	Mineworkings – susceptible to flooding, completed landfill (WMP 26B criteria)
5	E	High risk	<70		Mineworkings Unflooded inactive with shallow workings near surface
6	F	Very high risk	>70		Recent landfill site

Notes:

Gas screening value: (Litres of gas/hour) is calculated by multiplying the maximum gas concentration (%) by the maximum measured borehole flow rate (l.hr) – See Glossary.

Site Characterisation should be based on gas monitoring of concentrations and borehole flow rates for the minimum period defined in Table 5.5, CIRIA 659.

Source of gas and generation potential/performance should be identified.

Soil gas investigation should be in accordance with guidance provided in Chapters 4 to 6.

If there is no detectable flow, use the limit of detection of the instrument.

The boundaries between the Partners in Technology classifications do not fit exactly with the boundaries for the CIRIA classification.

Gas Risk Assessment – Characteristic Situations with Typical Maximum concentrations and Gas Screening Values (Reproduced from Table 8.5, CIRIA Report C659 – Assessing risk posed by hazardous ground gases to buildings).

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Code of Practice for the Design of Gas Protective Measures for Methane and Carbon Dioxide for New Buildings

Table 3

<u>BRITISH STANDARD</u>		<u>BS 8485:2015</u>		
Table 3 Building types				
	Type A	Type B	Type C	Type D
Ownership	Private	Private or commercial/public, possible multiple	Commercial/public	Commercial/industrial
Control (change of use, structural alterations, ventilation)	None	Some but not all	Full	Full
Room sizes	Small	Small/medium	Small to large	Large industrial/retail park style

- **Type A building:** private ownership with no building management controls on alterations to the internal structure, the use of rooms, the ventilation of rooms or the structural fabric of the building. Some small rooms present. Probably conventional building construction (rather than civil engineering). Examples include private housing and some retail premises.
- **Type B building:** private or commercial property with central building management control of any alterations to the building or its uses but limited or no central building management control of the maintenance of the building, including the gas protection measures. Multiple occupancy. Small to medium size rooms with passive ventilation of rooms and other internal spaces throughout ground floor and basement areas. May be conventional building or civil engineering construction. Examples include managed apartments, multiple occupancy offices, some retail premises and parts of some public buildings (such as schools, hospitals, leisure centres) and parts of hotels.
- **Type C building:** commercial building with central building management control of any alterations to the building or its uses and central building management control of the maintenance of the building, including the gas protection measures. Single occupancy of ground floor and basement areas. Small to large size rooms with active ventilation or good passive ventilation of all rooms and other internal spaces throughout ground floor and basement areas. Probably civil engineering construction. Examples include offices, some retail premises, and parts of some public buildings (such as schools, hospitals, leisure centres and parts of hotels).
- **Type D building:** industrial style building having large volume internal space(s) that are well ventilated. Corporate ownership with building management controls on alterations to the ground floor and basement areas of the building and on maintenance of ground gas protective measures. Probably civil engineering construction. Examples are retail park sales buildings, factory shop floor areas, warehouses. (Small rooms within these style buildings should be separately categorized as Type B or Type C).

NOTE 2 Type A buildings are those where the risk of failure of the gas protection measures is likely to be most significant to the safety of the occupants and Type D buildings are those where this same risk is likely to be least significant.

From the design CS and the type of building (A, B, C or D) the minimum level of gas protection (score) in the range 0 to 7.5 should be determined in accordance with Table 4.

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Code of Practice for the Design of Gas Protective Measures for Methane and Carbon Dioxide for New Buildings

Table 4

BS 8485:2015		BRITISH STANDARD		
Table 4 Gas protection score by CS and type of building				
CS	Minimum gas protection score (points)			
	High risk	Medium risk		Low risk
	Type A building	Type B building	Type C building	Type D building
1	0	0	0	0
2	3.5	3.5	2.5	1.5
3	4.5	4	3	2.5
4	6.5 ^{A)}	5.5 ^{A)}	4.5	3.5
5	— ^{B)}	6.5 ^{A)}	5.5	4.5
6	— ^{B)}	— ^{B)}	7.5	6.5

^{A)} Residential buildings should not be built on CS4 or higher sites unless the type of construction or site circumstances allow additional levels of protection to be incorporated, e.g. high-performance ventilation or pathway intervention measures, and an associated sustainable system of management of maintenance of the gas control system, e.g. in institutional and/or fully serviced contractual situations.

^{B)} The gas hazard is too high for this empirical method to be used to define the gas protection measures.

NOTE 3 The NHBC has published guidance [8] for use on residential developments, which utilizes an alternative classification ("traffic light") system. This guidance typically applies to Type A buildings utilizing beam and block floor constructions with clear void ventilation. The design choice variables are limited to decisions relating to the membrane specification and verification recommendations (see Table 7). Designers utilizing this system would therefore need to refer to the NHBC [8] to assess compliance for specific recommendations.

When the minimum gas protection score has been determined for the building as a whole, or for each part of the building, then a combination of two or more of the following three types of protection measures should be used to achieve that score:

- the structural barrier of the floor slab, or of the basement slab and walls if a basement is present;
- ventilation measures; and
- gas resistant membrane.

NOTE 4 The method of selecting the combination of these types of protection measures for a particular building is given in 7.2.

Once the types of protection measures have been decided, the detailed design and specification of the measures should be undertaken (see 7.3).

NOTE 5 In some cases, the designer might be of the opinion at this stage that the extent of the protection measures is potentially more than is needed, because of limitations in the scope of the site investigation [these limitations having led to a more conservative GSV and CS than is likely from the conceptual site model (see 6.3.7.2 and 6.3.7.3)]. In this case, further site investigation could be carried out to check the GSV. Only if there is sufficient time to carry out additional site investigation and gas monitoring would this step be useful.

The detailed design and specification of the protection measures should be recorded in a design report (see 8.3).

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Code of Practice for the Design of Gas Protective Measures for Methane and Carbon Dioxide
for New Buildings

Table 5

Table 5 Gas protection scores for the structural barrier	
Floor and substructure design (see Annex A)	Score ^{A)}
Precast suspended segmental subfloor (i.e. beam and block)	0
Cast in situ ground-bearing floor slab (with only nominal mesh reinforcement)	0.5
Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations	1 or 1.5 ^{B)}
Basement floor and walls conforming to BS 8102:2009, Grade 2 waterproofing ^{C)}	2
Basement floor and walls conforming to BS 8102:2009, Grade 3 waterproofing ^{C)}	2.5

^{A)} The scores are conditional on breaches of floor slabs, etc., being effectively sealed.
^{B)} To achieve a score of 1.5 the raft or suspended slab should be well reinforced to control cracking and have minimal penetrations cast in (see A.2.2.2).
^{C)} The score is conditional on the waterproofing not being based on the use of a geosynthetic clay liner waterproofing product (see C.3, Note 4).

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Code of Practice for the Design of Gas Protective Measures for Methane and Carbon Dioxide for New Buildings

Table 6

<u>BRITISH STANDARD</u>		<u>BS 8485:2015</u>
Table 6 Gas protection scores for ventilation protection measures		
Protection element/system	Score	Comments
(a) Pressure relief pathway (usually formed of low fines gravel or with a thin geocomposite blanket or strips terminating in a gravel trench external to the building)	0.5	Whenever possible a pressure relief pathway (as a minimum) should be installed in all gas protection measures systems. If the layer has a low permeability and/or is not terminated in a venting trench (or similar), then the score is zero.
(b) Passive sub floor dispersal layer: Very good performance: Good performance: Media used to provide the dispersal layer are: <ul style="list-style-type: none"> • Clear void • Polystyrene void former blanket • Geocomposite void former blanket • No-fines gravel layer with gas drains <ul style="list-style-type: none"> • No-fines gravel layer 	2.5 1.5	Performance criteria for methane and carbon dioxide are shown in Figure B.6 and Figure B.7, respectively. The ventilation effectiveness of different media depends on a number of different factors including the transmissivity of the medium, the width of the building, the side ventilation spacing and type and the thickness of the layer. The selected score should be assigned taking into account the recommendations in Annex B. Passive ventilation should be designed to meet at least "good performance", see Annex B.
(c) Active dispersal layer, usually comprising fans with active abstraction (suction) from a subfloor dilution layer, with roof level vents. The dilution layer may comprise a clear void or be formed of geocomposite or polystyrene void formers	1.5 to 2.5	This system relies on continued serviceability of the pumps, therefore alarm and response systems should be in place. There should be robust management systems in place to ensure the continued maintenance of the system, including pumps and vents. Active ventilation should always be designed to meet at least "good performance", as described in Annex B.
(d) Active positive pressurization by the creation of a blanket of external fresh air beneath the building floor slab by pumps supplying air to points across the central footprint of the building into a permeable layer, usually formed of a thin geocomposite blanket	1.5 to 2.5	This system relies on continued operation of the pumps, therefore alarm and response systems should be in place. The score assigned should be based on the efficient "coverage" of the building footprint and the redundancy of the system. Active ventilation should always be designed to meet at least "good performance".
(e) Ventilated car park (floor slab of occupied part of the building under consideration is underlain by a basement or undercroft car park)	4	Assumes that the car park is vented to deal with car exhaust fumes, designed to <i>Buildings Regulations 2000, Approved Document F</i> [9].

BS8485:2015

Code of Practice for the Design of Gas Protective Measures for Methane and Carbon Dioxide for New Buildings

Table 7

<u>BRITISH STANDARD</u>		<u>BS 8485:2015</u>
<p>Table 7 Gas protection score for the gas resistant membrane</p>		
Protection element/system	Score	Comments
<p>Gas resistant membrane meeting all of the following criteria:</p> <ul style="list-style-type: none"> • sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheet and joints (tested in accordance with BS ISO 15105-1 manometric method); • sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions; • sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab); • sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools, etc); • capable, after installation, of providing a complete barrier to the entry of the relevant gas; and • verified in accordance with CIRIA C735 [N1] 	2	<p>The performance of membranes is heavily dependent on the quality and design of the installation, resistance to damage after installation and integrity of joints.</p> <p>For example, a minimum 0.4 mm thickness (equivalent to 370 g/m² for polyethelene) reinforced membrane (virgin polymer) meets the performance criteria in Table 7 (see C.3).</p> <p>If a membrane is installed that does not meet all the criteria in column 1 then the score is zero.</p>

The Shadbolt Group

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**SHADBOLT
GROUP**

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	13/08/2019
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	EB	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.7	0.0	0.0	0.0	1006	-	-	
CP-01	0.0	5.5	0.0	5.5	7.1	0.0	0.0	0.0	1006	4.50	7.60	
CP-02	0.0	4.1	0.0	4.1	1.8	0.0	0.0	0.0	1006	4.50	7.60	
CP-03	0.0	0.8	0.0	0.8	16.2	0.0	0.0	0.0	1006	7.35	8.00	
CP-04	0.0	0.0	0.0	0.0	20.7	0.0	0.0	0.0	1006	8.30	8.70	
CP-07	0.0	1.3	0.0	1.3	17.2	0.0	0.0	0.0	1006	9.35	11.00	
CP-16B	0.0	2.1	0.0	2.1	17.3	0.0	0.0	0.0	1006	8.95	9.02	
CP-10	0.0	5.2	0.0	5.2	10.0	0.0	0.0	0.0	1006	8.15	9.00	

Notes:

1 The peak reading is the maximum recorded level during a monitoring event.
2 The steady reading is the level which remained constant after approximately 1 minute.

The Shadbolt Group

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	06/09/2019
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	EB	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.6	0.0	0.0	0.0	1008	-	-	
CP-01	0.0	6.3	0.0	6.3	10.5	0.0	0.0	0.0	1008	4.95	7.60	
CP-02	0.0	5.1	0.0	5.1	4.4	0.0	0.0	0.0	1008	4.55	7.60	
CP-03	0.0	0.0	0.0	0.0	20.5	0.0	0.0	0.0	1008	7.40	8.00	
CP-04	0.0	0.0	0.0	0.0	20.6	0.0	0.0	0.0	1008	8.35	8.70	
CP-07	0.0	3.0	0.0	3.0	17.3	0.0	0.0	0.0	1008	9.40	10.90	
CP-16B	0.0	6.6	0.0	6.6	9.5	0.0	0.0	0.0	1008	8.95	9.02	
CP-10	0.0	7.3	0.0	7.3	5.7	0.0	0.0	0.0	1008	8.25	9.00	

Notes:

1 The peak reading is the maximum recorded level during a monitoring event.
2 The steady reading is the level which remained constant after approximately 1 minute.

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**SHADBOLT
GROUP**

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	22/10/2019
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	EB	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.5	0.0	0.0	0.0	1011	-	-	
CP-01	0.0	5.4	0.0	5.4	9.4	0.0	0.0	0.0	1011	3.70	7.60	
CP-02	0.0	4.1	0.0	4.1	5.2	0.0	0.0	0.0	1011	4.20	7.60	
CP-03	0.0	2.8	0.0	2.8	12.0	0.0	0.0	0.0	1011	7.25	8.00	
CP-04	0.0	0.0	0.0	0.0	18.9	0.0	0.0	0.0	1011	8.20	8.70	
CP-07	0.0	4.3	0.0	4.3	15.0	0.0	0.0	0.0	1011	9.30	9.83	
CP-16B	0.0	6.8	0.0	6.8	7.5	0.0	0.0	0.0	1011	8.90	9.02	
CP-10	0.0	6.9	0.0	6.9	3.8	0.0	0.0	0.0	1011	8.20	9.00	

Notes:

1 The peak reading is the maximum recorded level during a monitoring event.
 2 The steady reading is the level which remained constant after approximately 1 minute.

The Shadbolt Group

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	06/11/2019
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	EB	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.4	0.0	0.0	0.0	995	-	-	
CP-01	0.0	5.3	0.0	5.3	5.7	0.0	0.0	0.0	995	3.37	7.60	
CP-02	0.0	3.1	0.0	3.1	4.2	0.0	0.0	0.0	995	3.99	7.60	
CP-03									995	7.10	8.00	No Bung
CP-04	0.0	2.4	0.0	2.4	13.4	0.0	0.0	0.1	995	8.12	8.70	
CP-07	0.0	2.5	0.0	2.5	16.7	0.0	0.0	0.1	995	9.17	9.83	
CP-10	0.0	6.8	0.0	6.8	1.8	0.0	0.0	0.0	995	7.99	9.02	
CP-16B	0.0	5.9	0.0	5.9	8.5	0.0	0.0	0.0	995	8.12	9.00	

Notes:

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The Shadbolt Group

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	15/11/2019
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	EB	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	989	-	-	
CP-01	0.0	3.2	0.0	3.2	12.7	0.0	0.0	0.0	989	4.10	7.60	
CP-02	0.0	3.8	0.0	3.8	5.1	0.0	0.0	0.0	989	3.40	7.60	
CP-03	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0.0	989	6.50	8.00	
CP-04	0.0	3.8	0.0	3.8	4.0	0.0	0.0	0.0	989	8.10	8.70	
CP-07	0.0	2.8	0.0	2.8	19.9	0.0	0.0	0.0	989	8.40	9.83	
CP-10	0.0	7.4	0.0	7.4	9.3	0.0	0.0	0.0	989	7.89	9.00	
CP-16B	0.0	8.1	0.0	8.1	3.5	0.0	0.0	0.0	989	8.20	9.02	

Notes:

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	29/11/2019
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	MT	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	985	-	-	
CP-01	0.0	3.3	0.0	3.3	12.9	0.0	0.0	0.0	985	4.12	7.60	
CP-02	0.0	3.9	0.0	3.9	5.2	0.0	0.0	0.0	985	3.30	7.60	
CP-03	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	985	6.48	8.00	
CP-04	0.0	3.9	0.0	3.9	4.5	0.0	0.0	0.0	985	8.05	8.70	
CP-07	0.0	2.7	0.0	2.8	20.0	0.0	0.0	0.0	985	8.20	9.83	
CP-10	0.0	8.4	0.0	8.4	9.9	0.0	0.0	0.0	985	7.90	9.00	
CP-16B	0.0	8.2	0.0	8.2	4.8	0.0	0.0	0.0	985	8.25	9.02	

Notes:

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	15/01/2021
Client:	Hellens Group	Weather:	Overcast
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	RK	Pressure Trend:	Steady

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	1028	-	-	
CP-01	0.0	2.2	0.0	2.2	15.0	0.0	0.0	0.0	1028	4.10	7.60	
CP-02	0.0	2.5	0.0	2.5	6.0	0.0	0.0	0.0	1028	3.32	7.60	
CP-03	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	1028	6.50	8.00	
CP-04	0.0	2.3	0.0	2.3	6.0	0.0	0.0	0.0	1028	8.00	8.70	
CP-07	0.0	2.5	0.0	2.5	20.2	0.0	0.0	0.0	1028	8.10	9.83	
CP-10	0.0	6.5	0.0	6.5	15.0	0.0	0.0	0.0	1028	8.00	9.00	
CP-16B	0.0	4.2	0.0	4.2	10.0	0.0	0.0	0.0	1028	8.20	9.02	

Notes:

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring							Job No:	2585				
								Date:	11/03/2021				
Client:	Hellens Group							Weather:	Raining				
								Instruments Used:	GMF 435 + Dipmeter				
Monitored by:	RK							Pressure Trend:	Falling				
	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks	
	CH ₄ (% vol)	CO ₂ 0	CH ₄ (% vol)	CO ₂ (% vol)	O ₂ (% vol)	CO PPM	H ₂ S PPM						
Ambient	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0.0	985	-	-		
CP-01	0.0	3.4	0.0	3.4	13.0	0.0	0.0	0.0	985	4.00	7.60		
CP-02	0.0	3.0	0.0	3.0	5.5	0.0	0.0	0.0	985	3.25	7.60		
CP-03	0.0	0.0	0.0	0.0	20.2	0.0	0.0	0.0	985	6.40	8.00		
CP-04	0.0	3.2	0.0	3.2	5.0	0.0	0.0	0.0	985	8.00	8.70		
CP-07	0.0	2.6	0.0	2.6	20.0	0.0	0.0	0.0	985	8.00	9.83		
CP-10	0.0	8.2	0.0	8.2	11.1	0.0	0.0	0.0	985	7.80	9.00		
CP-16B	0.0	8.1	0.0	8.1	7.2	0.0	0.0	0.0	985	8.10	9.02		
Notes:													

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	13/04/2021
Client:	Hellens Group	Weather:	Cloudy
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	RK	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks	
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S						
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM						
Ambient	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	1023	-	-		
CP-01	0.0	2.4	0.0	2.4	15.0	0.0	0.0	0.0	1023	4.00	7.60		
CP-02	0.0	2.6	0.0	2.6	6.0	0.0	0.0	0.0	1023	3.25	7.60		
CP-03	0.0	0.0	0.0	0.0	21.0	0.0	0.0	0.0	1023	6.40	8.00		
CP-04	0.0	2.4	0.0	2.4	6.0	0.0	0.0	0.0	1023	8.00	8.70		
CP-07	0.0	2.2	0.0	2.2	21.0	0.0	0.0	0.0	1023	8.00	9.83		
CP-10	0.0	6.1	0.0	6.1	15.0	0.0	0.0	0.0	1023	7.80	9.00		
CP-16B	0.0	4.1	0.0	4.1	10.0	0.0	0.0	0.0	1023	8.10	9.02		

Notes:

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	18/05/2021
Client:	Hellens Group	Weather:	Sunny / Cloudy
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	TS	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄ (% vol)	CO ₂ (% vol)	CH ₄ (% vol)	CO ₂ (% vol)	O ₂ (% vol)	CO (PPM)	H ₂ S (PPM)					
		0										
Ambient	0.0	0.0	0.0	0.0	21.0	0.0	0.0	1007	-	-		
CP-01	0.0	3.2	0.0	3.2	14.0	0.0	0.0	1007	4.10	7.60		
CP-02	0.0	3.2	0.0	3.2	6.0	0.0	0.0	1007	3.30	7.60		
CP-03	0.0	0.0	0.0	0.0	21.0	0.0	0.0	1007	6.40	8.00		
CP-04	0.0	3.1	0.0	3.1	4.5	0.0	0.0	1007	8.00	8.70		
CP-07	0.0	2.8	0.0	2.8	20.5	0.0	0.0	1007	8.00	9.83		
CP-10	0.0	7.2	0.0	7.2	8.8	0.0	0.0	1007	8.00	9.00		
CP-16B	0.0	5.6	0.0	5.6	5.5	0.0	0.0	1007	8.00	9.02		
Notes:												

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	18/06/2021
Client:	Hellens Group	Weather:	Overcast
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	TS	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate	Atmospheric Pressure	Water Depth	Base Depth	Remarks
	CH ₄	CO ₂	CH ₄	CO ₂	O ₂	CO	H ₂ S					
	(% vol)	0	(% vol)	(% vol)	(% vol)	PPM	PPM					
Ambient	0.0	0.0	0.0	0.0	20.3	0.0	0.0	0.0	1018	-	-	
CP-01	0.0	3.3	0.0	3.3	13.0	0.0	0.0	0.0	1018	4.00	7.60	
CP-02	0.0	3.9	0.0	3.9	6.0	0.0	0.0	0.0	1018	3.20	7.60	
CP-03	0.0	0.0	0.0	0.0	20.6	0.0	0.0	0.0	1018	6.20	8.00	
CP-04	0.0	3.9	0.0	3.9	4.0	0.0	0.0	0.0	1018	7.95	8.70	
CP-07	0.0	2.7	0.0	2.8	4.7	0.0	0.0	0.0	1018	7.95	9.83	
CP-10	0.0	8.4	0.0	8.4	9.9	0.0	0.0	0.0	1018	7.90	9.00	
CP-16B	0.0	8.2	0.0	8.2	4.8	0.0	0.0	0.0	1018	7.95	9.02	

Notes:

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

GROUNDWATER / GAS MONITORING RECORD SHEET

Site:	Newbottle Street, Houghton-le-Spring	Job No:	2585
		Date:	14/07/2021
Client:	Hellens Group	Weather:	Sunny
		Instruments Used:	GMF 435 + Dipmeter
Monitored by:	RK	Pressure Trend:	Falling

	Peak ¹		Steady ²					Flow Rate (l/hr)	Atmospheric Pressure (mbar)	Water Depth (m bgl)	Base Depth (m bgl)	Remarks
	CH ₄ (% vol)	CO ₂ 0	CH ₄ (% vol)	CO ₂ (% vol)	O ₂ (% vol)	CO PPM	H ₂ S PPM					
	Ambient	0.0	0.0	0.0	0.0	20.5	0.0	0.0	1018	-	-	
CP-01	0.0	3.2	0.0	3.2	14.2	0.0	0.0	1018	4.10	7.60		
CP-02	0.0	3.8	0.0	3.8	6.2	0.0	0.0	1018	3.25	7.60		
CP-03	0.0	0.0	0.0	0.0	20.5	0.0	0.0	1018	6.40	8.00		
CP-04	0.0	3.8	0.0	3.8	5.5	0.0	0.0	1018	7.80	8.70		
CP-07	0.0	2.8	0.0	2.8	20.1	0.0	0.0	1018	7.80	9.83		
CP-10	0.0	8.1	0.0	8.1	11.0	0.0	0.0	1018	7.80	9.00		
CP-16B	0.0	7.5	0.0	7.5	7.8	0.0	0.0	1018	7.80	9.02		

Notes:

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The Shadbolt Group

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SHADBOLT
ENVIRONMENTAL

Groundwater and Gas Monitoring Record Sheet

Site:	2585 Houghton Colliery	Job No:	2585
		Date:	18/07/2022
Client:	Hellens	Weather:	Sunny
		Instruments Used:	Intrerface Propbe
Monitored by:	TJS	Pressure Trend:	-

Borehole	Surface Level m aOD	CH ₄		CO ₂		O ₂		CO	H ₂ S	Flow Rate	Atmospheric	Water	Base	Water
		Peak	Steady	Peak	Steady	Low	Steady	Peak	Peak	Steady (Peak)	Pressure (mbar)	Depth (m bgl)	Depth (m bgl)	Depth (m aOD)
		(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)				
Ambient		-	-	-	-	-	-	-	-	-	-	-	-	-
RC01	71.13	-	-	-	-	-	-	-	-	-	-	13.90	16.40	57.23
RC02	71.92	-	-	-	-	-	-	-	-	-	-	15.55	16.70	56.37
RC03	71.99	-	-	-	-	-	-	-	-	-	-	6.30	7.85	65.69
RC04	73.03	-	-	-	-	-	-	-	-	-	-	18.52	23.58	54.51
RC05	72.59	-	-	-	-	-	-	-	-	-	-	15.30	18.42	57.29
RC06	73.34	-	-	-	-	-	-	-	-	-	-	12.75	16.30	60.59
RC07	72.87	-	-	-	-	-	-	-	-	-	-	8.91	17.60	63.96
RC08	73.17	-	-	-	-	-	-	-	-	-	-	11.25	18.56	61.92
RC09	72.85	-	-	-	-	-	-	-	-	-	-	17.45	24.20	55.40
RC10	72.89	-	-	-	-	-	-	-	-	-	-	4.78	9.18	68.11
RC11	73.4	-	-	-	-	-	-	-	-	-	-	5.30	6.25	68.10
RC12	73.19	-	-	-	-	-	-	-	-	-	-	17.91	20.65	55.28

Notes:

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SHADBOLT
ENVIRONMENTAL

Groundwater and Gas Monitoring Record Sheet

Site:	2585 Houghton Colliery	Job No:	2585
		Date:	10/08/2022
Client:	Hellens	Weather:	Sunny
		Instruments Used:	Intrerface Propbe
Monitored by:	TJS	Pressure Trend:	-

Borehole	Surface Level m aOD	CH ₄		CO ₂		O ₂		CO	H ₂ S	Flow Rate	Atmospheric	Water	Base	Water
		Peak	Steady	Peak	Steady	Low	Steady	Peak	Peak	Steady (Peak)	Pressure (mbar)	Depth (m bgl)	Depth (m bgl)	Depth (m aOD)
		(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)				
Ambient		-	-	-	-	-	-	-	-	-	-	-	-	-
RC01	71.13	-	-	-	-	-	-	-	-	-	-	13.90	16.40	57.23
RC02	71.92	-	-	-	-	-	-	-	-	-	-	15.60	16.70	56.32
RC03	71.99	-	-	-	-	-	-	-	-	-	-	6.35	7.85	65.64
RC04	73.03	-	-	-	-	-	-	-	-	-	-	18.52	23.58	54.51
RC05	72.59	-	-	-	-	-	-	-	-	-	-	15.29	18.42	57.30
RC06	73.34	-	-	-	-	-	-	-	-	-	-	12.76	16.30	60.58
RC07	72.87	-	-	-	-	-	-	-	-	-	-	8.92	17.60	63.95
RC08	73.17	-	-	-	-	-	-	-	-	-	-	11.23	18.56	61.94
RC09	72.85	-	-	-	-	-	-	-	-	-	-	17.41	24.20	55.44
RC10	72.89	-	-	-	-	-	-	-	-	-	-	4.75	9.18	68.14
RC11	73.4	-	-	-	-	-	-	-	-	-	-	5.32	6.25	68.08
RC12	73.19	-	-	-	-	-	-	-	-	-	-	18.00	20.65	55.19

Notes:

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SHADBOLT
ENVIRONMENTAL

Groundwater and Gas Monitoring Record Sheet

Site:	2585 Houghton Colliery	Job No:	2585
		Date:	18/08/2022
Client:	Hellens	Weather:	Overcast with showers
		Instruments Used:	Intrerface Propbe
Monitored by:	TJS	Pressure Trend:	-

Borehole	Surface Level m aOD	CH ₄		CO ₂		O ₂		CO	H ₂ S	Flow Rate	Atmospheric	Water	Base	Water
		Peak	Steady	Peak	Steady	Low	Steady	Peak	Peak	Steady (Peak)	Pressure (mbar)	Depth (m bgl)	Depth (m bgl)	Depth (m aOD)
		(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	(% vol)	PPM	PPM	(l/hr)				
Ambient		-	-	-	-	-	-	-	-	-	-	-	-	-
RC01	71.13	-	-	-	-	-	-	-	-	-	-	13.88	16.40	57.25
RC02	71.92	-	-	-	-	-	-	-	-	-	-	15.50	16.70	56.42
RC03	71.99	-	-	-	-	-	-	-	-	-	-	6.28	7.85	65.71
RC04	73.03	-	-	-	-	-	-	-	-	-	-	18.54	23.58	54.49
RC05	72.59	-	-	-	-	-	-	-	-	-	-	15.26	18.42	57.33
RC06	73.34	-	-	-	-	-	-	-	-	-	-	12.76	16.30	60.58
RC07	72.87	-	-	-	-	-	-	-	-	-	-	8.94	17.60	63.93
RC08	73.17	-	-	-	-	-	-	-	-	-	-	11.33	18.56	61.84
RC09	72.85	-	-	-	-	-	-	-	-	-	-	17.44	24.20	55.41
RC10	72.89	-	-	-	-	-	-	-	-	-	-	4.73	9.18	68.16
RC11	73.4	-	-	-	-	-	-	-	-	-	-	5.29	6.25	68.11
RC12	73.19	-	-	-	-	-	-	-	-	-	-	17.97	20.65	55.22

Notes:

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APPENDIX G

DEVELOPMENT PLAN (CORRECT AT THE TIME OF WRITING)



Key

- Existing Buildings
- Retail Buildings
- Ancillary Buildings
- Landscaped Areas
- Paved Areas
- Concrete Service Yards
- Tarmac
- Totem Sign
- PFS Sign
- Mineshaft
- Planning Application Boundary Line



Parking Provision

Standard Parking Spaces 4800 x 2500mm	274no
Accessible Spaces	22no
Parent & Child Spaces	17no
Electric Charging Spaces	16no
Total Spaces	329no



FINTRY | ESTATES



Keel Row 4 | The Watermark | Collieston | NE11 9SE
E: info@iba-architects.com T: 0191 461 1411
www.iba-architects.com

Project: HOUGHTON COLLIERY RETAIL
Newboothle Street
Houghton le Spring

Title: Proposed Site Layout

Client: Hellens Land / Finty Estates

Drawn: KW Scale: 1:500 @ AD

Checked: FW Date: 04.10.21

TENDER

1485 (SP)040 T1

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APPENDIX H
MINE SHAFT INVESTIGATION LETTER REPORT

Former Houghton Colliery

Mineshaft Ground Investigation Report

Hellens Land commissioned The Shadbolt Group to undertake supplementary ground investigations at the Former Houghton Colliery development site.

The physical ground investigation work was carried out by Shadbolt Environmental (part of the Shadbolt Group) in December 2019.

Scope of Investigation

The site works comprised the following:

- Trial pit excavations down the side of the known mineshafts to assess the thickness and condition of the known mineshaft caps (CA Ref' 433550-001 and 433550-002)
- Trial trenching to locate the potential 3rd mineshaft located adjacent to the northern boundary (433550-003) with an area of trees and shrubs.

Limitations

It should be noted that although every effort has been made to ensure the accuracy of the data obtained from the investigation, the possibility exists of variations in ground and groundwater conditions between and around the exploratory hole locations. In addition, groundwater levels and will vary seasonally and with changes in weather conditions.

Ground Investigation Findings

Trial pits extended down the side of each 433550-001 and 433550-002 exposed 0.5m of concrete founded on Made Ground. The Made Ground generally comprised of dark grey, reddish, brown, clay with varying amounts of sand, gravel and cobbles (slag, sandstone, shale, brick, concrete, mudstone)

The concrete was observed to be good condition with no obvious signs of deterioration. As can be seen in the photographs below;



Photo No.1 - 433550-001



Photo No.2 - 433550-002

Both caps were observed to be hexagonal in shape with 433550-001 being approximately 8.1m across and 433550-002 being approximately 8.7m across.

Prior to undertaking the trial trenching exercise within the embankment to the north of the site tree and shrub clearance was undertaken comprising a 20m x 20m area around national grid reference 433896mE and 550402mN.

On completion of the tree clearance works trial trenching was undertaken to locate the potential mineshaft. Photographs of the trenching are shown below for reference;



Photo No. 3 - 433550-003
Southern Edge of Concrete



Photo No. 4 - 433550-003
Eastern Edge of Concrete



Photo No. 5 - 433550-003
North Eastern Edge of Concrete

It was not possible to fully delineate the northern or western extents of the concrete due to the volume of soils to be removed within the timescales allowed and the requirements for further tree clearance.

The concrete encountered appeared to be a similar shape to that of the 433550-001 and 433550-002 and was generally appeared to be hexagonal in shape but was noted to be approximately 0.10m thick. The concrete did appear to be in relatively good condition and no sign of deterioration was noted. The concrete was encountered at the same level as the grassed plateau directly to the south of the embankment i.e. the same level as the other mineshaft caps and was approximately 6m across from southwest to northeast.

The ground conditions above the concrete comprised an initial 0.3m thick layer of topsoil overlying a reworked clay cap of firm to stiff brown slightly sandy gravelly clay, with gravel of fine to medium angular to subangular sandstone and mudstone. The clay cap was generally 1m thick and was underlain Made Ground consisting of dark grey, reddish, brown, clay with varying amounts of sand, gravel and cobbles (slag, sandstone, shale, brick, concrete, mudstone). During the trial trenching exercise steel railway girders and large relic armoured electricity cables were noted and natural soils were not encountered.

Recommendations

Based on the investigations undertaken the site it is considered highly likely that the concrete encountered at NGR 433896mE and 550402mN is the cap of mineshaft 433550-003.

It is considered likely that that as part of the development that the Coal Authority would wish to see the shaft grouted to 20.0m bgl and a new a new cap to be designed and constructed at the site (similar to that of 433550-001 and 433550-002).

Shadbolt Group

REPORT CONDITIONS

GEO-ENVIRONMENTAL GROUND INVESTIGATION

*This report is produced for the benefit of **Hellens Land** accordance with the terms of the appointment.*

This report has been prepared in accordance with the terms and conditions of the appointment and relates to the condition of the site at the time of ground investigations. No warranty is provided as to the possibility of future changes in the condition of the site.

Shadbolt Environmental takes no responsibility for conditions which occur between the individual exploratory holes. Whilst every effort has been made to interpret the conditions between investigation locations, such information is only indicative.

Whilst the contamination assessment detailed within this report reflects our view, because there are no exact UK definitions of these matters, being subject to risk analysis, Shadbolt Environmental are unable to give categoric assurances that they will be accepted by authorities or funds without question. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. In time, improved practices or amended legislation may necessitate a re-assessment.

The report is limited to the geotechnical and environmental aspects detailed within the report and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents.



**SHADBOLT
GROUP**

**APPENDIX B
COAL AUTHORITY DATA**



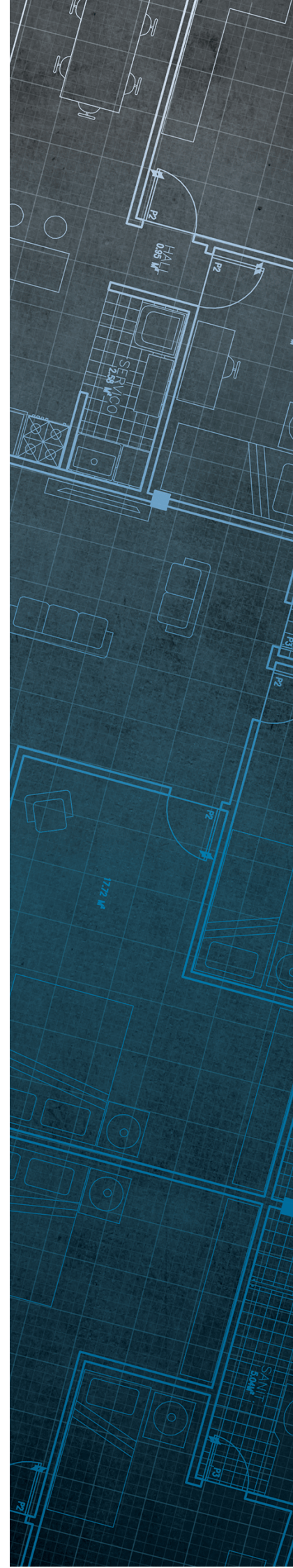
The Coal
Authority

Consultants Coal Mining Report

Former Houghton Colliery
Houghton Le Spring
Tyne & Wear

Date of enquiry: 20 March 2018
Date enquiry received: 20 March 2018
Issue date: 20 March 2018

Our reference: 51001813455001
Your reference: 2585



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

michael Taylor

Enquiry address

Former Houghton Colliery
Houghton Le Spring
Tyne & Wear


How to contact us

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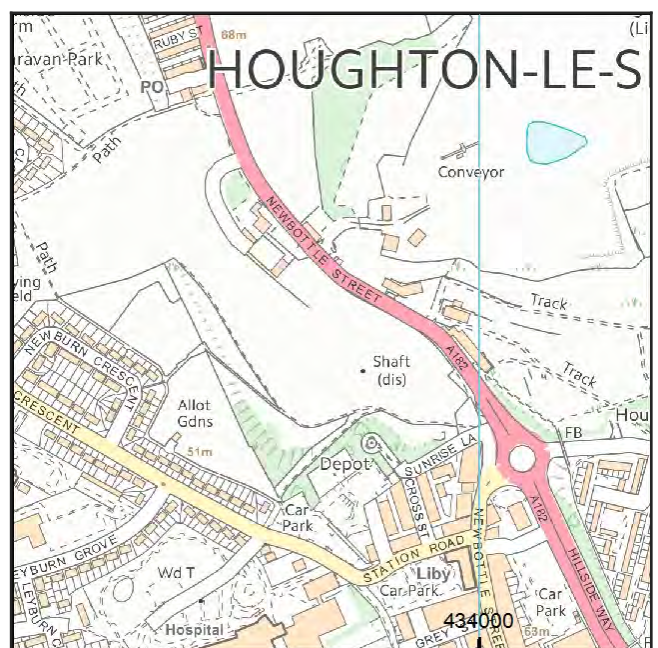
www.groundstability.com

 @coalauthority

 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	MAIN	Coal	3HCA	122	South	2.3	East	110	1928
unnamed	MAIN	Coal	3HTM	136	Beneath Property	5.9	North-West	110	1900
HOUGHTON	YARD	Coal	3HOR	142	South	2.0	East	180	1900
HOUGHTON	MAIN	Coal	3HT8	149	North-West	3.5	North-East	110	1944
unnamed	MAUDLIN	Coal	3HSJ	164	South	2.1	North-East	150	1900
unnamed	MAUDLIN	Coal	3HL6	166	South	1.7	East	140	1943
HOUGHTON	YARD	Coal	3HCD	169	Beneath Property	8.1	North-West	200	1922
HOUGHTON	LOW MAIN	Coal	3NQO	177	Beneath Property	5.3	South-West	163	1900
HOUGHTON	YARD	Coal	3HED	181	North-West	3.3	North	200	1922
HOUGHTON	LOW MAIN	Coal	3SMH	185	East	1.7	East	130	1900
unnamed	MAIN	Coal	3HTN	187	North-East	3.0	South-East	110	1900
HOUGHTON	HARVEY	Coal	3RIM	193	Beneath Property	34.4	South-West	76	1950
unnamed	MAUDLIN	Coal	3HBY	198	West	4.1	West	150	1909
HOUGHTON	LOW MAIN	Coal	3NQE	199	Beneath Property	9.8	North	163	1900
HOUGHTON	LOW MAIN	Coal	3NQS	202	Beneath Property	6.0	North-West	163	1900
unnamed	YARD	Coal	3HOD	208	North-East	2.0	East	180	1900
unnamed	MAUDLIN	Coal	3HBK	215	Beneath Property	5.0	South-East	150	1900
unnamed	MAUDLIN	Coal	3HTJ	215	North-West	0.5	North	150	1900
unnamed	MAUDLIN	Coal	3HKK	228	North-East	6.5	North	120	1900
HOUGHTON	HUTTON	Coal	3SLI	237	Beneath Property	3.8	East	230	1900
HOUGHTON	HUTTON	Coal	3SRW	237	South-East	6.6	N/A	100	1900
HOUGHTON	HUTTON	Coal	3SLW	242	Beneath Property	3.9	North	230	1900

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
HOUGHTON	LOW MAIN	Coal	3SLH	245	North-East	2.8	North-East	170	1900
HOUGHTON	HARVEY	Coal	3RYL	248	South	2.3	East	65	1954
HOUGHTON	HARVEY	Coal	3RXL	251	South	2.3	East	65	1949
HOUGHTON	HARVEY	Coal	3RK8	257	South	8.1	North	76	1952
HOUGHTON	HUTTON	Coal	3SSI	258	Beneath Property	2.3	North-West	100	1900
unnamed	BUSTY	Coal	3HH2	275	South-East	1.6	South-East	173	1945
unnamed	BUSTY	Coal	3HGU	276	South-East	1.7	South-East	173	1945
unnamed	BUSTY	Coal	3HFU	279	East	2.5	East	107	1945
unnamed	BUSTY	Coal	3HG2	279	East	0.7	North	173	1945
unnamed	BUSTY	Coal	3HGG	279	East	1.7	South-East	173	1945
HOUGHTON	HARVEY	Coal	3RI8	285	West	4.8	North-East	76	1946
unnamed	BUSTY	Coal	3HBU	286	South	4.4	North-West	170	1979
HOUGHTON	HARVEY	Coal	3RJM	286	North	3.6	East	76	1950
HOUGHTON	HARVEY	Coal	3RJ8	300	North-East	8.8	North-West	76	1950
HOUGHTON	HARVEY	Coal	3RWZ	313	North-East	3.2	North	76	1950

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	433550-001	433802 550398	This entry was originally capped in 1982 and used for washery tailings disposal until 1986. The shaft was filled from the top of the tailings to a depth of 20m from the surface with hardcore and completed to the surface with 40mm size stone in 1987. The fill was grouted from rockhead to the surface and the cap was reinstated to NCB specification in 1988.	Coal	Sunderland Borough Council 12/09/1989
Shaft	433550-002	433876 550358	This entry was originally capped in 1982 and used for washery tailings disposal until 1986. The shaft was filled from the top of the tailings to a depth of 20m from the surface with hardcore and completed to the surface with 40mm size stone in 1987. The fill was grouted from rockhead to the surface and the cap was reinstated to NCB specification in 1988.	Coal	Sunderland Borough Council 12/09/1989
Shaft	433550-003	433896 550402	This entry was located during demolition in 1982 and subsequently filled to an unknown specification.	Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

16754	D769	13451
D1096	D1464	4020
D1040	D1039	12739

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Faults under or close to the property recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.




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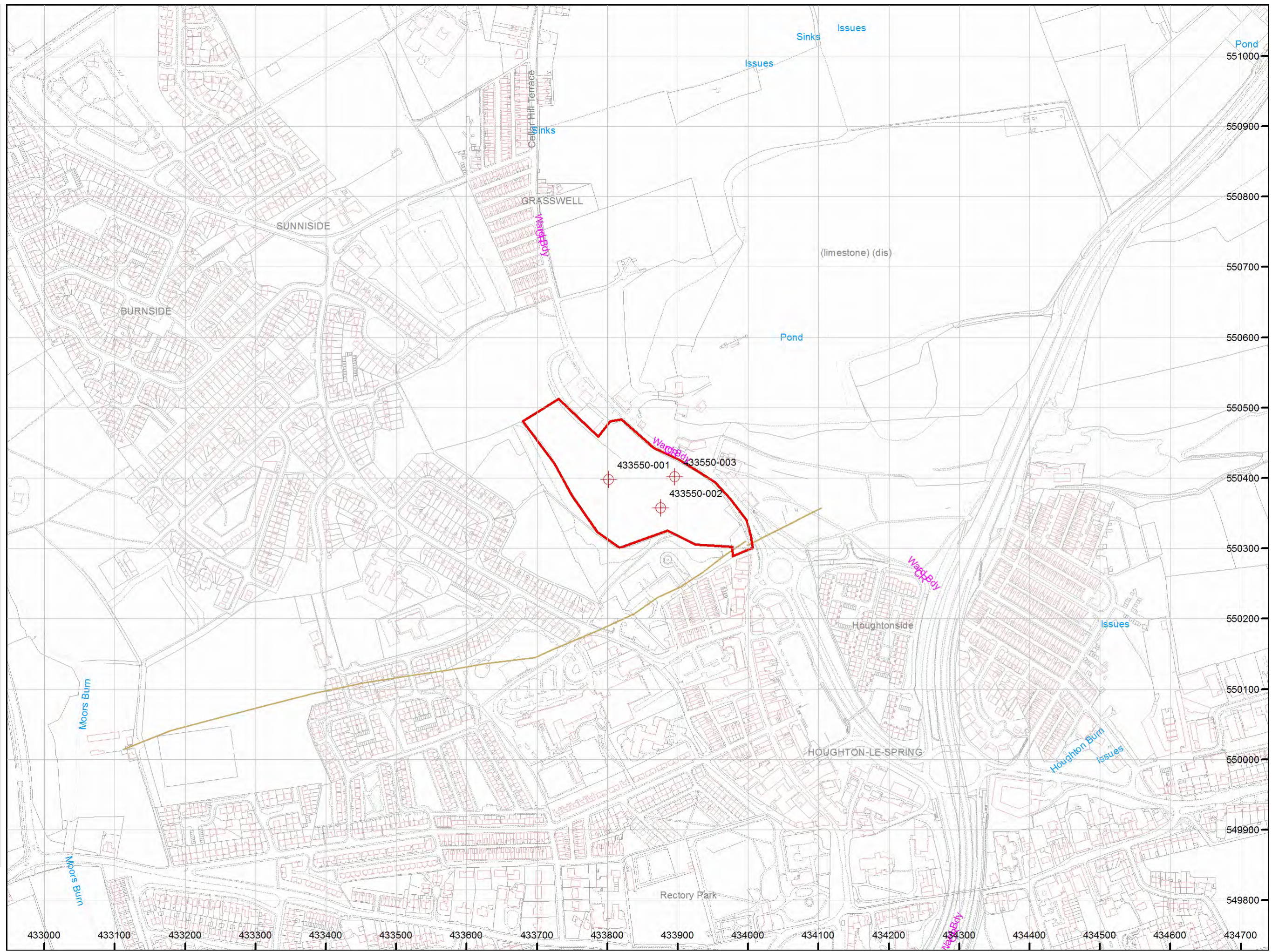
VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	20 March 2018
Issued to	MICHAEL TAYLOR 18 BEWICK ROAD BENSHAM GATESHEAD NE8 4DP
Property search for	FORMER HOUGHTON COLLIERY HOUGHTON LE SPRING TYNE & WEAR
Reference number	51001813455001
Date of issue	20 March 2018
Cost	£101.70
VAT @ 20%	£20.34
Total received	£122.04
VAT registration	598 5850 68

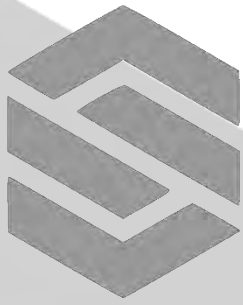
The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Disused mine shaft 
- Geological faults 



How to contact us
 0345 762 6848 (UK)
 +44 (0)1623 637 000 (International)
www.groundstability.com



SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

APPENDIX 4

Revised Desktop Study Assessment (Shadbolt Environmental, Version 2, July 2022)



SHADBOLT
ENVIRONMENTAL



Proposed Retail Development
Newbottle Street, Houghton Le Spring

Revised Desktop Study Assessment

For Hellens Land

V2

July 2022



SHADBOLT
GROUP

Newbottle Street, Houghton Le Spring

Revised Desktop Study Assessment

Project Reference: 2585

Client	Hellens Land
Our Reference	2585 – Newbottle Street, Houghton Le Spring, RPRA/V2
Produced by	Iain McClean
Checked by	Mike Taylor
Submitted	V2 – July 2022

Report checked:



Report Author:



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Accreditation



Passionate about innovation

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1.0 INTRODUCTION

The Shadbolt Group (TSG) were commissioned by the Client, **Hellens Land**, to carry out a Preliminary Risk Assessment (PRA); also referred to as Desk Top Study or Phase 1 Investigation; in respect of proposed onward development of an area of public open space in Houghton le Spring, near Sunderland for a commercial end use.

This report provides an overview of the site and has been compiled from a review of readily available information, published data, historical information, preliminary data searches and a site walk over and is intended as preliminary appraisal only.

The following list of information sources represent the 'standard' documents, datasets or surveys undertaken during the production of a Preliminary Risk Assessment. Where additional sources are incorporated including previous investigations carried at or surrounding the site these are referenced in Section 10.

- Site walkover survey.
- Historical and Recent Ordnance Survey maps and plans.
- British Geological Survey.
- The Environment Agency.
- Groundsure Report.
- The Coal Authority.
- NRPB-W26 'Radon Atlas of England and Wales,' NRPB, 2002.
- CIRIA 132 'A guide for safe working on contaminated sites,' CIRIA, 1996.
- CIRIA C552 'Contaminated Land Risk assessment. A guide to good practice,' CIRIA, 2001.
- BS10175 'Investigation of potentially contaminated sites – code of practice,' BS, 2011.
- LCRM: Land Contamination Risk Management, Environment Agency, October 2020
- Environmental Protection Act 1990: Part IIA
- Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance April 2012.
- Ciria C733 Asbestos in soil and made ground: a guide to understanding and managing risks, March 2014.

This report has been prepared in accordance with the letter of appointment, report conditions and the terms and conditions of the agreement.

The site is to be developed for 2 No. retail units, petrol filling station, access road, landscaping and associated parking and infrastructure.

The proposed development layout IBA Drawing 1485 (SP) 040 T1 is presented in **Appendix H**.

2.0 SITE INFORMATION

2.1 General

The site is located to the south of Newbottle Street (A182), north east of Houghton le Spring town centre. The site is an irregular, elongated plot orientated roughly north west to south east with an area in the order of 3.35ha. The approximate National Grid Reference (NGR) for the centre of the site is **433840,550400**.

A general site location plan of the site is presented as Figure 1 and an aerial photograph as Figure 2.

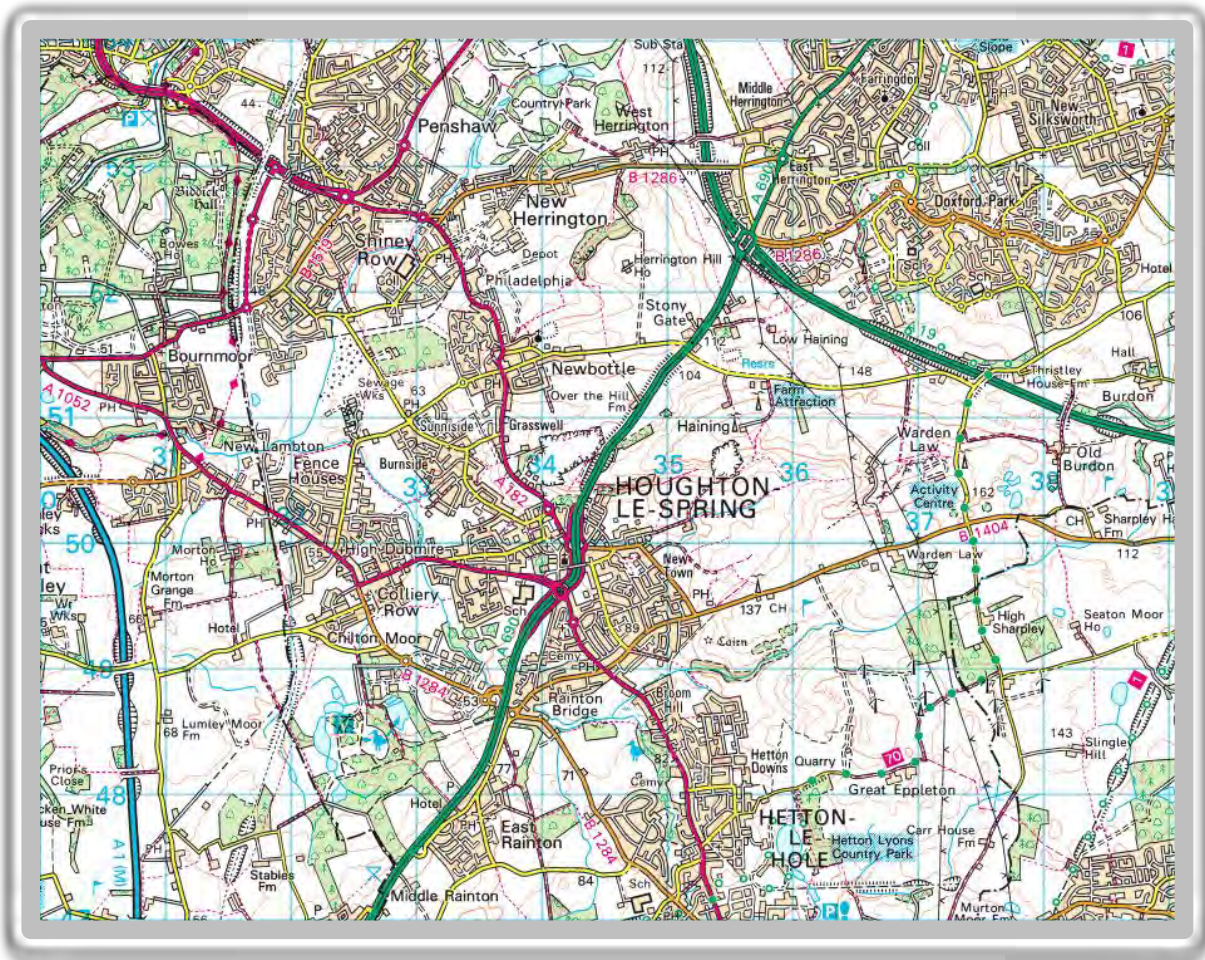


Fig. 1 – General Site Location Plan

2.2 Site Description

An initial site walkover was undertaken by TSG in March 2018.

The site comprises a large terrace of maintained grassland bound by slopes to the north east and south west. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall in the order of 4m tall along the boundary with a storage yard to the rear of the adjacent petrol filling station.

Stands of Japanese Knotweed were noted at the top of the northern end of the retaining wall and along the crest of the slope to the north.

The embankments at the fringes of the site are planted with small trees with the main body of the site comprising grass with a central ridge of rough grass / vegetation along the line of a former fence of which some components still remain. 2 No. roughly circular areas are not grassed and concrete is visible; these broadly align with given location of shafts recorded by the Coal Authority which have been capped at the surface.

The boundary along Newbottle Street is fenced with close boarded timber fencing up to a pair of billboards adjacent to a van hire depot and petrol filling station at the northern end of the site.

Vehicular access is available via a track leaving a service road to the rear of the petrol filling station but is blocked by a boulder placed along the perimeter of additional grassland extending to the north of the site.



Fig.2 – Aerial Photograph Showing the Development Area

3.0 HISTORICAL LAND USE

The following provides a summary of the historical land use of the site respectively and its surroundings. This information is drawn from a study of available historical plans contained within the GroundSure report presented in Appendix B.

Map Date	Site	Surrounding Area
1857 (Earliest Mapping)	<p>The site is recorded as Houghton Colliery with the headworks and associated buildings located in the east of the site and the west of the site featuring railway connections to the north west via the Lambton Wagon Way.</p> <p>Residential housing and residential gardens are displayed on-site to the east along Newbottle Street.</p> <p>A reservoir is present in the south east of the site.</p>	<p>From the earliest mapping the area surrounding the site is fairly typical of the north east at this time and is predominantly agricultural land interspersed with small villages. Houghton le Spring is a reasonably well-established town by this point to the south of the site and Newbottle is also present around 1km to the north.</p> <p>A Holy Well (latterly 'site of') is indicated in the far east of the site.</p> <p>A gas works is shown immediately south of the site.</p> <p>Houghton Quarry is shown to the north of the site on the other side of Newbottle Street from the earliest mapping and is shown to include limekilns.</p>
1897	<p>The colliery is now known as 'Houghton Pit' and has expanded to include additional sidings and railway lines in the west and structures in the east.</p> <p>Spoil is initially tipped on land in the east of the site and then on land to the north west of the site as works progressed.</p> <p>Two mine shafts have been mapped to the centre and west of the site.</p> <p>Terraced housing has been developed and replaces many of the original developments along Newbottle Street intersecting the site boundary to the east.</p>	<p>An allotment gardens is now present to the immediate north west of the site.</p> <p>A school has been developed to the immediate east of the site.</p> <p>The terraced housing expands over 100m northwards outside of the site boundary.</p>
1920	<p>Two chimneys have been associated on site relating to the colliery; one to the west and one to the east.</p>	<p>Further terraced housing has been developed to the north and south. Two schools have been developed ~100m to the south alongside a picture theatre.</p>
1939	<p>Two gantries have been labelled towards the centre of the site.</p>	<p>Development has occurred approximately 120m to the South of the site including a pavilion, a club and tennis courts. Public buildings have been noted in association with the terraced housing surrounding the site including a club and hall to the north.</p> <p>Tanks have been labelled at the gas works.</p>
1958	<p>The colliery is now labelled as a mine.</p>	
1969	<p>An extensive housing development and the associated road network has been built approximately 100m west of the site.</p> <p>A cooling tower has been labelled at the colliery to the south of the site.</p>	<p>An electrical sub-station has been developed at Houghton Quarry. Houghton quarry has now been labelled as specifically a limestone quarry.</p> <p>Public buildings ~100m to the south near the schools have been labelled as government offices, a social club and a cinema. Further public buildings have been built to the north.</p> <p>A garage has been developed to the immediate north of the site.</p> <p>A disused tip has been labelled to the immediate north-west of the site.</p>
1970		<p>A roundabout has been mapped approximately 30m to the south-east of the site.</p>
1979	<p>Various components of the colliery have been labelled to the centre of the site including the two shafts, three hoppers and 2 conveyors. 2 tanks have been labelled in the south-west and</p>	<p>The gas works is now labelled as a depot and various structures at the gas works have been demolished. A garage has been developed approximately 20m to the east of the site.</p>

	a shelter in the east.	Various components of Houghton Quarry have been labelled including a tank, conveyors and hoppers.
1993	The colliery and its associated buildings have been demolished leaving the two shafts and the shelter remaining.	
1994		A circular structure has been formed to the immediate south of the site by the depot. Further road networks have been formed to the immediate south and east of the site partially intersecting the boundary.

Summary

The site has been developed through much of the mapped history by the Houghton Colliery and associated infrastructure including railway sidings and reservoirs. Following the closure of the colliery in 1981 the site was cleared and has remained as grassed open space to the present day.

Many towns in the surrounding area were reasonably well established in the earliest mapping with the colliery and adjacent limestone quarry providing local employment opportunities. Residential areas were developed through the early 20th century with large developments in the 1940s and 1960s/70s. Extraction at the quarry has ceased and in recent times been repurposed as a landfill site and is now being considered for redevelopment.

Key Areas of Concern

From earliest mapping in 1857 the on-site Houghton Colliery with the associated railway lines, gas works to the south and Houghton Quarry and the associated limekilns to the north are the most potentially contaminative historic activities.

Between 1857 and 1897 the tipping of spoil to the north and east of the site and the presence of mine shafts on-site cause potential concern.

Between 1897 and 1920 the labelled chimneys on-site are indicative of further potential pollution.

Between 1920 and 1939, the labelled tanks at the gas works pose a key area of concern.

Between 1958 and 1969 the mapped electrical substation at Houghton Quarry, the garage to the north and the disused tip to the north-west are key potential contaminative features.

Between 1970 and 1979 the garage developed ~20m to the east of the site poses some cause for concern. Tanks labelled within the southwest corner of the site.

1990s demolition of the former colliery, capping of the mineshafts and infilling of the railway sidings.

4.0 ENVIRONMENTAL SETTING

Details of the geology underlying the site were gained from BGS Plans, GroundSure's Geo-Insight Report. The Insight reports are included in **Appendix C**

Information on potentially contaminative activities/conditions and details of any areas of environmental sensitivity and/or under legislative protection in the vicinity of the site are detailed within Insight Report, included in **Appendix C**.

The following sections represent a brief overview of the salient points contained within the above reports, for more detailed information reference should be made to the original documents.

4.1 Geology, Mining, Ground Stability and Ground Workings

4.1.1 Geology

Artificial deposits (Made Ground - Undivided) are indicated within the site boundary. These deposits are anticipated to comprise colliery spoil.

Superficial deposits are recorded on site to comprise Diamicton (Cohesive glacial till / boulder clay) comprising predominantly cohesive materials with varying proportions of granular materials; Glaciolacustrine deposits comprising interbedded clay and silt; and unclassified superficial strata which may be masked by the recorded artificial ground.

The solid geology beneath the site predominantly comprises Permian age sandstone of the Yellow Sand Formation in the north east of the site, stratigraphically overlying undifferentiated strata of the Pennine Middle Coal Measures comprising interbedded mudstone, siltstone and sandstone in the south west of the site.

BGS boreholes within the site boundary indicate Made Ground at the site to be ashy material with brick and demolition rubble with weathered limestone or sandstone bedrock encountered at 3-6m bgl through the main body of the site with colliery spoil recorded in excess of 12m thickness at the south western edge of the site and former tipping area. BGS boreholes

No coal seams are indicated to outcrop within the site boundary, however 8 No. are recorded within 500m of the site.

4 No. faults are present within 500m of the site including 1 No. which runs through the site close to and parallel with the south eastern boundary on a bearing in the order of 070°. This fault is recorded as inferred with an unknown displacement. The inferred fault is unlikely to impact on the development proposals due to its location on the site boundary.

4.1.2 Coal Mining

The site is located within an area where the effects of potential coal mining should be assessed as stated in the Groundsure report and verified by The Coal Authority's Gazetteer.

A Coal Authority Report for the site has been obtained has been reviewed as part of a Preliminary Coal Mining Risk Assessment by The Shadbolt Group which has been issued under separate cover. In brief the Coal Authority report states the following:

- *The site is within the zone of influence of workings of 7 No. seams recorded at depths of 122m to 313m bgl.*
- *No probable shallow mine workings are recorded on site.*
- *No records of spine roadways at shallow depth are recorded on site.*
- *3 No. shafts are recorded on site.*

- *There have been no damage claims within 50m of the site since 1994.*

The Coal Authority report confirms that workings have been undertaken at depth beneath the site. Although coal reserves are known to exist in the area the property is not considered to be in an area where the Coal Authority believe there is coal at or close to the surface, therefore shallow unrecorded mine workings undertaken for the extraction of coal are unlikely to be a risk factor at the site. The presence of the 3 mine entries coincide with 3 circular areas within the site which have been identified as Development High Risk areas are likely the reason for their designation.

2 No. shafts recorded at the site were originally capped in 1982 before being backfilled with washery wastes up to 1986 and then hardcore in 1987 and recapped in 1988; the third shaft was filled to an unknown specification.

Accordingly, the risk to developments at the site as a result of underground mine workings for the extraction of coal is considered to be low but the backfilling of the shafts will need to be verified if development is to proceed within the zone of influence.

4.1.3 Non-coal Mining and Natural Cavities

There is no record of any non-coal mining activity on the site.

The Groundsure Geo-Insight report indicates the site is not within 1000m of an area of Brine Extraction, Gypsum Extraction, Tin Mining or Clay Mining.

There is 1 No. record of natural cavities within 1000m. This record relates to a Solution Widened Joint or Fissure 534m E of the site.

4.1.4 Ground Stability

The BGS consider the overall risk to the site from natural ground subsidence to be Negligible to Moderate. This takes in to account the combined risks on site from Shrink-Swell Clays, Landslides, Soluble Rocks, Compressible Ground, Collapsible Rocks and Running Sands.

The most onerous of these risk factors has been applied to a low risk of landslides within slopes on the north eastern boundary and parallel with the south eastern boundary and a moderate risk of compressible deposits recorded in the same areas relating to the presence of unconsolidated colliery spoil and embankments.

4.1.5 Ground Workings

There are 32 No. historic surface ground workings features identified within 250m of the site including 16 No. within the site boundary recorded on historic mapping. These records include a reservoirs, ponds, unspecified heaps and tips, workings, pits, a colliery, a sands pit, a limestone quarry, cuttings and an old clay pit.

There are 3 No. records of Underground Workings Features on historical mapping within 1000m of the site. These include a colliery / mine on site and an unspecified disused shaft 970m NW of the site.

The BGS BRITPITS database contains 9 No. records relating to current ground workings within 1000m of the site. These records relate to coal (deep), clay and shale, limestone, dolomite and sandstone extraction. Each of the recorded workings is noted to have ceased operations.

4.2 Radon

Reference to the NRPB Report W26 'Radon Atlas of England and Wales,' 2002 and information contained in the EnviroInsight report indicates the following.

The property is in a Radon Affected Area as defined by the Health Protection Agency (HPA) as between 1% and 3% of properties are above the Action Level.

However, the property is not 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.

4.3 Hydrogeology, Hydrology, Flood Risk and Drainage Issues

4.3.1 Hydrogeology

Information on the hydrogeological characteristics of the site has been obtained from the following:

- The Environment Agency Groundwater Vulnerability Maps
- The GroundSure Report

The site is located upon a Secondary (A) Aquifer and Principal Aquifer (The Yellow Sand Formation) and of these two aquifers the protection of the principal aquifer with associated groundwater protection zone is of paramount importance.

The superficial strata located beneath the site are designated as **Secondary (A), Secondary (Undifferentiated) and Unproductive aquifers**. Formerly classified as minor aquifers, Secondary (A) Aquifers comprise 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.

The solid geology located beneath the site is designated as **Principal and Secondary (A) Aquifers**; Principal Aquifers comprise of high intergranular and fracture permeability, usually providing a high level of water storage and may support water supply to rivers on a strategic scale. This includes the Yellow Sand Formation which is designated as a Principal Aquifer by the Environment Agency. The site is situated at the geological base of the limestone classified as a Principal Aquifer and is considered the most sensitive receptor rather than the underlying Middle Coal Measures strata which is a secondary (A) aquifer.

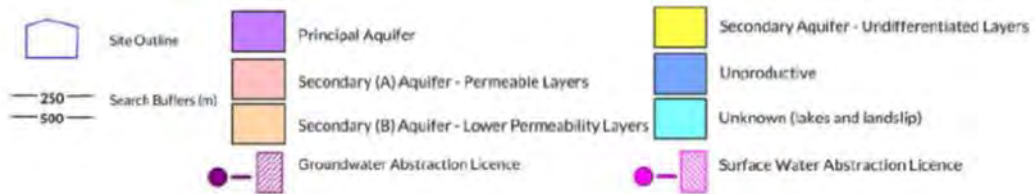
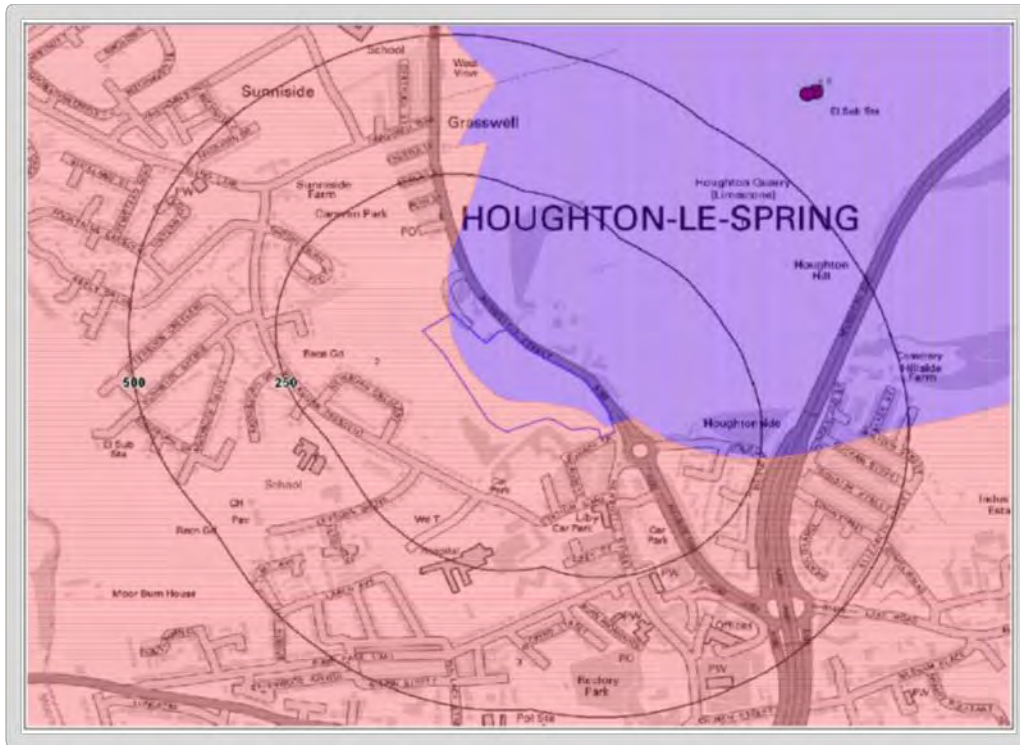


Fig.3 -Bedrock Aquifer Classification

The eastern edge of the site is located within a Source Protection Zone 3 – Total Catchment area as shown below.

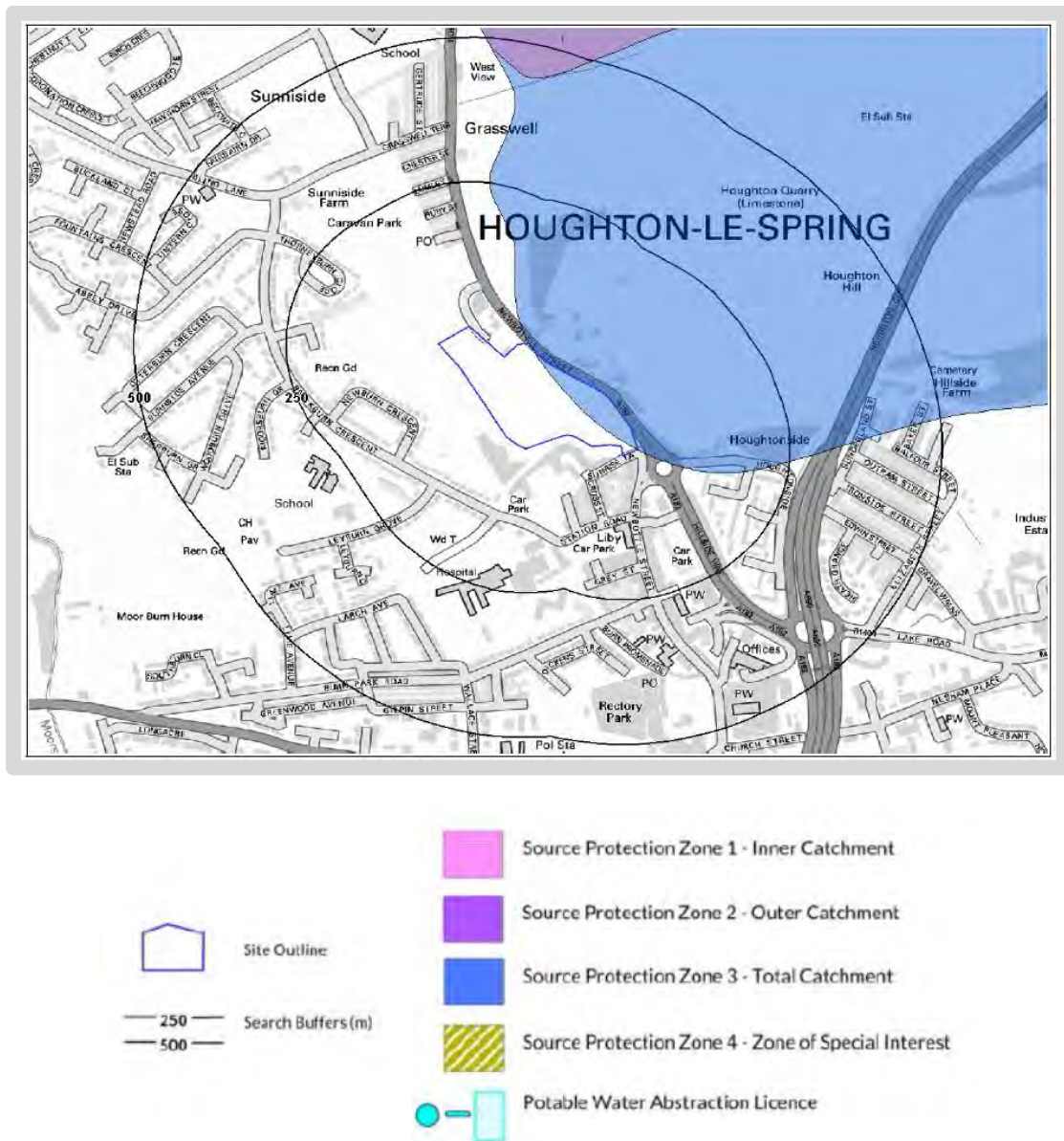


Figure 4 – Source Protection Zones

There are 2 No. Potable Water Abstraction Licences within 2000m of the site. These records are located 1953m NE of the site and relate to water supply.

The site sits approximately between 70.5m aOD and 73.5m aOD, with the northern extents sitting at approximately 70.5m aOD, the southern extents at approximately 71.5m aOD with the centre of the site at approximately 73.5m aOD.

At the time of writing there is no hydrogeology sheet available for this area, however it is understood that the regional hydraulic gradient is to the east (Younger 1994).

The surrounding land to the east of the site has an approximate elevation of 77m aOD increasing to over 100m aOD at High Haining Farm some 1.5km to the east with Moors Burn located 750m to the west, sitting at an elevation of 45m aOD, suggesting that the local shallow hydraulic gradient in the area may be from east to west towards Moors Burn.

Shallow groundwaters, where present, have the potential to migrate off-site to the west (following the natural

topography of the area) and similarly shallow waters located to the east of the site have the potential to migrate towards the site. However, it is likely that shallow / perched ground waters at the site may have their downward vertical migration restricted by low permeability superficial deposits. However, where clay is absent shallow groundwaters are likely to migrate vertically downwards and potentially interact with the deeper groundwaters within the solid strata and flow towards the east following the perceived regional hydraulic gradient.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, dense / light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse

4.3.2 Hydrology and Flood Risk

Information from the Environment Agency (EA) indicates that the site does not lie within 250m of an indicated Environment Agency Zone 2 and Zone 3 flood plain.

Information from the Environment Agency RoFRaS (Risk of Flooding from Rivers and Sea) database indicates that the risk of flooding at the centre of the site is **Very Low** (less than 1 in 1000 chance of flooding in a given year).

Additionally, there are no Flood Defences or areas benefitting from Flood Defences or Flood Storage within 250m of the site.

The BGS indicate that the site lies within 50m of groundwater flooding susceptible areas. The BGS note that there is Potential at Surface relating to Superficial Deposits Flooding and their confidence in this classification is high.

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

4.3.3 Watercourse Network, Surface Water Features and Groundwater Features

There are no Environment Agency river quality records within 1500m of the site.

There are 3 No. river network features recorded within 500m of the site the closest of which relates to a culvert 223m NE of the site (Houghton Burn) which appears to run through Houghton Quarry.

4.3.4 Groundwater, Surface Water and Potable Water Abstraction Licences

There are 4 No. Groundwater Abstraction Licences within 2000m of the site. The closest of these are located 636m and 648m NE of the site. Both licenses are for pollution remediation but while one has an active status the other is historical. Other active license uses include water supply at a point 1953m NE.

There are 4 No. Surface Water Abstraction Licence within 2000m of the site. These are located 1681m to 1880m W of the site and are historical permits for mineral washing and dust suppression.

There are 2 No. Potable Water Abstraction Licences within 2000m of the site. These records are located 1953m NE of the site and relate to water supply.

4.3.5 Source protection Zones

There are 2 No. Source Protection Zones within 500m of the site including 1 No. on site. The record on site is Zone 3, Total Catchment and relates to the Yellow Sand Formation designated by the Environment Agency as a Principle Aquifer. The other record 442m N of the site is Zone 2, Outer Catchment.

Total Catchment area as shown below.

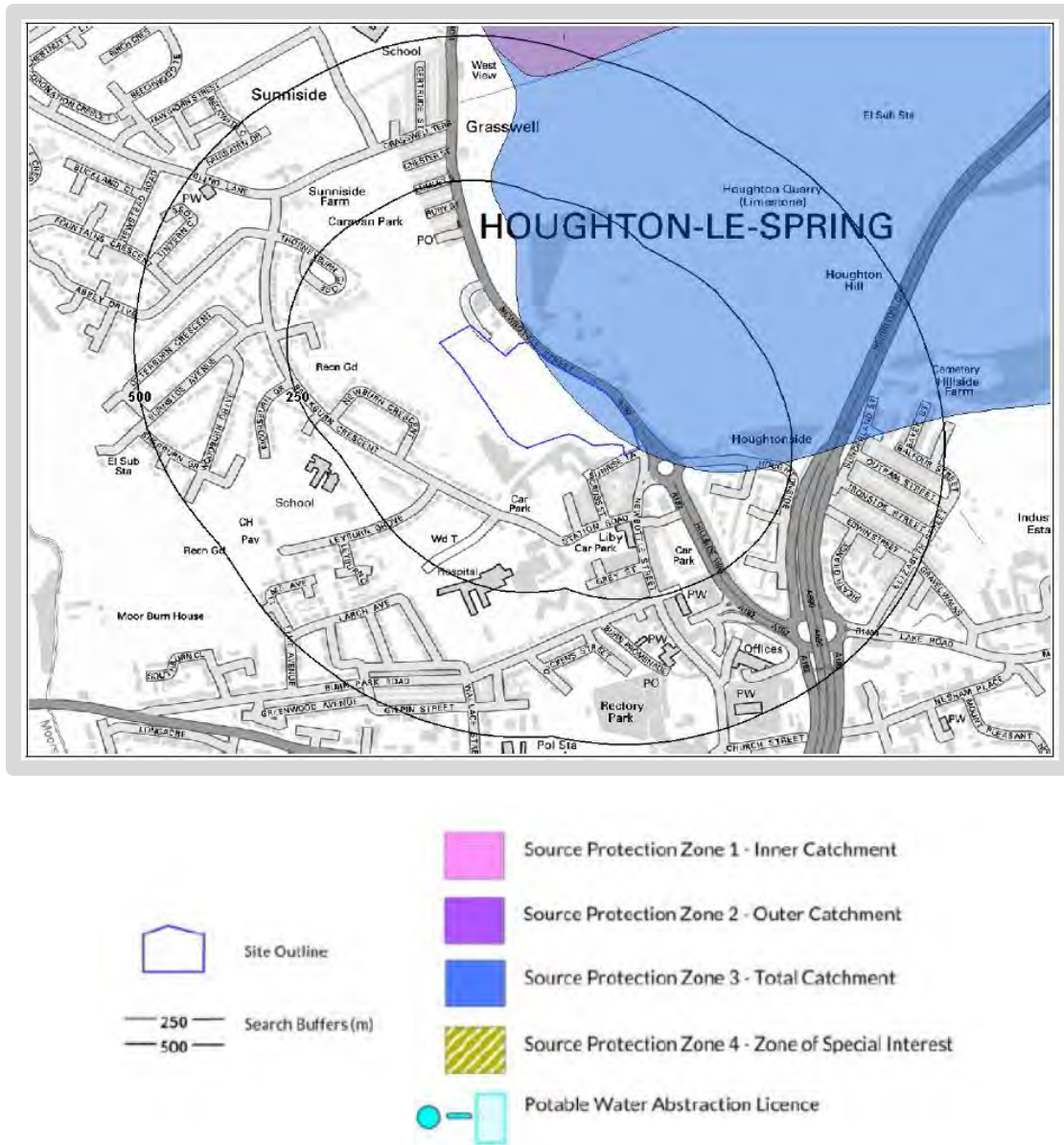


Figure 4 – Source Protection Zones

There are no Source Protection Zones within a Confined Aquifer within 500m of the site.

4.3.6 Groundwater Vulnerability

Superficial and Bedrock Vulnerability on-site is classified as Low relating to the Secondary Aquifers present and soils on-site are deemed to have a Low Leaching Potential.

Superficial Permeability on site is deemed to comprise mixed flow types with a High maximum permeability and a Low minimum permeability.

Bedrock permeability on site is deemed to consist of a fracture flow type with a High maximum permeability and a Low minimum permeability.

4.4 Environmental Permits, Incidents and Registers

4.4.1 Industrial Sites Holding Environmental Permits and/or Authorisations

There are no records of historic IPC Authorisations within 500m of the site.

There are 8 No. records of Part A(1) and IPPC Authorised Activities within 500m of the site. Each of these records relate to landfilling operations in the former Houghton Quarry 21m to 409m NE of the site.

There are no records of Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500m of the site.

There is 1 No. record of List 1 Dangerous Substances Inventory sites within 500m of the site. This record relates to cadmium and mercury in the landfill 409m NE of the site.

There is 1 No. record of List 2 Dangerous Substances Inventory sites within 500m of the site. The record relates to chromium, copper, lead, nickel, pH and zinc in the landfill 409m NE of the site.

There are 2 No. records of Part A(2) and Part B Activities and Enforcements within 500m of the site. These records relate to Part B permits, 1 No. historic for cement in the quarry 66m NE of the site and 1 No. active for unloading of petrol into storage tanks at the service station 26m NE.

There are no records of Category 3 or 4 Radioactive Substances Authorisations within 500m of the site.

There is 1 No. record of Licenced Discharge Consents within 500m of the site. This record relates to Brinkburn Crescent SSO located 201m SW of the site.

There are no records of Water Industry Referrals (potentially harmful discharges to public sewers) within 500m of the site.

There are no records of Planning Hazardous Substance Consents and Enforcements within 500m of the site.

4.4.2 Dangerous or Hazardous Sites

There are no records of COMAH and NIHHS sites within 500m of the site.

4.4.3 Environment Agency Recorded Pollution Incidents

There are 10 No. records on the Environment Agency National Incidents Recording System, List 2 within 500m of site. Each of these records relates to the landfill to the north of the site, 6 No. of these records record Significant Impacts to land, air or water.

There is no record on the Environment Agency National Incidents Recording System, List 1 within 250m of site.

4.4.4 Contaminated Land

There are no records of Sites Determined as Contaminated Land under Part 2A EPA 1990 within 500m of the

site.

4.5 Landfill and Other Waste Sites

4.5.1 Landfill Sites

There is 1 No. record of Environment Agency Registered Landfill Site Licenses Issued within 500m of the site. This is located 33m NE of the site and relates to a waste landfill site operated by Biffa Waste Services Ltd.

There are 3 No. records of Environment Agency Historic Landfill Site Licenses Issued within 500m of the site. The closest relates to 3 landfill sites at Houghton Colliery located on-site. The license was issued on the 7th of September 1995 and surrendered on the 7th of April 1999. It is understood that the historic landfill sites on-site are associated with the reclamation of the former colliery,

The EA have confirmed that the three records relate to the same “landfill site” (License TW452SL) with one of the EA records stating the site is known as Houghton Colliery, which was operated by City of Sunderland, City Building Services.

The site was licensed to receive clean hardcore and brick and Category A Wastes i.e.

“Excavation Wastes only, containing no biodegradable or soluble chemical material. This category may include subsoil, sand, clay, shale or rock, provided they are not contaminated with any other materials”.

The landfill was licensed to receive 400 tonnes per day or 50 loads with a maximum capacity of 10,000m³. Copies of the waste documentation provided by the EA is presented in **Appendix C**. Sunderland City Council have also been contacted regarding the landfill; however, no information has been forthcoming.

There are no records on the BGS / DoE Landfill Site Survey Database within 500m of the site relating to a site.

There are no records of Local Authority Landfill Sites within 500m of the site.

4.5.2 Other Waste Sites

There are no records of Waste Treatment, Transfer or Disposal Sites within 500m of the site.

There are no Environment Agency Licensed Waste Sites within 500m of the site.

4.6 Current Land Uses

There are 24 No. records of Potentially Contaminative Industrial Sites within 250m of the site. The closest relates to the recorded mine shaft on site. Other records include electrical infrastructure, vehicle sales and repair, petrol stations, bedding, tanks, and quarrying.

There is 1 No. record of Petrol and Fuel Sites within 500m of the site. This relates to the Jet petrol filling station located 53m NE of the site.

There are no records of National Grid High Voltage Underground Electricity Transmission Cables within 500m of the site.

There are no records of National Grid High Pressure Gas Pipelines within 500m of the site.

4.7 Designated Environmentally Sensitive Sites

There are 3 No. records of Sites of Special Scientific Interest (SSSI) within 2000m of the site. The closest of these

relates to High Haining Hill located 1575m E of the site.

There are no records of National Nature Reserves (NNR) within 2000m of the site.

There are no records of Special Areas of Conservation (SAC) within 2000m of the site.

There are no records of Special Protection Areas (SPA) within 2000m of the site.

There are no records of Ramsar Sites within 2000m of the site.

There are 3 No. records of Ancient Woodland within 2000m of the site. The closest of these relates to an Unknown Ancient and Semi-Natural Woodland 1705m SE of the site.

There is 1 No. record of Local Nature Reserves (LNR) within 2000m of the site. This record relates to Hetton Bogs 1708m S of the site.

There are no records of World Heritage Sites within 2000m of the site.

There are no records of Environmentally Sensitive Areas within 2000m of the site.

There are no records of Areas of Outstanding Natural Beauty (AONB) within 2000m of the site.

There are no records of National Parks within 2000m of the site.

There are no records of Nitrate Sensitive Areas within 2000m of the site.

There are 4 No. records of Nitrate Vulnerable Zones within 2000m of the site. 2 No. of these records are recorded on site, the next closest to the site is located 288m S of the site.

There are 3 No. records of Green Belt Land within 2000m of the site. The closest of the records is located 18m NE of the site and relates to the North East Greenbelt, Sunderland District (B).

5.0 PREVIOUS INVESTIGATIONS

The Client has supplied a preliminary ground investigation undertaken by Allied Exploration and Geotechnics Ltd. For Sunderland City Council, in January 2006 comprising 12 No. mechanically excavated trial pits and limited environmental testing.

The trial pits identified mixed Made Ground across the site comprising predominantly colliery spoil with demolition wastes bound by cohesive soils ranging from 1.50m to in excess of 4.80m. Superficial deposits were found to comprise stiff clays of glacial origin and variably gravelly sands which likely represent weathered bedrock. Weathered sandstone bedrock was reported in 4 No. locations at depths ranging from 3.10m to 3.80m.

A number of boreholes have been undertaken on site and in the surrounding area. Some records are held by the BGS and made available via their data portal and have also been reviewed.

Records of a borehole undertaken in 1987 towards the southern corner of the site indicated colliery spoil to be present in excess of 12.00m bgl and limestone as shallow as 3.00m bgl in the northeast of the site.

Shaft records from Houghton Colliery indicate a number of thin seams from around 16m bgl with the first notable seam being recorded at 170 ft bgl (approximately 52m bgl) of 13 inches followed by another of 29 inches at 252 ft 7 in bgl (approximately 77m bgl).

Pertinent logs held by the BGS are presented in **Appendix E**.

6.0 CONCEPTUAL SITE MODEL

The information presented in the previous sections of this report has been collated and evaluated to establish an initial qualitative risk assessment and conceptual site model for the site. The following risk assessment identifies hazards posed both by, and to the site in its current status as well as potential future risks which may occur when the proposed end use is established. The proposed onward use of the site is **COMMERCIAL**.

6.1 Contaminated Land Regulations

Part IIA of the Environmental Protection Act 1990 provides a regime for the control of specific threats to health or the environment from existing land contamination. In accordance with the Act, the statutory guidance document and The Contaminated Land (England) Regulations 2000, the definition of contaminated land is intended to embody the concept of risk assessment. Within the meaning of the Act, land is only “contaminated land” where it appears to the regulatory authority, by reason of substances within, on, or under the land that:

- **Significant harm** is being caused, or there is significant possibility of such harm being caused; or
- **Pollution of controlled waters** is being, or is likely to be, caused.

The guidance defines “risk” as the combination of:

- **Probability**, or frequency, of occurrence of a defined hazard (for example, exposure of a property to a substance with the potential to cause harm); and
- **Magnitude** (including the seriousness) of the consequences.

For a risk of pollution or environmental harm to occur as a result of ground contamination, **all** of the following elements must be present:

- **Source**, i.e. a substance that is capable of causing pollution or harm;
- **Receptor** (or target), i.e. something which could be adversely affected by the contaminant; and
- **Pathway**, i.e. a route by which the contaminant can reach the receptor.

If one of these elements are missing, there can be **no significant risk**. If all are present then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

6.2 Potential Hazard Sources

Based on a review of the information currently available for the site it is considered that the following potential sources of contamination may be present at the site:

Actual / Potential on site sources

Given the site history and the current topography Made Ground is considered to be present across the site in deposits remaining from former spoil heaps, inert waste materials and potential buried former tanks.

The industrial legacy of the site and surrounding areas, give an increased potential for contaminants to be present in any Made Ground or within the fabric of the underlying bedrock. Considering the site and surrounding areas history, potential contaminants may include;

- Polyaromatic Hydrocarbons (PAHs)
- Phenols
- Total Petroleum Hydrocarbons (both aliphatic and aromatic)
- Volatile and semi-volatile organic compounds (VOS's and SVOCs)
- Benzene, Toluene, Ethyl-Benzene Xylene (BTEX Compounds)
- Methyl tert-butyl ether (MTBE)
- Polychlorinated biphenyls (PCBs)
- Asbestos,
- Heavy metals and metalloids
- Pesticides
- inorganic compounds (pH, sulphates, sulphur, cyanides)
- Coal Tars, Alcohols, glycols, chlorides, nitrogen, herbicides and pesticides.

The potential also exists for deeper Made Ground associated with the colliery and more recent landfilling of the mine shafts and railway cutting including potentially biodegradable materials or naturally occurring organic material in adjacent superficial strata resulting in the potential for 'landfill' gas production by the burial and decomposition of organic material.

However, it should be noted that the site was previously an inert landfill and significant contamination is not anticipated within these fill materials.

Potential off-site sources

The potential exists for contamination to be present within the ground surrounding the site which may be transmitted to the site through the fabric of the underlying superficial or solid strata and likely Made Ground including from the adjacent quarry/landfill, electrical substation and historic gas works. The site would also be susceptible to any airborne contaminants such as airborne particulates or vapours from surrounding land uses including the historic adjacent works and mills in the area and the road and rail networks.

6.3 Potential Contaminant Pathways

Potential pathways are considered to be:

- Inhalation of dust and volatile contaminants
- Direct contact (ingestion and dermal contact)
- Leaching of contaminants and migration through permeable soils
- Groundwater migration
- Migration through service conduits

- Migration through the local drainage network
- Leakage from site drainage
- Surface water run-off
- Ground gas migration
- Plant root up-take

6.4 Potential Receptors at Risk

Potential receptors are considered to be as follows:

Human Health

- Current site users (Dog walkers etc.)
- Future site users (Residential)
- Site development workers
- Site maintenance workers

Environmental

- Local aquifers
- Local surface waters
- Flora and fauna
- Buildings and underground services

6.5 Risk Assessment

The qualitative risk assessment has been undertaken to assess the significance of any potential pollutant linkages. The risks posed to each of the identified potential receptors are discussed separately and attributed a low, moderate or high level of risk. The risk assessment has been undertaken in accordance with BS10175:2001 and CIRIA Document C552: Contaminated Land Risk assessment, A Guide to Good Practice. The source – pathway – receptor linkages are developed around the information presented above.

The risk assessment has been undertaken by assessing the severity of the potential consequence, taking into account both the potential severity of the hazard and the sensitivity of the target, based on the categories given below.

<i>Category</i>	<i>Definition</i>
Severe	Acute risks to human health, catastrophic damage to buildings / property, major pollution of controlled waters
Medium	Chronic risk to human health, pollution of sensitive controlled waters, significant effects on sensitive ecosystems or species, significant damage to buildings or structures
Mild	Pollution of non-sensitive waters, minor damage to buildings or structures

Minor	Requirement for protective equipment during site works to mitigate health effects, damage to non-sensitive ecosystems or species
--------------	--

Table 6.1 – Definition of Risk Severity

The likelihood of an event (probability) takes into account both the presence of the hazard and target and the integrity of the pathway and has been assessed based on the categories given below.

<i>Category</i>	<i>Definition</i>
High Likelihood	Pollutant linkage may be present, and risk is almost certain to occur in long term, or there is evidence of harm to the receptor
Likely	Pollutant linkage may be present, and it is probable that the risk will occur over the long term
Low Likelihood	Pollutant linkage may be present, and there is a possibility of the risk occurring, although there is no certainty that it will do so
Unlikely	Pollutant linkage may be present, but the circumstances under which harm would occur are improbable

Table 6.2 – Definition of Risk Probability

The potential severity of the risk and the probability of the risk occurring have been combined in accordance with the following matrix in order to give a level of risk for each potential hazard.

		<i>Potential Severity</i>			
		<i>Severe</i>	<i>Medium</i>	<i>Mild</i>	<i>Minor</i>
<i>Probability of Risk</i>	<i>High Likelihood</i>	Very high	High	Moderate	Low/Moderate
	<i>Likely</i>	High	Moderate	Low/Moderate	Low
	<i>Low likelihood</i>	Moderate	Low/Moderate	Low	Very low
	<i>Unlikely</i>	Low/Moderate	Low	Very low	Very low

Table 6.3 – Risk Matrix of Potential Hazard

The following table provides an initial qualitative risk assessment for the site. Additional details are provided in the subsequent discussion sections.

The risk assessment for the site based on identified sources is presented in Table 6.4.

Hazard / Pollutant	Source	Pathway	Receptor	Potential severity	Probability of risk	Level of risk		
<p>Made Ground / Colliery / Inert Landfill History with associated railway land, on-site landfill sites and adjacent quarrying / landfill, tip, spoil heaps, garages, petrol station, former gas works, substation</p> <ul style="list-style-type: none"> • Polyaromatic Hydrocarbons (PAHs) • Phenols • Total Petroleum Hydrocarbons (both aliphatic and aromatic) • Volatile and semi-volatile organic compounds (VOS's and SVOCs) • Benzene, Toluene, Ethyl-Benzene Xylene (BTEX Compounds) • Methyl tert-butyl ether (MTBE) • Polychlorinated biphenyls (PCBs) • Asbestos, • Heavy metals and metalloids • Pesticides (herbicides and biocides). • inorganic compounds (pH, sulphates, sulphur, cyanides) • Coal Tars, Alcohols, glycols, chlorides, nitrogen 	Potential Made Ground, former and current off-site and on-site sources.	Inhalation, Dermal contact and Ingestion	Future site users, future buildings and structures.	Medium	Unlikely	Low		
		Inhalation, Dermal contact and Ingestion	Development workers.	Medium	Low Likelihood	Low/Moderate		
		Root Uptake	Plants	Minor	Low likelihood	Very Low		
		Contaminated Groundwater Migration	Secondary (A) Aquifer	Mild	Likely	Low / Moderate		
			Principle Aquifer (The Yellow Sand Formation)	Medium	Likely	Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Leaching of Soil Contamination	Secondary (A) Aquifer	Mild	Likely	Low / Moderate		
			Principle Aquifer (The Yellow Sand Formation),	Medium	Likely	Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Migration through service conduits, foundations, drainage solutions	Secondary (A) Aquifer	Mild	Likely	Low / Moderate		
			Principle Aquifer (The Yellow Sand Formation),	Medium	Likely	Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Surface Run-off	Secondary (A) Aquifer	Mild	Likely	Low / Moderate		
			Principle Aquifer (The Yellow Sand Formation),	Medium	Likely	Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Volatilisation (vapour phase migration and partitioning into sorbed / dissolved phase).	Secondary (A) Aquifer	Mild	Likely	Low / Moderate		
			Principle Aquifer (The Yellow Sand Formation),	Medium	Likely	Moderate		
			Culvert / Water Course	Medium	Unlikely	Low		
		Hazardous gas and volatile compounds	Migration from possible Made Ground and buried organic soils	Inhalation, Explosion	Future site users, Structures	Medium	Low Likelihood	Low/Moderate
					Site development workers	Medium	Unlikely	Low

Table 6.4 – Environmental Risk Assessment

The Risk Assessment presented above should be considered as preliminary and should be reassessed following intrusive ground investigations.

6.5.1 Current and Future Site Users

Potential pathways considered significant to current and future site uses are dermal contact, ingestion of contaminated soil / groundwater and inhalation of fibres, gases, vapours or dusts.

Based on the historical industrial uses at the site, current appearance (thriving vegetation etc) and current use of the site it is considered that there is a **LOW** risk to current site users.

Should the site be developed in the future the risk to site users would also be **LOW** based on the likely hardstanding / building footprint covering at the site which would effectively act as a barrier to future site users from potential contaminants located at the site.

6.5.2 Ground Excavation / Development Workers

Earthworks will likely be undertaken as part of the proposed development . It is considered that the risk to construction and/or maintenance workers during redevelopment works and post-development maintenance works is **LOW** subject to appropriate health and safety requirements and the use of personal protective equipment.

Should any materials, including suspected Asbestos Containing Materials, suspected of being contaminated be observed during site works these works should cease and specialist environmental advice sought.

6.5.3 Future Developments including Buried Structures and Services

The risk to encountering buried structures and services (i.e. possible migration of contamination within service corridors) is considered to be **MODERATE** due to the sites industrial history.

6.5.4 Controlled Waters

The site is located upon a Secondary (A) Aquifer and Principal Aquifer (The Yellow Sand Formation) and of these two aquifers the protection of the principal aquifer with associated groundwater protection zone is of paramount importance.

The geological and hydrogeological plans for the site suggest that the northeaster part of the site lies within the groundwater protection zone whilst the majority of the building's footprints appear to be located within the secondary aquifer. At this stage it is not known if there is a competent thickness of low permeable superficial strata located beneath the site that would protect the groundwater protection zone and therefore the potential exists for potential mobile contamination (impacted groundwater, leachate from soils contamination, dense / light non-aqueous phase liquids (DNAPL and LNAPL)) and potentially volatilised hydrocarbons that may exist to migrate vertically downwards and impact the underlying principal aquifer. It is considered that there is a **MODERATE** risk of potential contamination migrating vertically downwards and impacting on the underlying principal aquifer.

The foundation solution of the future development has the potential to provide preferential pathways to potential mobile contains i.e. piled foundation solution is considered pose **MODERATE** risk of potential contamination migrating vertically downwards and impacting on the underlying principal aquifer.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile

contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, dense /light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.

The site is currently vacant and no surface water drainage and or service ducts are known to exist at the site and therefore it is unlikely that potential mobile contaminants could migrate and impact surface waters via service conduits and existing site drainage and surface run off.

It is considered that there is a **LOW** risk of potential contamination migrating and impacting local water courses. Assuming the culverted watercourse is in a good state of repair this risk maybe reduced to **VERY LOW**.

6.5.5 Flora

Made Ground encountered at the site is may be chemically suitable - however may not provide a texturally unsuitable growing medium.

It is therefore recommended that any planting areas receive appropriate subsoil and topsoil to enable appropriate plant growth

7.0 GROUND ENGINEERING CONSIDERATIONS

A number of geotechnical issues are anticipated at the site, which could affect any proposed development on the site. The following should be taken into account when designing site investigation, earth and construction works at the site.

7.1 Site Access

Pedestrian and vehicle access is available to all areas of the site via a small road to the rear of the Jet petrol station. Pedestrian access is readily available however a boulder will need removing to allow vehicles to enter the site. At the time of the walk over the ground was wet so some difficulty should be anticipated for vehicular movements.

7.2 Ground Obstructions

Given the sites history significant ground obstructions may include shaft caps, relic foundations, retaining structures and services.

Additionally, large cobbles and boulders may be present within any Made Ground present at the site and also may occur naturally within superficial strata recorded at the site and may require localised deepening or extending of excavations to remove if required.

7.3 Existing Structures

The site is currently free of above ground structures with the exception of a retaining wall in the order of 4m in height located on the north-eastern boundary.

7.4 Settlement and Subsidence

The BGS consider the overall risk to the site from natural ground subsidence to be Negligible to Moderate. This takes in to account the combined risks on site from Shrink-Swell Clays, Landslides, Soluble Rocks, Compressible Ground, Collapsible Rocks and Running Sands. The most onerous of these are a low risk rating of landslides and moderate risk of landslides attributed to slopes in the east of the site and parallel to the western boundary.

7.5 Slope Stability

Given the topography of the site slope stability is unlikely to be of concern across main proposed development area, however there is an existing retaining wall in the north of the site in the order of 4m tall, it is unlikely that the development will require any similar support but if any significant cuts in to the existing ground profile are proposed then the stability of any formed slopes should be considered.

7.6 Excavations

Excavations in natural cohesive strata are likely to remain stable for a reasonable length of time, where excavations encounter Made Ground or granular strata the stability is likely to be greatly reduced. If deep excavations are to remain open for more than a few hours, it is anticipated that some form of trench support or battering may be required. The requirement for temporary support should be determined in accordance with current health and safety guidance. Excavations within shallow rock may require breaking out.

7.7 Foundations / Earthworks

With regards to future development, at this initial stage, depending on the suitability of the underlying natural ground and the loadings required, foundation solutions may comprise;

- Deepened Strip Foundations
- Raft / mass concrete
- Pad foundations
- Piles

7.8 Development Drainage

Historic boreholes within the site indicate sandstone and limestone bedrock, a Principal aquifer, may be encountered at relatively shallow depth in the main development area beneath a covering of Made Ground. This is supported by the presence of visible bedrock to the north east where the former Houghton Quarry has been cut into the hillside.

On the basis that the site comprises an industrial and railway former use with Made Ground overlying a Principal Aquifer we would anticipate that soakaways (SUDS) will not be a feasible surface water solution for the site and that formal drainage will be required.

7.9 Environmental Issues

Given the site history and the current topography Made Ground is known to be present across the site in relatively thin deposits thickening to the south west. The site has previous uses including a colliery and associated railway infrastructure. The site would also be susceptible to any airborne contaminants such as airborne particulates or vapours from surrounding land uses including the historic adjacent gas works, quarry and road network. Considering the site and surrounding areas history, potential contaminants may include hydrocarbons, asbestos, metals and metalloids and organic and inorganic compounds.

The potential also exists for deeper Made Ground at the surface and within backfilled mineshafts and reservoirs to include potentially biodegradable materials or naturally occurring organic material in adjacent superficial strata resulting in the potential for 'landfill' gas production by the burial and decomposition of organic material.

7.10 Invasive species

Suspected Japanese Knotweed was noted during the site walkover to the rear of the petrol filling station at the top of the retaining wall and along the crest of the adjacent slope and may exist elsewhere around the site. Due to the timing of the visit any young plants may not have been noted. Whilst suspected Japanese Knotweed was noted on the edge of the site it has the capacity to grow and spread rapidly if left unchecked at the start of the growing season. Should any suspected invasive species be identified advice should be sought from a suitably qualified and experienced professional.

7.11 Mining Issues

Although coal reserves are known to exist in the area the property is not considered to be in an area where the Coal Authority believe there is coal at or close to the surface, therefore shallow unrecorded mine-workings are unlikely to be a risk factor at the site. However, the Coal Authority report confirms that workings have been undertaken at depth beneath the site and that 3 No. shafts are recorded within the site boundary. 2 No. shafts have been treated and capped and third has been

backfilled to an unknown specification.

From initial consultation with the Coal Authority any development undertaken close to or over the existing shafts would depend on confirmatory investigation of the shafts but otherwise the risk to developments at the site as a result of underground mine workings for the extraction of coal is considered to be negligible.

7.12 Archaeological Issues

No significant archaeological issues are anticipated for the development as any archaeology would have been disturbed by the colliery development.

The Local Planning Authority (County Archaeologist) would be able to advise on any requirements arising from archaeological interest at the site.

7.13 Unexploded Ordnance

Evidence from the unexploded bomb risk map provided by Zetica indicates that the site is in a low risk area indicating that the land has 15 bombs per 1,000 acre or less.

8.0 PRELIMINARY COAL MINING RISK ASSESSMENT

8.1 Preliminary Coal Mining Risk Assessment – Data Appraisal

The following table (Table 8.1) represents a preliminary coal mining risk assessment based on published data including the Coal Authority Mining Report obtained for the site, BGS mapping and the Coal Authority’s online map viewing system.

Coal Mining Issue	Risk Factor?	Risk Assessment
Past Underground Mining	No	Coal Authority data and geological plans indicate that no <u>shallow</u> mine workings have been undertaken within the site boundary. Risk to developments at the site from recorded shallow mine workings is considered to be NEGLIGIBLE.
Underground Coal Mining (probable unrecorded shallow workings)	No	The Coal Authority do not consider the site to be within an area where unrecorded shallow mine workings may be present. Risk to developments at the site from unrecorded shallow mine workings is considered to be NEGLIGIBLE.
Recorded Workings	Yes	There are 37 records of underground mining within the zone of influence of the site. These range in depth from 122m bgl to 313m bgl within seams including the Main, Yard, Maudlin, Low Main, Harvey, Hutton and Busty. These workings are all recorded at sufficient depth to mitigate against and related ground instability.
Spine Roadways at Shallow Depth	No	The Coal Authority have no records of spine roadways at shallow depth. The risk to developments at the site from recorded roadways is NEGLIGIBLE.

Mine entries	Yes	<p>Coal Authority Mining Report and geological plans confirms that 3 No. known mine entries exist at the site. 2 No. shafts along the centre line of the site are recorded to have been reinstated to NCB specifications in 1988. The third shaft located in the wooded area adjacent to Newbottle Street has been filled to an unknown specification.</p> <p>The risk to developments at the site from known mine entries is considered to be LOW.</p>
Opencast Mines	No	<p>Coal Authority data and geological plans indicate that no opencast workings are known within 500m of the site.</p> <p>The risk to developments at the site from known opencast workings at the site is considered to be NEGLIGIBLE.</p>
Recorded coal mining subsidence	No	<p>The Coal Authority has not received a damage notice or any claim for the site. A fault is recorded running close and parallel to the south eastern boundary but is not expected to impact on the development due to its location.</p> <p>The risk to developments at the site from coal mining subsidence is considered to be NEGLIGIBLE</p>
Record of past mine gas emissions	No	<p>There is no reported history of past mine gas emissions in the area.</p> <p>The risk to developments at the site from mine gas emissions is considered to be VERY LOW.</p>

Table 8.1: Potential Risk Factors arising from Coal Mining (Preliminary Risk Assessment).

9.0 SUMMARY CONCLUSIONS

The site is located to the south of Newbottle Street (A182), north east of Houghton le Spring town centre. The site is an irregular, elongated plot orientated roughly north west to south east with an area in the order of 3.35ha and comprises a large terrace of maintained grassland bound by slopes to the north east and south west. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall in the order of 4m tall along the boundary with a storage yard to the rear of the adjacent petrol filling station. Suspected Japanese knotweed was noted at the northern end of the retaining wall and along the crest of the adjacent slope.

Geological plans indicate that the site is underlain by artificial deposits (Made Ground) comprising colliery spoil, ash materials and demolition rubble. Superficial deposits are recorded as cohesive glacial till (boulder clay) and glaciolacustrine deposits but any deposits are likely to be relatively thin. Solid geology comprises Permian limestone and sandstone in the east of the site giving way to the underlying coal measures strata comprising mudstone, siltstone and sandstone elsewhere.

Coal is not indicated to be present at, or close to the surface beneath the site but has been worked at depth. From initial consultation with the Coal Authority any development undertaken close to or over the existing shafts would depend on confirmatory investigation of the shafts but otherwise the risk to developments at the site as a result of underground mine workings for the extraction of coal is considered to be negligible.

The BGS consider the overall risk to the site from natural ground subsidence to be Negligible to Very Low, however a Moderate risk of Landslides has been assigned to the embankments along the north east and parallel to the south western boundaries.

Given the site history and the current topography Made Ground is known to be present across the site in relatively thin deposits thickening to the south west. The site has previous uses including a colliery and associated railway infrastructure. The site would also be susceptible to any airborne contaminants such as airborne particulates or vapours from surrounding land uses including the historic adjacent gas works, quarry and road network. Considering the site and surrounding areas history, potential contaminants may include hydrocarbons, asbestos, metals and metalloids and organic and inorganic compounds.

The potential also exists for deeper Made Ground at the surface and within backfilled mineshafts and reservoirs to include potentially biodegradable materials or naturally occurring organic material in adjacent superficial strata resulting in the potential for 'landfill' gas production by the burial and decomposition of organic material.

The site is located upon a Secondary (A) Aquifer and Principal Aquifer (The Yellow Sand Formation) and of these two aquifers the protection of the principal aquifer with associated groundwater protection zone is of paramount importance.

The geological and hydrogeological plans for the site suggest that the northeaster part of the site lies within the groundwater protection zone whilst the majority of the building's footprints appear to be located within the secondary aquifer. At this stage it is not known if there is a competent thickness of low permeable superficial strata located beneath the site that would protect the groundwater protection zone and therefore the potential exists for potential mobile contamination (impacted groundwater, leachate from soils contamination, dense / light non-aqueous phase liquids (DNAPL and LNAPL)) and potentially volatilised hydrocarbons that may exist to migrate vertically downwards and impact the underlying principal aquifer. It is considered that there is a MODERATE risk of potential contamination migrating vertically downwards and impacting on the underlying

principal aquifer.

The foundation solution of the future development has the potential to provide preferential pathways to potential mobile contaminants i.e. piled foundation solution is considered pose a MODERATE risk of potential contamination migrating vertically downwards and impacting on the underlying principal aquifer.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east, the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, dense / light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.

The site is currently vacant and no surface water drainage and or service ducts are known to exist at the site and therefore it is unlikely that potential mobile contaminants could migrate and impact surface waters via service conduits and existing site drainage and surface run off.

It is considered that there is a LOW risk of potential contamination migrating and impacting local water courses. Assuming the culverted watercourse is in a good state of repair this risk maybe reduced to VERY LOW.

Given the topography of the site slope stability is unlikely to be of concern across main proposed development area, however there is an existing retaining wall in the north of the site in the order of 4m tall, it is unlikely that the development will require any similar support but if any significant cuts in to the existing ground profile are proposed then the stability of any formed slopes should be considered.

At this early stage it is likely that strip foundations, raft / mass concrete, pad or piled foundations would be appropriate for the proposed development at this site subject to the proposed loadings and confirmatory intrusive ground investigation.

Formal drainage is anticipated to be required for surface water at the site to the presence of potentially contaminated Made Ground overlying a Principal Aquifer.

10.0 RECOMMENDATIONS

It is recommended that intrusive ground investigations are undertaken at the site, comprising a suitable number of exploratory holes to target the Made Ground, any superficial strata and the underlying solid geology with appropriate environmental and geotechnical analysis and the installation of gas and groundwater monitoring points.

The site investigation should also assess any potential risk to the underlying groundwater regime and the underlying protected aquifer and groundwater protection zone. Thus, enabling an understanding of how the relevant shallow and deep groundwaters interact with each other and how they flow to potentially onsite and offsite receptors.

Confirmatory investigation of the backfilled mine shafts by rotary drilling and inspection of the caps by trial pitting will also be required.

This will provide confirmation of the Preliminary Risk Assessment and allow the project to proceed on a more assured basis with regards foundations, earthworks, and any risks to proposed developments and future site users arising from the materials present on and beneath the site.

The Shadbolt Group

11.0 REFERENCES

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- **Asbestos in soil and made ground: a guide to understanding and managing the risks. Ciria, March 2014.**
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- **Hydrogeology in the Geology of the North East England (Second Edition). Special Publication of the Natural History Society of Northumbria.**

APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

PRELIMINARY RISK ASSESSMENT

*This report is produced for the benefit of **Hellens Land** in accordance with the terms of the appointment.*

This report has been prepared in accordance with the terms and conditions of the appointment and relates to the condition of the site at the time of ground investigations. No warranty is provided as to the possibility of future changes in the condition of the site.

Whilst the contamination assessment detailed within this report reflects our view, because there are no exact UK definitions of these matters, being subject to risk analysis, Shadbolt Environmental are unable to give categoric assurances that they will be accepted by authorities or funds without question. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. In time, improved practices or amended legislation may necessitate a re-assessment.

The report is limited to the geotechnical and environmental aspects detailed within the report and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents.

APPENDIX B

HISTORICAL PLANS



Site Details:

U + C Houghton

Client Ref: 4281
Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

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



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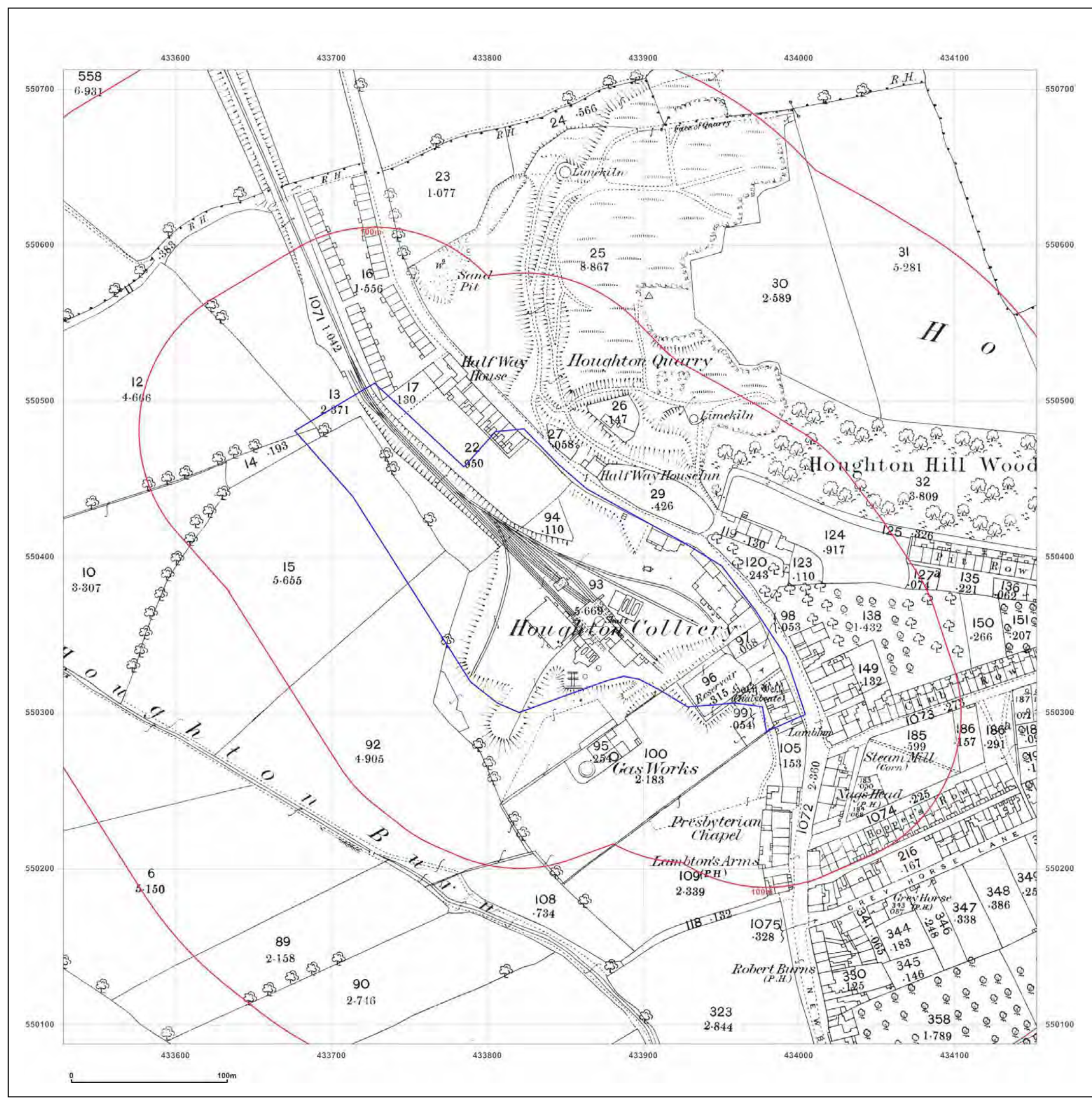


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Production date: 20 March 2018

Map legend available at:
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Site Details:

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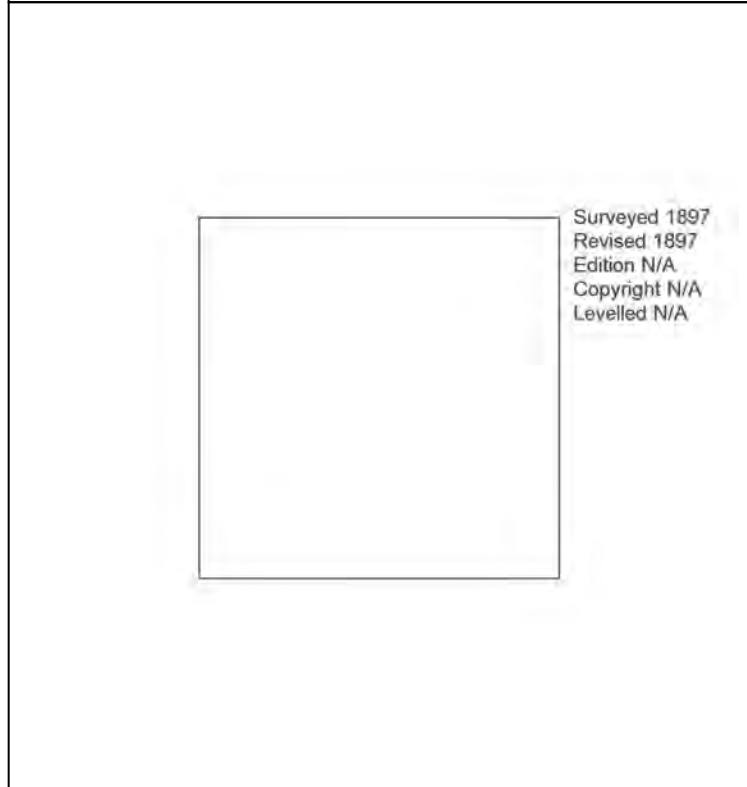
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Grid Ref: 433840, 550400

Map Name: County Series

Map date: 1897

Scale: 1:2,500

Printed at: 1:2,500



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



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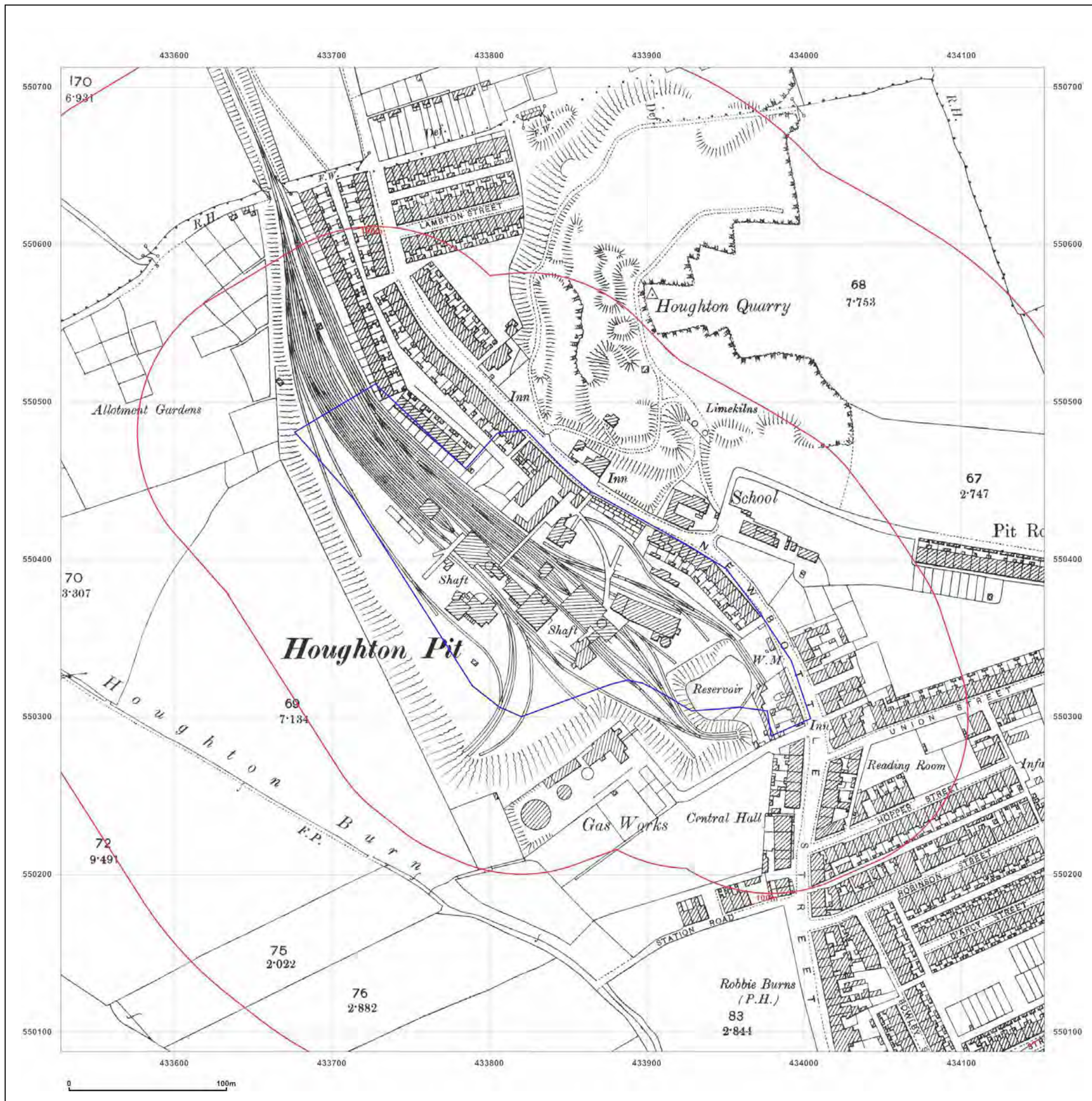


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Site Details:

U + C Houghton

Client Ref: 4281
Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: County Series

Map date: 1920

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1920
Revised 1920
Edition N/A
Copyright N/A
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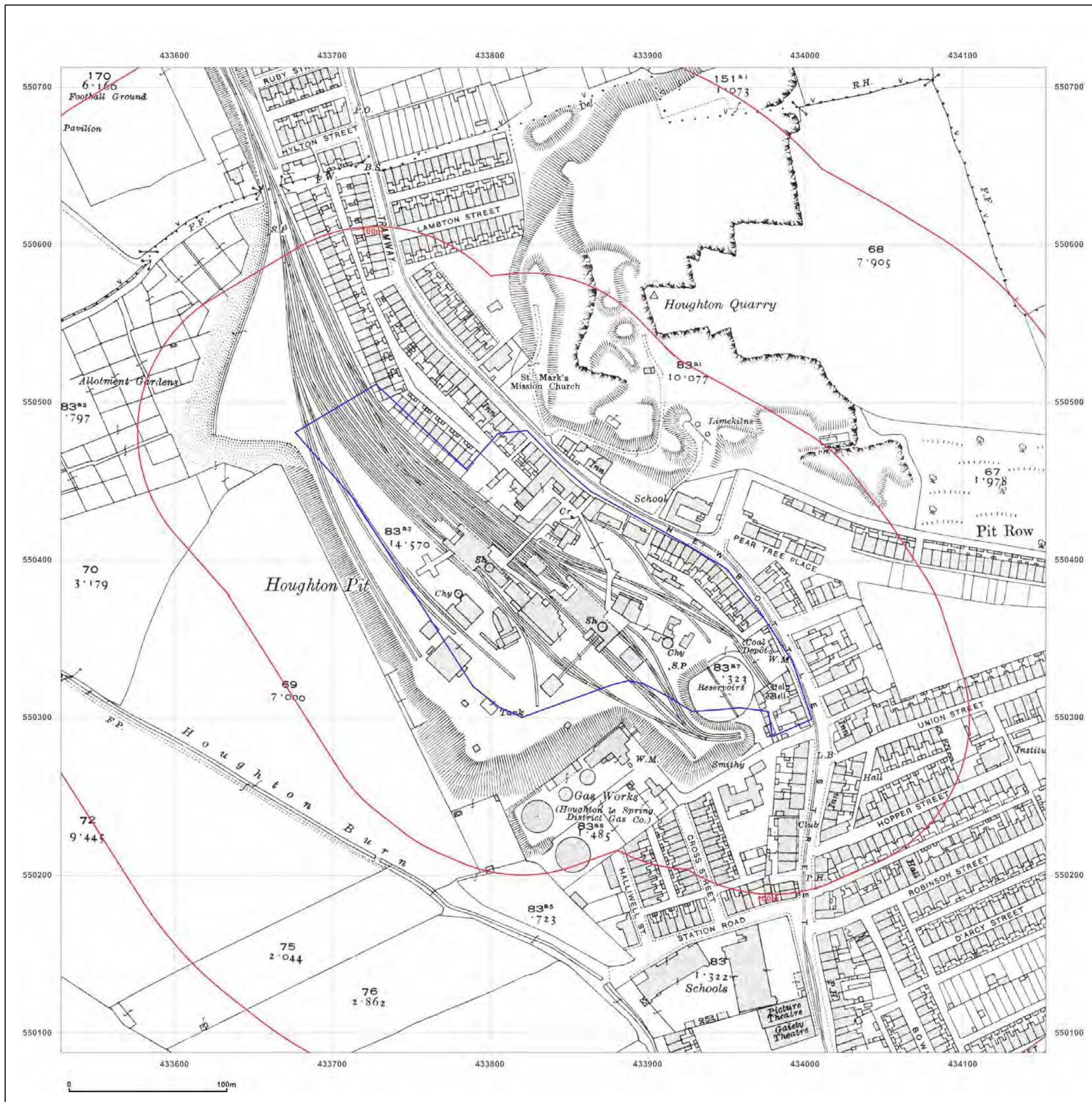


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Site Details:

U + C Houghton

Client Ref: 4281
Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: County Series

Map date: 1939

Scale: 1:2,500

Printed at: 1:2,500



Surveyed 1939
 Revised 1939
 Edition N/A
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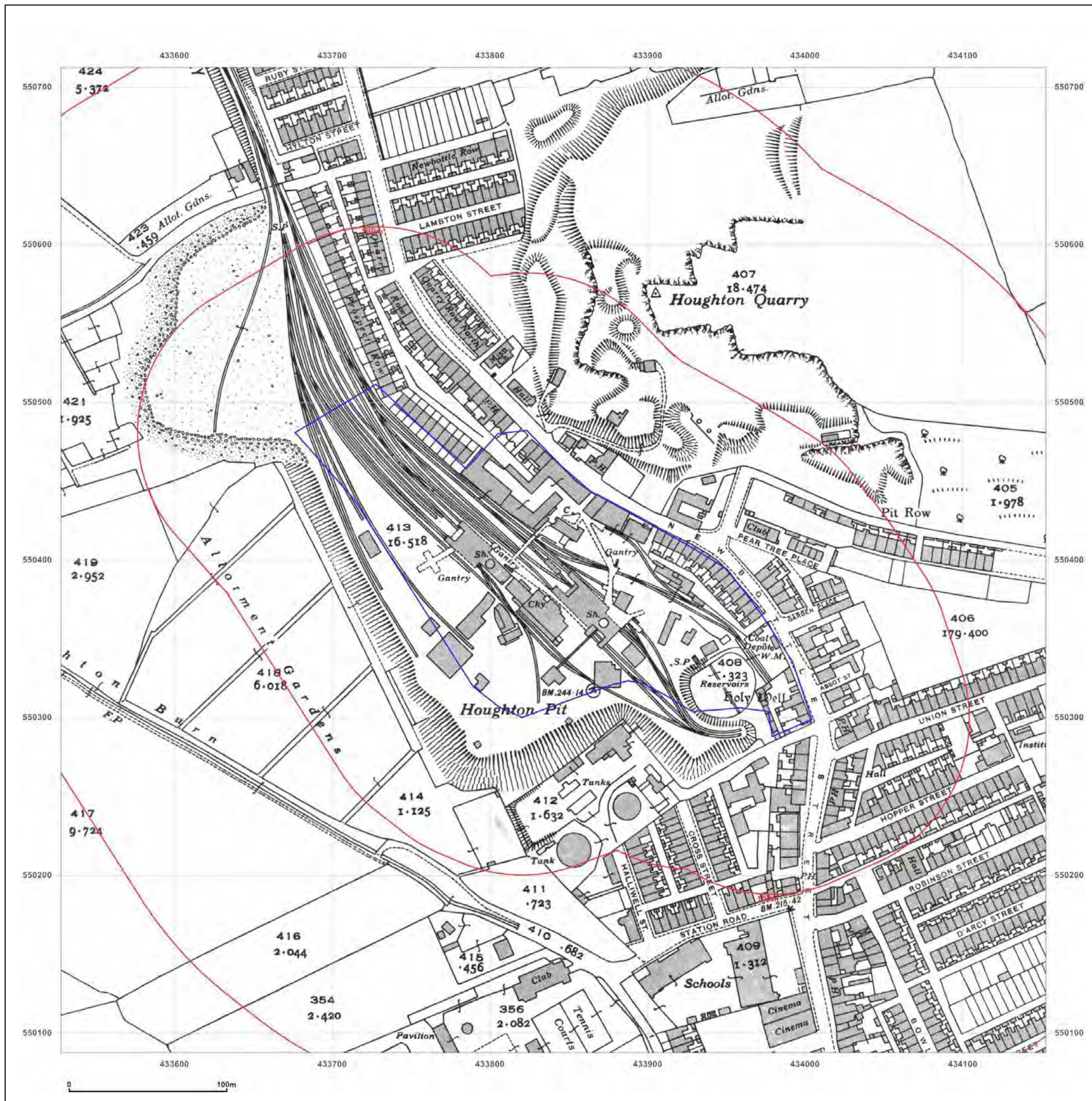


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Site Details:

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Client Ref: 4281
Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 1958

Scale: 1:2,500

Printed at: 1:2,500



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



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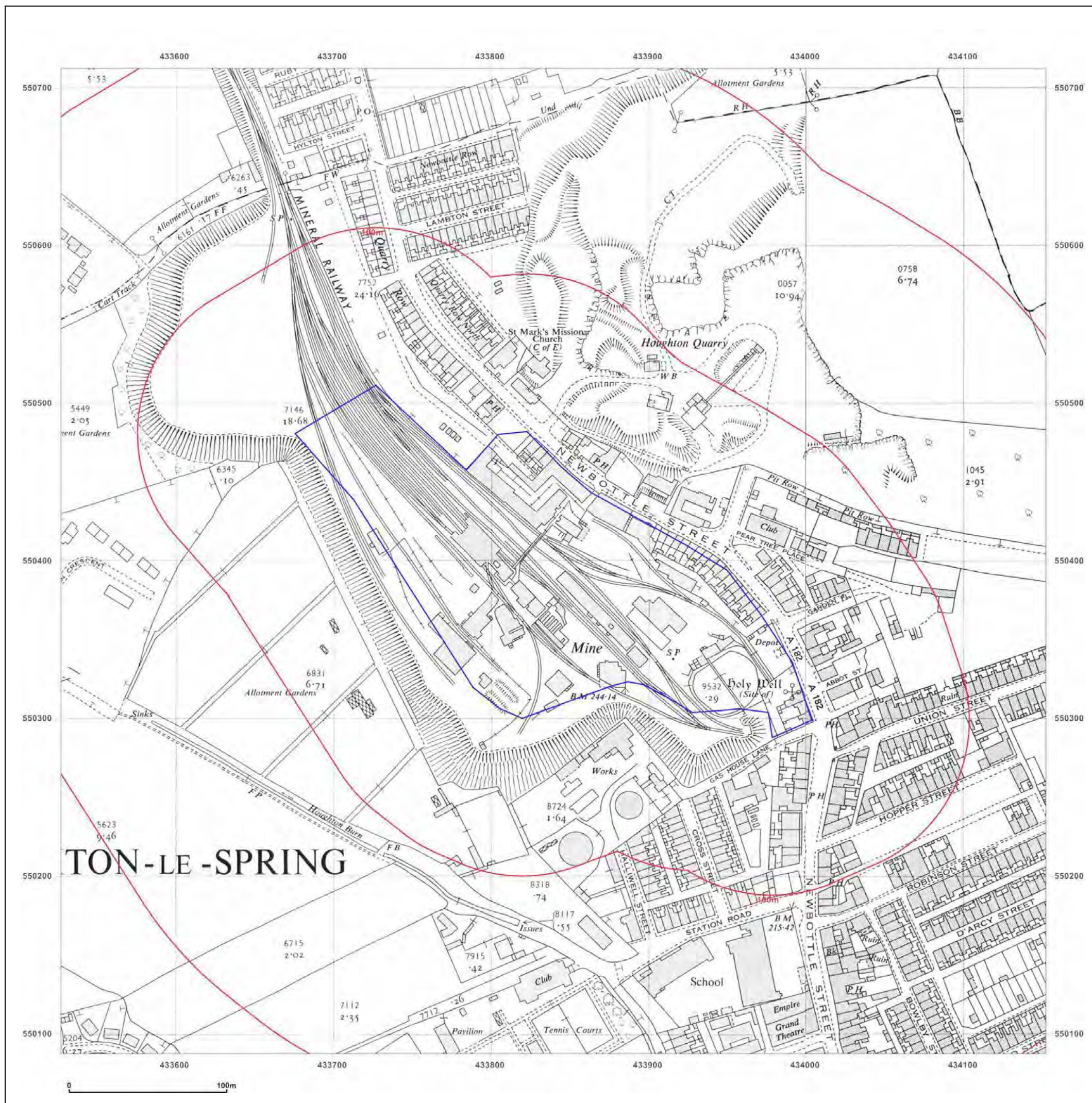


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Site Details:

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Client Ref: 4281
Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: National Grid

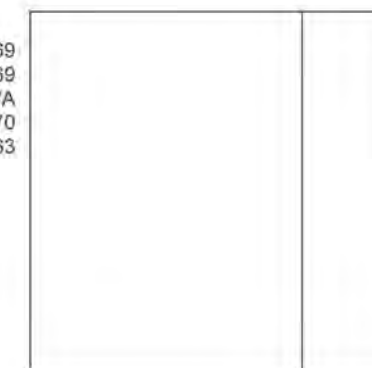
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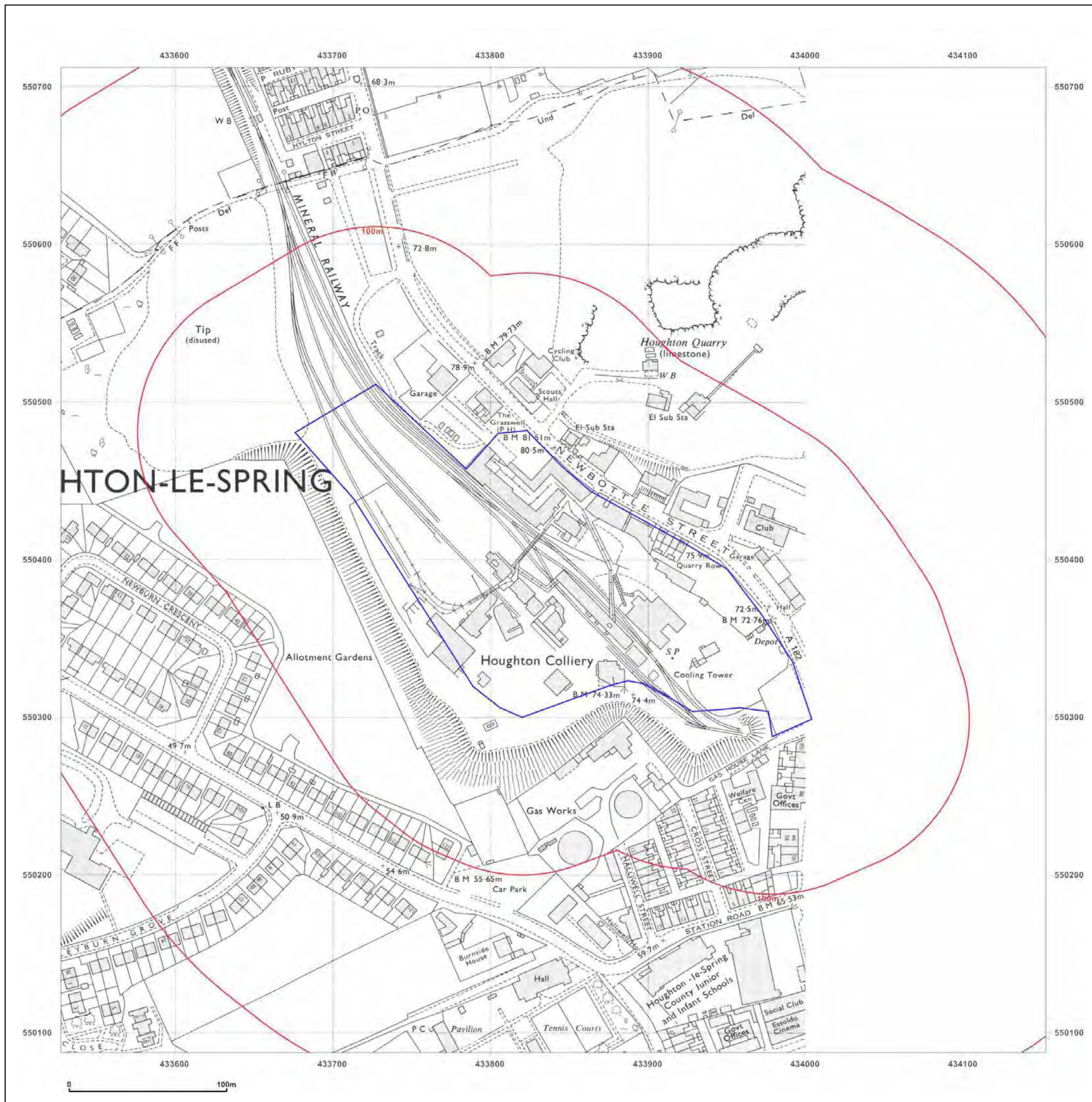


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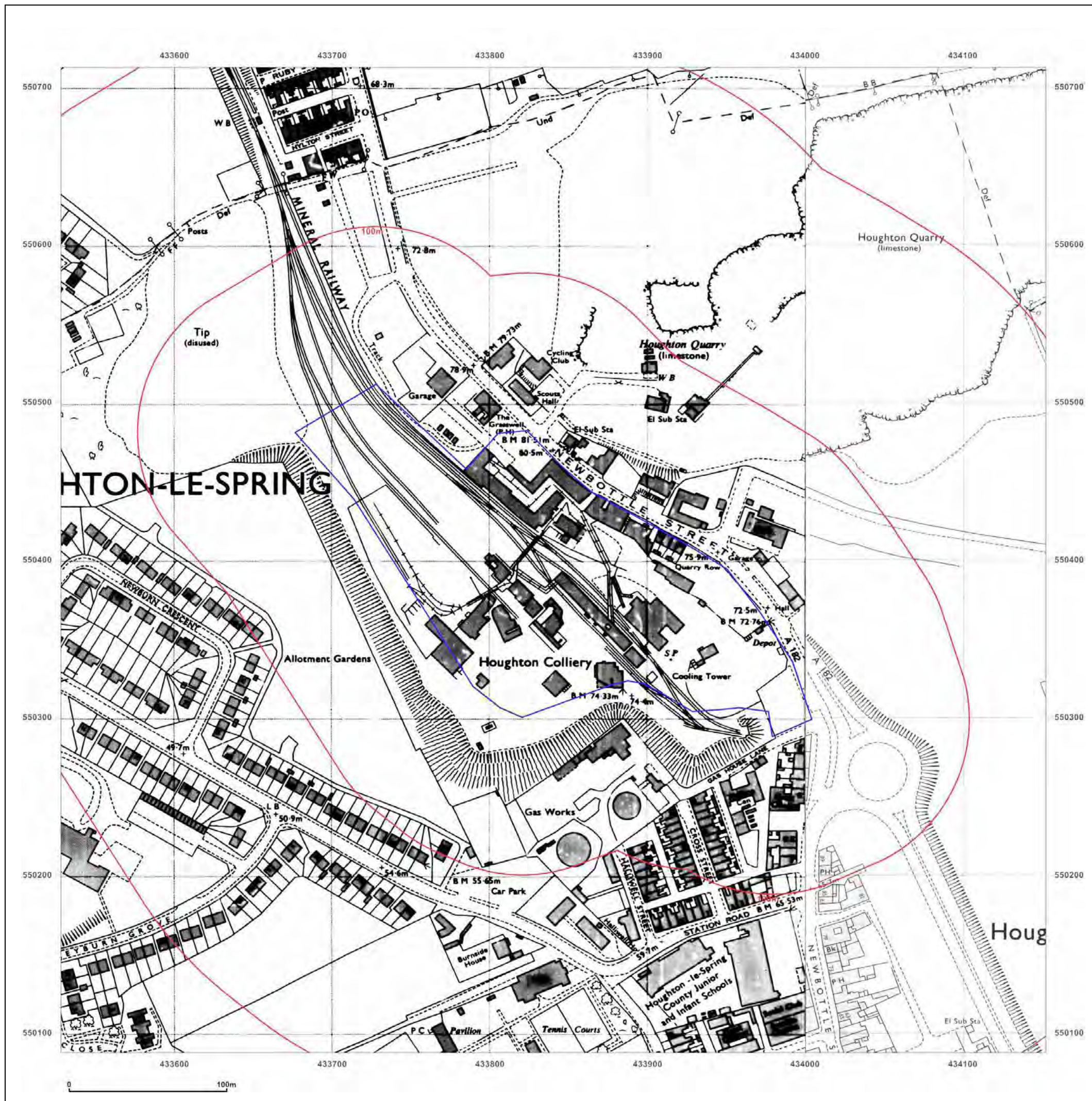


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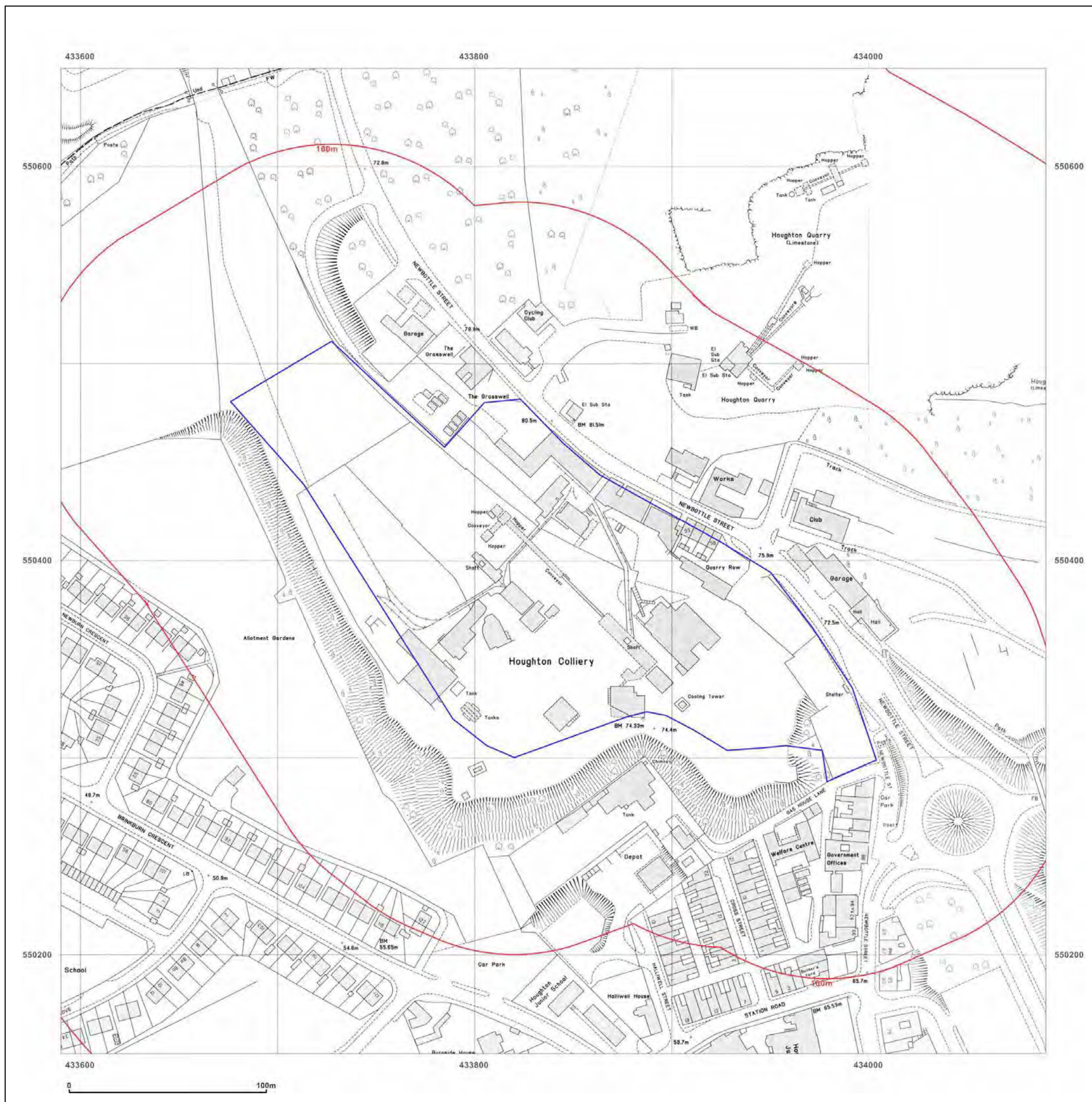


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Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 1989-1993

Scale: 1:1,250

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Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 1993

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 Edition N/A
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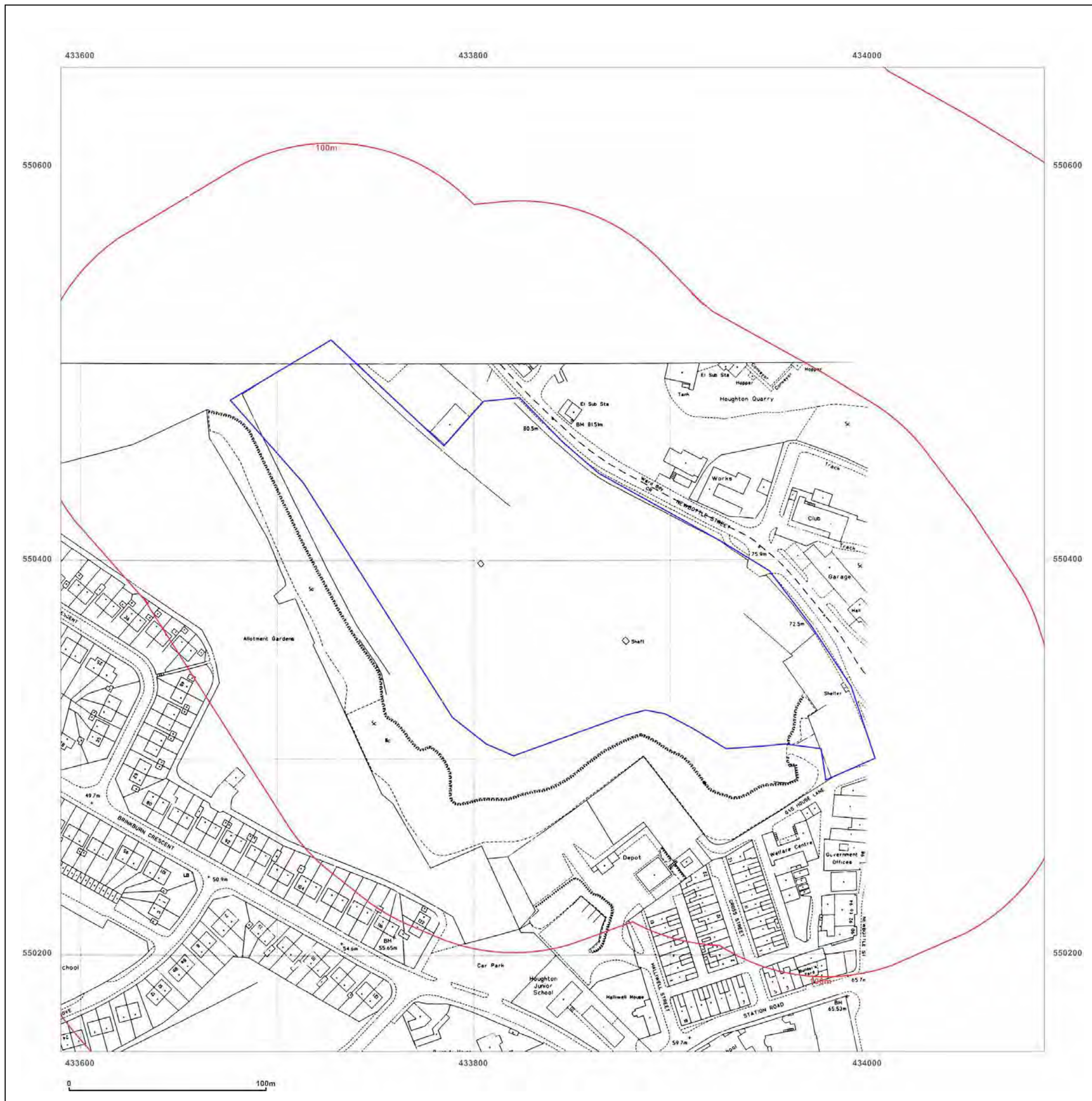


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Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 1994

Scale: 1:1,250

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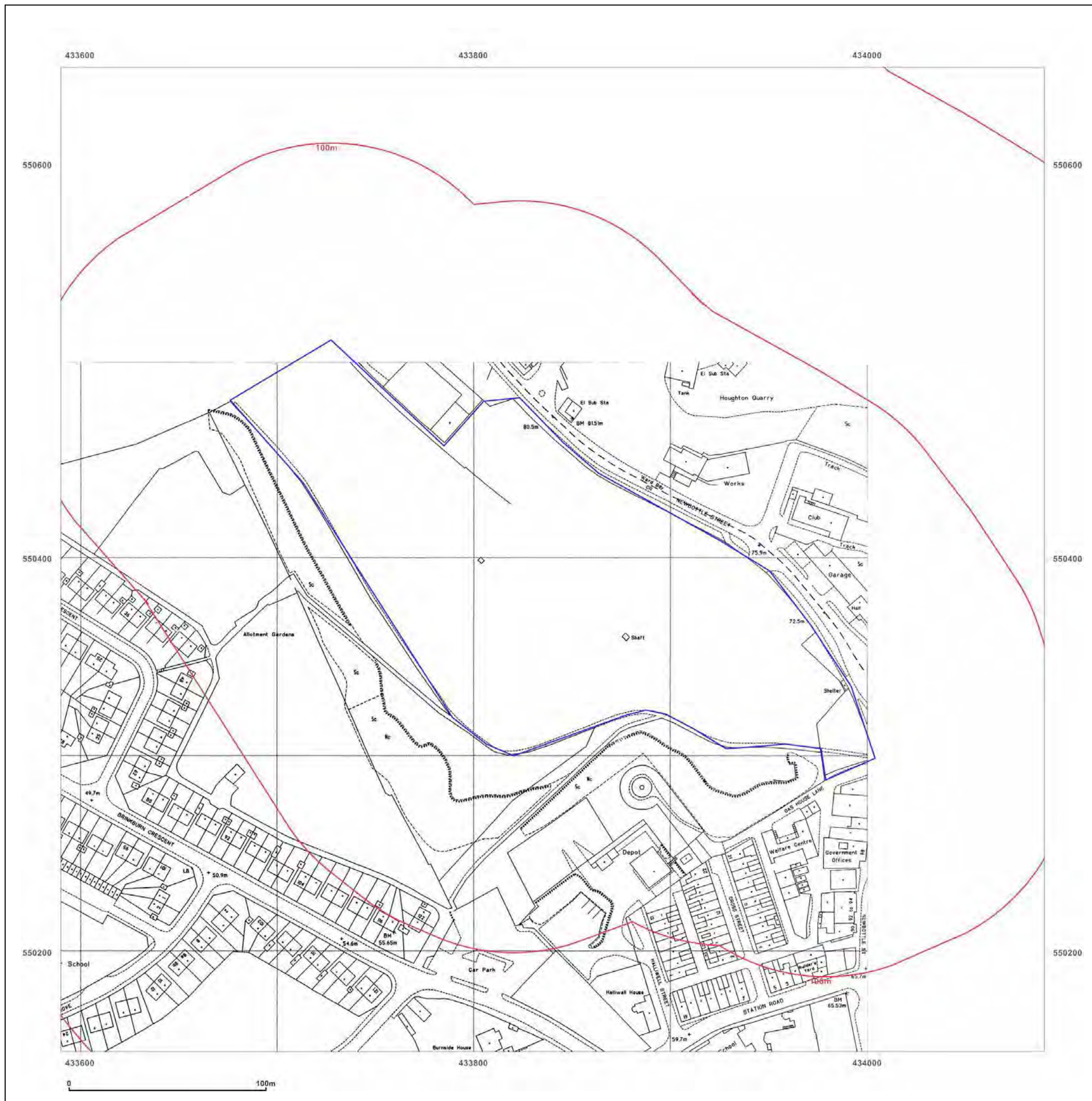


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Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: County Series

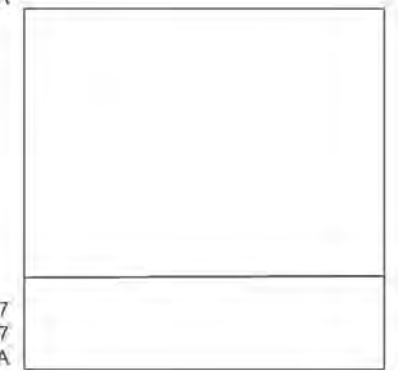
Map date: 1857

Scale: 1:10,560

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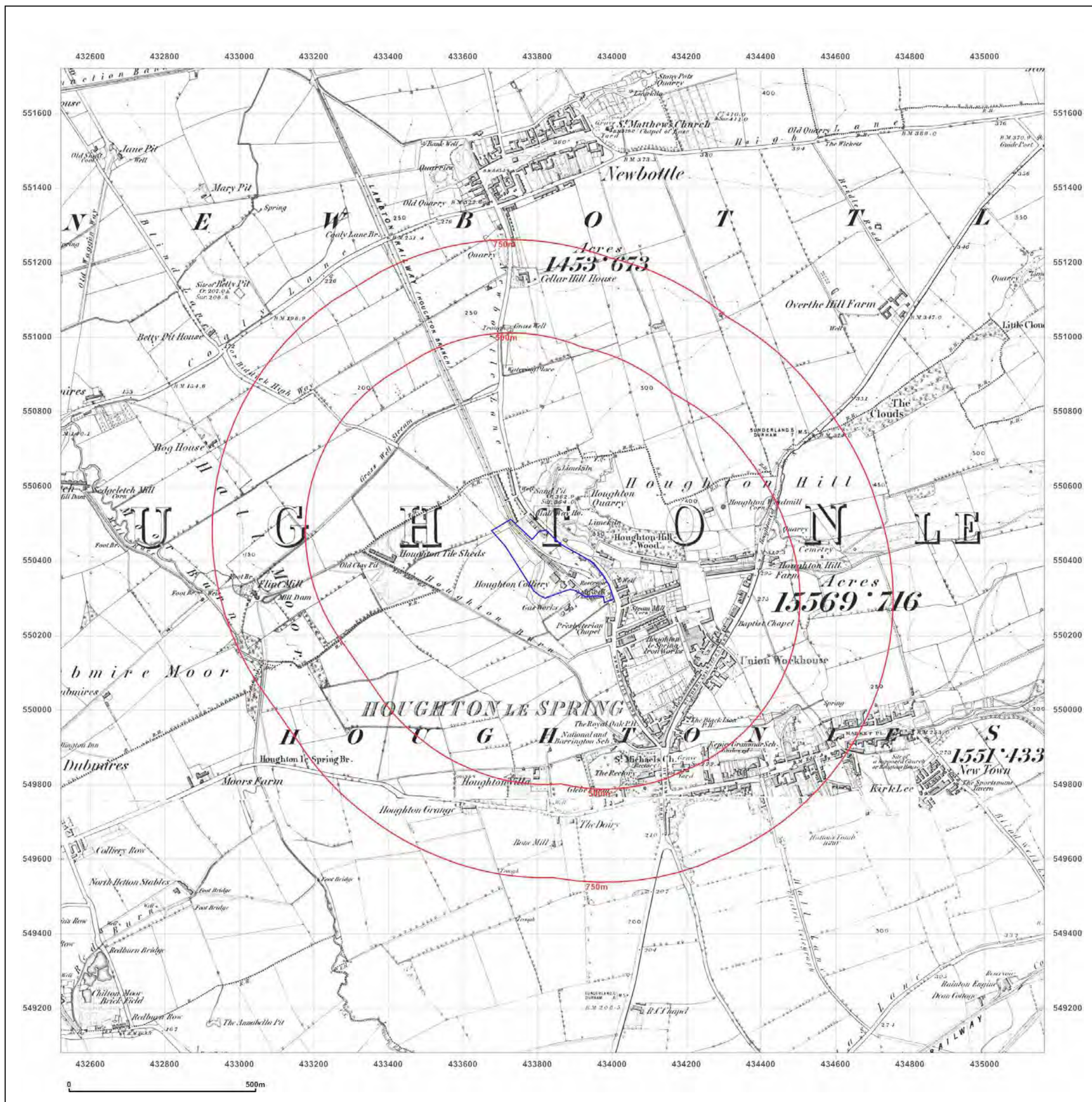


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Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: County Series

Map date: 1895-1898

Scale: 1:10,560

Printed at: 1:10,560



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 Edition 1898
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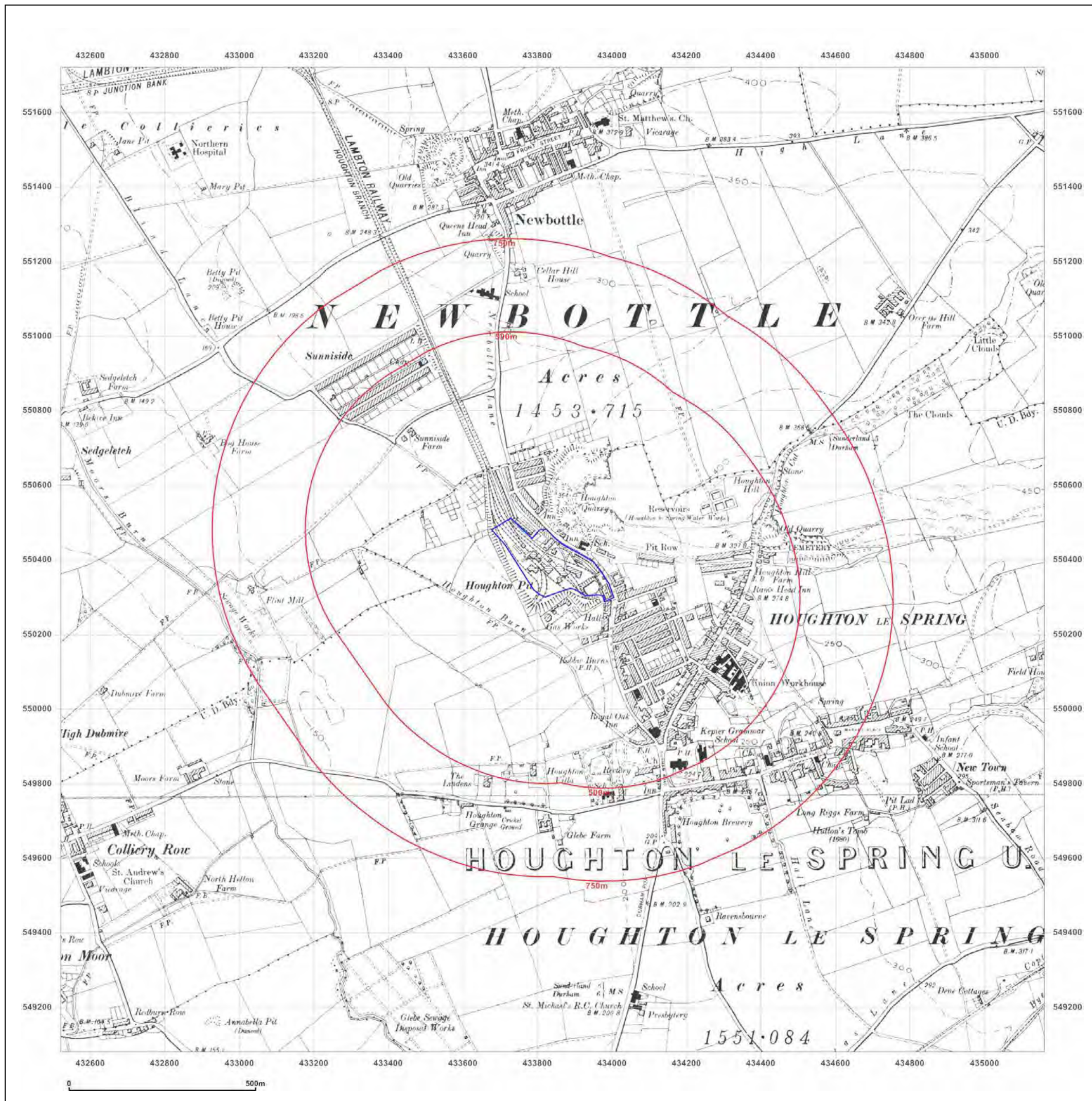


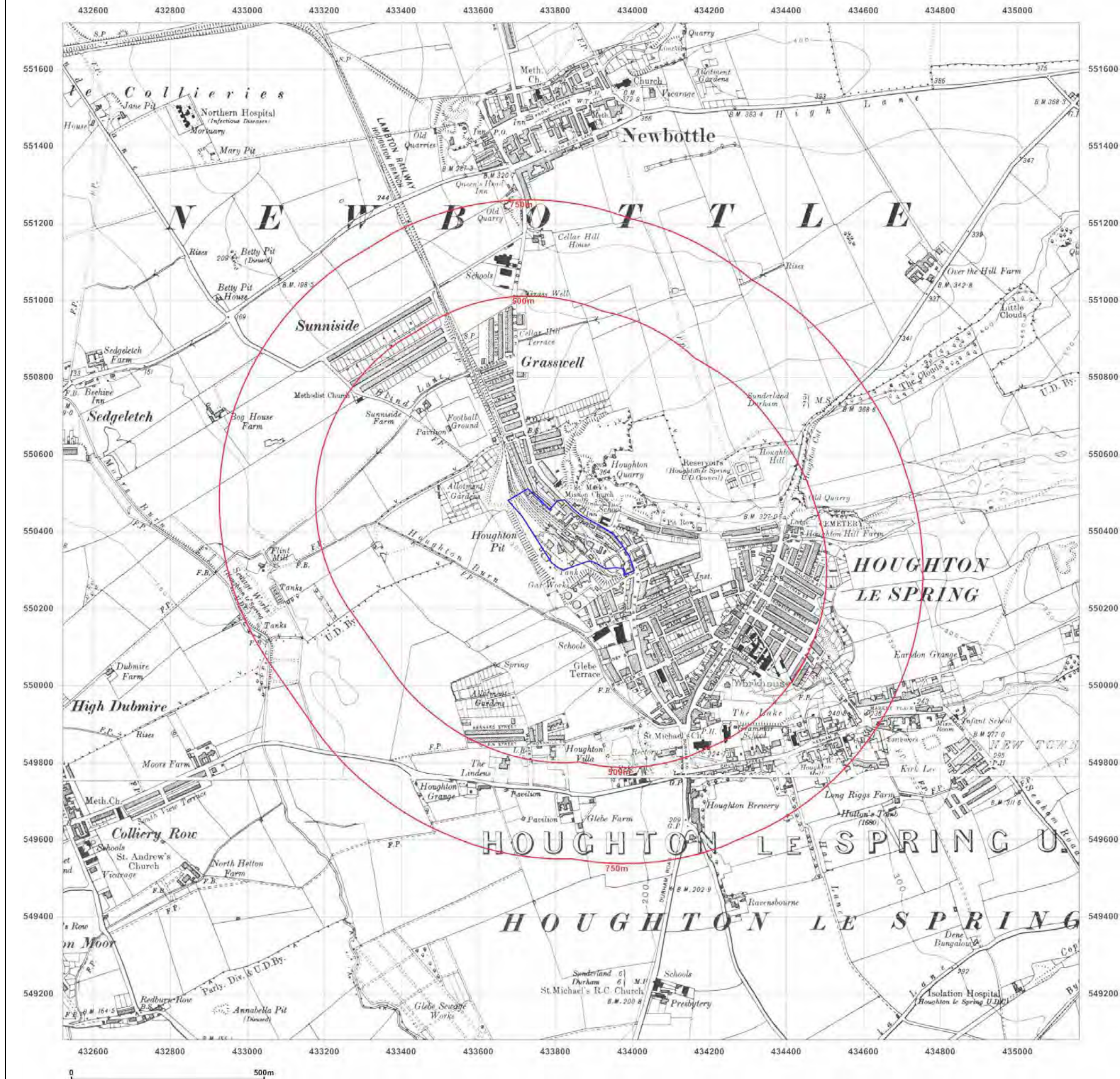
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Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: County Series

Map date: 1921-1923

Scale: 1:10,560

Printed at: 1:10,560



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Grid Ref: 433840, 550400

Map Name: County Series

Map date: 1921-1923

Scale: 1:10,560

Printed at: 1:10,560



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Revised 1923
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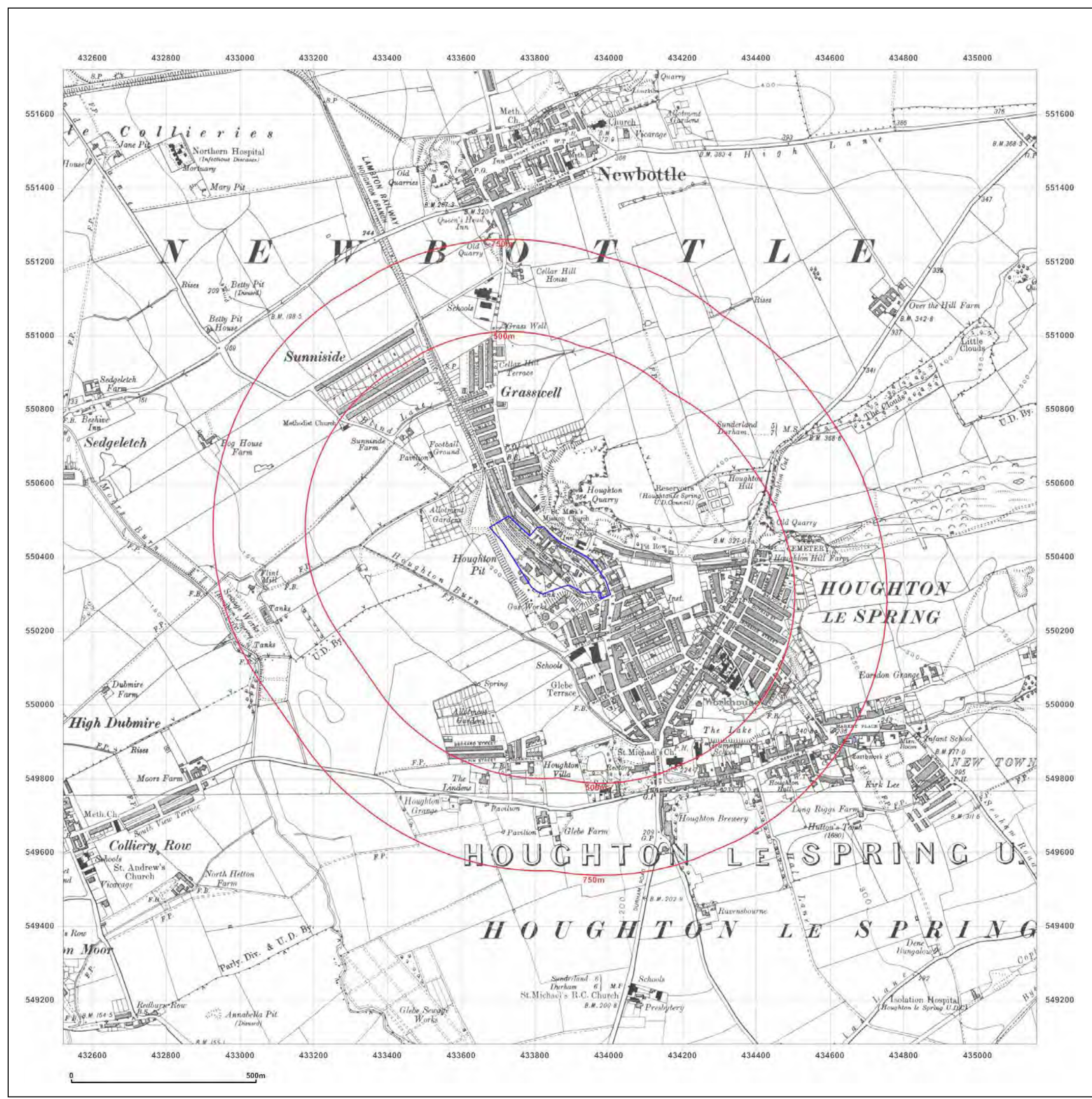


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Grid Ref: 433840, 550400

Map Name: Provisional

Map date: 1951

Scale: 1:10,560

Printed at: 1:10,560



Surveyed N/A
 Revised 1951
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 Levelled N/A

Surveyed 1940
 Revised 1940
 Edition N/A
 Copyright 1951
 Levelled N/A

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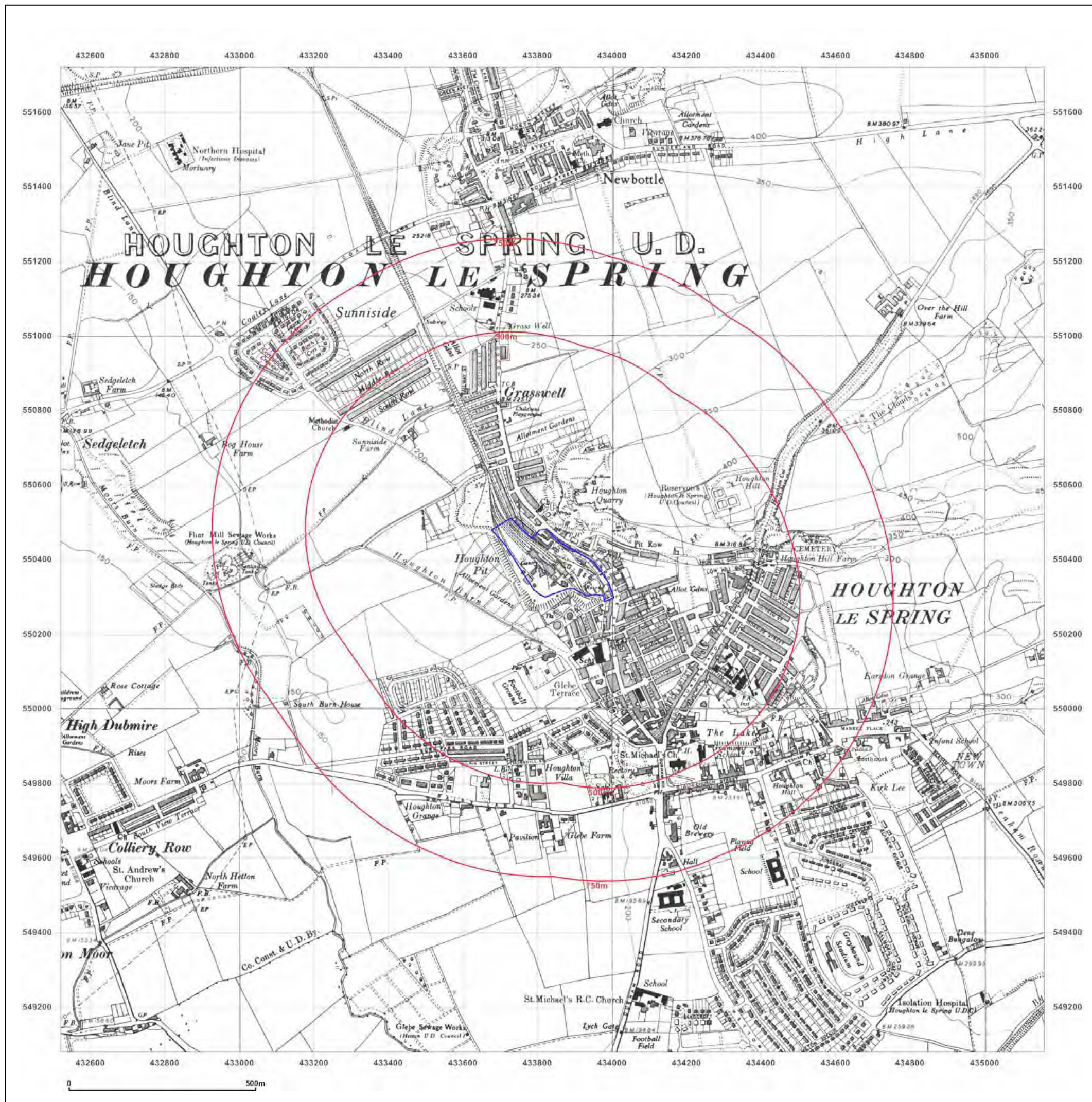


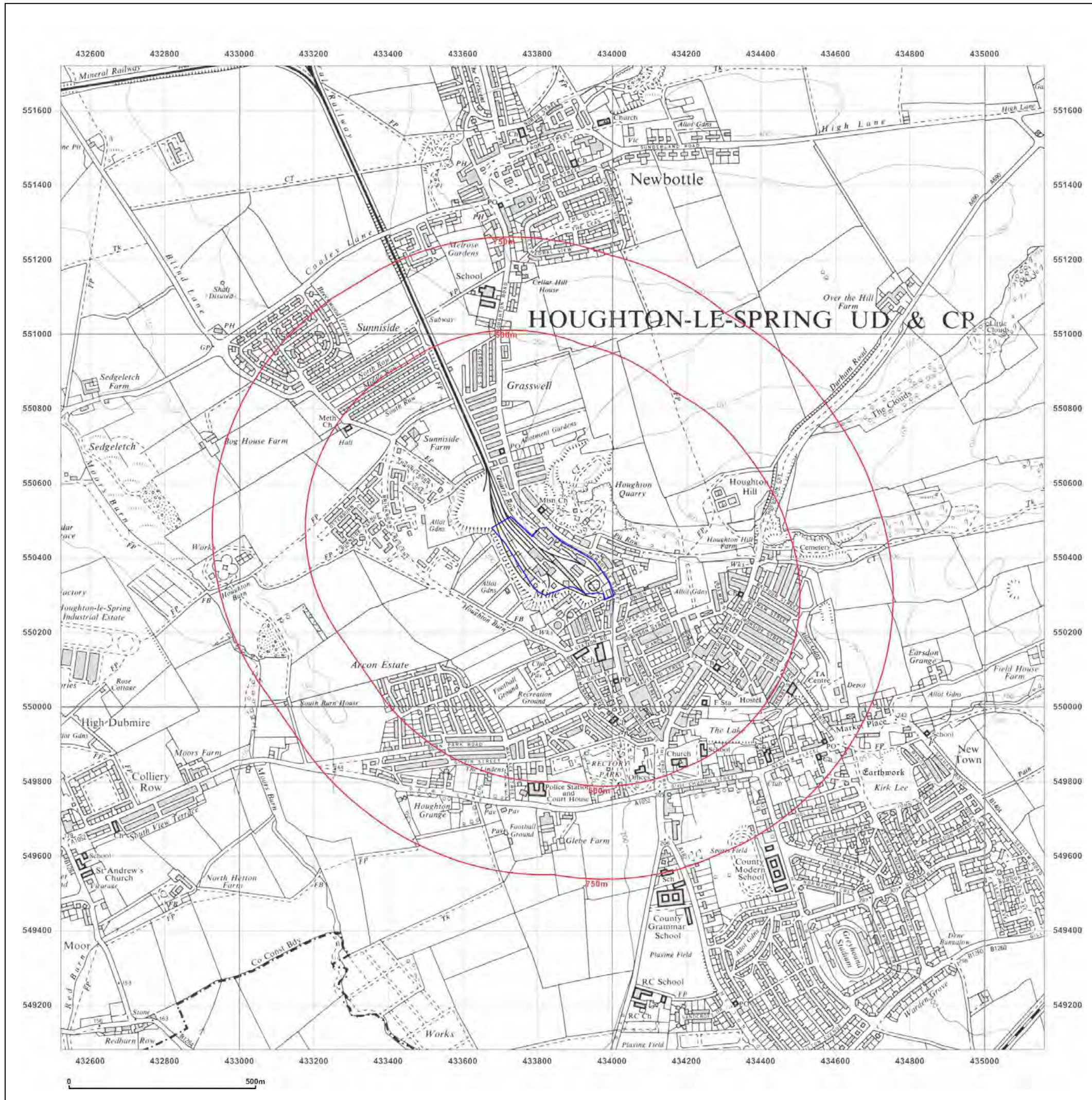
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Grid Ref: 433840, 550400

Map Name: Provisional

Map date: 1966-1967

Scale: 1:10,560

Printed at: 1:10,560



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 Levelled N/A

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 Revised 1967
 Edition N/A
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 Levelled N/A

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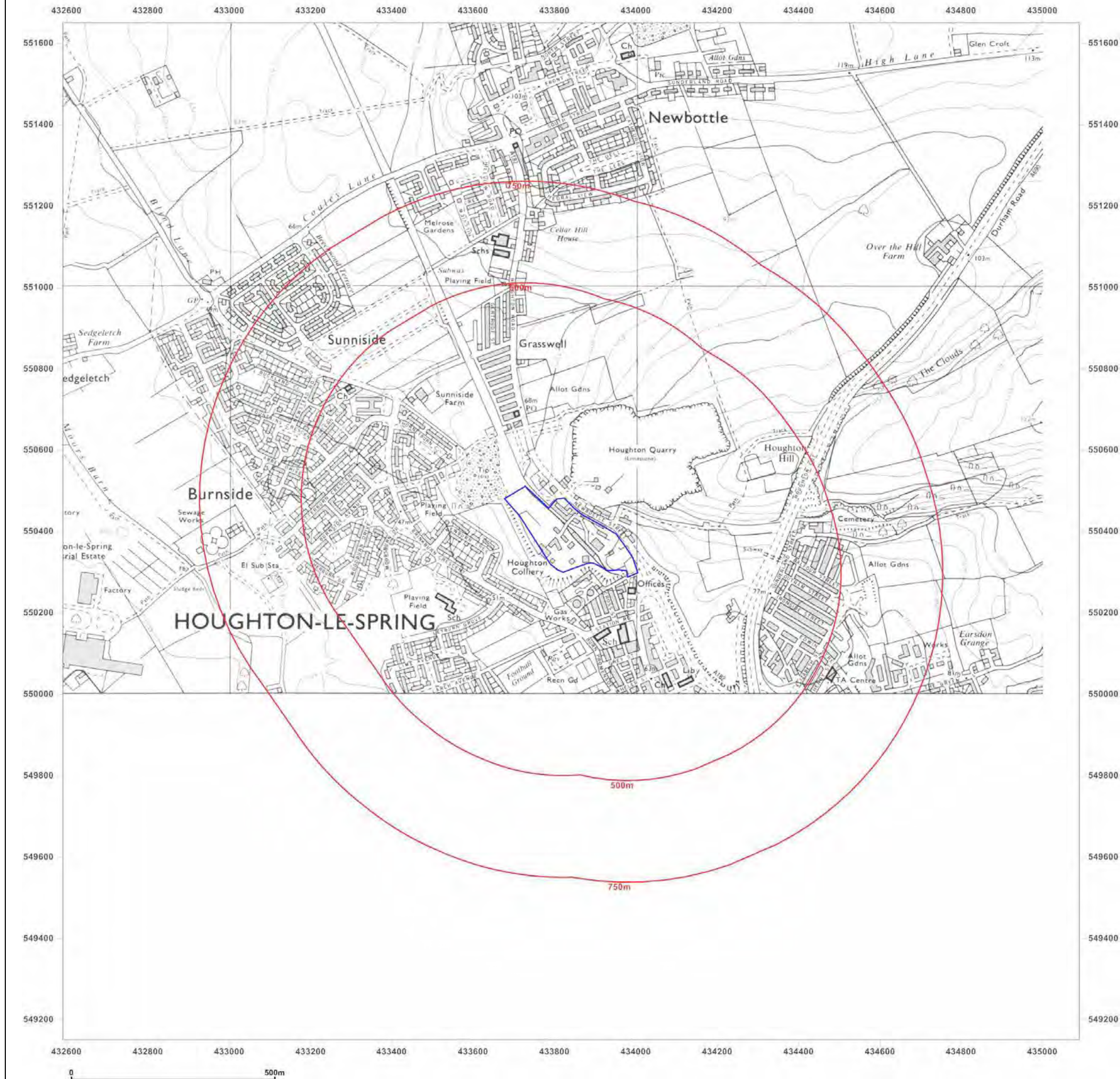


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Grid Ref: 433840, 550400

Map Name: National Grid

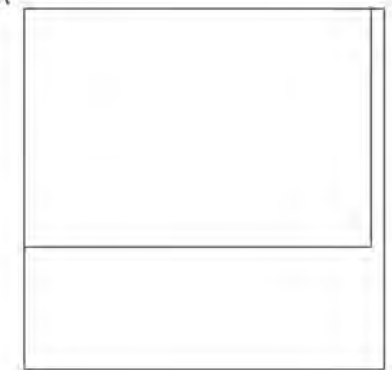
Map date: 1973

Scale: 1:10,000

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Revised 1973
Edition N/A
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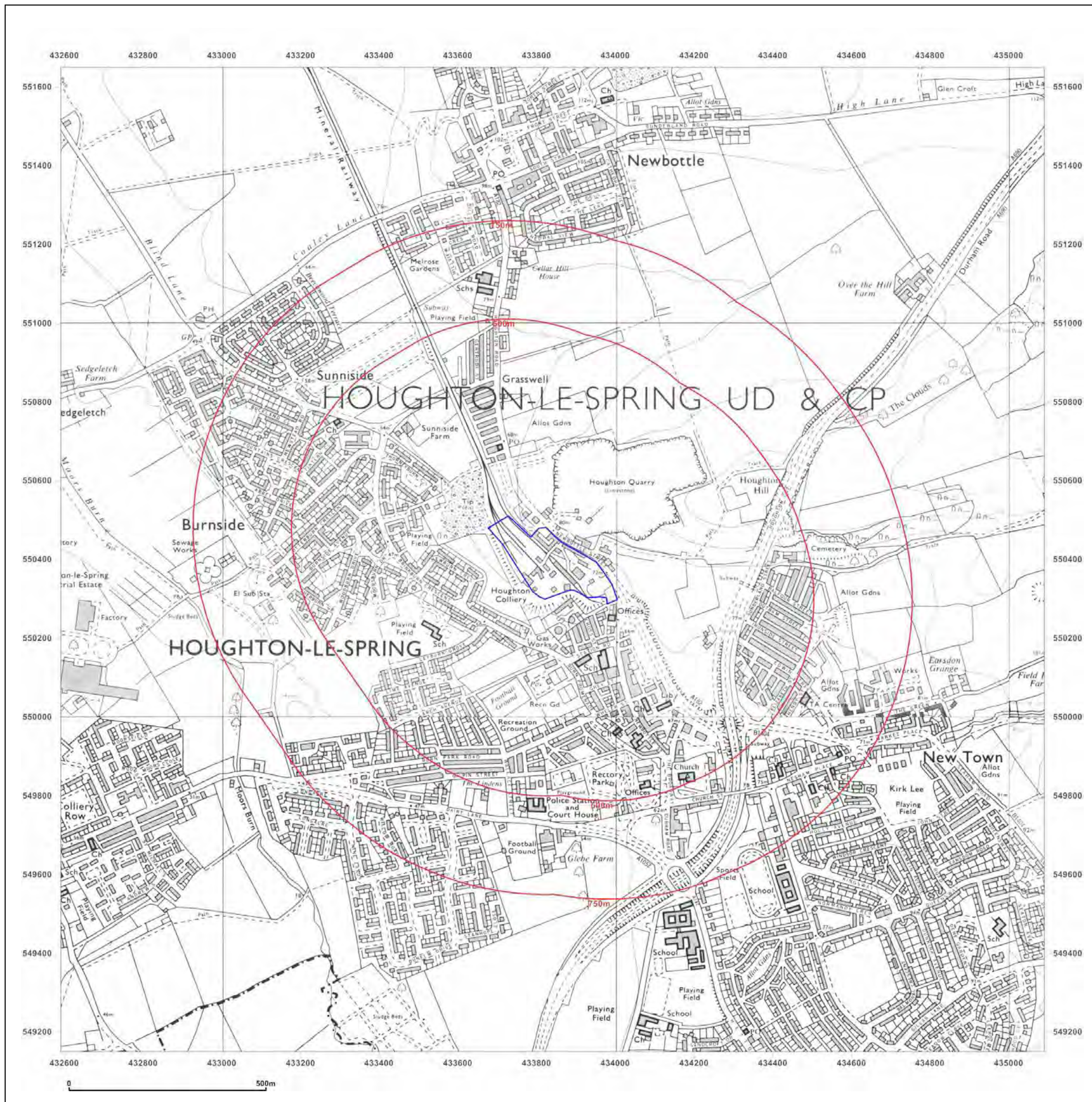


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Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 1973-1975

Scale: 1:10,000

Printed at: 1:10,000



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

Surveyed 1973
 Revised 1973
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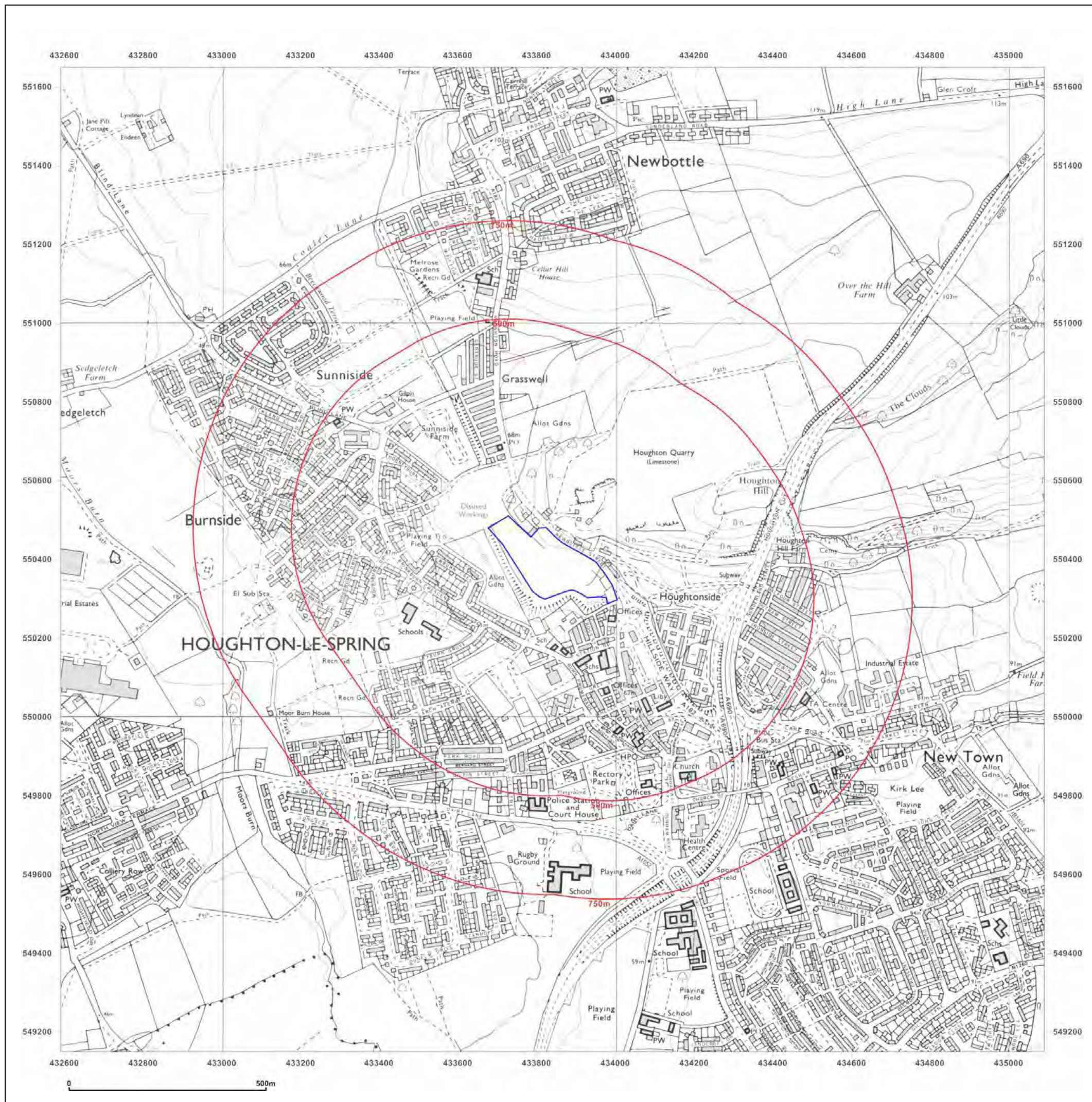


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Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 1988-1990

Scale: 1:10,000

Printed at: 1:10,000



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Surveyed 1985
 Revised 1988
 Edition N/A
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 Levelled N/A

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 Revised 1990
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Client Ref: 4281
Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: 1:10,000 Raster

Map date: 2002

Scale: 1:10,000

Printed at: 1:10,000



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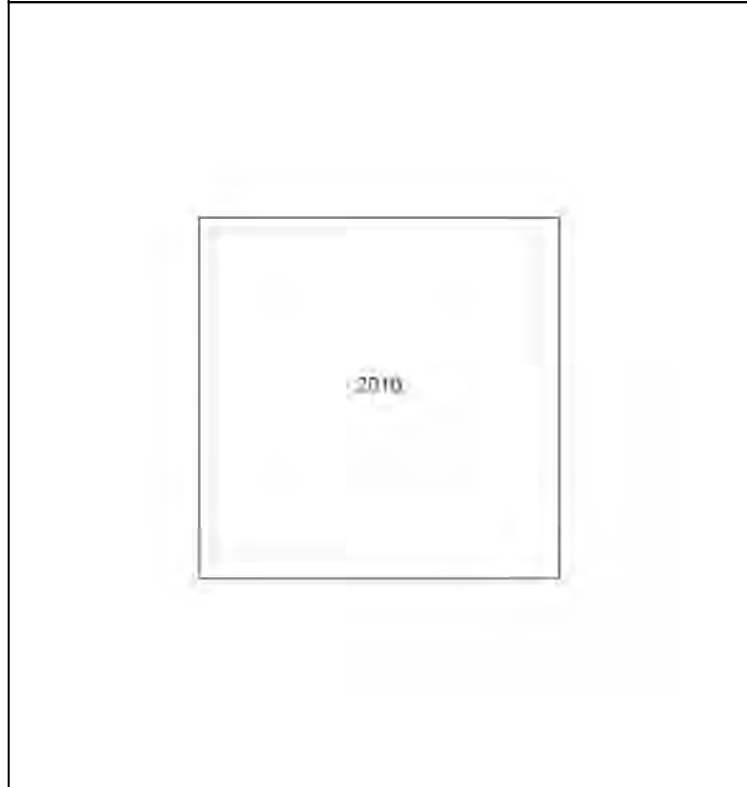
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Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 2010

Scale: 1:10,000

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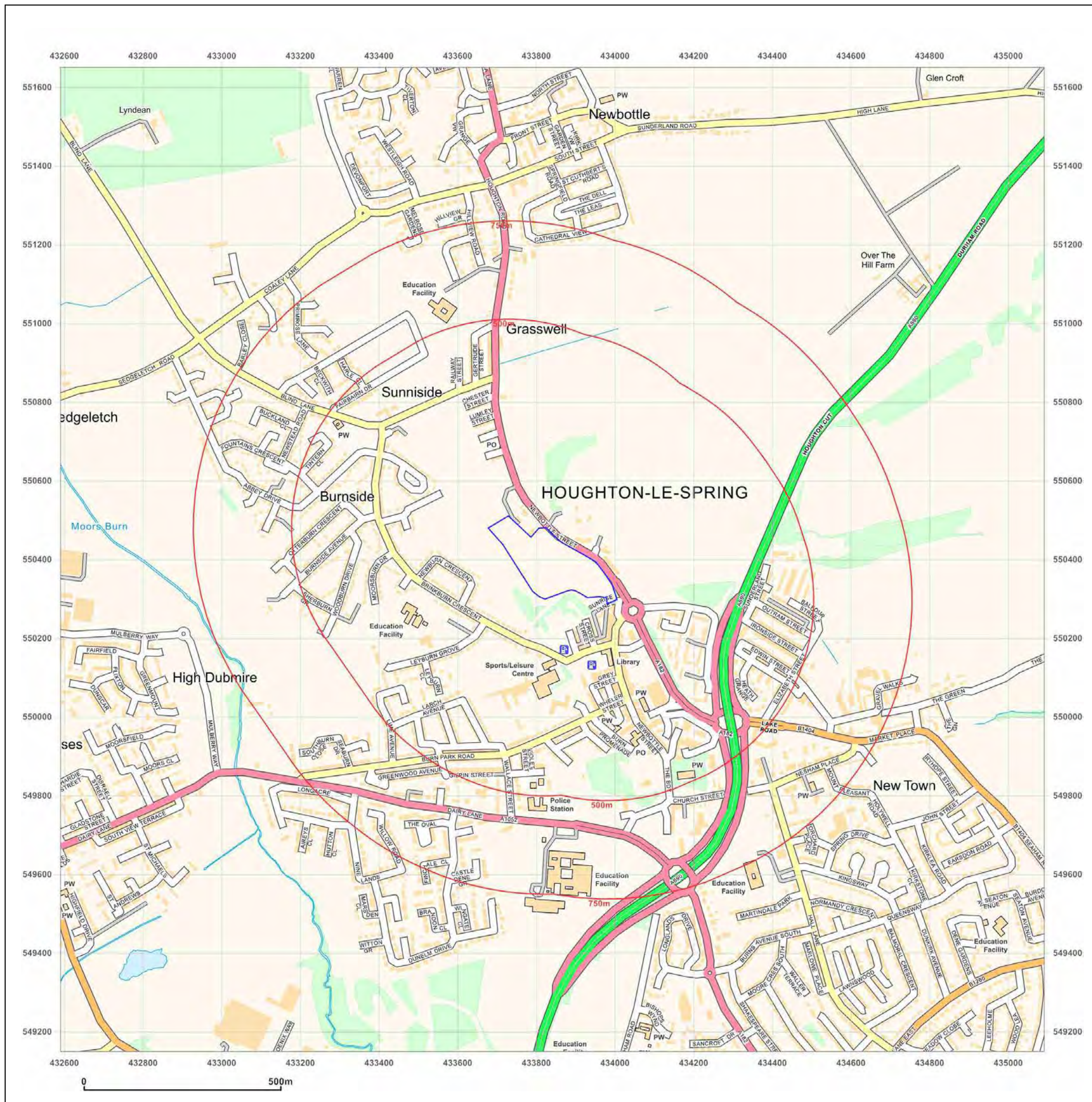


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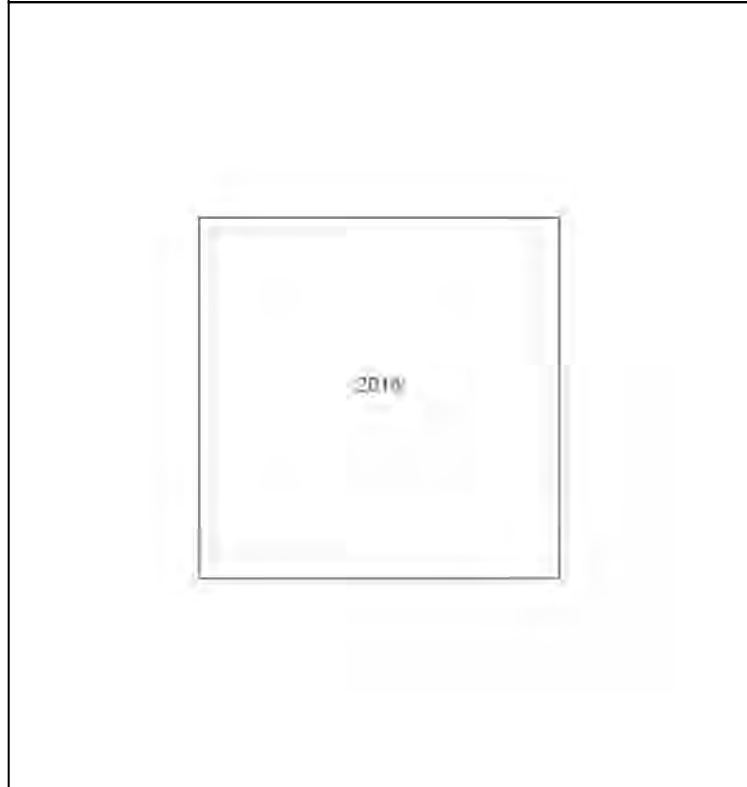
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Report Ref: CMAPS-CM-698987-4281-200318HIS
Grid Ref: 433840, 550400

Map Name: National Grid

Map date: 2014

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APPENDIX C

ENVIRO / GEO INSITE

REPORT/ WASTE INFO



CENTREMAPS

Open Space, Upper Interfields,
Worcester, WR14 1UT

Groundsure Reference: CMAPS-CM-698987-4281-200318EDR

Your Reference: 4281

Report Date 20 Mar 2018

Report Delivery Method: Email - pdf

Enviro Insight

Address: U + C Houghton,

Dear Sir/ Madam,

Thank you for placing your order with Groundsure. Please find enclosed the **Groundsure Enviro Insight** as requested.

If you need any further assistance, please do not hesitate to contact our helpline on 01886 832972 quoting the above CENTREMAPS reference number.

Yours faithfully,

CENTREMAPS

Enc.
Groundsure Enviroinsight

Address: U + C Houghton,
Date: 20 Mar 2018
Reference: CMAPS-CM-698987-4281-200318EDR
Client: CENTREMAPS



Aerial Photograph Capture date: 06-Sep-2015
Grid Reference: 433840,550400
Site Size: 3.35ha

Report Reference: CMAPS-CM-698987-4281-200318EDR
Client Reference: 4281

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Overview of Findings

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Section 1: Historical Industrial Sites	On-site	0-50	51-250	251-500
1.1 Potentially Contaminative Uses identified from 1:10,000 scale mapping	26	26	18	34
1.2 Additional Information – Historical Tank Database	7	11	19	4
1.3 Additional Information – Historical Energy Features Database	0	11	18	27
1.4 Additional Information – Historical Petrol and Fuel Site Database	0	0	0	0
1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database	0	7	0	0
1.6 Potentially Infilled Land	17	12	4	30
Section 2: Environmental Permits, Incidents and Registers	On-site	0-50m	51-250	251-500
2.1 Industrial Sites Holding Environmental Permits and/or Authorisations				
2.1.1 Records of historic IPC Authorisations	0	0	0	0
2.1.2 Records of Part A(1) and IPPC Authorised Activities	0	3	0	5
2.1.3 Records of Red List Discharge Consents	0	0	0	0
2.1.4 Records of List 1 Dangerous Substances Inventory sites	0	0	0	1
2.1.5 Records of List 2 Dangerous Substances Inventory sites	0	0	0	1
2.1.6 Records of Part A(2) and Part B Activities and Enforcements	0	1	1	0
2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations	0	0	0	0
2.1.8 Records of Licensed Discharge Consents	0	0	1	0
2.1.9 Records of Water Industry Referrals	0	0	0	0
2.1.10 Records of Planning Hazardous Substance Consents and Enforcements within 500m of the study site	0	0	0	0
2.2 Records of COMAH and NIHHS sites	0	0	0	0
2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents				
2.3.1 National Incidents Recording System, List 2	0	1	4	5
2.3.2 National Incidents Recording System, List 1	0	0	0	0
2.4 Sites Determined as Contaminated Land under Part 2A EPA 1990	0	0	0	0

Section 3: Landfill and Other Waste Sites	On-site	0-50m	51-250	251-500	501-1000	1000-1500
3.1 Landfill Sites						
3.1.1 Environment Agency/Natural Resources Wales Registered Landfill Sites	0	1	0	0	0	Not searched
3.1.2 Environment Agency/Natural Resources Wales Historic Landfill Sites	1	1	0	1	3	2
3.1.3 BGS/DoE Landfill Site Survey	0	0	0	0	0	1
3.1.4 Records of Landfills in Local Authority and Historical Mapping Records	0	0	0	0	0	2
3.2 Landfill and Other Waste Sites Findings						
3.2.1 Operational and Non-Operational Waste Treatment, Transfer and Disposal Sites	0	0	0	0	Not searched	Not searched
3.2.2 Environment Agency/Natural Resources Wales Licensed Waste Sites	2	0	1	3	3	7

Section 4: Current Land Use	On-site	0-50m	51-250	251-500
4.1 Current Industrial Sites Data	1	8	15	Not searched
4.2 Records of Petrol and Fuel Sites	0	0	1	0
4.3 National Grid Underground Electricity Cables	0	0	0	0
4.4 National Grid Gas Transmission Pipelines	0	0	0	0

Section 5: Geology	
5.1 Records of Artificial Ground and Made Ground present beneath the study site	Identified
5.2 Records of Superficial Ground and Drift Geology present beneath the study site	Identified
5.3 For records of Bedrock and Solid Geology beneath the study site see the detailed findings section	

Section 6: Hydrogeology and Hydrology	0-500m					
6.1 Records of Strata Classification in the Superficial Geology within 500m of the study site	Identified					
6.2 Records of Strata Classification in the Bedrock Geology within 500m of the study site	Identified					
	On-site	0-50m	51-250	251-500	501-1000	1000-2000
6.3 Groundwater Abstraction Licences (within 2000m of the study site)	0	0	0	0	2	2
6.4 Surface Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	4
6.5 Potable Water Abstraction Licences (within 2000m of the study site)	0	0	0	0	0	2
6.6 Source Protection Zones (within 500m of the study site)	1	0	0	1	Not searched	Not searched
6.7 Source Protection Zones within Confined Aquifer	0	0	0	0	Not searched	Not searched
6.8 Groundwater Vulnerability and Soil Leaching Potential (within 500m of the study site)	2	0	1	4	Not searched	Not searched

Section 6: Hydrogeology and Hydrology

0-500m

	On-site	0-50m	51-250	251-500	501-1000	1000-1500
6.9 Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site	No	No	No	No	No	No
6.10 Detailed River Network entries within 500m of the site	0	0	1	2	Not searched	Not searched
6.11 Surface water features within 250m of the study site	No	No	No	Not searched	Not searched	Not searched

Section 7: Flooding

7.1 Environment Agency Zone 2 floodplains within 250m of the study site	None identified					
7.2 Environment Agency/Natural Resources Wales Zone 3 floodplains within 250m of the study site	None identified					
7.3 Risk of flooding from Rivers and the Sea (RoFRaS) rating for the study site	Very Low					
7.4 Flood Defences within 250m of the study site	None identified					
7.5 Areas benefiting from Flood Defences within 250m of the study site	None identified					
7.6 Areas used for Flood Storage within 250m of the study site	None identified					
7.7 Maximum BGS Groundwater Flooding susceptibility within 50m of the study site	Potential at Surface					
7.8 BGS confidence rating for the Groundwater Flooding susceptibility areas	High					

Section 8: Designated Environmentally Sensitive Sites

	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.1 Records of Sites of Special Scientific Interest (SSSI)	0	0	0	0	0	3
8.2 Records of National Nature Reserves (NNR)	0	0	0	0	0	0
8.3 Records of Special Areas of Conservation (SAC)	0	0	0	0	0	0
8.4 Records of Special Protection Areas (SPA)	0	0	0	0	0	0
8.5 Records of Ramsar sites	0	0	0	0	0	0
8.6 Records of Ancient Woodlands	0	0	0	0	0	3
8.7 Records of Local Nature Reserves (LNR)	0	0	0	0	0	1
8.8 Records of World Heritage Sites	0	0	0	0	0	0
8.9 Records of Environmentally Sensitive Areas	0	0	0	0	0	0

Section 8: Designated Environmentally Sensitive Sites	On-site	0-50m	51-250	251-500	501-1000	1000-2000
8.10 Records of Areas of Outstanding Natural Beauty (AONB)	0	0	0	0	0	0
8.11 Records of National Parks	0	0	0	0	0	0
8.12 Records of Nitrate Sensitive Areas	0	0	0	0	0	0
8.13 Records of Nitrate Vulnerable Zones	2	0	0	1	0	1
8.14 Records of Green Belt land	0	1	0	0	1	1

Section 9: Natural Hazards

9.1 Maximum risk of natural ground subsidence	Moderate
9.1.1 Maximum Shrink-Swell hazard rating identified on the study site	Low
9.1.2 Maximum Landslides hazard rating identified on the study site	Moderate
9.1.3 Maximum Soluble Rocks hazard rating identified on the study site	Very Low
9.1.4 Maximum Compressible Ground hazard rating identified on the study site	Moderate
9.1.5 Maximum Collapsible Rocks hazard rating identified on the study site	Very Low
9.1.6 Maximum Running Sand hazard rating identified on the study site	Very Low
9.2 Radon	
9.2.1 Radon Affected Area rating	The site is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.
9.2.2 Radon protection measures requirements	No radon protective measures are necessary.

Section 10: Mining

10.1 Coal mining areas within 75m of the study site	Identified
10.2 Non-Coal Mining areas within 50m of the study site boundary	None identified
10.3 Brine affected areas within 75m of the study site	None identified

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. Historical Industrial Sites

Provides information on past land uses that may pose a risk to the study site in terms of potential contamination from activities or processes. Potentially Infilled Land features are also included. This search is conducted using radii of up to 500m.

2. 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.

3. 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.

4. 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 gas pipelines and underground electricity transmission lines.

5. Geology

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

6. 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.

7. Flooding

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

8. 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.

9. 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 and radon..

10. Mining

Provides information on areas of coal and non-coal mining and brine affected areas.

11. 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.

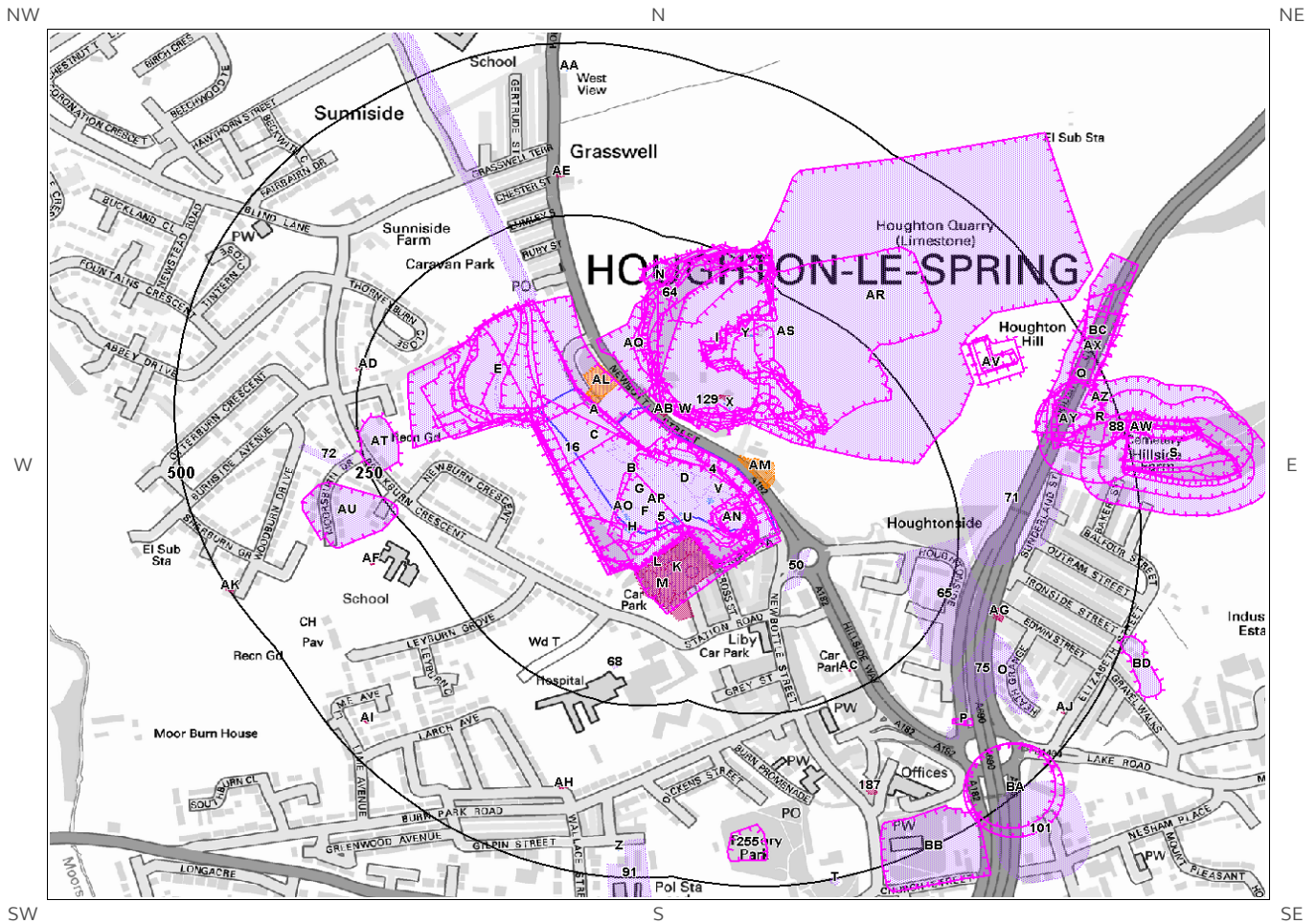
Note: Maps

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. Historical Land Use



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1. Historical Industrial Sites

1.1 Potentially Contaminative Uses identified from 1:10,000 scale Mapping

The systematic analysis of data extracted from standard 1:10,560 and 1:10,000 scale historical maps provides the following information:

Records of sites with a potentially contaminative past land use within 500m of the search boundary: 104

ID	Distance [m]	Direction	Use	Date
1F	0	On Site	Unspecified Heap	1857
2AP	0	On Site	Unspecified Pit	1921
3D	0	On Site	Railway Sidings	1857
4	0	On Site	Railway Building	1921
5	0	On Site	Railway Building	1921
6B	0	On Site	Railway Sidings	1895
7A	0	On Site	Railway Sidings	1921
8A	0	On Site	Railway Sidings	1921
9H	0	On Site	Unspecified Tank	1921
10U	0	On Site	Colliery	1857
11B	0	On Site	Railway Sidings	1973
12C	0	On Site	Unspecified Disused Workings	1988
13C	0	On Site	Railway Sidings	1967
14V	0	On Site	Railway Buildings	1951
15D	0	On Site	Railway Building	1951
16	0	On Site	Railway Building	1951
17B	0	On Site	Unspecified Pit	1921
18G	0	On Site	Unspecified Pit	1895
19E	0	On Site	Unspecified Disused Tip	1973
20E	0	On Site	Refuse Heap	1951
21C	0	On Site	Unspecified Mine	1967
22J	0	On Site	Unspecified Ground Workings	1973
23F	0	On Site	Unspecified Ground Workings	1988
24B	0	On Site	Railway Sidings	1951
25C	0	On Site	Unspecified Pit	1951
26G	0	On Site	Railway Buildings	1951
27H	1	SW	Unspecified Tank	1921
28E	3	SW	Refuse Heap	1921
29E	12	W	Unspecified Heap	1967
30I	16	NE	Unspecified Quarry	1921
31I	17	NE	Unspecified Quarry	1895
32I	17	NE	Unspecified Quarry	1951

33AQ	18	N	Sand Pit	1857
34AR	19	NE	Limestone Quarry	1988
35J	20	S	Gas Works	1895
36J	20	S	Gas Works	1921
37J	20	S	Gas Works	1921
38W	21	NE	Cuttings	1921
39AS	23	NE	Limestone Quarry	1973
40K	23	S	Unspecified Works	1967
41K	23	S	Gas Works	1973
42K	23	S	Unspecified Commercial/Industrial	1988
43I	27	NE	Unspecified Quarry	1967
44J	28	SW	Gas Works	1857
45K	29	SW	Gas Works	1921
46I	33	NE	Unspecified Quarry	1857
47I	37	NE	Unspecified Quarry	1921
48L	37	S	Gasometers	1921
49L	37	S	Gasometers	1895
50	38	SE	Corn Mill	1857
51L	45	S	Unspecified Tanks	1951
52J	50	S	Gasometer	1857
53K	52	S	Gasometer	1857
54L	52	S	Gasometers	1921
55M	59	S	Gasometers	1921
56K	61	SW	Unspecified Tanks	1951
57K	62	SW	Gasometer	1973
58K	64	SW	Unspecified Tank	1967
59X	69	NE	Lime Kiln	1857
60M	75	S	Unspecified Tanks	1951
61M	78	S	Gasometer	1973
62M	79	S	Unspecified Tank	1967
63M	81	S	Unspecified Tank	1921
64	161	N	Lime Kiln	1857
65	168	E	Iron Works	1857
66N	173	N	Unspecified Heap	1921
67N	179	NE	Unspecified Heap	1895
68	191	S	Unspecified Tank	1951
69AT	199	W	Unspecified Pit	1857
70AU	240	SW	Old Clay Pit	1857
71	258	E	Unspecified Works	1967
72	263	W	Tile Sheds	1857
73O	319	SE	Unspecified Workhouse	1921
74O	319	SE	Unspecified Workhouse	1895
75	321	SE	Unspecified Workhouse	1857
76O	337	SE	Unspecified Workhouse	1921
77P	361	SE	Cuttings	1973

78AV	363	NE	Corn Windmill	1857
79P	366	SE	Fire Station	1967
80AW	382	E	Unspecified Quarry	1951
81Q	382	E	Cuttings	1973
82Q	382	E	Cuttings	1988
83R	395	E	Unspecified Old Quarry	1921
84R	395	E	Unspecified Old Quarry	1895
85AX	400	E	Cuttings	1951
86AY	401	E	Cuttings	1967
87AZ	410	E	Unspecified Old Quarry	1921
88	423	E	Unspecified Quarry	1857
89S	427	E	Cemetery	1921
90BB	442	SE	Grave Yard	1857
91	443	S	Police Station and Court House	1966
92S	452	E	Cemetery	1895
93S	452	E	Cemetery	1921
94BC	457	NE	Cuttings	1967
95S	482	E	Cemetery	1857
96S	484	E	Cemetery	1951
97S	484	E	Cemetery	1967
98S	484	E	Cemetery	1988
99S	484	E	Cemetery	1973
100S	484	E	Unspecified Ground Workings	1967
101	490	SE	Bus Station	1990
102BD	497	E	Gravel Pit	1921
103T	497	S	Unspecified Tank	1921
104T	497	S	Unspecified Tank	1895

1.2 Additional Information – Historical Tank Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical tanks within 500m of the search boundary:

41

ID	Distance (m)	Direction	Use	Date
105U	0	On Site	Unspecified Tank	1939
106V	0	On Site	Unspecified Tank	1897
107V	0	On Site	Unspecified Tank	1920
108U	0	On Site	Unspecified Tank	1857
109U	0	On Site	Unspecified Tank	1857
110H	0	On Site	Tanks	1979

111AO	0	On Site	Unspecified Tank	1979
112F	1	SW	Unspecified Tank	1920
113K	22	S	Gas Works	1969
114K	24	S	Gas Works	1920
115K	24	S	Gas Works	1897
116J	26	S	Gas Works	1857
117J	42	S	Unspecified Tank	1979
118J	45	S	Gasometer	1920
119J	45	S	Unspecified Tank	1897
120J	45	S	Gasometer	1857
121J	45	S	Gasometer	1857
122K	47	S	Tanks	1939
123K	51	S	Gasometer	1920
124K	51	S	Gasometer	1897
125L	54	S	Gasometer	1920
126L	54	S	Gasometer	1897
127W	59	NE	Unspecified Tank	1989
128X	59	NE	Unspecified Tank	1994
129	60	NE	Unspecified Tank	1979
130K	63	SW	Unspecified Tank	1958
131K	63	SW	Gasometer	1969
132K	66	SW	Unspecified Tank	1939
133X	68	NE	Tanks	1939
134M	78	S	Unspecified Tank	1958
135M	78	S	Gasometer	1969
136M	82	S	Gasometer	1920
137M	82	S	Unspecified Tank	1939
138Y	169	NE	Unspecified Tank	1993
139Y	169	NE	Unspecified Tank	1979
140Y	174	NE	Unspecified Tank	1993
141Y	175	NE	Unspecified Tank	1979
142Z	458	S	Unspecified Tank	1991
143Z	458	S	Unspecified Tank	1980
144AA	460	N	Unspecified Tank	1993
145AA	461	N	Unspecified Tank	1979

1.3 Additional Information – Historical Energy Features Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical energy features within 500m of the search boundary:

56

ID	Distance (m)	Direction	Use	Date
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146AB	8	NE	Electricity Substation	1989
147AB	9	NE	Electricity Substation	1979
148AB	9	NE	Electricity Substation	1994
149AB	12	NE	Electricity Substation	1969
150L	22	S	Gas Works	1969
151L	24	S	Gas Works	1920
152L	24	S	Gas Works	1897
153J	26	S	Gas Works	1857
154L	45	S	Gasometer	1920
155L	45	S	Gasometer	1857
156J	45	S	Gasometer	1857
157L	51	S	Gasometer	1920
158L	51	S	Gasometer	1897
159L	54	S	Gasometer	1897
160L	54	S	Gasometer	1920
161K	63	SW	Gasometer	1969
162X	72	NE	Electricity Substation	1969
163X	76	NE	Electricity Substation	1994
164X	76	NE	Electricity Substation	1989
165X	77	NE	Electricity Substation	1979
166X	78	NE	Electricity Substation	1993
167M	78	S	Gasometer	1969
168X	79	NE	Electricity Substation	1979
169M	82	S	Gasometer	1920
170AC	216	SE	Electricity Substation	1983
171AC	217	SE	Electricity Substation	1979
172AC	217	SE	Electricity Substation	1993
173AC	218	SE	Electricity Substation	1970
174AD	241	W	Electricity Substation	1969
175AD	253	W	Electricity Substation	1993
176AD	253	W	Electricity Substation	1979
177AE	306	N	Electricity Substation	1993
178AE	307	N	Electricity Substation	1979
179AE	308	N	Electricity Substation	1969
180AF	316	SW	Electricity Substation	1979
181AF	316	SW	Electricity Substation	1969
182AF	317	SW	Electricity Substation	1979
183AG	319	E	Electricity Substation	1979
184AG	321	E	Electricity Substation	1983
185AG	322	E	Electricity Substation	1993
186AG	325	E	Electricity Substation	1970
187	376	SE	Electricity Substation	1971
188AH	380	S	Electricity Substation	1991
189AH	380	S	Electricity Substation	1980
190AI	452	SW	Electricity Substation	1994
191AI	452	SW	Electricity Substation	1994

192AI	452	SW	Electricity Substation	1979
193AI	452	SW	Electricity Substation	1979
194AI	453	SW	Electricity Substation	1969
195AJ	467	SE	Electricity Substation	1970
196AJ	467	SE	Electricity Substation	1979
197AK	493	SW	Electricity Substation	1994
198AK	493	SW	Electricity Substation	1994
199AK	493	SW	Electricity Substation	1979
200AK	493	SW	Electricity Substation	1979
201AK	494	SW	Electricity Substation	1969

1.4 Additional Information – Historical Petrol and Fuel Site Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical petrol stations and fuel sites within 500m of the search boundary: 0

Database searched and no data found.

1.5 Additional Information – Historical Garage and Motor Vehicle Repair Database

The systematic analysis of data extracted from High Detailed 1:1,250 and 1:2,500 scale historical maps provides the following information.

Records of historical garage and motor vehicle repair sites within 500m of the search boundary: 7

ID	Distance (m)	Direction	Use	Date
202AL	2	NE	Garage	1969
203AL	4	NE	Garage	1993
204AL	5	NE	Garage	1979
205AM	9	NE	Garage	1989
206AM	10	NE	Garage	1979
207AM	12	NE	Garage	1969
208AM	12	NE	Garage	1994

1.6 Potentially Infilled Land

Records of Potentially Infilled Features from 1:10,000 scale mapping within 500m of the study site: 63

The following Historical Potentially Infilled Features derived from the Historical Mapping information is provided by Groundsure:

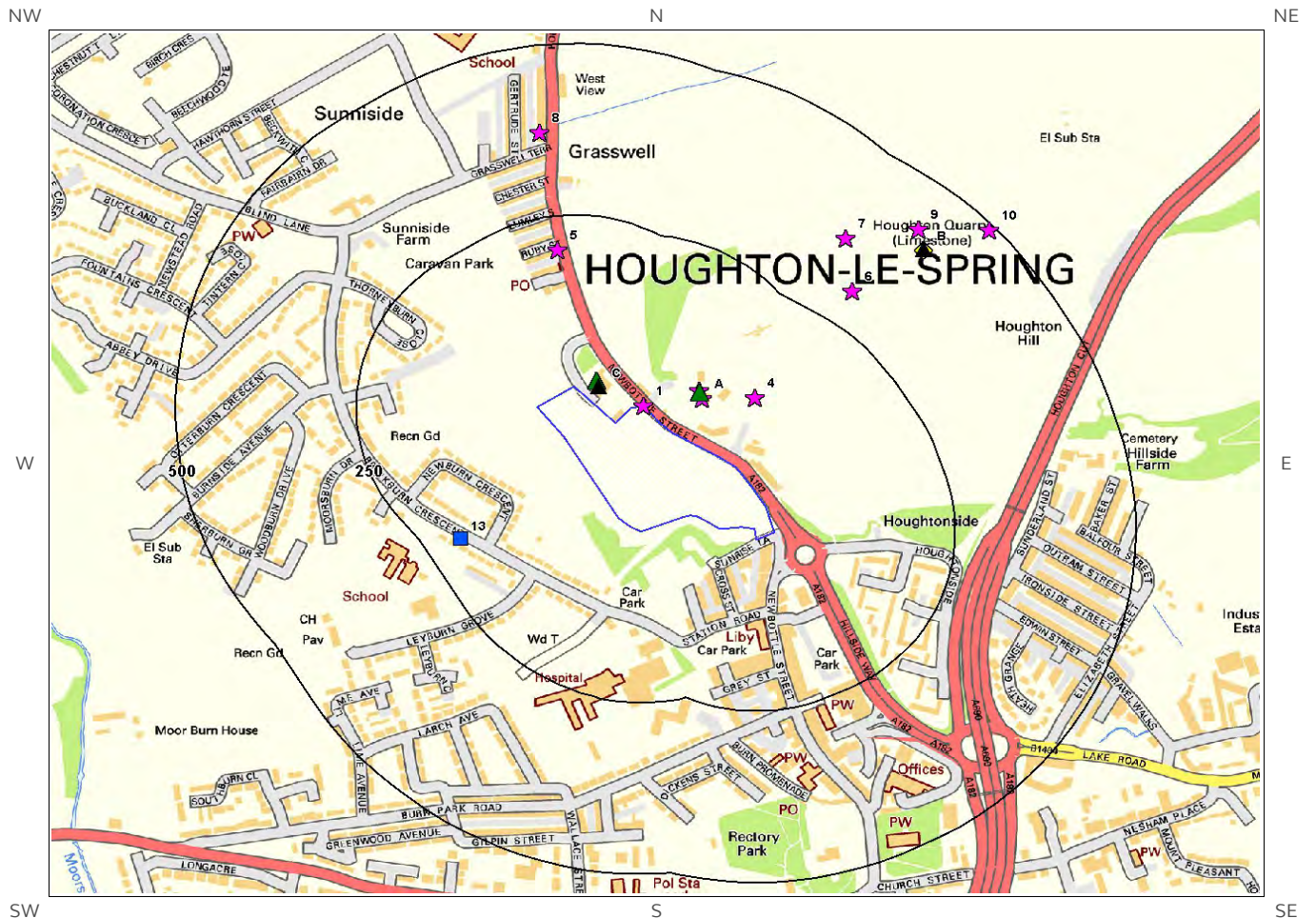
ID	Distance(m)	Direction	Use	Date
209AN	0	On Site	Ponds	1921

210AN	0	On Site	Pond	1895
211AN	0	On Site	Reservoirs	1951
212AN	0	On Site	Reservoir	1857
213AO	0	On Site	Unspecified Heap	1857
214U	0	On Site	Colliery	1857
215J	0	On Site	Unspecified Ground Workings	1973
216AP	0	On Site	Unspecified Pit	1921
217B	0	On Site	Unspecified Pit	1921
218AO	0	On Site	Unspecified Ground Workings	1988
219E	0	On Site	Refuse Heap	1951
220E	0	On Site	Unspecified Disused Tip	1973
221C	0	On Site	Unspecified Pit	1951
222C	0	On Site	Unspecified Disused Workings	1988
223C	0	On Site	Unspecified Mine	1967
224AN	0	On Site	Pond	1921
225AP	0	On Site	Unspecified Pit	1895
226E	3	SW	Refuse Heap	1921
227E	12	W	Unspecified Heap	1967
228I	16	NE	Unspecified Quarry	1921
229I	17	NE	Unspecified Quarry	1895
230I	17	NE	Unspecified Quarry	1951
231AQ	18	N	Sand Pit	1857
232AR	19	NE	Limestone Quarry	1988
233W	21	NE	Cuttings	1921
234AS	23	NE	Limestone Quarry	1973
235I	27	NE	Unspecified Quarry	1967
236I	33	NE	Unspecified Quarry	1857
237I	37	NE	Unspecified Quarry	1921
238N	173	N	Unspecified Heap	1921
239N	179	NE	Unspecified Heap	1895
240AT	199	W	Unspecified Pit	1857
241AU	240	SW	Old Clay Pit	1857
242AV	343	NE	Reservoirs	1921
243AV	349	NE	Reservoirs	1895
244AV	349	NE	Reservoirs	1921
245AV	356	NE	Reservoirs	1951
246P	361	SE	Cuttings	1973
247AW	382	E	Unspecified Quarry	1951
248Q	382	E	Cuttings	1988
249Q	382	E	Cuttings	1973
250R	395	E	Unspecified Old Quarry	1921
251R	395	E	Unspecified Old Quarry	1895
252AX	400	E	Cuttings	1951
253AY	401	E	Cuttings	1967

254AZ	410	E	Unspecified Old Quarry	1921
255	411	S	Pond	1951
256AW	423	E	Unspecified Quarry	1857
257BA	426	SE	Lake	1921
258BA	426	SE	Lake	1951
259BA	426	SE	Lake	1966
260S	427	E	Cemetery	1921
261BB	442	SE	Grave Yard	1857
262S	452	E	Cemetery	1895
263S	452	E	Cemetery	1921
264BC	457	NE	Cuttings	1967
265S	482	E	Cemetery	1857
266S	484	E	Cemetery	1951
267S	484	E	Cemetery	1967
268S	484	E	Cemetery	1988
269S	484	E	Unspecified Ground Workings	1967
270S	484	E	Cemetery	1973
271BD	497	E	Gravel Pit	1921



2. Environmental Permits, Incidents and Registers Map



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- Recorded Pollution Incident
- RAS 3 & 4 Authorisations
- Dangerous Substances (List 1)
- Part A(1) Authorised Processes and Historic IPC Authorisations
- Dangerous Substances (List 2)
- Part A(2) and Part B Authorised Processes
- Water Industry Referrals
- COMAH / NIHHS Sites
- Licenced Discharge Consents
- Sites Determined as Contaminated Land
- Red List Discharge Consents
- Hazardous Substance Consents and Enforcements

2. Environmental Permits, Incidents and Registers

2.1 Industrial Sites Holding Licences and/or Authorisations

Searches of information provided by the Environment Agency/Natural Resources Wales and Local Authorities reveal the following information:

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

0

Database searched and no data found.

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

8

The following Part A(1) and IPPC Authorised Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details
24C	21	NE	433760 550510	<p>Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE</p> <p>Permit Number: MP3632AC Original Permit Number: BU8045IR EPR Reference: - Issue Date: 18/5/2015 Effective Date: 18/5/2015 00:00:00 Last date noted as effective: 2018-03-01 Status: Superseded</p>
25C	21	NE	433760 550510	<p>Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE</p> <p>Permit Number: TP3139RV Original Permit Number: BU8045IR EPR Reference: - Issue Date: 25/11/2015 Effective Date: 25/11/2015 00:00:00 Last date noted as effective: 2018-03-01 Status: Effective</p>
26C	21	NE	433760 550510	<p>Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE</p> <p>Permit Number: PP3239VA Original Permit Number: BU8045IR EPR Reference: - Issue Date: 22/9/2014 Effective Date: 22/9/2014 00:00:00 Last date noted as effective: 2018-03-01 Status: Superseded</p>

ID	Distance (m)	Direction	NGR	Details	
27B	409	NE	434210 550710	Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE	Permit Number: PP3632LS Original Permit Number: BU8045IR EPR Reference: - Issue Date: 25/7/2008 Effective Date: 25/7/2008 00:00:00 Last date noted as effective: 2018-03-01 Status: Superseded
28B	409	NE	434210 550710	Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE	Permit Number: ZP3031CZ Original Permit Number: BU8045IR EPR Reference: - Issue Date: 31/7/2013 Effective Date: 31/7/2013 00:00:00 Last date noted as effective: 2018-03-01 Status: Superseded
29B	409	NE	434210 550710	Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE	Permit Number: MP3837HT Original Permit Number: BU8045IR EPR Reference: - Issue Date: 18/5/2012 Effective Date: 18/5/2012 00:00:00 Last date noted as effective: 2018-03-01 Status: Superseded
30B	409	NE	434210 550710	Operator: Biffa Waste Services Ltd Installation Name: - Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE	Permit Number: BU8045 Original Permit Number: BU8045 EPR Reference: - Issue Date: - Effective Date: - Last date noted as effective: 2004-10-01 Status: Superseded By Pas
31B	409	NE	434210 550710	Operator: Biffa Waste Services Ltd Installation Name: Houghton-le-spring Epr/bu8045ir Process: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE	Permit Number: BU8045IR Original Permit Number: BU8045IR EPR Reference: - Issue Date: 31/8/2004 Effective Date: 31/8/2004 00:00:00 Last date noted as effective: 2018-03-01 Status: Superseded

2.1.3 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.

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

1

The following List 1 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
11B	409	NE	434210 550710	Name: Biffa Waste Services Ltd Houghton-le-spring Status: Active Receiving Water: -	Authorised Substances: Mercury (other), Cadmium

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

1

The following List 2 Dangerous Substance Inventory Site records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
12B	409	NE	434210 550710	Name: Biffa Waste Services Ltd Houghton-le-spring Status: Not Active Receiving Water: -	Authorised Substances: Chromium, Copper, Lead, Nickel, pH, Zinc

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

2

The following Part A(2) and Part B Activities are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
22C	26	NE	433758 550518	Address: Quarry Service Station, Quarry Row, Houghton-le-Spring, DH4 4AX Process: Unloading of Petrol into Storage at Service Stations Status: Current Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

ID	Distance (m)	Direction	NGR	Details	
23A	66	NE	433900 550500	Address: Hanson, Houghton Quarry, Newbottle Street, Houghton Le Spring, DH4 4AU Process: Cement Status: Historical Permit Permit Type: Part B	Enforcement: No Enforcement Notified Date of Enforcement: No Enforcement Notified Comment: No Enforcement Notified

2.1.7 Records of Category 3 or 4 Radioactive Substances Authorisations:

0

Database searched and no data found.

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

1

The following Licensed Discharge Consents records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
13	201	SW	433570 550290	Address: BRINKBURN CRESCENT SSO, HOUGHTON Effluent Type: UNSPECIFIED Permit Number: 245/0849 Permit Version: 1	Receiving Water: HOUGHTON BURN Status: REVOKED - UNSPECIFIED Issue date: 21/09/1989 Effective Date: 21-Sep-1989 Revocation Date: 01/07/1996

2.1.9 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.

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

0

Database searched and no data found.

2.2 Dangerous or Hazardous Sites

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

0

Database searched and no data found.

2.3 Environment Agency/Natural Resources Wales Recorded Pollution Incidents

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

10

The following NIRS List 2 records are represented as points on the Environmental Permits, Incidents and Registers Map:

ID	Distance (m)	Direction	NGR	Details	
1	1	N	433822 550483	Incident Date: 07-Feb-2010 Incident Identification: 751529 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Landfill Odour	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)
2A	63	NE	433903 550494	Incident Date: 17-Mar-2010 Incident Identification: 762474 Pollutant: Organic Chemicals/Products Pollutant Description: Other Organic Chemical or Product	Water Impact: Category 2 (Significant) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
3A	70	NE	433899 550506	Incident Date: 21-Apr-2008 Incident Identification: 580448 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Other Atmospheric Pollutant or Effect	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)
4	99	NE	433976 550495	Incident Date: 19-Mar-2007 Incident Identification: 478195 Pollutant: Atmospheric Pollutants and Effects Pollutant Description: Smoke	Water Impact: Category 3 (Minor) Land Impact: Category 4 (No Impact) Air Impact: Category 2 (Significant)
5	201	N	433703 550711	Incident Date: 16-Oct-2001 Incident Identification: 37014 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)
6	302	NE	434110 550650	Incident Date: 12-Feb-2002 Incident Identification: 57846 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
7	363	NE	434101 550727	Incident Date: 09-Apr-2010 Incident Identification: 768666 Pollutant: Contaminated Water Pollutant Description: Landfill Leachate	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
8	374	N	433678 550882	Incident Date: 24-Jan-2003 Incident Identification: 133064 Pollutant: Pollutant Not Identified Pollutant Description: Not Identified	Water Impact: Category 4 (No Impact) Land Impact: Category 4 (No Impact) Air Impact: Category 4 (No Impact)

ID	Distance (m)	Direction	NGR	Details	
9	428	NE	434202 550741	Incident Date: 13-Oct-2009 Incident Identification: 724517 Pollutant: Other Pollutant Pollutant Description: Other	Water Impact: Category 2 (Significant) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)
10	492	NE	434300 550740	Incident Date: 13-Sep-2001 Incident Identification: 30548 Pollutant: General Biodegradable Materials and Wastes Pollutant Description: Other General Biodegradable Material or Waste	Water Impact: Category 4 (No Impact) Land Impact: Category 3 (Minor) Air Impact: Category 4 (No Impact)

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

0

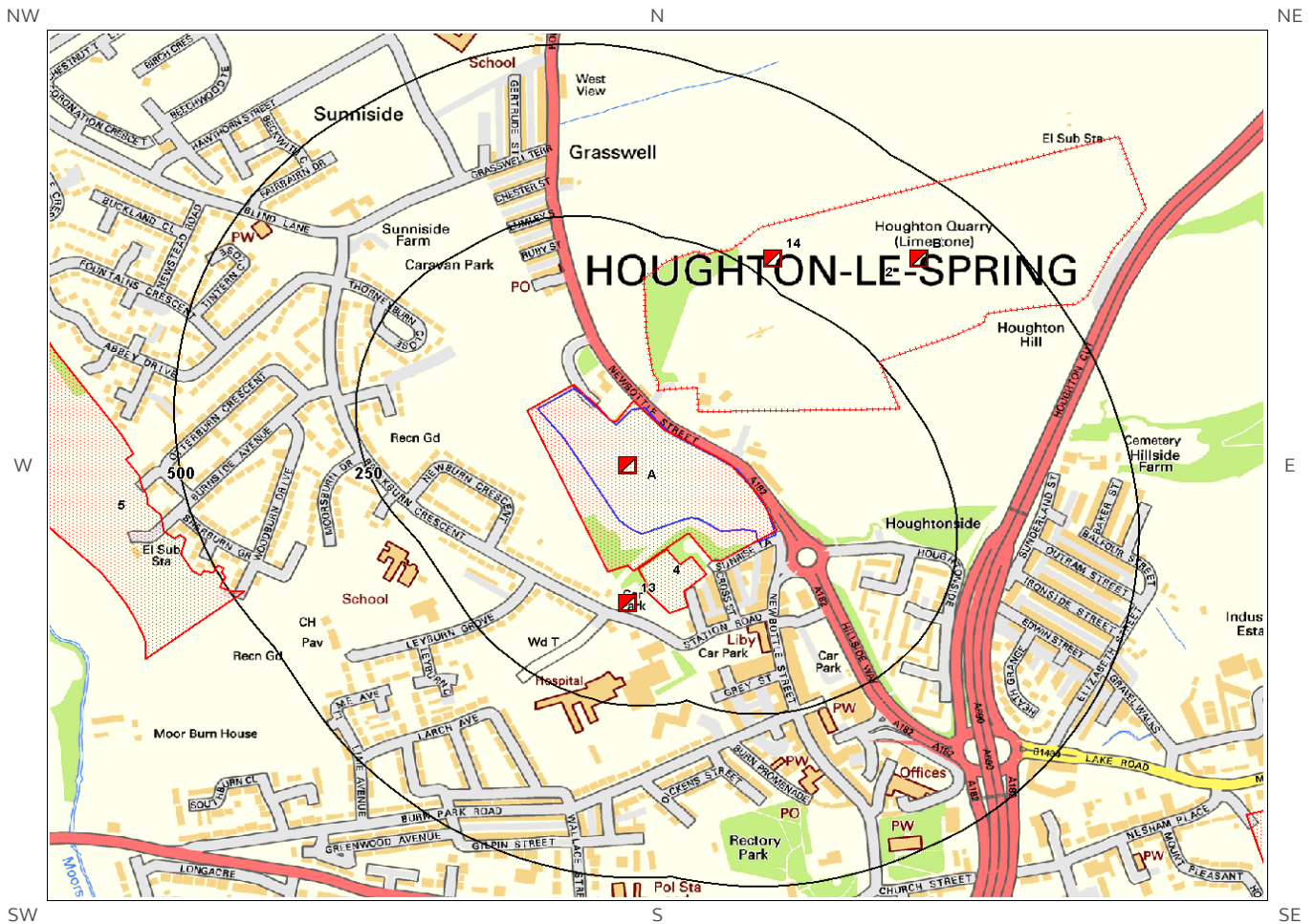
Database searched and no data found.

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










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.

3. Landfill and Other Waste Sites Map



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-  Site Outline
-  EA/NRW Active Landfill
-  Historic and Planned Waste Sites
-  EA/NRW Historic Landfill
-  EA/NRW Licensed Waste Site
-  BGS / DoE Survey Landfill
-  Local Authority/Historical Mapping Landfill Records
-  250 Search Buffers (m)
-  500 Search Buffers (m)

3. Landfill and Other Waste Sites

3.1 Landfill Sites

3.1.1 Records from Environment Agency/Natural Resources Wales landfill data within 1000m of the study site:

1

The following Environment Agency/Natural Resources Wales landfill records are represented as polygons on the Landfill and Other Waste Sites map:

ID	Distance (m)	Direction	NGR	Details
2	33	NE	433760 550510	<p>Address: The Quarry, Quarry Row, County Durham, DH4 4AU Landfill Reference: 0.0 Environmental Permitting Regulations (Waste) Reference: - Landfill Type: WASTE LANDFILLING; >10 T/D WITH CAPACITY >25,000T EXCLUDING INERT WASTE</p> <p>Operator: Biffa Waste Services Ltd Status: Effective IPPC Reference: EPR Reference:</p>

3.1.2 Records of Environment Agency/Natural Resources Wales historic landfill sites within 1500m of the study site:

8

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
3A	0	On Site	433800 550300	<p>Site Address: Houghton Colliery, Newbottle Street, Houghton Le Spring, Tyne and Wear Waste Licence: Yes Site Reference: SL 085, TW 452 SL Waste Type: - Environmental Permitting Regulations (Waste) Reference: TWR/L/CIT010</p> <p>Licence Issue: 07-Sep-1995 Licence Surrendered: 07-Apr-1999 Licence Holder Address: Eden Vale, Eden House Road, Sunderland, Tyne and Wear Operator: - Licence Holder: City Of Sunderland - City Building Services First Recorded: - Last Recorded: -</p>
4	32	S	433800 550200	<p>Site Address: British Gas Halliwell Street, Houghton le Spring, Sunderland Waste Licence: - Site Reference: TW 332 SL Waste Type: - Environmental Permitting Regulations (Waste) Reference: -</p> <p>Licence Issue: Licence Surrendered: Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -</p>

ID	Distance (m)	Direction	NGR	Details	
5	483	SW	432900 550300	Site Address: Flint Mill Sewerage Works, Sunnyside, Houghton-le-Spring, Tyne and Wear Waste Licence: Yes Site Reference: TW 163 SL, SL 072 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: YO1/L/SUN002	Licence Issue: 18-Nov-1987 Licence Surrendered: 16-Dec-1988 Licence Holder Address: Town Hall, Civic Centre, Sunderland Operator: - Licence Holder: Director of Architecture and Planning, Sunderland Borough Council First Recorded: 19-Nov-1987 Last Recorded: 16-Dec-1988
Not shown	745	E	434800 550500	Site Address: Hillside Farm, Hillside Farm, Houghton-le Spring, Tyne and Wear Waste Licence: Yes Site Reference: SL 068, TW 078 SL Waste Type: Industrial Environmental Permitting Regulations (Waste) Reference: YO1/L/SHE002	Licence Issue: 23-Mar-1981 Licence Surrendered: 31-Mar-1983 Licence Holder Address: Hillside Farm, Houghton-le Spring, Tyne and Wear Operator: - Licence Holder: W Shepherd First Recorded: 31-Aug-1980 Last Recorded: 01-Jul-1982
7	765	SE	434700 549800	Site Address: Kirk Lee Field, New Town, Sunderland Waste Licence: - Site Reference: SL 017, SL 23 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: - Licence Surrendered: - Licence Holder Address: - Operator: - Licence Holder: - First Recorded: - Last Recorded: -
Not shown	843	N	433500 551300	Site Address: Long Beach, Coaley Lane, Coaley, Part of Spring Twynings, Tyne and Wear Waste Licence: - Site Reference: SL 004, SL 9 Waste Type: - Environmental Permitting Regulations (Waste) Reference: -	Licence Issue: - Licence Surrendered: - Licence Holder Address: - Operator: A B Demolition Contractors (Stonehouse) Limited Licence Holder: - First Recorded: - Last Recorded: -
Not shown	1114	N	434000 551600	Site Address: Newbottle, Houghton le Spring, Sunderland Waste Licence: Yes Site Reference: TW 011 SL, SL 071 Waste Type: Inert, Industrial, Commercial, Household, Liquid sludge Environmental Permitting Regulations (Waste) Reference: TWR/L/CIT004	Licence Issue: 14-Jun-1977 Licence Surrendered: 18-Apr-1994 Licence Holder Address: Public Health Department, Town Hall & Civic Centre, PO Box 107, Sunderland, Tyne and Wear Operator: - Licence Holder: City Of Sunderland First Recorded: 31-Dec-1976 Last Recorded: 31-Dec-1993
Not shown	1223	SW	432900 549200	Site Address: Rainton Bridge, Rainton Bridge Ind Estate, Houghton-le Spring, Tyne and Wear Waste Licence: Yes Site Reference: TW 074 SL, SL 070 Waste Type: Inert, Industrial, Commercial, Household Environmental Permitting Regulations (Waste) Reference: YO1/L/BOR012	Licence Issue: 26-Jan-1981 Licence Surrendered: 31-Mar-1994 Licence Holder Address: Town Hall & Civic Centre, Sunderland, Tyne and Wear Operator: - Licence Holder: Borough Of Sunderland First Recorded: 31-Jan-1981 Last Recorded: 31-Dec-1981

3.1.3 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	
Not shown	1246	N	434100.0 551700.0	Address: Newbottle Quarry, Newbottle Houghton-le-Spring, T&W BGS Number: 2191.0	Risk: Risk to minor aquifer Waste Type: N/A

3.1.4 Records of Landfills from Local Authority and Historical Mapping Records within 1500m of the study site:

2

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

ID	Distance (m)	Direction	NGR	Site Address	Source	Data Type
Not shown	1113	N	434077 551669	Refuse Tip	1973 mapping	Polygon
Not shown	1126	N	433987 551643	Refuse Tip	1977 mapping	Polygon

3.2 Other Waste Sites

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

0

Database searched and no data found.

3.2.2 Records of Environment Agency/Natural Resources Wales licensed waste sites within 1500m of the study site:

16

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

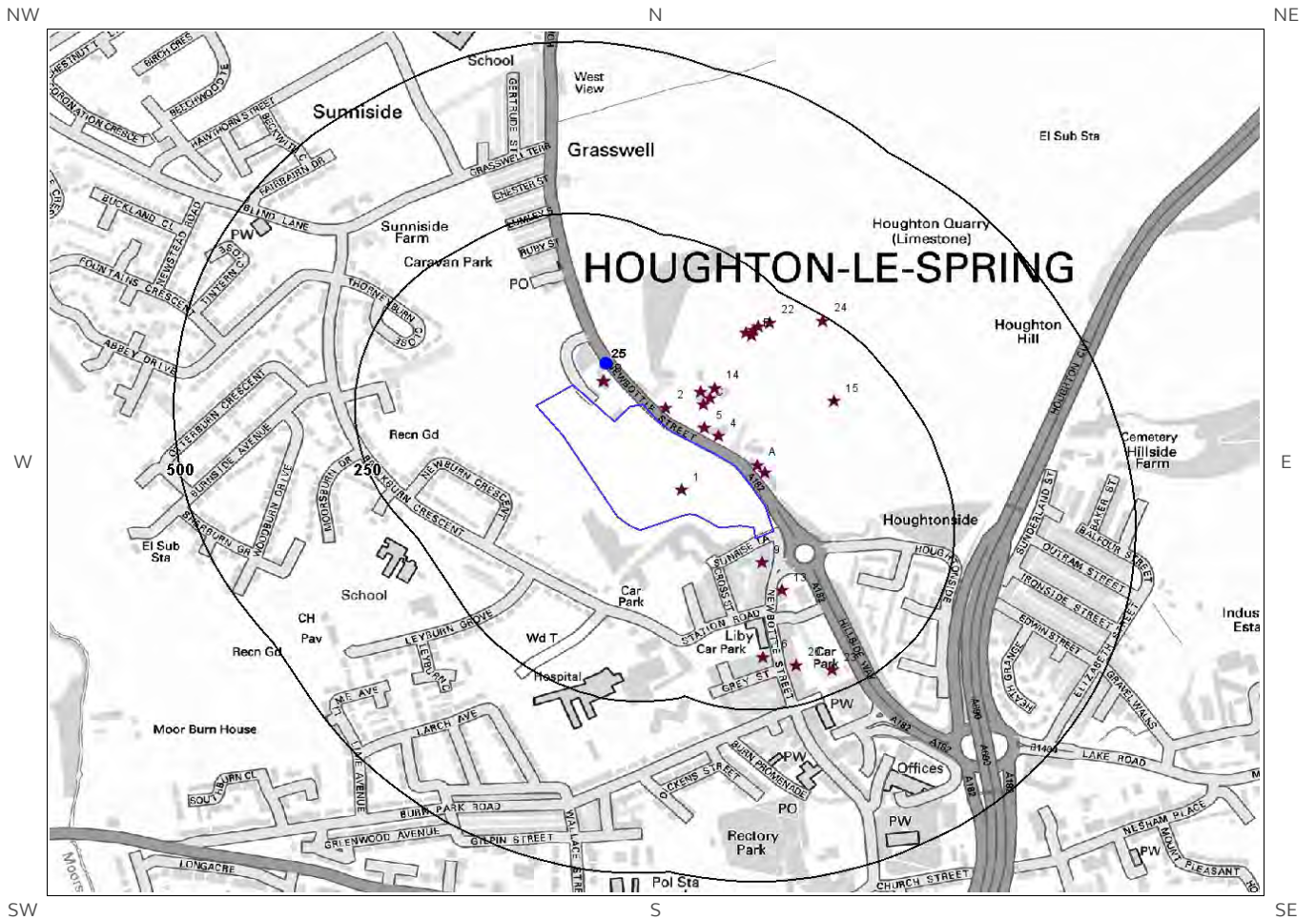
ID	Distance (m)	Direction	NGR	Details
11A	0	On Site	433800 550400	<p>Site Address: The Old Railway Cutting, Newbottle Street, Houghton Le Spring, Tyne & Wear</p> <p>Type: Landfill taking Non-Biodegradable Wastes</p> <p>Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CIT010</p> <p>EPR reference: -</p> <p>Operator: City Of Sunderland - City Building Services</p> <p>Waste Management licence No: 67597</p> <p>Annual Tonnage: 0.0</p> <p>Issue Date: 07/09/1995</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: 07/04/1999</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Surrendered</p> <p>Site Name: Houghton Colliery Site</p> <p>Correspondence Address: Eden Vale, Eden House Road, Sunderland, Tyne & Wear, SR4 7LD</p>
12A	0	On Site	433800 550400	<p>Site Address: The Old Railway Cutting, Newbottle Street, Houghton-le Spring, Tyne & Wear, DH4 6NJ</p> <p>Type: Landfill taking Non-Biodegradable Wastes</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: CIT010</p> <p>EPR reference: EA/EPR/MP3393NL/S003</p> <p>Operator: City Of Sunderland - City Building Services</p> <p>Waste Management licence No: 67597</p> <p>Annual Tonnage: 250000.0</p> <p>Issue Date: 07/09/1995</p> <p>Effective Date: -</p> <p>Modified: -</p> <p>Surrendered Date: 07/04/1999</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Surrendered</p> <p>Site Name: Houghton Colliery Site</p> <p>Correspondence Address: -</p>
13	102	S	433800 550200	<p>Site Address: ., ., Halliwell Street, Houghton-le Spring, Tyne & Wear, DH4 5AQ</p> <p>Type: Transfer Station taking Non-Biodegradable Wastes</p> <p>Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: BRI009</p> <p>EPR reference: EA/EPR/YP3197ZG/S002</p> <p>Operator: British Gas Plc (Northern)</p> <p>Waste Management licence No: 67533</p> <p>Annual Tonnage: 30000.0</p> <p>Issue Date: 09/09/1993</p> <p>Effective Date: -</p> <p>Modified: 01/05/1994</p> <p>Surrendered Date: 25/01/1996</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: Surrendered</p> <p>Site Name: British Gas - Halliwell Street Depot</p> <p>Correspondence Address: -</p>
14	281	NE	434000 550700	<p>Site Address: Newbottle Street, ., Houghton-le Spring, Tyne & Wear, DH4 4AV</p> <p>Type: Co-Disposal Landfill Site</p> <p>Size: >= 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: BIF001</p> <p>EPR reference: EA/EPR/ZP3097ZX/V004</p> <p>Operator: Biffa Waste Services Ltd</p> <p>Waste Management licence No: 67446</p> <p>Annual Tonnage: 500000.0</p> <p>Issue Date: 07/10/1985</p> <p>Effective Date: -</p> <p>Modified: 04/11/1993</p> <p>Surrendered Date: -</p> <p>Expiry Date: -</p> <p>Cancelled Date: -</p> <p>Status: To PPC</p> <p>Site Name: Houghton Quarry Landfill Site</p> <p>Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details	
15B	395	NE	434200 550700	<p>Site Address: The Quarry, Quarry Row, Houghton Le Spring, County Durham, DH4 4AU</p> <p>Type: Physical Treatment Facility Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: BIF003 EPR reference: -</p> <p>Operator: Biffa Waste Services Ltd Waste Management licence No: 64145 Annual Tonnage: 0.0</p>	<p>Issue Date: 12/09/2005 Effective Date: - Modified: -</p> <p>Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued</p> <p>Site Name: Houghton Quarry Correspondence Address: Rixton Old Hall, Manchester Road, Rixton, Warrington, Cheshire, WA3 6EW</p>
16B	395	NE	434200 550700	<p>Site Address: The Quarry, Quarry Row, Houghton-le Spring, Tyne & Wear, DH4 4AU</p> <p>Type: Physical Treatment Facility Size: >= 25000 tonnes < 75000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: BIF003 EPR reference: EA/EPR/XP3094ZJ/V002</p> <p>Operator: Biffa Waste Services Ltd Waste Management licence No: 64145 Annual Tonnage: 74999.0</p>	<p>Issue Date: 12/09/2005 Effective Date: - Modified: 31/07/2013</p> <p>Surrendered Date: - Expiry Date: - Cancelled Date: - Status: To PPC</p> <p>Site Name: Houghton Le Spring Landfill Site Correspondence Address: -</p>
Not shown	821	E	434800 550500	<p>Site Address: Hillside Farm, Houghton-le Spring, Tyne & Wear, DH4</p> <p>Type: Landfill taking Non-Biodegradable Wastes Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHE002 EPR reference: EA/EPR/PP3794EG/S002</p> <p>Operator: Shepherd W Waste Management licence No: 64479 Annual Tonnage: 150000.0</p>	<p>Issue Date: 23/03/1981 Effective Date: - Modified: -</p> <p>Surrendered Date: 31/03/1983 Expiry Date: - Cancelled Date: - Status: Surrendered</p> <p>Site Name: Mr W Husband Correspondence Address: -</p>
Not shown	821	E	434800 550500	<p>Site Address: Hillside Farm, Houghton-le Spring, Tyne & Wear</p> <p>Type: - Size: Unknown</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHE002 EPR reference: -</p> <p>Operator: Shepherd W Waste Management licence No: 0 Annual Tonnage: 0.0</p>	<p>Issue Date: 23/03/1981 Effective Date: - Modified: -</p> <p>Surrendered Date: 31/03/1983 Expiry Date: - Cancelled Date: - Status: Surrendered</p> <p>Site Name: Mr W Husband Correspondence Address: Hillside Farm, Houghton-le Spring, Tyne & Wear, DH</p>
Not shown	821	E	434800 550500	<p>Site Address: Hillside Farm, Houghton-le Spring, Tyne & Wear</p> <p>Type: Landfill taking Non-Biodegradable Wastes Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: SHE002 EPR reference: -</p> <p>Operator: Shepherd W Waste Management licence No: 0 Annual Tonnage: 0.0</p>	<p>Issue Date: 23/03/1981 Effective Date: - Modified: -</p> <p>Surrendered Date: 31/03/1983 Expiry Date: - Cancelled Date: - Status: Surrendered</p> <p>Site Name: Mr W Husband Correspondence Address: Hillside Farm, Houghton-le Spring, Tyne & Wear, DH</p>
Not shown	1040	E	435000 550000	<p>Site Address: Laygate, South Shields, Tyne & Wear</p> <p>Type: Landfill taking Non-Biodegradable Wastes Size: < 25000 tonnes</p> <p>Environmental Permitting Regulations (Waste) Licence Number: BOR015 EPR reference: -</p> <p>Operator: Borough Of South Tyneside Waste Management licence No: 0 Annual Tonnage: 0.0</p>	<p>Issue Date: 23/02/1983 Effective Date: - Modified: -</p> <p>Surrendered Date: 31/03/1994 Expiry Date: - Cancelled Date: - Status: Surrendered</p> <p>Site Name: West Holborn Landfill Correspondence Address: Town Hall, South Shields, Tyne & Wear, NE33</p>

ID	Distance (m)	Direction	NGR	Details	
Not shown	1040	E	435000 550000	<p>Site Address: Laygate, South Shields, Tyne & Wear Type: - Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: BOR015 EPR reference: - Operator: Borough Of South Tyneside Waste Management licence No: 0 Annual Tonnage: 0.0</p>	<p>Issue Date: 23/02/1983 Effective Date: - Modified: - Surrendered Date: 31/03/1994 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: West Holborn Landfill Correspondence Address: Town Hall, South Shields, Tyne & Wear, NE33</p>
Not shown	1040	E	435000 550000	<p>Site Address: Laygate, South Shields, Tyne & Wear Type: Landfill taking Non-Biodegradable Wastes Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: BOR015 EPR reference: EA/EPR/SP3794EH/S002 Operator: Borough Of South Tyneside Waste Management licence No: 64499 Annual Tonnage: 150000.0</p>	<p>Issue Date: 23/02/1983 Effective Date: - Modified: - Surrendered Date: 31/03/1994 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: West Holborn Landfill Correspondence Address: -</p>
Not shown	1246	N	434100 551700	<p>Site Address: ., North Street, Newbottle, Sunderland, Tyne & Wear, . Type: Household, Commercial & Industrial Waste Landfill Size: Unknown Environmental Permitting Regulations (Waste) Licence Number: CIT004 EPR reference: - Operator: City Of Sunderland Waste Management licence No: 67436 Annual Tonnage: 0.0</p>	<p>Issue Date: 14/06/1977 Effective Date: - Modified: 02/06/1981 Surrendered Date: 18/04/1994 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Newbottle Highway Maintenance Tip Correspondence Address: Public Health Department, Town Hall & Civic Centre, P O Box 107, Sunderland, Tyne & Wear, SR2 7DN</p>
Not shown	1246	N	434100 551700	<p>Site Address: ., North Street, Newbottle, Sunderland, Tyne & Wear Type: Household, Commercial & Industrial Waste Landfill Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CIT004 EPR reference: EA/EPR/CP3097ZG/A001 Operator: City Of Sunderland Waste Management licence No: 67436 Annual Tonnage: 250000.0</p>	<p>Issue Date: 14/06/1977 Effective Date: - Modified: 02/06/1981 Surrendered Date: 18/04/1994 Expiry Date: - Cancelled Date: - Status: Surrendered Site Name: Newbottle Highway Maintenance Tip Correspondence Address: -</p>
Not shown	1344	NW	432800 551500	<p>Site Address: Endean Works, Blind Lane, Houghton-le Spring, Tyne & Wear, DH4 6NJ Type: Household, Commercial & Industrial Waste T Stn Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: CUR001 EPR reference: EA/EPR/QP3897ZZ/V002 Operator: T Curry & Son Waste Management licence No: 67551 Annual Tonnage: 4999.0</p>	<p>Issue Date: 11/09/1996 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Modified Site Name: T Curry & Son Correspondence Address: -</p>

ID	Distance (m)	Direction	NGR	Details
Not shown	1492	W	432196 550672	<p>Site Address: Hawthorne House, Blackthorn Way, Sedgelych Ind Est, Fencehouses, Tyne & Wear, DH4 6JN Type: 75kte HCl Waste TS + treatment Size: < 25000 tonnes Environmental Permitting Regulations (Waste) Licence Number: MAX018 EPR reference: EA/EPR/BP3590VJ/A001 Operator: Max Recycle U K Ltd Waste Management licence No: 100887 Annual Tonnage: 24999.0</p> <p>Issue Date: 03/04/2009 Effective Date: - Modified: - Surrendered Date: - Expiry Date: - Cancelled Date: - Status: Issued Site Name: Max Recycle U K Ltd Correspondence Address: -</p>

4. Current Land Use Map



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-  Site Outline
-  Current Industrial Sites
-  Electricity Transmission Cables
-  Search Buffers (m)
-  Petrol & Fuel Sites
-  Gas Transmission Pipelines

4. Current Land Uses

4.1 Current Industrial Data

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

24

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

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
1	0	On Site	Shaft	433877 550360	DH4	Unspecified Quarries Or Mines	Extractive Industries
2	21	NE	Electricity Sub Station	433855 550479	DH4	Electrical Features	Infrastructure and Facilities
3A	25	NE	T R G	433980 550395	Newbottle Street, Houghton le Spring, DH4 4AS	Secondhand Vehicles	Motoring
4	26	NE	Works	433928 550438	DH4	Unspecified Works Or Factories	Industrial Features
5	27	NE	Tyre Spot Ltd	433907 550449	Newbottle Street, Houghton le Spring, DH4 4AS	Vehicle Parts and Accessories	Motoring
6A	27	NE	Houghton MOT Centre	433991 550385	Newbottle Street, Houghton le Spring, DH4 4AS	Vehicle Repair, Testing and Servicing	Repair and Servicing
7B	33	NE	Quarry Service Station	433768 550517	Quarry Row, Houghton le Spring, DH4 4AU	Petrol and Fuel Stations	Road and Rail
8B	33	NE	Quarry Service Station	433769 550518	Quarry Row, Houghton le Spring, DH4 4AU	Petrol and Fuel Stations	Road and Rail
9	35	S	North East Bed Warehouse	433988 550254	98b, Newbottle Street, Houghton le Spring, DH4 4AJ	Beds and Bedding	Consumer Products
10C	56	NE	Tank	433907 550484	DH4	Tanks (Generic)	Industrial Features
11C	69	NE	Electricity Sub Station	433916 550493	DH4	Electrical Features	Infrastructure and Facilities
12C	70	NE	Biffa Waste Services Ltd	433903 550502	The Quarry, Quarry Row, Houghton le Spring, DH4 4AU	Waste Storage, Processing and Disposal	Infrastructure and Facilities
13	83	SE	Dante Fire & Security	434015 550213	5 Lambton House, Newbottle Street, Houghton le Spring, DH4 4AR	Electronic Equipment	Industrial Products
14	85	NE	Electricity Sub Station	433923 550508	DH4	Electrical Features	Infrastructure and Facilities
15	166	NE	Houghton Quarry (Limestone)	434087 550489	DH4	Stone Quarrying and Preparation	Extractive Industries

ID	Distance (m)	Direction	Company	NGR	Address	Activity	Category
16	172	S	Houghton Carpet Centre Ltd	433989 550116	Ground Floor Empire House, Newbottle Street, Houghton-le-Spring, DH4 4AF	Carpets, Flooring, Rugs and Soft Furnishings	Consumer Products
17D	176	NE	Tank	433973 550584	DH4	Tanks (Generic)	Industrial Features
18D	176	NE	Hopper	433966 550588	DH4	Hoppers and Silos	Farming
19D	185	NE	Conveyor	433976 550593	DH4	Conveyors	Industrial Features
20	192	S	Skylite Systems	434034 550104	61a, Newbottle Street, Houghton le Spring, DH4 4AR	Curtains and Blinds	Consumer Products
21D	193	NE	Hopper	433983 550598	DH4	Hoppers and Silos	Farming
22	204	NE	Hopper	433998 550603	DH4	Hoppers and Silos	Farming
23	217	SE	Electricity Sub Station	434084 550097	DH4	Electrical Features	Infrastructure and Facilities
24	244	NE	Houghton-le-Spring Landfill Site - Landfill Gas (DECC)	434071 550606	The Quarry, Quarry Row, Houghton-le-Spring, Tyne And Wear, DH4 4AU	Energy Production	Industrial Features

4.2 Petrol and Fuel Sites

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

1

The following petrol or fuel site records provided by Catalist are represented as points on the Current Land Use map:

ID	Distance (m)	Direction	NGR	Company	Address	LPG	Status
25	53	NE	433772 550543	Jet	Quarry Service Station, Quarry Row, Quarry Row, Houghton-Le-Spring, Tyne And Wear, DH4 4AU	No	Open

4.3 National Grid High Voltage Underground Electricity Transmission Cables

This dataset identifies the high voltage electricity transmission lines running between generating power plants and electricity substations. The dataset does not include the electricity distribution network (smaller, lower voltage cables distributing power from substations to the local user network). This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high voltage underground electricity transmission cables within 500m of the study site: 0

Database searched and no data found.

4.4 National Grid High Pressure Gas Transmission Pipelines

This dataset identifies high-pressure, large diameter pipelines which carry gas between gas terminals, power stations, compressors and storage facilities. The dataset does not include the Local Transmission System (LTS) which supplies gas directly into homes and businesses. This information has been extracted from databases held by National Grid and is provided for information only with no guarantee as to its completeness or accuracy. National Grid do not offer any warranty as to the accuracy of the available data and are excluded from any liability for any such inaccuracies or errors.

Records of National Grid high pressure gas transmission pipelines within 500m of the study site: 0

Database searched and no data found.

5. Geology

5.1 Artificial Ground and Made Ground

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

Lex Code	Description	Rock Type
MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT
MGR-ARTDP	MADE GROUND (UNDIVIDED)	ARTIFICIAL DEPOSIT

5.2 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
GFDUD-XSV	GLACIOFLUVIAL DEPOSITS, DEVENSIAN	SAND AND GRAVEL
GLLDD-XCZ	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT
SUPNM-UKNOWN	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	UNKNOWN/UNCLASSIFIED ENTRY
GLLDD-XCZ	GLACIOLACUSTRINE DEPOSITS, DEVENSIAN	CLAY AND SILT
SUPNM-UKNOWN	SUPERFICIAL THEME NOT MAPPED [FOR DIGITAL MAP USE ONLY]	UNKNOWN/UNCLASSIFIED ENTRY

5.3 Bedrock and Solid Geology

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

Lex Code	Description	Rock Type
PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
PMCM-MDSS	PENNINE MIDDLE COAL MEASURES FORMATION	MUDSTONE, SILTSTONE AND SANDSTONE
YWS-SDST	YELLOW SANDS FORMATION	SANDSTONE
PMCM-SDST	PENNINE MIDDLE COAL MEASURES FORMATION	SANDSTONE
YWS-SDST	YELLOW SANDS FORMATION	SANDSTONE
RML-DOLO	RAISBY FORMATION	DOLOSTONE



Groundsure

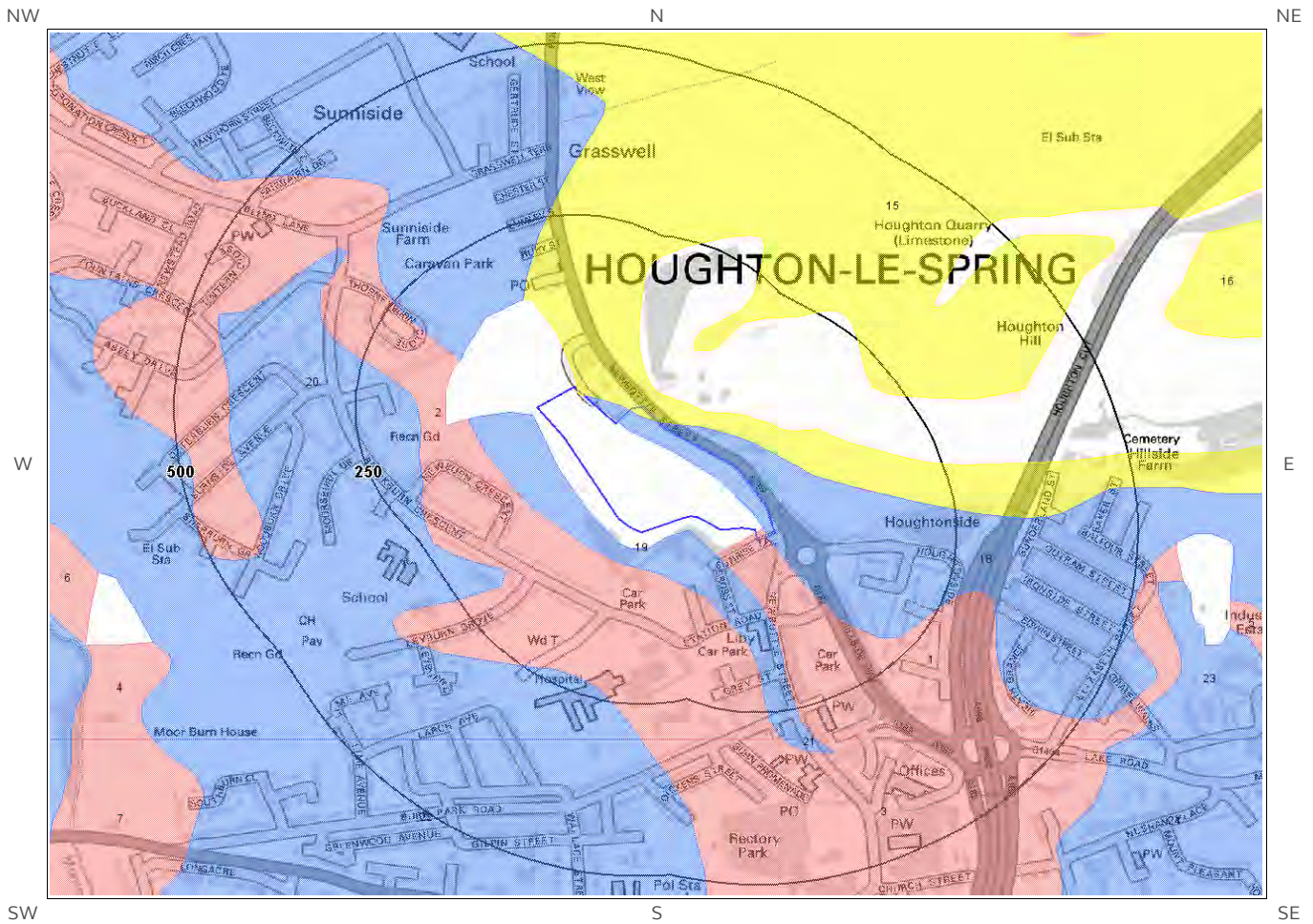
LOCATION INTELLIGENCE

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



6 Hydrogeology and Hydrology

6a. Aquifer Within Superficial Geology

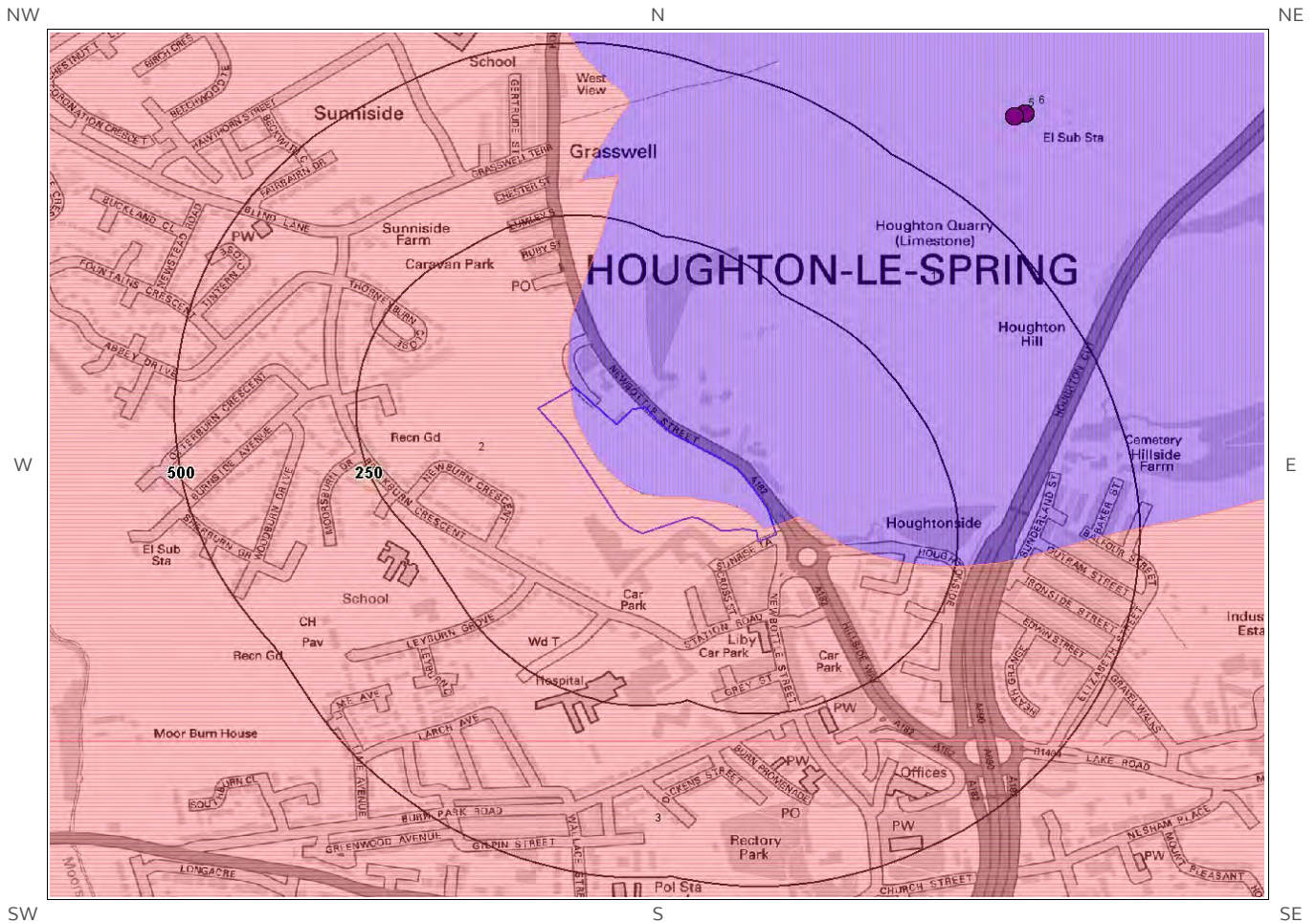


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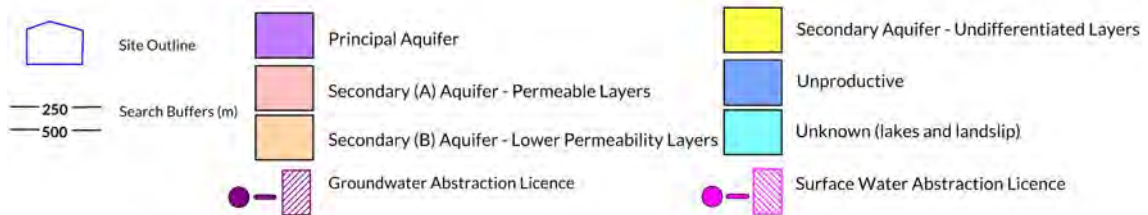




6b. Aquifer Within Bedrock Geology and Abstraction Licenses

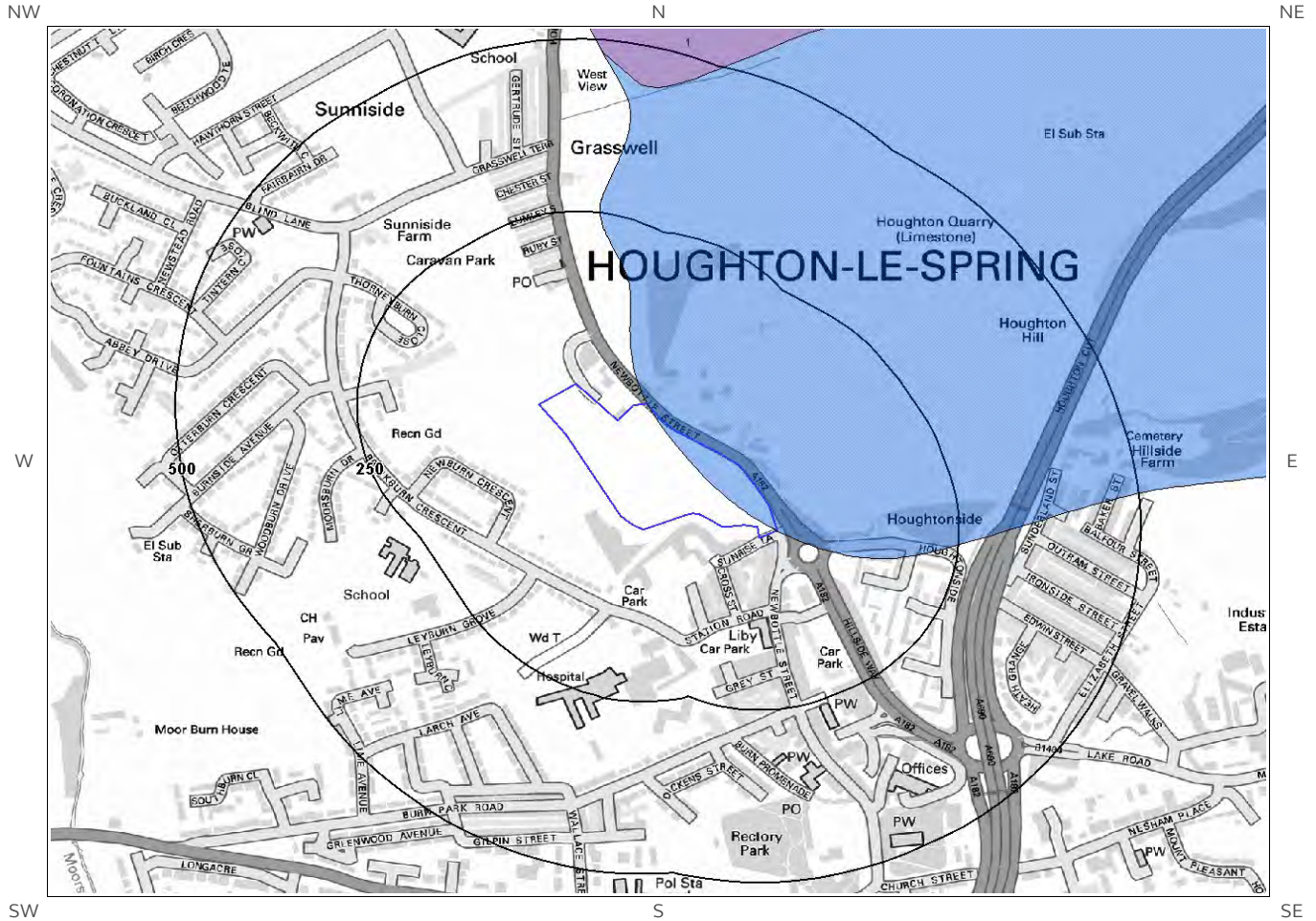


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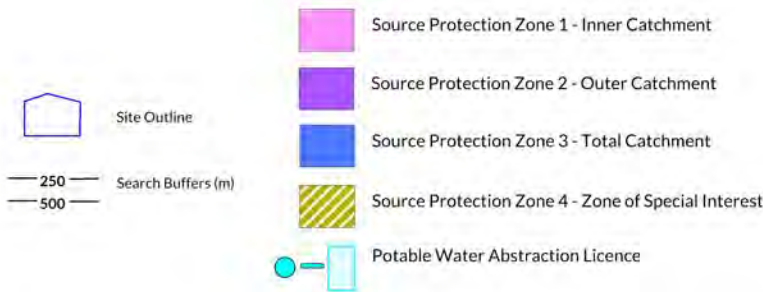




6c. Hydrogeology – Source Protection Zones and Potable Water Abstraction Licenses

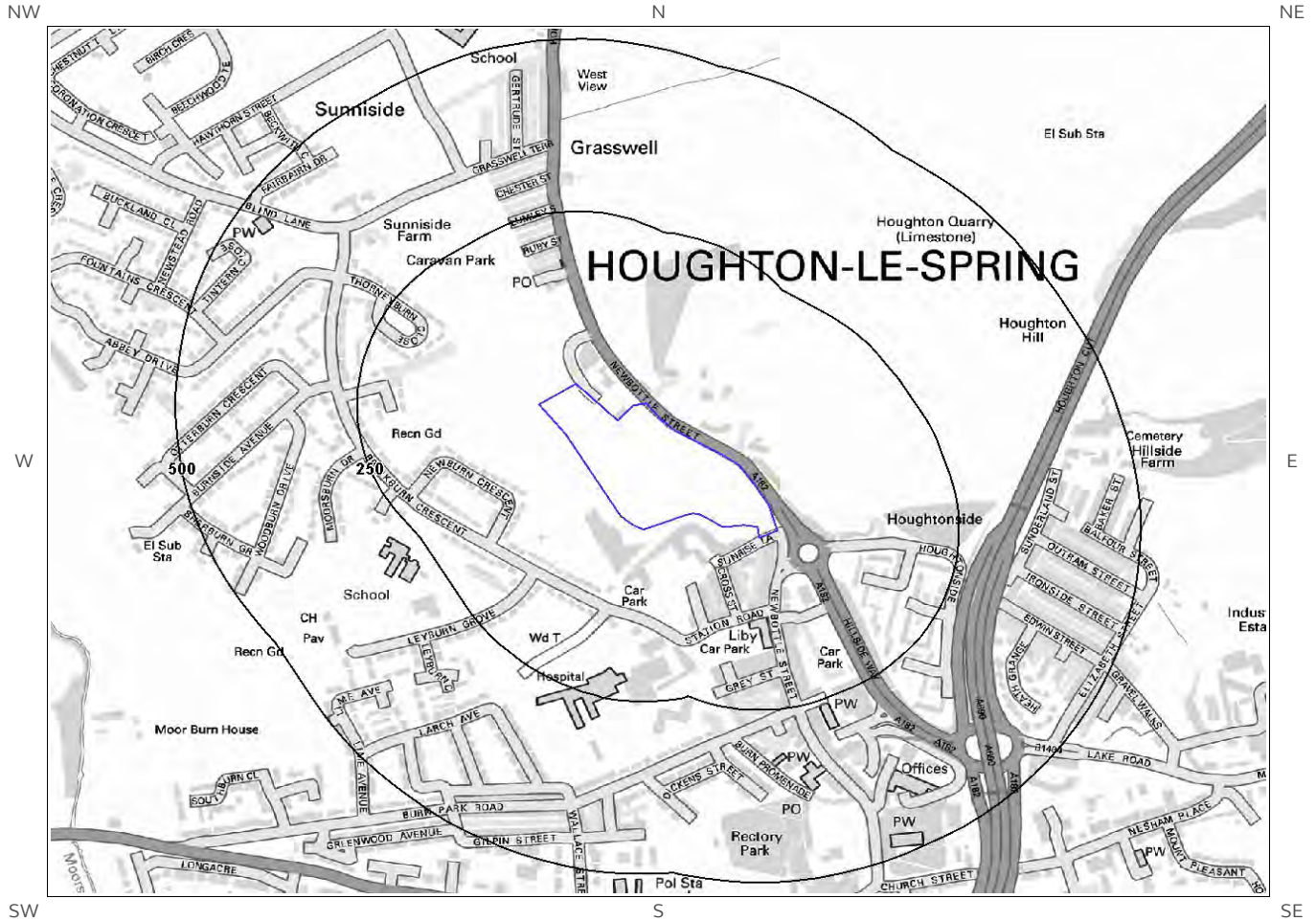


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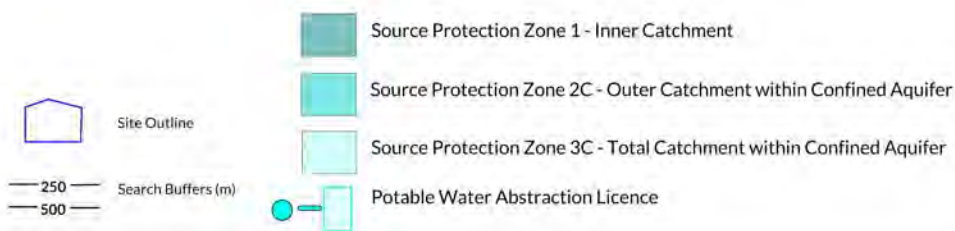




6d. Hydrogeology – Source Protection Zones within confined aquifer

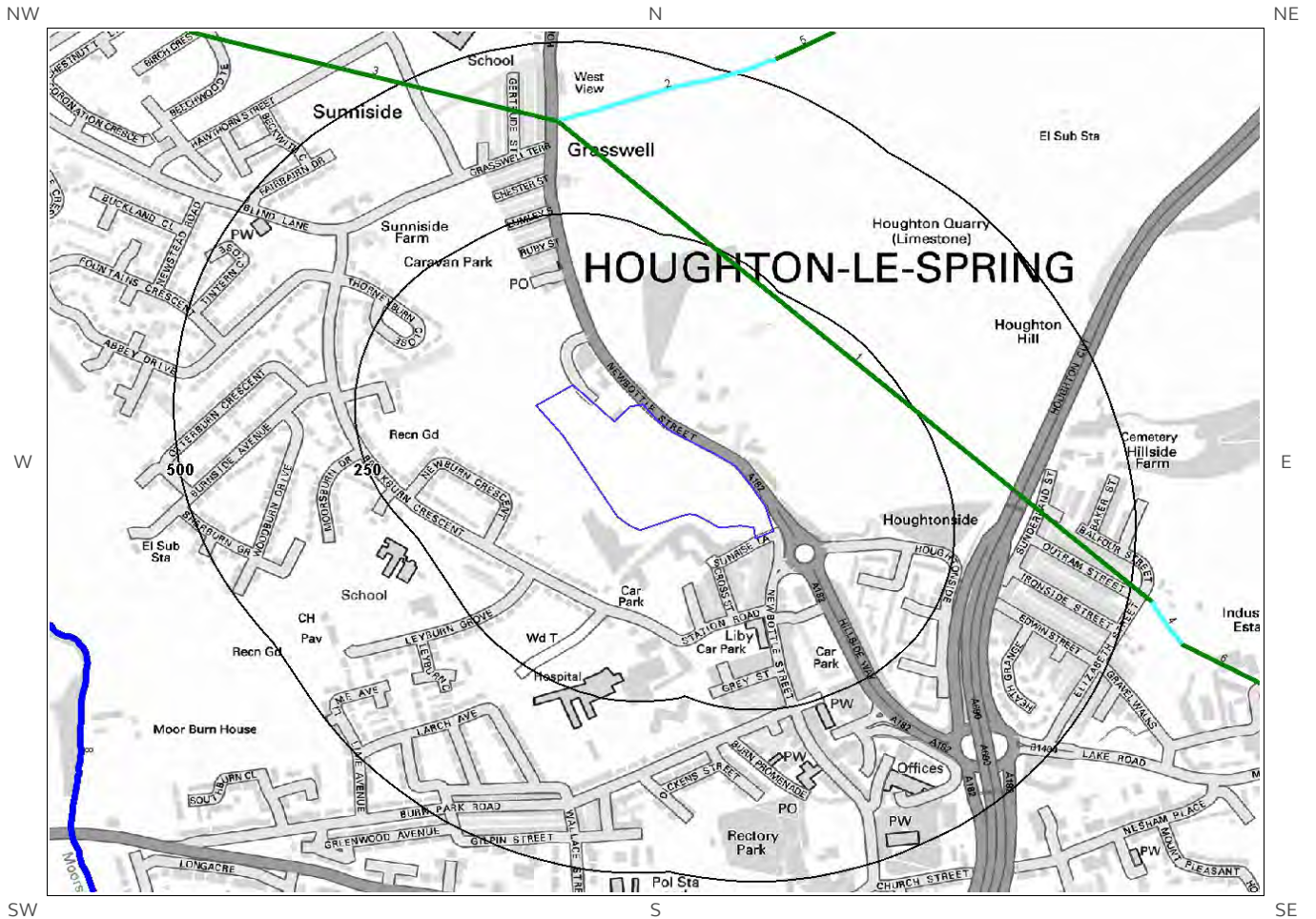


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6e. Hydrology – Detailed River Network and River Quality



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

6. Hydrogeology and Hydrology

6.1 Aquifer within Superficial Deposits

Records of strata classification within the superficial geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales'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 Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Superficial Geology Map (6a):

ID	Distance (m)	Direction	Designation	Description
1	0	On Site	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
15	0	On Site	Secondary (undifferentiated)	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
18	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
19	11	SW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
2	51	S	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
20	127	NW	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
3	288	S	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
21	290	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
22	300	S	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow

6.2 Aquifer within Bedrock Deposits

Records of strata classification within the bedrock geology at or in proximity to the property Yes

From 1 April 2010, the Environment Agency/Natural Resources Wales'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 Enviro Insight User Guide.

The following aquifer records are shown on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	Designation	Description
1	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	0	On Site	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
3	288	S	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

6.3 Groundwater Abstraction Licences

Groundwater Abstraction Licences within 2000m of the study site Identified

The following Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details
5	636	NE	434331 550904	Status: Historical Licence No: NE/024/0005/004 Details: Pollution Remediation Direct Source: Groundwaters Point: Borehole - Magnesian Limestone - Houghton-le-spring Data Type: Point Name: BIFFA WASTE SERVICES LTD Annual Volume (m ³): 73000 Max Daily Volume (m ³): 200 Original Application No: NPS/WR/004613 Original Start Date: 11/11/2010 Expiry Date: 31/3/2026 Issue No: 1 Version Start Date: 11/11/2010 Version End Date:
6	648	NE	434345 550908	Status: Active Licence No: NE/024/0005/004 Details: Pollution Remediation Direct Source: Groundwaters Point: Borehole - Basal Permian Sands - Houghton-le-spring Data Type: Point Name: BIFFA WASTE SERVICES LTD Annual Volume (m ³): 91250 Max Daily Volume (m ³): 250 Original Application No: NPS/WR/015684 Original Start Date: 11/11/2010 Expiry Date: 31/3/2026 Issue No: 3 Version Start Date: 22/8/2014 Version End Date:
Not shown	1953	NE	435420 551680	Status: Historical Licence No: 1/24/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Stonygate (magnesian Limestone) Data Type: Point Name: NORTHUMBRIAN WATER Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 025/24/05 Original Start Date: 9/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 8/4/1968 Version End Date:

ID	Distance (m)	Direction	NGR	Details	
Not shown	1953	NE	435420 551680	Status: Active Licence No: 1/24/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Borehole - Magnesian Limestone - Stoneygate Data Type: Point Name: NORTHUMBRIAN WATER	Annual Volume (m ³): 1463812 Max Daily Volume (m ³): 5273.5 Original Application No: 025/24/05 Original Start Date: 9/3/1966 Expiry Date: - Issue No: 100 Version Start Date: 8/4/1968 Version End Date:

6.4 Surface Water Abstraction Licences

Surface Water Abstraction Licences within 2000m of the study site

Identified

The following Surface Water Abstraction Licences records are represented as points, lines and regions on the Aquifer within Bedrock Geology Map (6b):

ID	Distance (m)	Direction	NGR	Details	
Not shown	1681	W	431980 550820	Status: Historical Licence No: 1/24/05/064 Details: Dust Suppression Direct Source: Surface Water Point: Herrington Burn Data Type: Line Name: MOWLEM PLC	Annual Volume (m ³): 26000 Max Daily Volume (m ³): 150 Application No: 071/24/05 Original Start Date: 20/6/2005 Expiry Date: 31/5/2008 Issue No: 1 Version Start Date: 20/6/2005 Version End Date:
Not shown	1681	W	431980 550820	Status: Historical Licence No: 1/24/05/066 Details: Dust Suppression Direct Source: Surface Water Point: Herrington Burn Data Type: Line Name: CARILLION JM LTD	Annual Volume (m ³): 26000 Max Daily Volume (m ³): 150 Application No: 071/24/05 Original Start Date: 1/6/2008 Expiry Date: 31/5/2010 Issue No: 1 Version Start Date: 1/6/2008 Version End Date:
Not shown	1880	W	431820 550780	Status: Historical Licence No: 1/24/05/047 Details: Mineral Washing Direct Source: Surface Water Point: Lumley Park Burn Data Type: Point Name: SGS(NE)LTD	Annual Volume (m ³): - Max Daily Volume (m ³): - Application No: 054/24/05 Original Start Date: 1/5/1990 Expiry Date: - Issue No: 100 Version Start Date: 1/5/1990 Version End Date:
Not shown	1880	W	431820 550780	Status: Historical Licence No: 1/24/05/047 Details: Mineral Washing Direct Source: Surface Water Point: Lumley Park Burn (inland Water Non Tidal) Data Type: Point Name: SGS(NE)LTD	Annual Volume (m ³): - Max Daily Volume (m ³): - Application No: 054/24/05 Original Start Date: 1/5/1990 Expiry Date: - Issue No: 100 Version Start Date: 1/5/1990 Version End Date:

6.5 Potable Water Abstraction Licences

Potable Water Abstraction Licences within 2000m of the study site

Identified

The following Potable Water Abstraction Licences records are represented as points, lines and regions on the SPZ and Potable Water Abstraction Licences Map (6c):

ID	Distance (m)	Direction	NGR	Details
Not shown	1953	NE	435420 551680	Status: Historical Licence No: 1/24/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Stonygate (magnesian Limestone) Data Type: Point Name: NORTHUMBRIAN WATER Annual Volume (m ³): - Max Daily Volume (m ³): - Original Application No: 025/24/05 Original Start Date: 9/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:
Not shown	1953	NE	435420 551680	Status: Active Licence No: 1/24/05/001 Details: Potable Water Supply - Direct Direct Source: Groundwaters Point: Borehole - Magnesian Limestone - Stonygate Data Type: Point Name: NORTHUMBRIAN WATER Annual Volume (m ³): 1463812 Max Daily Volume (m ³): 5273.5 Original Application No: 025/24/05 Original Start Date: 9/3/1966 Expiry Date: - Issue No: 100 Version Start Date: Version End Date:

6.6 Source Protection Zones

Source Protection Zones within 500m of the study site

Identified

The following Source Protection Zones records are represented on the SPZ and Potable Water Abstraction Map (6c):

ID	Distance (m)	Direction	Zone	Description
2	0	On Site	3	Total catchment
1	442	N	2	Outer catchment

6.7 Source Protection Zones within Confined Aquifer

Source Protection Zones within the Confined Aquifer within 500m of the study site

None identified

Historically, Source Protection Zone maps have been focused on regulation of activities which occur at or near the ground surface, such as prevention of point source pollution and bacterial contamination of water supplies. Sources in confined aquifers were often considered to be protected from these surface pressures due to the presence of a low permeability confining layer (e.g. glacial till, clay). The increased interest in subsurface activities such as onshore oil and gas exploration, ground source heating and cooling requires protection zones for confined sources to be marked on SPZ maps where this has not already been done.

Database searched and no data found.

6.8 Groundwater Vulnerability and Soil Leaching Potential

Environment Agency/Natural Resources Wales information on groundwater vulnerability and soil leaching potential within 500m of the study site Identified

Distance (m)	Direction	Classification	Soil Vulnerability Category	Description
0	On Site	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
0	On Site	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
163	E	Major Aquifer/High Leaching Potential	H3	Coarse textured or moderately shallow soils which readily transmit non-adsorbed pollutants and liquid discharges but have some ability to attenuate adsorbed pollutants because of their clay or organic matter content.
288	S	Minor Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.
451	E	Major Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
459	E	Minor Aquifer/Intermediate Leaching Potential	I1	Soils which can possibly transmit a wide range of pollutants.
489	N	Major Aquifer/High Leaching Potential	HU	Soil information for urban areas and restored mineral workings. These soils are therefore assumed to be highly permeable in the absence of site-specific information.

6.9 River Quality

Environment Agency/Natural Resources Wales information on river quality within 1500m of the study site None identified

6.9.1 Biological Quality:

Database searched and no data found.

Database searched and no data found.

6.10 Detailed River Network

Detailed River Network entries within 500m of the study site

Identified

The following Detailed River Network records are represented on the Hydrology Map (6e):

ID	Distance (m)	Direction	Details
1	223	NE	River Name: Houghton Burn Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined
2	385	N	River Name: - Welsh River Name: - Alternative Name: - River Type: Tertiary River Main River Status: Currently Undefined
3	385	N	River Name: - Welsh River Name: - Alternative Name: - River Type: Culvert Main River Status: Currently Undefined

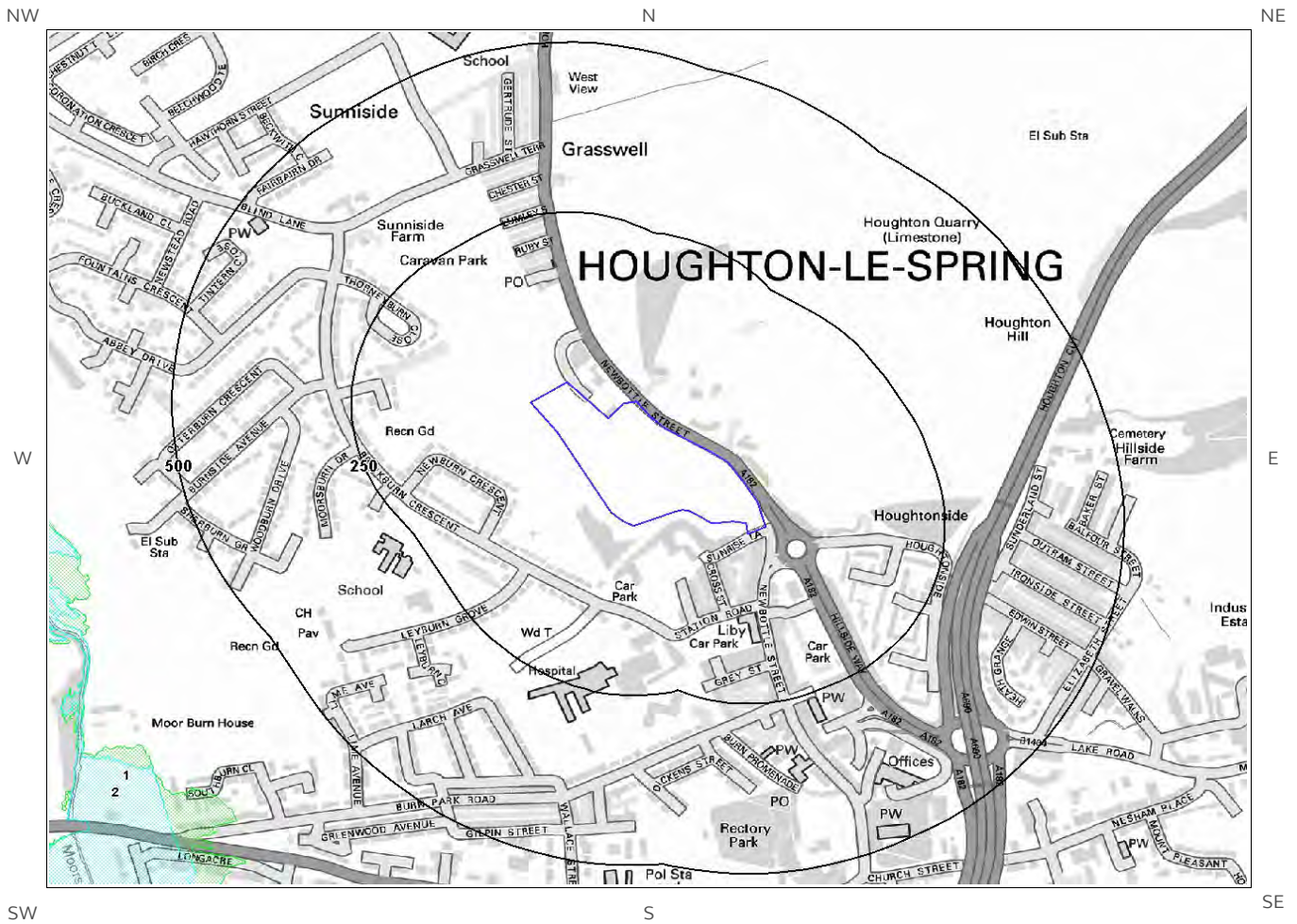
6.11 Surface Water Features

Surface water features within 250m of the study site

None identified

Database searched and no data found.

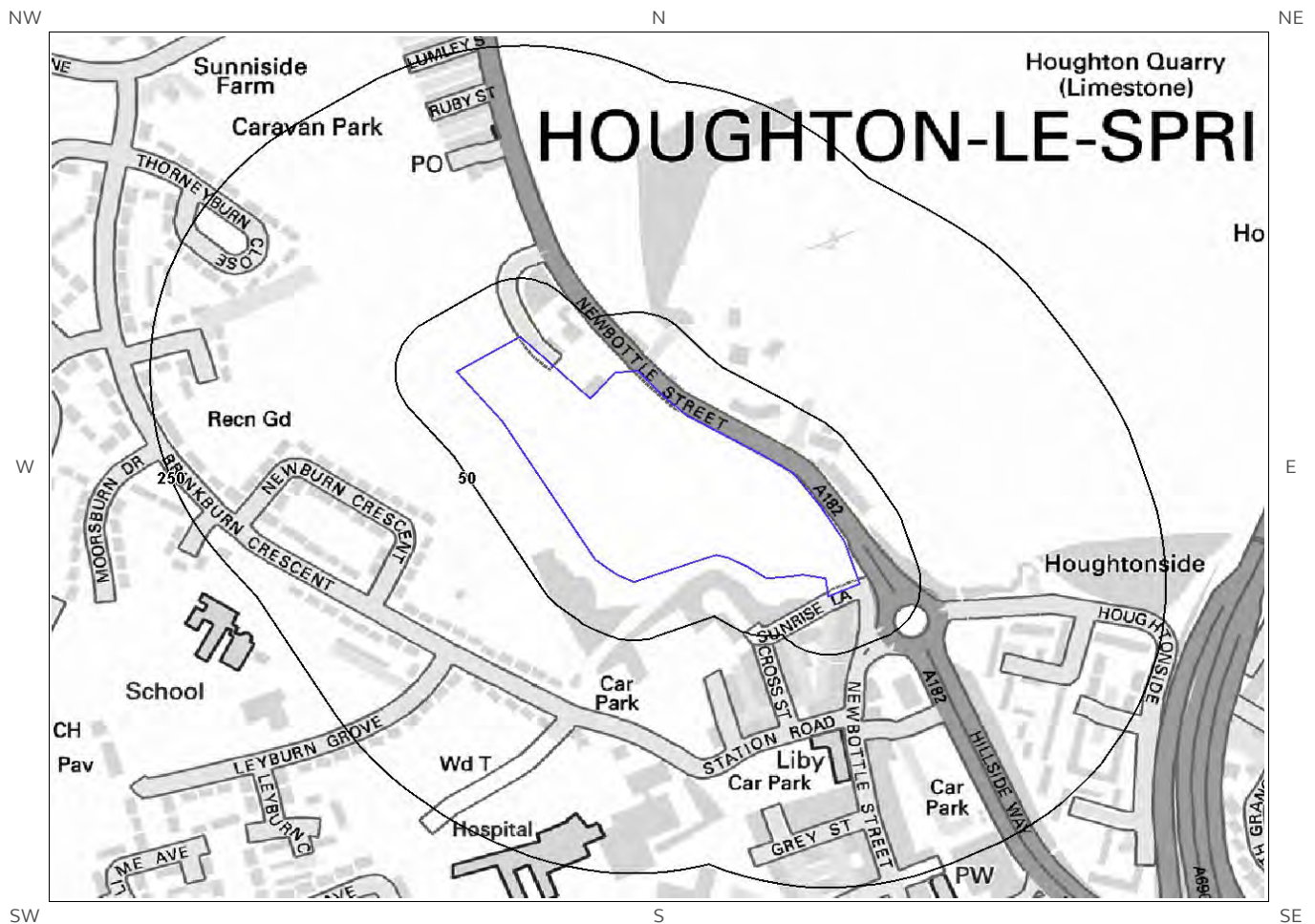
7a. Environment Agency/Natural Resources Wales Flood Map for Planning (from rivers and the sea)



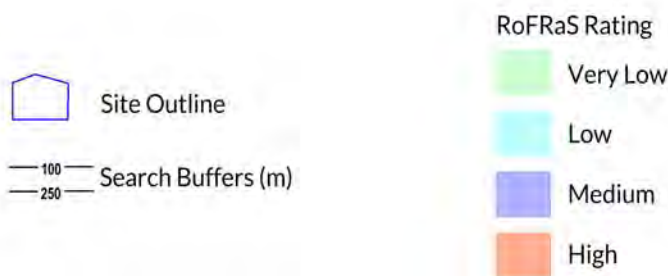
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7b. Environment Agency/Natural Resources Wales Risk of Flooding from Rivers and the Sea (RoFRaS) Map



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7 Flooding

7.1 River and Coastal Zone 2 Flooding

Environment Agency/Natural Resources Wales Zone 2 floodplain within 250m None identified

Environment Agency/Natural Resources Wales 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 7a – Flood Map for Planning:

Database searched and no data found.

7.2 River and Coastal Zone 3 Flooding

Environment Agency/Natural Resources Wales Zone 3 floodplain within 250m None identified

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 7a – Flood Map for Planning.

Database searched and no data found.

7.3 Risk of Flooding from Rivers and the Sea (RoFRaS) Flood Rating

Highest risk of flooding onsite Very Low

The Environment Agency/Natural Resources Wales RoFRaS database provides an indication of river and coastal flood risk at a national level on a 50m grid with the flood rating at the centre of the grid calculated and given above. The data considers the probability that the flood defences will overtop or breach by considering their location, type, condition and standard of protection.

RoFRaS data for the study site indicates the property is in an area with a Very Low (less than 1 in 1000) chance of flooding in any given year.

7.4 Flood Defences

Flood Defences within 250m of the study site None identified
Database searched and no data found.

7.5 Areas benefiting from Flood Defences

Areas benefiting from Flood Defences within 250m of the study site None identified

7.6 Areas benefiting from Flood Storage

Areas used for Flood Storage within 250m of the study site

None identified

7.7 Groundwater Flooding Susceptibility Areas

7.7.1 British Geological Survey groundwater flooding susceptibility areas within 50m of the boundary of the study site

Identified

Clearwater Flooding or Superficial Deposits Flooding

Superficial Deposits 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).

7.7.2 Highest susceptibility to groundwater flooding in the search area based on the underlying geological conditions

Potential at Surface

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

7.8 Groundwater Flooding Confidence Areas

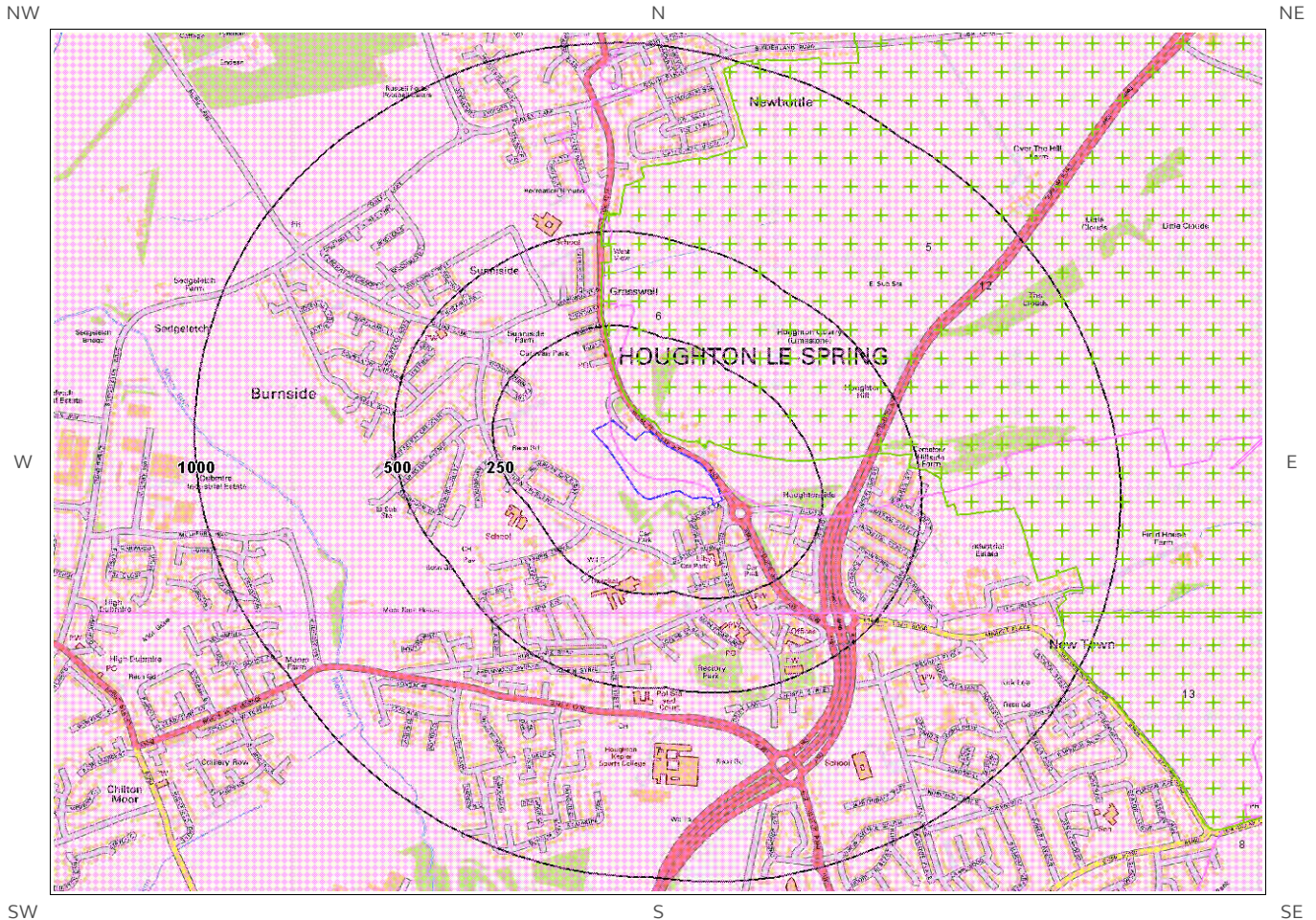
British Geological Survey confidence rating in this result

High

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.

8. Designated Environmentally Sensitive Sites Map



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8. Designated Environmentally Sensitive Sites

Presence of Designated Environmentally Sensitive Sites within 2000m of the study site

Identified

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

3

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

ID	Distance (m)	Direction	SSSI Name	Data Source
Not shown	1575	E	High Haining Hill	Natural England
Not shown	1719	S	Hetton Bogs	Natural England
Not shown	1793	SW	Joe's Pond	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

8.5 Records of Ramsar sites within 2000m of the study site:

0

Database searched and no data found.

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

3

The following records of Designated Ancient Woodland provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	Ancient Woodland Name	Data Source
Not shown	1705	SE	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1766	S	UNKNOWN	Ancient and Semi-Natural Woodland
Not shown	1874	W	UNKNOWN	Ancient and Semi-Natural Woodland

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

1

The following Local Nature Reserve (LNR) records provided by Natural England/Natural Resources Wales are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	LNR Name	Data Source
Not shown	1708	S	Hetton Bogs	Natural England

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

0

Database searched and no data found.

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

4

The following Nitrate Vulnerable Zone records produced by DEFRA are represented as polygons on the Designated Environmentally Sensitive Sites Map:

ID	Distance (m)	Direction	NVZ Name	Data Source
5	0	On Site	Existing	DEFRA
6	0	On Site	Existing	DEFRA
7	288	S	Existing	DEFRA
8	1483	SE	Existing	DEFRA

8.14 Records of Green Belt land within 2000m of the study site:

3

Green Belt data contains Ordnance Survey data © Crown copyright and database right [2015].

ID	Distance	Direction	Green Belt Name	Local Authority Name
12	18	NE	North East Greenbelt	Sunderland District (B)
13	895	E	North East Greenbelt	Sunderland District (B)
Not shown	1928	W	North East Greenbelt	Durham UA

9. Natural Hazards Findings

9.1 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 Geo Insight**, available from our [website](#). The following information has been found:

9.1.1 Shrink Swell

Maximum Shrink-Swell** hazard rating identified on the study site Low

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

Hazard
Ground conditions predominantly medium plasticity. Do not plant trees with high soil moisture demands near to buildings. For new build, consideration should be given to advice published by the National House Building Council (NHBC) and the Building Research Establishment (BRE). There is a possible increase in construction cost to reduce potential shrink-swell problems. For existing property, there is a possible increase in insurance risk, especially during droughts or where vegetation with high moisture demands is present.

9.1.2 Landslides

Maximum Landslide* hazard rating identified on the study site Moderate

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

Hazard
Significant potential for slope instability with relatively small changes in ground conditions. Avoid large amounts of water entering the ground through pipe leakage or soak-aways. Do not undercut or place large amounts of material on slopes without technical advice. For new build consider the potential and consequences of ground movement during excavations, or consequence of changes to loading or drainage. For existing property probable increase in insurance risk is likely due to potential natural slope instability after changes to ground conditions such as a very long, excessively wet winter.

9.1.3 Soluble Rocks

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.

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

9.1.4 Compressible Ground

Maximum Compressible Ground* hazard rating identified on the study site

Moderate

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

Hazard

Significant potential for compressibility problems. Avoid large differential loadings of ground. Do not drain or de-water ground near the property without technical advice. For new build consider possibility of compressible ground in ground investigation, construction and building design. Consider effects of groundwater changes. Extra construction costs are likely. For existing property possible increase in insurance risk from compressibility, especially if water conditions or loading of the ground change significantly.

9.1.5 Collapsible Rocks

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.

9.1.6 Running Sand

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.

9.2 Radon

9.2.1 Radon Affected Areas

Radon Affected Area assessment: The site is in a Radon Affected Area, as between 1 and 3% of properties are above the Action Level.

The radon data in this report is supplied by the BGS/Public Health England and is the definitive map of Radon Affected Areas in Great Britain and Northern Ireland. The dataset was created using long-term radon measurements in over 479,000 homes across Great Britain and 23,000 homes across Northern Ireland, combined with geological data. The dataset is considered accurate to 50m to allow for the margin of error in geological lines, and the findings of this report supercede any answer given in the less accurate Indicative Atlas of Radon in Great Britain, which simplifies the data to give the highest risk within any given 1km grid square. As such, the radon atlas is considered indicative, whereas the data given in this report is considered definitive.

9.2.2 Radon Protection

Radon protection measures requirements for new properties or extensions to existing ones as described in publication BR211 by the Building Research Establishment: No radon protective measures are necessary.

10. Mining

10.1 Coal Mining

Coal mining areas within 75m of the study site

Identified

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

Distance (m)	Direction	Details
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.

10.2 Non-Coal Mining

Non-Coal Mining areas within 50m of the study site boundary

None identified

Database searched and no data found.

10.3 Brine Affected Areas

Brine affected areas within 75m of the study site

None identified

Guidance: No Guidance Required.

Contact Details

CENTREMAPS

Telephone: 01886 832972
Groundsure@centremaps.co.uk
Open Space, Upper Interfields, Malvern, Worcester, WR14 1UT



British Geological Survey Enquiries

Kingsley Dunham Centre
Keyworth, Nottingham NG12 5GG
Tel: 0115 936 3143.
Fax: 0115 936 3276.
Email:

Web: www.bgs.ac.uk

BGS Geological Hazards Reports and general geological enquiries:
enquiries@bgs.ac.uk



Environment Agency
National Customer Contact Centre, PO Box 544
Rotherham, S60 1BY
Tel: 03708 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
www.gov.uk/phe
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: Sunderland City Council
Phone: 0191 520 5555
Web: <http://www.sunderland.gov.uk/>
Address: City Centre Customer Service Centre, 31-32 Fawcett Street,

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





Groundsure

LOCATION INTELLIGENCE



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, Natural England who retain the Copyright and Intellectual Property Rights for the data.

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<https://www.groundsure.com/terms-and-conditions-march-2018>

Houghton Colliery landfill site(s)

Wallace, Gary <gary.wallace@environment-agency.gov.uk>

Wed 9/23/2020 3:11 PM

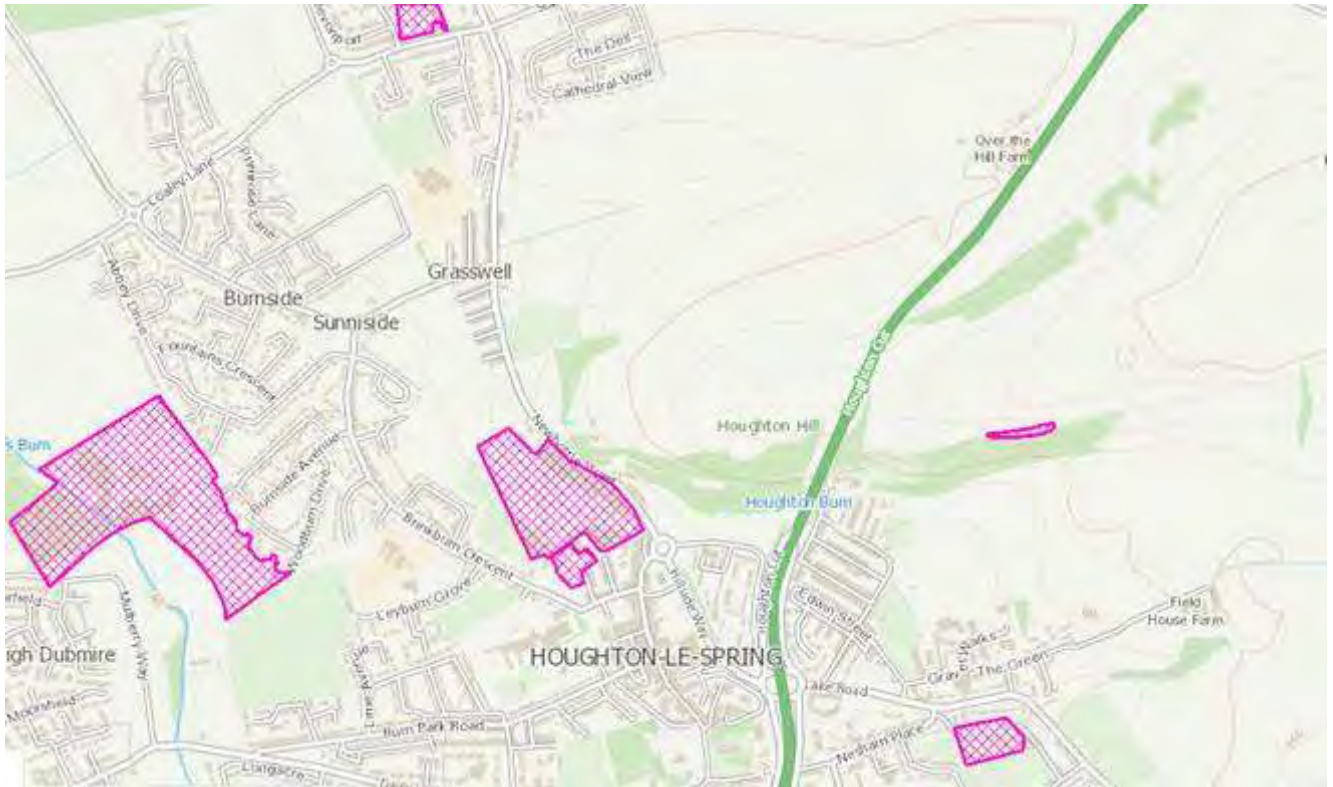
To: Laura Jackson <LauraJ@shadboltgroup.net>

📎 1 attachments (3 MB)

Houghton colliery landfill site information.zip;

Hello Laura,

I have looked into your request concerning three historic landfills sites off Newbottle Street, Houghton-le-Spring. From viewing our database it would seem that these three sites may well be the same landfill site, possibly with different licence numbers over the years. Our database indicates one site, known as Houghton Colliery site, and operating between 1995 and 1999 (screenshot below). I notice the three sites you mention all have the same 1995 – 1999 operational dates which again leads me to think it is all one site. The site we have records for exists as EAWML 67597 or TW 452 SL. The reference MP3393NL was given to the site upon acceptance of the surrender application. The site operator were the City of Sunderland, Building Services.



I've attached a folder which contains:

- Summary of inspection reports (collated by year)
- Landfill licence
- Licence surrender notice

I'd advise having a look through the attached initially. If you then have any further queries please get back in touch.

Many Thanks

Gary Wallace BSc PgD MCIWM PER | Team Leader – Waste East
Environment Agency

📞 direct 0203 025 5309

✉️ gary.wallace@environment-agency.gov.uk

✉ Tyneside House | Skinnerburn Road | Newcastle Business Park | Newcastle-upon-Tyne | NE4 7AR

North East Area

National Customer Contact Centre - 03708 506 506



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INTERNAL



FORM

INSPECTION FORM COVER SHEET

Site Reference: EAWML67597

Other ID: TW452SL

Site Name: HOUGHTON COLLIERY SITE

Year: 1995

5

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER											TW 452 SL HOUGHTON COLLIERY SITE TIME ON SITE 11:20 DATE 7:12:95							OPEN CLOSED										
FINE																												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY										
HIGHWAY	WHEEL CLEANER ACCESS & EX-	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME					
/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	✓	/	/	✓	/	✓				
Details of action which has been taken or further action required:-																												
SITE CLOSED FOR 2 DAYS WHILST ACCESS ROAD IS BEING TARMACKED.																												
LOADS DIVERTED TO WARDON LANE																												
COPY RECEIVED BY											PHOTOS P/TW							INCLUSIVE										
ON BEHALF OF											SAMPLES S/TW							INCLUSIVE										
TIME DATE SIGNED											TIME OFF							TIME		DATE		SIGNED						
: : :											12:00							:		7:12:95		[Signature]						

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER FINE											TW 452 SL HOUGHTON COLLEORY SITE TIME ON SITE 2:45 DATE 30:11:95						OPEN CLOSED-						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY					
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓																							
	✓																						
Details of action which has been taken or further action required:-																		R					
① MUD ON HIGHWAY TOWARDS NEWBOTTLE FROM SITE ENTRANCE TO BE CLEARED.																							
② NOTE - ACCESS ROAD FROM WHEEL CLEANER IS TO BE TARMACKED.																							
COPY RECEIVED BY <i>[Signature]</i>											PHOTOS P/TW INCLUSIVE												
ON BEHALF OF											SAMPLES S/TW INCLUSIVE												
TIME DATE SIGNED											TIME OFF TIME DATE SIGNED												
: : :											3:30 : 30 11:95 <i>[Signature]</i>												

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER											TW 4523L HOUGHTON COLLIERY SITE							OPEN CLOSED						
LIGHT RAIN											TIME ON SITE 2:40							DATE 20: 11:95						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EC.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FENCES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
✓	✓	✓																				✓		
																	✓						✓	
Details of action which has been taken or further action required:-																								
① MUD STARTING TO BE DEPOSITED ON HIGHWAY - THIS REQUIRES CLEANING																								
② ACCESS ROAD COVERED IN MUD AND REQUIRES CLEANING. WHEEL CLEANER AT PRESENT INEFFECTIVE AS VEHICLES ARE CROSSING TOO SLOWLY TO SHAKE MUD FROM TYRES. WATER SUPPLY REQUIRES CONNECTING.																								
③ FENCING TO BE COMPLETED IN ACCORDANCE WITH LICENSING PLAN (REVISED).																								
④ WARNING NOTICES TO BE LOCATED AROUND PERIMETER OF SITE																								
COPY RECEIVED BY											PHOTOS P/TW INCLUSIVE													
ON BEHALF OF											SAMPLES S/TW INCLUSIVE													
TIME DATE SIGNED											TIME OFF TIME DATE SIGNED													
: : :											3:30 : : 20: 11: 95 F.L.H.													



INTERNAL



FORM

INSPECTION FORM COVER SHEET

Site Reference: EAWML67597

Other ID: TW452SL

Site Name: HOUGHTON COLLIERY SITE

Year: 1996

33

Environmental Protection Act 1990
Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT AGENCY

Site: TW 452 SL HOUGHTON COLLIERY	Time on Site: 1225 Date: 17-10-96.	Weather: SUNNY/CALM.
--------------------------------------	---------------------------------------	----------------------

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A		Availability of Cover	Y/N
	Access Road	A		Usage of Cover	
	Site Roads	-	+	Litter Outside the Site	
NA	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
3:3	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
3:3.	THE FENCE ALONG THE WESTERN BOUNDARY REQUIRES REPAIR.
	+ THERE IS STILL LITTER/RUBBISH TO BE CLEANED FROM THE MAIN ENTRANCE GATE OF THE SITE.
	+ SITE CLOSED AT TIME OF INSPECTION.

Acknowledged Receipt of Inspection Report		Signed:	Time Off: 1265
Signed: POST	Date:		Date: 17.10.96
Printed:	Time:	Samples: No	Photos: No
			Time: -

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form



ENVIRONMENT AGENCY

Site: TW 452 SL HOUGHTON COLLIERY		Time on Site: 1105		Weather: RAINING	
		Date: 9-10-96			
Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	-
	Site Roads	A	*	Litter Outside the Site	C
NA	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	(Y/N)		Litter Catchment	(Y/N)
	Technically Competent Manager	(Y/N)	NA	Litter Collection	Y/N
NA	Site Staffing	Y/N		Fires on Site	(Y/N)
3:3	Gates; Fencing	Y/N		Noise	(Y/N)
NA	Site Control Office	Y/N		Dust	(Y/N)
NA	Oil/Fuel Storage	Y/N		Odours	A
NA	Waste Reception Procedures	Y/N		Insects	A
NI	Duty of Care Records	Y/N		Birds	A
NI	Waste Records	Y/N		Vermin	(Y/N)
NA	Site Diary	Y/N		Surface Water Controls	(Y/N)
NA	Site Machinery	Y/N	NA	Leachate Control	Y/N
NA	Working Face	Y/N	NA	Landfill Gas Control	Y/N
NA	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
NA	Checking of Load at Disposal Point	Y/N			
Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor N/I Not Inspected Y - Condition complied with; N - Contravention					
Condition Number(s)		Description of Contravention, Action Required and Other Comments			
3:3		THE FENCE ALONG THE WESTERN BOUNDARY IS DAMAGED IN SEVERAL PLACES & REQUIRES REPAIR.			
NOTE:-		* THERE ARE STILL SEVERAL PLASTIC BAGS OF SEVERAL HOUSEHOLD WASTE FLY TIPPED NEAR THE MAIN GATES OF THE SITE.			
Acknowledged Receipt of Inspection-Report			Signed:		
Signed: POST	Date:		Time Off: 1120		
Printed:	Time:	Samples: NO	Photos: NO		
				Date: 9-10-96	
				Time: -	

Environmental Protection Act 1990
Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW4525L HOUGHTON COLLIERY	Time on Site: 1040 Date: 4-10-96	Weather: CLOUDY/RAINING
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	✓	*	Litter Outside the Site	
NA	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N	NA	Litter Collection	Y/N
NA	Site Staffing	Y/N		Fires on Site	Y/N
3:3	Gates; Fencing	Y(N)		Noise	Y/N
NA	Site Control Office	Y/N		Dust	Y/N
NA	Oil/Fuel Storage	Y/N		Odours	^
NA	Waste Reception Procedures	Y/N		Insects	^
NA	Duty of Care Records	Y/N		Birds	A
NA	Waste Records	Y/N		Vermin	Y/N
1	Site Diary	Y/N		Surface Water Controls	Y/N
1	Site Machinery	Y/N	NA	Leachate Control	Y/N
1	Working Face	Y/N	NA	Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
✓	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
3:3	THE FENCE ALONG THE WESTERN BOUNDARY IS DAMAGED IN SEVERAL PLACES AND REQUIRES REPAIR.
	* SEVERAL BAGS OF GENERAL HOUSEHOLD WASTE HAVE BEEN FLYTIPPED ON THE GRASSY AREA OUTSIDE OF THE SITE OPPOSITE THE MAIN ENTRANCE GATES.

Acknowledged Receipt of Inspection Report		Signed:	Time Off: 1055
Signed: POST	Date:		Date: 4-10-96
Printed:	Time:	Samples: NO	Photos: NO
		Time: -	

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW452SL HOUGHTON COLLIERY.	Time on Site: 15:30. Date: 18.9.06.	Weather: FINE.
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
NA	Technically Competent Manager	Y/N		Litter Collection	Y/N
NA	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	Y/N		Noise	Y/N
NA	Site Control Office	Y/N		Dust	Y/N
NA	Oil/Fuel Storage	Y/N		Odours	A
NA	Waste Reception Procedures	Y/N		Insects	A
NA	Duty of Care Records	Y/N		Birds	A
NA	Waste Records	Y/N		Vermin	Y/N
NA	Site Diary	Y/N		Surface Water Controls	Y/N
NA	Site Machinery	Y/N		Leachate Control	Y/N
NA	Working Face	Y/N		Landfill Gas Control	Y/N
NA	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
NA	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	NO ACTIVITY ON SITE AT TIME OF INSPECTION.
	SITE CLOSED AND GATES LOCKED.
3.3	- THE FENCING ON THE WESTERN BOUNDARY IS DAMAGED IN A NUMBER OF PLACES AND REQUIRES REPAIR.
	NOTE: - SEVERAL LOADS OF TOPSOIL HAVE BEEN DEPOSITED ON THE AREA VACATED BY THE SITE CABIN.
	TOM JOHNSON OF SCBS CONTACTED THE AGENCY TO EXPLAIN THAT THE ABOVE MENTIONED TOPSOIL IS TO BE USED FOR RESTORATION. HE ALSO INDICATED THAT THE SITE IS TO BE COMPLETED IN THE NEAR FUTURE.

Acknowledged Receipt of Inspection Report		Signed: <i>S. Johnson</i>	Time Off: 15:50
Signed: <i>POST.</i>	Date:		Date:
Printed:	Time:	Samples: —	Photos: —
			Time:

Environmental Protection Act 1990
Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW452SL HOUGHTON COLLIERY/		Time on Site: 9:30	Weather: FAIR		
		Date: 12.9.96			
Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
NA	Technically Competent Manager	Y/N	NA	Litter Collection	Y/N
NA	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	Y/N		Noise	Y/N
NA	Site Control Office	Y/N		Dust	Y/N
NA	Oil/Fuel Storage	Y/N		Odours	A
NA	Waste Reception Procedures	Y/N		Insects	A
NA	Duty of Care Records	Y/N		Birds	A
NA	Waste Records	Y/N		Vermin	Y/N
NA	Site Diary	Y/N		Surface Water Controls	Y/N
NA	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
NA	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	NO ACTIVITY ON SITE AT TIME OF INSPECTION. SITE CLOSED AND GATES LOCKED.
3.3	- THE FENCING ON THE WESTERN BOUNDARY IS DAMAGED IN A NUMBER OF PLACES AND REQUIRES REPAIR.

Acknowledged Receipt of Inspection Report		Signed: <i>[Signature]</i>	Time Off: 9:55
Signed: POST	Date:		Date:
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



ENVIRONMENT AGENCY

Site: TW 452SL HOUGHTON COLLIERY	Time on Site: 16:35 Date: 4.9.96	Weather: DULL.
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	SITE CLOSED & GATES LOCKED. NO OPERATION ON SITE AT TIME OF INSPECTION. THE SITE IS APPROXIMATELY 90% COMPLETE.

Acknowledged Receipt of Inspection Report		Signed: S. Johnston		Time Off: 17:00	
Signed: POST.	Date:			Date:	
Printed:	Time:	Samples:	Photos:	Time:	

Environmental Protection Act 1990
 Waste Management Licensing
 Landfill Site Inspection Form



ENVIRONMENT
 AGENCY

Site: TW 452SL HOUGHTON COLLIERY	Time on Site: 15.45 Date: 20.8.96	Weather: FINE
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
NA	Oil/Fuel Storage	Y/N		Odours	A
	Waste Reception Procedures	Y/N		Insects	A
	Duty of Care Records	Y/N		Birds	A
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
3.3	- THE FENCING ON THE WESTERN BOUNDARY IS DAMAGED AND REQUIRES REPAIR.
	NOTE: THE SITE HAS COMMENCED OPERATION AGAIN BUT ONLY FOR APPROXIMATELY 2 WEEKS.

Acknowledged Receipt of Inspection Report		Signed: <i>S. Schmidt</i>	Time Off: 16:30
Signed: Post.	Date:		Date:
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990
Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW452SL HOUGHTON COLLIERY	Time on Site: 16:00 Date: 14.8.96	Weather: HOT & SUNNY
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	X/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	A
NA	Waste Reception Procedures	Y/N		Insects	A
NI	Duty of Care Records	Y/N		Birds	A
NI	Waste Records	Y/N		Vermin	Y/N
NI	Site Diary	Y/N		Surface Water Controls	Y/N
NA	Site Machinery	Y/N		Leachate Control	Y/N
4.11	Working Face	X/N		Landfill Gas Control	Y/N
2.1	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
NA	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	A SIGN HAS BEEN ERECTED WHICH STATES THAT THE SITE IS CLOSED.
3.3	THE FENCING ON THE SW BOUNDARY IS DAMAGED AND REQUIRES REPAIR.
4.11	- A NUMBER OF INERT LOADS ARE LYING AROUND THE SITE. THESE LOADS SHOULD BE COMPACTED AND FORMED INTO LAYERS.
2.1	- TWO SKIPS CONTAINING SEGREGATED GENERAL WASTES REQUIRE REMOVING FROM SITE.

Acknowledged Receipt of Inspection Report		Signed: S. Johnson	Time Off: 16:30
Signed: POST.	Date:		Date:
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW 452SL HOUGHTON COLLIERY.	Time on Site: 8:40 Date: 8.8.06	Weather: DULL.
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Condition No. NLC or NI	Inspected Item	Compliance Assessment	Condition No. NLC or NI	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	A
NA	Waste Reception Procedures	Y/N		Insects	A
NI	Duty of Care Records	Y/N		Birds	A
NI	Waste Records	Y/N		Vermin	Y/N
NI	Site Diary	Y/N		Surface Water Controls	Y/N
NA	Site Machinery	Y/N		Leachate Control	Y/N
4.11	Working Face	Y/N		Landfill Gas Control	Y/N
2.1	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
NA	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 NI Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	SITE CLOSED & GATES LOCKED.
3.3	- THE FENCING ON THE SW BOUNDARY IS DAMAGED AND REQUIRES REPAIR.
4.11	- A NUMBER OF INERT LOADS ARE LYING AROUND THE SITE. THESE LOADS SHOULD BE COMPACTED AND FORMED INTO LAYERS.
2.1	- TWO SKIPS CONTAINING SEGREGATED GENERAL WASTES REQUIRE REMOVING FROM THE SITE. LITTER AND DEBRIS LYING AROUND THIS SKIP SHOULD ALSO BE CLEARED.

Acknowledged Receipt of Inspection Report		Signed: S. Johnson	Time Off: 9:15
Signed: POST.	Date:		Date:
Printed:	Time:	Samples:	Photos: Time:

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW452SL HOUGHTON COLLIERY	Time on Site: 15:45	Weather:
	Date: 31.7.96	FINE.

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	A
	Waste Reception Procedures	Y/N		Insects	A
	Duty of Care Records	Y/N		Birds	A
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
3.3	- THE FENCING ON THE WESTERN BOUNDARY OF THE SITE IS DAMAGED AND REQUIRES REPAIR.

Acknowledged Receipt of Inspection Report		Signed: S. Johnson	Time Off: 16:10
Signed: I. Scott	Date:		Date:
Printed: I. Scott	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW452 SL HOUGHTON COLLIERY	Time on Site: 8.05 Date: 26.7.96	Weather: DULL, FINE.
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Availability of Cover	Y/N
	Access Road	A	NA	Usage of Cover	
	Site Roads	A		Litter Outside the Site	A
	Wheelcleaner	Y/N		Litter Within the Site	A
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
3.3	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N	5.5	Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	A
	Waste Reception Procedures	Y/N		Insects	A
	Duty of Care Records	Y/N		Birds	A
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
NA	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
3.3	- THE FENCING ON THE WESTERN BOUNDARY OF THE SITE IS DAMAGED AND REQUIRES REPAIR.
5.5	- DUST SUPPRESSION METHODS ARE REQUIRED ON THE ACCESS AND SITE ROADS.

Acknowledged Receipt of Inspection Report		Signed: <i>S. Johnson</i>	Time Off: 8.50
Signed: <i>I. Scott</i>	Date: _____		Date: _____
Printed: I. SCOTT	Time: _____	Samples: _____	Photos: _____

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW452 SL <i>Moughston Colliery</i>	Time on Site: 13-10 Date: 5/7/96	Weather: <i>Fine</i>
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Condition No. N/A or N/I	Inspected Item	Compliance Assessment	Condition No. N/A or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Special/Restricted Waste Procedure	Y/N
	Access Road	B		Checking of Load at Disposal Point	Y/N
	Site Roads	B	NA	Availability of Cover	Y/N
	Wheelcleaner	Y/N	NA	Usage of Cover	
	Notice Board	Y/N	*	Litter Outside the Site	A
	Technically Competent Manager	Y/N		Litter Within the Site	A
	Site Staffing	Y/N		Litter Catchment	Y/N
3-3	Gates; Fencing	Y/N		Litter Collection	Y/N
	Site Control Office	Y/N		Fires on Site	Y/N
	Oil/Fuel Storage	Y/N		Dust	Y/N
	Waste Reception Procedures	Y/N		Odours	Y/N
NI	Duty of Care Records	Y/N		Insects	A
	Waste Records	Y/N		Birds	A
NI	Site Diary	Y/N		Vermin	Y/N
	Site Machinery	Y/N		Surface Water Controls	Y/N
	Working Face	Y/N		Leachate Control	Y/N
	Types of Waste	Y/N			

Key: N/A Not Applicable A - Good; B - Satisfactory; C - Fair; D - Poor
N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention and Action Required
3-3	The perimeter fencing has been damaged in a number of places. Condition 3-3 requires that fencing be maintained in good repair.
Note:	
*	There is rubbish in the field adjacent to the site and outside the gates. This does not appear to have originated from the site. The environmental health department are due to clear the rubbish.

Acknowledged Receipt of Inspection Report		Signed: <i>[Signature]</i>	Time Off: 13-50
Signed: <i>[Signature]</i>	Date:		Date: 5/7/96
Printed:	Time:	Samples: <input checked="" type="checkbox"/>	Photos: <input checked="" type="checkbox"/>
			Time:

Environmental Protection Act 1990
 Waste Management Licensing
 Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW452SL HOUGHTON COLLIERY	Time on Site: 14:30 Date: 11.6.96	Weather: DULL
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Condition No. N/A or N/I	Inspected Item	Compliance Assessment	Condition No. N/A or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Special/Restricted Waste Procedure	Y/N
	Access Road	A		Checking of Load at Disposal Point	Y/N
	Site Roads	A		Availability of Cover	Y/N
	Wheelcleaner	Y/N		Usage of Cover	A
	Notice Board	Y/N		Litter Outside the Site	A
	Technically Competent Manager	Y/N		Litter Within the Site	A
	Site Staffing	Y/N		Litter Catchment	Y/N
	Gates; Fencing	Y/N		Litter Collection	Y/N
	Site Control Office	Y/N		Fires on Site	Y/N
	Oil/Fuel Storage	Y/N		Dust	Y/N
	Waste Reception Procedures	Y/N		Odours	Y/N
	Duty of Care Records	Y/N		Insects	A
	Waste Records	Y/N		Birds	A
	Site Diary	Y/N		Vermin	Y/N
	Site Machinery	Y/N		Surface Water Controls	Y/N
	Working Face	Y/N		Leachate Control	Y/N
	Types of Waste	Y/N			

Key: N/A Not Applicable A - Good; B - Satisfactory; C - Fair; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention and Action Required
	SITE OPERATION IN COMPLIANCE WITH LICENCE CONDITIONS

Acknowledged Receipt of Inspection Report		Signed: S. Johnson	Time Off: 16:55
Signed: [Signature]	Date: 11-6-96		Date:
Printed: [Signature]	Time: 4:30	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW 452 SL HOUGHTON COLLIERY	Time on Site: 8:10 Date: 7-6-96	Weather: FINE & SUNNY, HOT
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Condition No. N/A or N/I	Inspected Item	Compliance Assessment	Condition No. N/A or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Special/Restricted Waste Procedure	Y/N
	Access Road	A		Checking of Load at Disposal Point	Y/N
	Site Roads	A		Availability of Cover	Y/N
	Wheelcleaner	Y/N	NA	Usage of Cover	
	Notice Board	Y/N		Litter Outside the Site	A
	Technically Competent Manager	Y/N		Litter Within the Site	A
	Site Staffing	Y/N		Litter Catchment	Y/N
	Gates; Fencing	Y/N		Litter Collection	Y/N
	Site Control Office	Y/N		Fires on Site	Y/N
	Oil/Fuel Storage	Y/N		Dust	Y/N
	Waste Reception Procedures	Y/N		Odours	Y/N
	Duty of Care Records	Y/N		Insects	A
	Waste Records	Y/N		Birds	A
	Site Diary	Y/N		Vermin	Y/N
	Site Machinery	Y/N		Surface Water Controls	Y/N
	Working Face	Y/N		Leachate Control	Y/N
	Types of Waste	Y/N			

Key: N/A Not Applicable A - Good; B - Satisfactory; C - Fair; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention and Action Required
	SITE OPERATION IN COMPLIANCE WITH LICENCE CONDITIONS.

Acknowledged Receipt of Inspection Report		Signed: <i>S. Johnson</i>	Time Off: 8:45.
Signed: <i>[Signature]</i>	Date: 7-6-96		Date:
Printed: BRONALIC	Time: 8-50	Samples:	Photos:
			Time:

Environmental Protection Act 1990
Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW452SL HOUGHTON COLLIERY		Time on Site: 15:45		Weather: DULL.	
		Date: 29.5.96			

Condition No. N/A or N/I	Inspected Item	Compliance Assessment	Condition No. N/A or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Special/Restricted Waste Procedure	Y/N
	Access Road	A		Checking of Load at Disposal Point	Y/N
	Site Roads	A		Availability of Cover	Y/N
	Wheelcleaner	Y/N		Usage of Cover	A
	Notice Board	Y/N		Litter Outside the Site	A
	Technically Competent Manager	Y/N		Litter Within the Site	A
	Site Staffing	Y/N		Litter Catchment	Y/N
3.3	Gates; Fencing	X/N		Litter Collection	Y/N
	Site Control Office	Y/N		Fires on Site	Y/N
	Oil/Fuel Storage	Y/N		Dust	Y/N
	Waste Reception Procedures	Y/N		Odours	Y/N
	Duty of Care Records	Y/N		Insects	A
	Waste Records	Y/N		Birds	A
	Site Diary	Y/N		Vermin	Y/N
	Site Machinery	Y/N		Surface Water Controls	Y/N
	Working Face	Y/N		Leachate Control	Y/N
	Types of Waste	Y/N			

Key: N/A Not Applicable A - Good; B - Satisfactory; C - Fair; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention and Action Required
3.3	- THE FENCING ON THE NW BOUNDARY IS DAMAGED AND REQUIRES REPAIR.

Acknowledged Receipt of Inspection Report		Signed: <i>S. Johnson</i>		Time Off: 16:05	
Signed:		Date:		Date:	
Printed:		Time:		Samples: Photos: Time:	

Environmental Protection Act 1990
Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW452SL HOUGHTON COLLERY	Time on Site: 16:00 Date: 1.5.96	Weather: WET.
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Condition No. N/A or N/I	Inspected Item	Compliance Assessment	Condition No. N/A or N/I	Inspected Item	Compliance Assessment
	Public Highway	A	NA	Special/Restricted Waste Procedure	Y/N
	Access Road	A		Checking of Load at Disposal Point	Y/N
	Site Roads	A	NA	Availability of Cover	Y/N
	Wheelcleaner	Y/N	NA	Usage of Cover	
	Notice Board	Y/N		Litter Outside the Site	A
	Technically Competent Manager	Y/N		Litter Within the Site	A
	Site Staffing	Y/N		Litter Catchment	Y/N
3.3	Gates; Fencing	X/N		Litter Collection	Y/N
	Site Control Office	Y/N		Fires on Site	Y/N
	Oil/Fuel Storage	Y/N		Dust	Y/N
	Waste Reception Procedures	Y/N		Odours	Y/N
	Duty of Care Records	Y/N		Insects	A
	Waste Records	Y/N		Birds	A
	Site Diary	Y/N		Vermin	Y/N
	Site Machinery	Y/N		Surface Water Controls	Y/N
	Working Face	Y/N		Leachate Control	Y/N
	Types of Waste	Y/N			

Key: N/A Not Applicable A - Good; B - Satisfactory; C - Fair; D - Poor
N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention and Action Required
3.3	FIFTY PER CENT OF THE FENCING ON THE WESTERN BOUNDARY IS MISSING. THIS SECTION OF FENCING SHOULD BE RELETED.

Acknowledged Receipt of Inspection Report		Signed: S. Johnson	Time Off: 16:30
Signed: [Signature]	Date: 1-5-96		Date:
Printed: R. DONALD	Time: 4-35	Samples:	Photos: Time:

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER FAIR											TW452SL HOUGHTON COLLIERY							OPEN 0508ED						
											TIME ON SITE 15:00. DATE 24.4.96													
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						✓		✓									✓				✓		✓	
																							✓	

Details of action which has been taken or further action required:-

9) AN APPROPRIATE MACHINE IS REQUIRED ON SITE IN ORDER TO COMPLY WITH LICENCE CONDITION NO. 4.7.

18) THE FENCING ON THE WESTERN BOUNDARY IS EITHER VANDALISED OR MISSING. LICENCE CONDITION NO. 3.3 REQUIRES THE SITE FENCING TO BE ERECTED AND THAT ALL REASONABLE PRECAUTIONS SHOULD BE TAKEN TO PREVENT UNAUTHORISED ACCESS TO THE SITE.

9) A FEW HUNDRED LAMPPOSTS HAVE BEEN DEPOSITED ON SITE. CONDITION 4.11 REQUIRES THESE LAMPPOSTS TO BE INCORPORATED INTO THE WORKING FACE.

7) TWO DOZEN GREEN NET BAGS CONTAINING GULLY/SWEEPING TYPE WASTE HAVE BEEN DEPOSITED ON SITE. CONDITION 2.1 PERMITS ONLY INERT WASTES TO BE DEPOSITED AT THE SITE THEREFORE THESE WASTES SHOULD BE REMOVED FROM SITE.

COPY RECEIVED BY <i>[Signature]</i>			PHOTOS P/TW / / INCLUSIVE		
ON BEHALF OF I. Scott Soss.			SAMPLES S/TW / / INCLUSIVE		
TIME	DATE	SIGNED	TIME OFF	TIME	DATE
:	:	:	15:30	:	:
					<i>[Signature]</i>

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER FINE											TW 452 SL HOUGHTON COLLIERY						OPEN CEGSED							
											TIME ON SITE 13:43		DATE 19: 4: 96											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
								✓									✓				✓			
																								✓
Details of action which has been taken or further action required:-																								
9) A FEW HUNDRED LAMPPOSTS HAVE BEEN DEPOSITED ON SITE. CONDITION 4.11 OF THE LICENCE REQUIRES THESE LAMPPOSTS TO BE INCORPORATED INTO THE WORKING FACE.																								
18) APPROXIMATELY ONE THIRD OF THE WESTERN BOUNDARY PERIMETER FENCING HAS BEEN ERECTED. THE REMAINING TWO THIRDS SHOULD BE ERECTED AS SOON AS POSSIBLE IN ORDER TO COMPLY WITH LICENCE CONDITION NO. 33.																								
COPY RECEIVED BY											PHOTOS P/TW												INCLUSIVE	
ON BEHALF OF											SAMPLES S/TW												INCLUSIVE	
TIME DATE SIGNED											TIME OFF			TIME			DATE			SIGNED				
: : :											14:15			:			:			S. Johnson				

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER Overcast. Strong Westerly											TW452SL Houghton Colliery						OPEN CLOSED							
											TIME ON SITE 10:50		DATE 12:4 '96											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HANDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Details of action which has been taken or further action required:-

18) THE FENCING ON THE EASTERN BOUNDARY HAS BEEN COMPLETELY REMOVED. CONDITION 33 OF THE LICENCE REQUIRES THIS FENCE TO BE RE-ERECTED.

9) A FEW HUNDRED LAMPOSTS HAVE BEEN DEPOSITED ON SITE WITHOUT BEING INCORPORATED INTO THE WORKING FACE. CONDITION 4.11 OF THE LICENCE REQUIRES WASTE TO BE INCORPORATED INTO THE WORKING FACE AS SOON AS POSSIBLE AFTER DEPOSIT.

COPY RECEIVED BY		PHOTOS P/TW		INCLUSIVE		
ON BEHALF OF		SAMPLES S/TW		INCLUSIVE		
TIME	DATE	SIGNED	TIME OFF	TIME	DATE	SIGNED
:	:	:	11:25	:	:	S. John

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER <i>FINE</i>											TW <i>45250</i> <i>INDUSTRIAL WASTE</i>						OPEN CLOSED						
											TIME ON SITE <i>10:30</i>						DATE <i>29: 3:76</i>						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY					
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Details of action which has been taken or further action required:-

(9) THERE ARE STILL A CONSIDERABLE NUMBER OF LAMPPOSTS DEPOSITED ON SITE - THESE REQUIRE INCORPORATING INTO THE WORKING FACE & COVERED IN ORDER TO COMPLY WITH CONDITION 4.11 OF THE SITE LICENCE

(18) THE FENCING ON THE EASTERN BOUNDARY OF THE SITE IS TO BE RE-CHECKED AS INDICATED ON LAST REPORT AND TO COMPLY WITH CONDITION 7.3 OF THE SITE LICENCE.

NOTE:- SITE CLOSED AT TIME OF INSPECTION

COPY RECEIVED BY <i>PST</i>	PHOTOS P/TW <i>NO</i>	INCLUSIVE
ON BEHALF OF	SAMPLES S/TW	INCLUSIVE
TIME DATE SIGNED	TIME OFF <i>10:50</i>	TIME DATE SIGNED <i>29: 46</i>

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER											TW 452 SL							OPEN CLOSED						
FINE											HOUGHTON COLLIERY SITE							DATE 27: 3: 96						
TIME ON SITE 11:00																								
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EX-	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
								✓									✓							
Details of action which has been taken or further action required:-																								
<p>⑨ LARGE NUMBER OF LAMPPOSTS DEPOSITED ON SITE THESE REQUIRE INCORPORATING INTO LINDERING FACIL AND COVERING IN ACCORDANCE WITH CONDITIONS 4.11</p> <p>⑩ FENCING ON WESTERN BOUNDARY HAS BEEN COMPLETELY REMOVED. THIS FENCING IS TO BE RE-ERECTED IN ACCORDANCE WITH CONDITION 3.3 BEFORE TIPPING RECOMMENCES ON SITE</p>																								
COPY RECEIVED BY											PHOTOS P/TW / / INCLUSIVE													
ON BEHALF OF											SAMPLES S/TW / / INCLUSIVE													
TIME DATE SIGNED											TIME OFF TIME DATE SIGNED													
: : :											11:30 : 27:3:96 [Signature]													

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER FINE - COLD.	TW 4525L HOUGHTON COLLICKY SITE	OPEN CLOSED
	TIME ON SITE 2:10	DATE 31: 1: 96

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Details of action which has been taken or further action required:-

SITE TIDY.

SITE CLOSED AT PRESENT.

COPY RECEIVED BY	PHOTOS P/TW / INCLUSIVE	
ON BEHALF OF	SAMPLES S/TW / INCLUSIVE	
TIME : : : DATE : : : SIGNED :	TIME OFF : : : TIME : : : DATE : : : SIGNED :	
	2:20 : : : 31: 1: 96	

WASTE MANAGEMENT LICENSING

LANDFILL SITES

WEATHER											TW 452 SL HOUGHTON COLLIERY SITE							OPEN CLOSED						
FINE											TIME ON SITE 10:45							DATE 16:1:96						
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	KEY						
HIGHWAY	WHEEL CLEANER ACCESS & EX.	NOTICE BOARD AND GATES	SITE ROADS	LITTER CONTROL SCREENING & PICKING	FLATTENING OF CONTAINERS	UNPERMITTED WASTES	FACES FLANKS & SURFACE	METHOD	USE & AVAILABILITY OF COVER	OTHER SURFACES	SURFACE WATER	FIRES	VERMIN	EQUIPMENT & MANNING	OFFICE & HARDSTANDING	RECORDS & CONDITIONS	FENCING & REST OF PERIMETER	INSPECTED	NOT INSPECTED	ACTION NOT REQUIRED	ACTION REQUIRED TODAY	ACTION REQUIRED FUTURE	NOT REQUIRED AT TIME	
											✓							✓	✓					
											✓											✓		
Details of action which has been taken or further action required:-																								
SITE CLOSED AT TIME OF INSPECTION.																								
② SILT BEING DEPOSITED, DUE TO WATER RUN OFF FROM SITE, OUTSIDE THE NORTH WESTERN CORNER OF SITE. SEE CONDITIONS 5.25 & 5.27. THIS RUN OFF IS TO BE PREVENTED.																								
COPY RECEIVED BY											PHOTOS P/TW INCLUSIVE													
ON BEHALF OF											SAMPLES S/TW INCLUSIVE													
TIME DATE SIGNED											TIME OFF TIME DATE SIGNED													
: : :											11:10 : 16:1:96													



INTERNAL



FORM

INSPECTION FORM COVER SHEET

Site Reference: EAWML67597

Other ID: TW452SL

Site Name: HOUGHTON COLLIERY SITE

Year: 1997

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Environmental Protection Act 1990
 Waste Management Licensing
 Landfill Site Inspection Form



ENVIRONMENT
 AGENCY

Site: TW452 SL HOUGHTON COLLIERY	Time on Site: 1100	Weather: OVERCAST
	Date: 8-1-97	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads		*	Litter Outside the Site	C
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
*	THERE IS LITTER TO CLEAR FROM AROUND THE SOUTHERN END OF THE SITE.

Acknowledged Receipt of Inspection Report		Signed:	Time Off: 1110
Signed: POST	Date:		Date: 8-1-97
Printed:	Time:	Samples: NO	Photos: NO
			Time: -



INTERNAL

INSPECTION FORM COVER SHEET



FORM

Site Reference: EAWML67597

Other ID: TW452SL

Site Name: HOUGHTON COLLIERY SITE

Year: 1998

18

ENVIRONMENTAL PROTECTION ACT 1990

Waste Management Licensing
Landfill Site Inspection Report



Report ID Number
67597

Facility Type: **HIC LIF** WML No: **TW 452**

Site Name: **HOUGHTON COLLIERY**

Operator:

Operational Status: **NOT RECEIVING** Site Life Status: **CLOSED**

Areas/Phases Inspected:

Inspector(s): **B TOINTON** Northumbria Area Office
Tyneside House
Newcastle upon Tyne
NE4 7AR
0191 203 4000

Accompanying Persons:

Date: **2-11-98** Time: (24hr) **13:45** Arr: **13:50** Dep:

Weather: **HEAVY RAIN (BUSTEEY)** Type of Inspection: **ROUT**

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Waste Records	Y/N		Litter Collection	Y/N
	Access Road			Site Diary	Y/N		Fires on Site	Y/N
	Site Roads			Site Machinery	Y/N		Noise	Y/N
	Wheelcleaner	Y/N		Working Face	Y/N		Dust	Y/N
	Notice Board	Y/N		Types Of Waste	Y/N		Odours	
	Tech. Comp. Manager	Y/N		Special/Restricted Procedure	Y/N		Insects	
	Site Staffing	Y/N		Load Checking	Y/N		Birds	
	Gates; Fencing	Y/N		Availability of Cover	Y/N		Vermin	Y/N
	Site Control Office	Y/N		Usage of Cover			Surface Water Controls	Y/N
	Oil/Fuel Storage	Y/N		Litter Outside the Site			Leachate Controls	Y/N
	Waste Reception Procedures	Y/N		Litter Within the Site			Landfill Gas Controls	Y/N
	Duty of Care Records	Y/N		Litter Catchment	Y/N			

Key: NLC No Licence Condition A - Good B - Satisfactory C - Unsatisfactory D - Poor N/I - Not Inspected Y - Condition Complied With N - Contravention

Condition Number(s)	DESCRIPTION OF CONTRAVENTION, ACTION REQUIRED AND OTHER COMMENTS
	SITE CLOSED
	CAR PARTS FLY TIPPED AT ENTRANCE. MATTRESS FLY TIPPED ON SITE

ACTION REQUIRED (Y/N) Y

SAMPLES TAKEN	Leachate	Gas	Waste	G/Water	S/Water	Photos
---------------	----------	-----	-------	---------	---------	--------

REPORT *GIVEN/ SENT TO: _____ NAME: _____ POSITION: _____ SIGNATURE (Acknowledgement of receipt only): _____

(*Delete as appropriate)

LETTER REQUESTED (Y/N) N INSPECTOR(S) SIGNATURE *B. Tointon*

SHEET 1 OF 1

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form

PD7: 192 - GB



ENVIRONMENT AGENCY

17597

Site: HOUGHTON COLLIERY TW 452	Time on Site: 14.30	Weather: DRY / BLUSTERY
	Date: 12.10.98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Roads			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates and Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Fuel/Oil Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	1997 Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Loads at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	SITE CLOSED
	CAR PARTS FLU TIPPED AT ENTRANCE ALSO MATTRESS ON SITE COLLECTION REQUIRED

Acknowledged Receipt of Inspection Report		Signed: B. J. J. J.	Time Off:
Signed	Date		Date
Printed	Time	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form

PD7-192-GB



ENVIRONMENT AGENCY

Site: HAUGHTON CREEK TW 452	Time on Site: 13.30	Weather: OVERCAST.
	Date: 15.9.98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Roads			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates and Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Fuel/Oil Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Loads at Disposal Point	Y/N			

Key: NLC No Licence Condition; N/I Not Inspected; A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor; Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	THE SITE IS CLOSED.
	Fly TIPPED CAR PARTS PRESENT AT THE ENTRANCE ALONG WITH A MATTRESS ON SITE REQUIRES COLLECTION

Acknowledged Receipt of Inspection Report		Signed: <i>[Signature]</i>	Time Off:
Signed	Date		Date
Printed	Time	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form

PD7-192-GB



ENVIRONMENT AGENCY

Site: HOUGHTON COLLIERY TW452	Time on Site: 9.20	Weather: OVERCAST, WINDY
	Date: 6.8.98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Roads			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates and Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Fuel/Oil Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Loads at Disposal Point	Y/N			

Key: NLC No Licence Condition
 N/I Not Inspected
 A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	SITE REMAINS CLOSED
	ELI TIPPED RUBBISH MENTIONED IN PREVIOUS SITE REPORT REQUIRES REMOVAL.

Acknowledged Receipt of Inspection Report		Signed: <i>[Signature]</i>	Time Off: 9.35
Signed	Date		Date
Printed	Time	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: HOUGHTON COLLIERY TW 452	Time on Site: 12.40pm Date: 14.7.98	Weather: BRIGHT, WINDY
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	THE SITE IS CLOSED
	fly TIPPING Small Amount of fly tipping (car parts & RUBBISH) REQUIRES COLLECTING FROM THE SITE ENTRANCE.

Acknowledged Receipt of Inspection Report		Signed: <u>R Hill</u>	Time Off: 1.10pm
Signed:	Date: 1		Date:
Printed:	Time:	Samples:	Photos: Time:

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form

PD7-192-GB



ENVIRONMENT AGENCY

Site: <i>Houghton Colliery</i> <i>TW 452SL</i>	Time on Site: <i>305</i>	Weather: <i>overcast, calm.</i>
	Date: <i>12-6-98</i>	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Roads			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates and Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Fuel/Oil Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Loads at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	<i>The site remains closed</i>
	<i>Comment</i>
	<i>Fly tipping to the left hand side of the access road - car parts</i>

Acknowledged Receipt of Inspection Report		Signed <i>[Signature]</i>	Time Off: <i>3.20</i>
Signed	Date		Date
Printed	Time	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form



ENVIRONMENT AGENCY

Site: HOUGHTON COLLIERY TW 452	Time on Site: 11.55am	Weather: WARM SUNNY
	Date: SAT 16 5 98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates, Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	THE SITE IS CLOSED.
	FLY TIPPING - SOME CAR PARTS - CAR BUMPERS REMAIN PRESENT ADJACENT TO THE ACCESS ROAD, ALONG WITH SOME BUILDING RUBBISH REQUIRES REMOVAL.

Acknowledged Receipt of Inspection Report		Signed: <i>RHally</i>		Time Off: 12.20 pm	
Signed:	Date:			Date:	
Printed:	Time:	Samples:	Photos:	Time:	

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: <u>TW 452</u> <u>HOUGHTON COLLIERY</u>	Time on Site: <u>255</u> Date: <u>16-4-98</u>	Weather: <u>Overcast</u>
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Faces	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC - No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
N/I - Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	<u>The site remains closed</u>
	<u>The fly tipped waste as previously reported still has not been moved.</u>

Acknowledged Receipt of Inspection Report			Signed:	Time Off: <u>3.10</u>
Signed:	Date:			Date:
Printed:	Time:	Samples:	Photos:	Time:

Environmental Protection Act 1990
 Waste Management Licensing
 Landfill Site Inspection Form



ENVIRONMENT
 AGENCY

Site: TW452 HOUGHTON COLLEERY	Time on Site: 14:15 Date: 8-4-98	Weather: HEAVY RAIN
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
 N/I Not Inspected
 A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention; Action Required and Other Comments
	SITE CLOSED. THE SITE IS AN OPEN GRASSED AREA. SOME RUBBISH IS DUMPED CLOSE TO THE ACCESS ROAD.

Acknowledged Receipt of Inspection Report			
Signed:	Date:	Signed: A. ILEY	Time Off: 14:25
Signed:	Date:	K. Daniels	Date: 20/4/98
Printed:	Time:	Samples:	Photos:

Environmental Protection Act 1990

Waste Management Licensing

Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW 452 COLLIERY HOUGHTON COLLIERY	Time on Site: 2.45	Weather: Overcast.
	Date: 1.4.98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	Site remains closed.
	General household rubbish and several car parts have been dumped next to the former access road.
	* If not removed by next inspection, ascertain landowner & request clearance. <i>KD</i>

Acknowledged Receipt of Inspection Report		Signed: <i>J. Anarack</i>	Time Off: 2.55
Signed:	Date:	<i>K Daniel</i>	Date: 3-4-98
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing
Metal Recycling Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW 452		Time on Site: 14:00	Weather: CLOUDY	
Date: 27-3-98		Weather: LIGHT BREEZE		
HOUGHTON COLLEGE				
Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item Compliance Assessment
	Public Highway			Site Infrastructure Y/N
	Access Roads			Litter Outside the Site
	Site Roads			Litter Within the Site
	Notice Board	Y/N		Odours
	Technically Competent Manager	Y/N		Fires on Site Y/N
	Site Staffing	Y/N		Dust Control Y/N
	Gates; Fencing; Security	Y/N		Vermin Y/N
	Load Checking	Y/N		Ponding Y/N
	Duty of Care Records	Y/N		Interceptor Y/N
	Site Machinery	Y/N		Drainage System Y/N
	Types of Waste	Y/N		Impermeable Pavements Y/N
	Waste Storage	Y/N		
	Waste Handling	Y/N		
	Fuel/Oil Storage	Y/N		
	Battery Storage	Y/N		
	Oil Contaminated Material Storage	Y/N		
	Dismantling Area	Y/N		

Key: NLC No Licence Condition
N/I Not Inspected

A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	THERE ARE SEVERAL CAR BUMPERS IN THE BUSHES CLOSE TO THE ENTRANCE TO THE SITE
	THE FENCING AROUND THE SITE IS IN NEED OF REPAIR

Acknowledged Receipt of Inspection Report		Signed: A. ILEY		Time Off: 14:15	
Signed:	Date:	Signed:	Date:	Signed:	Date:
Printed:	Time:	Samples:	Photos:	Signed:	Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW 452 W Houghton Colliery	Time on Site: 150	Weather: Overcast Calm
	Date: 26-3-98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	THE SITE REMAINS NON OPERATIONAL

Acknowledged Receipt of Inspection Report		Signed:	Time Off: 215
Signed:	Date:	K Daniels	Date: 27/3/98
Printed:	Time:	Samples:	Photos:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW 452 SL HOUGHTON COLLIERY	Time on Site: 10.20 Date: 25.3.98	Weather: FINE, CALM
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N	*	Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
 N/I Not Inspected Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention	Action Required and Other Comments
*	There is litter and various car parts located next to the former access road.	

Acknowledged Receipt of Inspection Report		Signed: <i>J. Anasrah</i>	Time Off: 10:35
Signed:	Date:		Date:
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT
AGENCY

Site: TW 452 SL HOUGHTON COLLIERY	Time on Site: 2.15 Date: 24.3.98	Weather: DULL, COLD
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Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N	*	Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
*	AS PREVIOUSLY REPORTED, THERE ARE SEVERAL CAR PARTS AS WELL AS GENERAL HOUSEHOLD RUBBISH NEAR TO THE BOULDERS BLOCKING THE FORMER ACCESS ROAD.

Acknowledged Receipt of Inspection Report		Signed: <i>J. Pharaoh</i>	Time Off: 2.25
Signed: POST.	Date:		Date:
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing Landfill Site Inspection Form



**ENVIRONMENT
AGENCY**

Site: TW 452SL HOUGHTON COLLIERY	Time on Site: 10.50	Weather: OVERCAST COOL
	Date: 23-3-98	

Condition No NLC or N/I	Inspected Item	Compliance Assessment	Condition No NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N		Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
	There are several car parts as well as general household rubbish just inside the former access point. This requires clearing from the site.

Acknowledged Receipt of Inspection Report		Signed: <i>J. Pharaoh</i>	Time Off: 11.00
Signed:	Date:	<i>K. Daniels</i>	Date: 24/3/98
Printed:	Time:	Samples:	Photos:
			Time:

Environmental Protection Act 1990

Waste Management Licensing
Landfill Site Inspection Form



ENVIRONMENT AGENCY

Site: TW 452 SL	Time on Site: 11.55	Weather: Sunny, calm
Houghton Colliery	Date: 19.03.98	

Condition No. NLC or N/I	Inspected Item	Compliance Assessment	Condition No. NLC or N/I	Inspected Item	Compliance Assessment
	Public Highway			Availability of Cover	Y/N
	Access Road			Usage of Cover	
	Site Roads			Litter Outside the Site	
	Wheelcleaner	Y/N	*	Litter Within the Site	
	Notice Board	Y/N		Litter Catchment	Y/N
	Technically Competent Manager	Y/N		Litter Collection	Y/N
	Site Staffing	Y/N		Fires on Site	Y/N
	Gates; Fencing	Y/N		Noise	Y/N
	Site Control Office	Y/N		Dust	Y/N
	Oil/Fuel Storage	Y/N		Odours	
	Waste Reception Procedures	Y/N		Insects	
	Duty of Care Records	Y/N		Birds	
	Waste Records	Y/N		Vermin	Y/N
	Site Diary	Y/N		Surface Water Controls	Y/N
	Site Machinery	Y/N		Leachate Control	Y/N
	Working Face	Y/N		Landfill Gas Control	Y/N
	Types of Waste	Y/N			
	Special/Restricted Waste Procedure	Y/N			
	Checking of Load at Disposal Point	Y/N			

Key: NLC No Licence Condition
N/I Not Inspected
A - Good; B - Satisfactory; C - Unsatisfactory; D - Poor
Y - Condition complied with; N - Contravention

Condition Number(s)	Description of Contravention, Action Required and Other Comments
*	There are several car parts (bumpers, doors, panels) as well as general household rubbish near to the boulders blocking the former access road.

Acknowledged Receipt of Inspection Report		Signed: <i>J. Phareah</i>	Time Off: 12.15
Signed:	Date:	<i>KJ Daniels</i>	Date: 23/3/98
Printed:	Time:	Samples:	Photos:
			Time:



OUTGOING



PERMIT

**TYNE AND WEAR
WASTE REGULATION
AUTHORITY**

**CONDITIONS
OF WASTE MANAGEMENT LICENCE**

TW 452 SL

LANDFILL SITE

**HOUGHTON COLLIERY SITE
HOUGHTON LE SPRING**

GRID REF. NZ 337 504

TYNE AND WEAR WASTE REGULATION AUTHORITY

**CONDITIONS OF WASTE MANAGEMENT LICENCE
FOR LANDFILL SITE**

TW452SL - HOUGHTON COLLIERY SITE

GENERAL GUIDANCE NOTES

These notes are for general guidance only and do not constitute an authoritative statement of the law.

- (i) This licence relates only to the requirements of Part II of The Environmental Protection Act 1990 for the treatment, keeping or disposal of Controlled Waste on land subject to the conditions imposed in Sections A to G and attached Schedules, and does not constitute a consent required by other legislation.

In particular it is the responsibility of the licence holder to comply with any other legislation, principally, though not limited to, the Town and Country Planning Act 1990., and Environmental Protection Act 1990, the Water Act 1989 and the Health and Safety at Work etc. Act 1974.

- (ii) In these conditions 'Authority' means the Tyne and Wear Waste Regulation Authority.

SECTION 1 - ADMINISTRATION

- 1.1 The landfill site shall, subject to the conditions of this licence, be operated in accordance with the submitted licence application and Working Plan comprising all written submissions, operational statement and plans which were approved by the Authority on 7th September 1995. In the event of any proposals contained in the Working Plan being contradictory to the conditions, the conditions shall prevail.
- 1.2 The licence holder shall keep the Working Plan under review for the duration of this licence (TW452SL). Any proposals to change the Working Plan shall not be brought into effect until details have been submitted to and agreed in writing with the Authority.
- 1.3 The terms of this licence shall apply to the area shown outlined in red on plan no. HCS 004.

- 1.4 Not less than 14 days notice in writing shall be given to the Authority in advance:-
- (i) of the date on which landfilling is to commence and
 - (ii) in the event of any temporary cessation of operations for a period in excess of one month, of the date on which landfilling is to recommence.
- 1.5 Any temporary cessation of operations for a period in excess of one month shall be notified in writing to the Authority.
- 1.6 Any change in the name or address of the person or company holding this licence must be notified to the Authority immediately.
- 1.7 Applications for transfer or surrender of a waste management licence shall be made in accordance with Regulation 2 of The Waste Management Licensing Regulations 1994, (S.I. 1994 No.1056). Applications shall be made in writing, shall include information specified in Schedule 1 or Schedule 2 of the Regulations as appropriate in so far as required and be accompanied by the prescribed fee.
- 1.8 The Authority shall be notified of any conviction of the relevant offences listed under Regulation 3 of the Waste Management Licensing Regulations 1994 by any director, manager, secretary or other similar officer of the company. This condition shall not apply to any convictions declared in the application for the licence.
- 1.9 The licence holder shall inform the Authority in writing of the details, including qualifications, experience and training, of the Technically Competent Manager(s) responsible for the management and control of the site. Any changes to the arrangements for managing the site or in the personnel responsible for the management and control of the site shall be notified to the Authority immediately together with the details of the changes.
- 1.10 No deposit shall take place unless a technically competent manager is available to control operations on the site.
- 1.11 The terms of this licence shall be made known to the manager(s) of the site.
- 1.12 The terms of this licence shall be made known to all other site personnel who shall be trained to a level appropriate to their duties and level of responsibility. Staff training shall be reviewed at least once a year and such reviews shall be documented and made available for inspection by Waste Regulation Authority officer.

- 1.13 The site shall be staffed in such numbers as necessary to ensure compliance with the licence. A minimum of 2 persons shall be on site at all times when the site is open for the receipt and disposal of waste.
- 1.14 A copy of this licence shall be displayed and a copy of the conditions and working plan shall be made available in the site control office at all times.
- 1.15 Waste shall only be received between the following times:

WEEKDAYS	08.00 - 16.30
SATURDAY	Closed
SUNDAY	Closed
BANK HOLIDAYS	Closed

- 1.16 Operations shall be limited to the following times:

WEEKDAYS	08.00 - 16.30
SATURDAY	Closed
SUNDAY	Closed
BANK HOLIDAYS	Closed

- 1.17 The Authority shall be informed forthwith in the event of any accident resulting in the death or serious injury of any person as a result of operations in the licensed areas, and of any outbreaks of fire.
- 1.18 The Authority shall be informed as soon as practicable of any incident, including fire, that could give (or has given) rise to danger to public health, pollution of water or could be (or has been) seriously detrimental to local amenities.

SECTION 2 - PERMITTED WASTE DEPOSITS

- 2.1 No wastes other than the wastes detailed in Schedule 2 shall be received or handled at the facility.
- 2.2 The total daily input of waste into the site shall not exceed the quantities stated in Schedule 2 and shall not be such that the handling or storage capacity of the site is exceeded.

SECTION 3 - SITE PREPARATION, SERVICES AND INFRASTRUCTURE

- 3.1 No deposit shall take place until written acknowledgement has been received from the authority that all the site preparation works, services(e.g. lighting, telephone etc.) and infrastructure (e.g. main access, subsidiary roads and wheel cleaner) have been constructed in accordance with the working plan.

- 3.2 All stripped topsoil, subsoil and clay shall be used immediately as restoration material or stored in mounds and grassed until required for future restoration. The mounds shall be kept free from weeds.
- 3.3 The fencing, gate and security systems described in the Working Plan will be provided and will be maintained in good repair.
- 3.4 All reasonable precautions shall be taken to prevent unauthorised access to the site and the unauthorised deposit of waste on the site.
- 3.5 No deposit shall take place until a site identification board of durable material and finish is displayed at the site entrance, showing the hours when the site is open and giving the name and licence number of the site, the name, address and telephone number of the operator (and his local agent, if any) and of the Authority responsible for issuing the licence. The board shall be maintained in good repair and in particular, the wording shall be legible at all times.
- 3.6 No deposit shall take place unless warning notices are displayed at intervals of no greater than 50 metres along the perimeter fence. These signs shall be of durable material and finish and be maintained. In particular, the wording shall be legible at all times.
- 3.7 No deposit shall take place until a site control office has been provided on site. It shall be located at the position shown on drawing number HCS 004 and maintained in good repair.
- 3.8 No deposit shall take place until the main access, main exit, main and subsidiary site roads have been provided in accordance with the Working Plan, All site roads shall be maintained in good repair, being free from potholes, ruts and any standing water. Throughout the operation of the site, subsidiary site roads shall be provided to within 40 metres of the tip face.
- 3.9 The main access and main exit roads shall be maintained in good condition being free from potholes, ruts, mud, standing water and any extraneous material. Main and subsidiary site roads and in particular the road leading to the wheel cleaner shall be maintained in good condition being free from potholes, ruts, standing water, extraneous material and any build up of mud.
- 3.10 The wheel cleaner shall be used effectively to ensure that mud etc. is removed from vehicle wheels.
- 3.11 Vehicles shall be checked to ensure that they are free of mud and extraneous material before leaving the site.

- 3.12 The exit road from the wheel cleaner to the highway shall be maintained in good condition being free from potholes, ruts, mud, standing water and any extraneous material
- 3.13 No deposit shall take place unless areas for the standing of vehicles and the parking of cars have been provided on the site. Such areas shall be marked on a plan to be submitted to the Authority. The plan shall be amended as necessary during the lifetime of the site.
- 3.14 A quarantine area shall be retained adjacent to the waste reception area for the storage of unsuitable loads and waste types. The quarantine area shall be kept free of obstruction and available for use at all times.
- 3.15 No deposit shall take place until a mechanical wheel cleaning facility has been installed at the location shown on drawing number HCS 004.
- 3.16 The wheel cleaning facility shall be maintained and used in accordance with the manufacturer's instructions to ensure that mud, waste and other extraneous material resulting from the operations of the site are not deposited on a public highway.
- 3.17
- i) Fuel and oils stored on site shall be in containers of a type and construction suitable for the liquid they contain and labelled to show their contents.
 - ii) The containers shall be located within a bund wall capable of retaining 110% of the volume of the largest tank within the structure.
 - iii) The floor and walls of the structure shall be constructed from impermeable materials and shall not contain any drain or outlet.
 - iv) Any leakage or spillage of fuel from the container within the structure shall be removed immediately.
 - v) Any rainfall which collects within the structure shall be removed immediately without damaging or altering the structure.
 - vi) The structure shall be kept free of solid debris which may reduce its retention capacity.
 - vii) All filling and distribution valves, vents and sight glasses associated with the storage tanks shall be located within the bunded area.

- 3.18 No deposit shall take place until at least two temporary survey bench marks related to an Ordnance Survey Bench Mark are established on the site and their location and value shown on a plan which shall be submitted to the Authority .
- 3.19 The temporary survey bench marks established for use on the site shall be checked at 6 monthly intervals and be replaced if damaged or missing. The location and value of any new bench mark shall be submitted to the Authority within 14 days of installation.
- 3.20 No deposit shall take place until peripheral cut-off ditches or drains are designed and provided to prevent the ingress of surface water into the site.

SECTION 4 - SITE OPERATIONS

- 4.1 All vehicles intending to deposit waste on the site shall be directed to report to the site control office where the contents of the vehicle shall, where practicable, be visually examined to ensure that the waste corresponds with the waste transfer note and is in accordance with the permitted wastes.
- 4.2 Vehicles shall not be allowed to proceed to the working face without authorisation.
- 4.3 Subsequent to deposit and prior to compaction, levelling and covering, the waste shall be further inspected to ensure compliance with those permitted by conditions of licence.
- 4.4 Vehicles found on inspection to contain waste materials unsuitable for deposition on the site shall be refused permission to deposit the waste concerned. the operator shall :
- a) advise the Authority forthwith.
 - b) request the vehicle remain on site until its waste can be inspected by a duly authorised officer of the Authority.
- 4.5 All deposited waste shall be inspected prior to and whilst it is being levelled, compacted and covered at the working face.
- 4.6 Where deposited waste is found to contain materials which the site is not licensed to accept the site operator shall :
- a) advise the Authority forthwith.
 - b) isolate the unacceptable material.

- c) if necessary store the waste in a container until it can be inspected by a duly authorised officer of the Authority.
- d) inform the waste haulier and producer.
- e) remove the waste, in accordance with the Duty of Care Regulations, from site within 7 days of the date of receipt and after compliance with (a) to (d) above.

- 4.7 No deposit shall take place unless an appropriate machine is on site.
- 4.8 Appropriate machines shall be provided capable of dealing with the maximum quantity of incoming wastes.
- 4.9 Equipment and receptacles (such as machinery, skips, etc.) which remain on site outside working hours or when the site is unmanned shall be maintained in good condition. At the end of the working day any such equipment and receptacles (except for operational equipment used for landfill gas and leachate control) shall be placed within a designated area and be kept in a neat and tidy manner.
- 4.10 No waste shall be deposited in water.
- 4.11 Solid waste shall be formed into a layer, not exceeding 2.5 metres depth, and compacted and covered with 150 millimetres of suitable cover material so that no combustible material is visible. Coverage shall take place as soon as possible after deposit and not later than the end of the working day on which the waste is received.
- 4.12 The width of the working face shall not exceed 30 metres.
- 4.13 Waste shall either:-
- a) be deposited on the surface of the site behind the working face and be compacted using an appropriate machine before being pushed over the working face.
- OR
- b) be deposited on the ground forming the base of the site or on a previous layer of waste in front of the working face and shall be formed into a compacted layer by being pushed upward and driven over by an appropriate machine.

- 4.14 All large articles (such as furniture, crates and hollow containers etc.) shall be crushed, broken up or flattened and placed at the bottom of the working face and covered with other materials by the end of the working day on which the article was received.

THIS CONDITION SHALL NOT APPLY TO GAS CYLINDERS WHICH SHOULD BE COLLECTED AND DISPOSED OF IN ACCORDANCE WITH THE DUTY OF CARE REGULATIONS.

- 4.15 Working faces and flanks shall be compacted to form gradients not steeper than 1 in 2.
- 4.16 Operations such as covering and grading of each layer of waste shall be laid to a fall to encourage surface water run-off which shall not have adverse effects upon the land drainage interests of local landowners.
- 4.17 At least once a week any loose waste which is lying on the surface of the site shall be gathered and disposed of in such a way as to keep the site tidy.
- 4.18 At least once a day the land surrounding the site shall be inspected for the presence of debris attributable to the operation of the site and any such materials found shall be removed before the end of that day. The results of each inspection and the action taken shall be reported in the site diary.
- 4.19 No operation shall be carried out during the hours of darkness or dusk unless lighting adequate for safe working is used. The hours of darkness are those published as statutory lighting up times by the Science Research Council.
- 4.20 Operations shall be carried out in such a manner as to avoid water pollution and flooding and shall not have any adverse effects on the land drainage interests of adjacent land occupiers.
- 4.21 Any solid waste derived from the site that enters or collects in any adjacent watercourse shall be removed immediately.

SECTION 5 - ENVIRONMENTAL AND POLLUTION MONITORING AND CONTROL

- 5.1 Litter shall be prevented from escaping the site by the use of static and mobile litter fences positioned close to the working area and having regard to the prevailing wind direction. Litter arrested by such fences shall be collected and disposed of by the end of the working day.

- 5.2 Any loose waste or litter blown beyond the boundaries of the site shall be collected immediately. The acceptance of wastes liable to give rise to a windblown litter problem shall cease until such time as any litter beyond the site boundaries has been collected.
- 5.3 Measures shall be taken to ensure that mud, waste and other extraneous matter resulting from the operation of the site is not deposited on a public highway
- 5.4 Any mud, waste and other extraneous matter deposited on a public highway shall be cleared immediately. The acceptance of wastes shall cease until such time as any mud, waste and other extraneous matter deposited on a public highway has been cleared.
- 5.5 Measures shall be taken to ensure that dusts arising from the operation of the site do not carry beyond the boundaries of the site.
- 5.6 If dust arising from the operation of the site is carried beyond the boundaries of the site the acceptance of wastes shall cease until such time as measures have been taken to prevent dusts arising from the operation of the site carrying beyond the boundaries of the site.
- 5.7 The noise emitted from operations on site shall not result in ambient noise levels greater than 55dB(a) Leq (1 Hour). as measured at properties within 50 metres of the site boundaries.
- 5.8 Monitoring of noise levels shall be carried out by the operator every month, at a time when operations are being carried out within 50 metres of properties, or at the request of the Authority.
- 5.9 If noise levels exceed 55dB(a) Leq (1 Hour) as measured at properties within 50 metres of the site boundaries then the acceptance of wastes shall cease until such time as measures have been taken to reduce noise levels to below this level.
- 5.10 If the operation of the site gives rise to any problem from odours, immediate action shall be taken to prevent the detection of the odour beyond the boundary of the site.
- 5.11 If odours are detected beyond the boundary of the site then the acceptance of waste shall cease until such time than odours are no longer detectable beyond the boundary of the site.

- 5.12 Measures shall be taken to prevent infestation of the site by vermin, primarily rats and flies. These measures shall include, but not be limited to, the effective compaction and covering of putrescible wastes, and the use of rodenticides and insecticides. Where rodenticides and insecticides are used, measures shall be taken to ensure the safety of non-vermin species and the environment in general.
- 5.13 If an infestation of vermin is found on site then the acceptance of waste shall cease until the infestation has been eradicated.
- 5.14 Measures shall be taken to prevent flocks of birds feeding or roosting at the site. These measures shall include, but not be limited to, the use of bird scaring techniques and netting systems.
- 5.15 If flocks of birds are feeding or roosting on site then the acceptance of waste shall cease until flocks of birds are prevented from feeding and roosting on site.
- 5.16 No material shall be burnt within the boundaries of the site and a fire at the site shall be regarded as an emergency and immediate action shall be taken to extinguish it. (Measures to counter fire and to protect personnel from fire shall be in accordance with the relevant Legislation).
- 5.17 The environment monitoring programme shall be implemented in accordance with the Working Plan.
- No changes in the monitoring programme shall be implemented without the prior written approval of the Authority.
- 5.18 Environmental monitoring and sampling shall only be carried out using appropriate, properly calibrated equipment by trained and experienced personnel following clearly documented quality control procedures.
- 5.19 All environmental monitoring points shall be made available to any authorised officer of the Authority upon demand and maintained by the site operator for the duration of the licence.
- 5.20 If landfill gas emissions in excess of 1% flammable gas or 0.5% carbon dioxide (by volume in air) are found to be migrating beyond the boundaries of, or being emitted from, the site, the licence holder shall immediately instigate measures agreed by the Authority to prevent migration outside the boundaries of, or the uncontrolled emission from, the site.
- 5.21 Completed areas of the site shall be assessed annually by a suitably qualified person for evidence of differential settlement. Measures shall be taken to remediate affected areas to prevent ponding of surface water.

- 5.22 The activities to which this licence relates shall not be so carried on as to cause pollution of water or danger to public health or become seriously detrimental to the amenities of the locality affected by the activities.
- 5.23 All areas on which waste is stored shall be laid out in such a way as to ensure that any spillage does not escape from the site or enter any drainage system off the site.
- 5.24 Any spillage shall be dealt with immediately to clear or alleviate the effect of the spillage, and to prevent water pollution and to ensure public safety. Adequate quantities of sand/absorbent material shall be kept on site and used on appropriate spillages.
- 5.25 Any liquids arising or likely to arise whether directly or indirectly as a process, effluent, washdown or by any other means shall be treated or otherwise disposed of to the satisfaction of the National Rivers Authority (NRA) Northumbria Region. In this respect any discharge of trade effluent to the public sewer shall only be made with the prior consent of Northumbria Water Ltd.
- 5.26 The site shall be operated in such a manner as to prevent any pollution of water, flooding or danger to public health.
- 5.27 During the operation of the site:-
1. No waters shall be permitted to drain to any surrounding surface water course unless it is uncontaminated with silt or other solids, chemicals or organic materials.

In this respect any discharge to controlled waters shall be only with the consent of the National Rivers Authority (Northumbria Region).
 2. Any waters found to be contaminated with silt or other solids, chemicals or organic materials shall only be discharged from the site with the prior approval of the Authority.

In this respect any discharge to controlled waters shall be only with the consent of the National Rivers Authority (Northumbria Region) or any discharge to the public sewerage system with the consent of the local sewerage services operator (Northumbrian Water Ltd).

SECTION 6 - SITE RECORDS

- 6.1 A daily record shall be kept in the site office, giving details of all wastes received onto the site for disposal.

Details recorded shall include;

- i) Type and quantity of waste
- ii) Date, time of entry
- iii) Waste carriers registration number

These records and any removed from the site shall be made available to the Authority on request.

6.2 Copies of all signed documents shall be kept in chronological order.

TYNE AND WEAR WASTE REGULATION AUTHORITY

**CONDITIONS OF WASTE MANAGEMENT LICENCE
FOR LANDFILL SITE**

TW452SL - HOUGHTON COLLIERY SITE

SCHEDULE 1

WORKING PLAN

Application reference number TWR / A / 28 Dated 16 : 05 : 95

Accompanying document entitled " CONTENTS OF WORKING PLAN "

Accompanying document entitled " ENVIRONMENTAL MONITORING PROGRAMME "

Drawings :-

<u>Drawing Number</u>	<u>Description</u>
HCS 001	EXISTING AND PROPOSED LEVELS
HCS 002	LOCATION OF CROSS SECTIONS
HCS 003	PROPOSED AND EXISTING CROSS SECTIONS
HCS 004	WORKING PLAN

CONTENTS WORKING PLAN

A statement of intent (including where necessary, drawings with annotations and side notes) which should include the following information.

- (i) An outline of the operational principle of the site including width and depth of working face, method of layering and compacting, method of transporting and spreading covering materials, storage, processing and the plant used.
- (ii) Site preparatory works to be carried out.
- (iii) Procedures to check and record waste input including all administrative arrangements prior to, and during the reception of asbestos waste, drummed waste, tankered waste and all other difficult or hazardous wastes.
- (iv) Procedures to be followed should wastes not included in the site licence be delivered to the site.
- (v) Manning arrangements, including qualifications, experience and functions of staff.
- (vi) Arrangements for sampling, analysing, handling, storing and disposing of difficult wastes.
- (vii) Measures to be used to prevent the pollution of surface or groundwaters by leachate or the spillage of wastes or other materials.
- (viii) Provision of leachate monitoring and control during and after filling.
- (ix) Provision for landfill gas monitoring and control (including extraction) during and after filling.
- (x) Environmental control and monitoring arrangements in addition to 7, 8 and 9 above, including details of dust control equipment, litter screens and their usage, pest, vermin and odour control, the prevention of mud and other debris leaving the site, and the prevention of asbestos fibre release.
- (xi) Provision for maintenance, service and repair of site equipment.
- (xii) Details of all materials or resources recovered, recycled or otherwise utilised.
- (xiii) Site security arrangements.
- (xiv) Proposals for final restoration and aftercare of the landfill.
- (xv) Water balance calculations to determine maximum cell size.

CONTENTS OF WORKING PLAN

i) The operational principle of the site is to bring up the level of the existing ground in order to prepare the area for the future development of a supermarket and associated car parking facilities. The material which will be used will comprise of broken concrete, bricks, hard-core and tarmac only which will be laid and compacted in layers and finally capped off with clay and top-soil. The top-soil used will be that which will have been stripped off the site at the start of the project. The plant used on the site will be a tracked blade which will be towing a 72T vibrating roller.

ii) The access road from the main road will have to be widened to 8 metres to allow the passing of wagons. A haul road from the access road to the site will have to be constructed from planing-off material, 8 metres wide.

A wheel-cleaning grid facility will be constructed, just off the haul road, to remove the excess mud from the wagons on wet days.

The existing topsoil will be stripped off the site and will be used to form a bund around the site to prevent illegal tipping.

At the entrance to the site a lockable gate will be erected to prevent ingress into the site during the hours the site is not working.

iii) All vehicles checked in on record sheets as used by the site at Warden Law. Asbestos waste, drummed waste, tankered waste and any other difficult or hazardous wastes will not be permitted on the site.

iv) All vehicles entering the site have their loads checked by the site operatives. Any material other than broken concrete, bricks, hard-core and tarmac will be turned away. If during the course of the day a wagon does turn up with pieces of plastic, metal or such-like mixed in with the concrete, bricks etc. these will be removed from the wagon and placed into segregation skips to be taken away at a later date.

v) Site controlled by M. Turnbull, Contracts Manager (Level 4 WAMITAB). Foreman to supervise site operatives' welfare, wages, time-keeping, safety and record sheets.

Machine operative experienced on other landfill sites so constant supervision will not be required. If a problem does occur on site, Mel Turnbull and other supervisors can be contacted on the radio, which will be left on site.

vi) As aforementioned (iii) difficult wastes will not be allowed on to the site.

vii) Not applicable on this site.

viii) Not applicable on this site.

ix) Not applicable on this site.

x) The dust control measures to be taken on this site will be the same as those carried out at Warden Law. That is on dry days, when the threat of dust is high, we will employ the services of one of our water tankers to come to the site and "wet down" the dry areas to prevent the dust flying about and creating a hazard.

The only other part of this section applicable is the prevention of mud leaving the site. This will be solved by the use of the wheel-cleaning grid which will be positioned on site. In the event of extreme wet weather we have easy access to mechanical brushes from the Public Health Department on a daily basis. This would ensure that the access road and the main road would be kept clean.

xi) Should the tracked machine be a hired one, the maintenance, servicing and repair will be carried out by the hire company. If the machine is owned by ourselves, the maintenance fitters are based less than half a mile away. The fuel for the machine on site will be kept in 45 gallon drums and these will be locked away in the container, which will also house the machine at night to prevent vandalism.

xii) Not applicable on this site.

xiii) A lockable gate placed at the entrance to the site and an earth bund running around one side of the site (the other side being enclosed by a 2 metre high timber fence) will be erected to prevent "fly-tipping" during the hours the site is not working.

xiv) After the site has been brought up to the proposed levels, it will be capped off with clay, topsoiled and grass-seeded. The temporary access road, the wheel cleaning grid, the gate, the fencing and the cabins will all be removed from the site. As mentioned earlier in section (i) there is a designated construction project to be built here, namely a supermarket with car parking facilities which presumably can commence as soon as the landfill operations have been completed.

xv) Not applicable on this site

TYNE AND WEAR WASTE REGULATION AUTHORITY

**CONDITIONS OF WASTE MANAGEMENT LICENCE
FOR LANDFILL SITE**

TW452SL - HOUGHTON COLLIERY SITE

SCHEDULE 2

TYPES AND QUANTITIES OF WASTES

The following types and quantities of wastes are permitted to be deposited at the site, as per the definitions on pages 2 and 3 of this schedule.

<u>1. General Wastes</u>	<u>Quantities per Day</u>
Category A	400 tonnes
Excavation wastes only containing no biodegradable or soluble chemical material.	50 loads
Clean hardcore (concrete and brick)	

Maximum Capacity

Maximum capacity of site = 10 000 cubic metres

WASTE DEFINITIONS

1. GENERAL WASTES:

Excluding all difficult, special and liquid waste defined in Sections 2, 3 and 4.

Category

- A. Excavation wastes only, containing no biodegradable or soluble chemical material.

This category may include subsoil, sand, clay, shale or rock, provided they are not contaminated with any other materials.

- B. Construction, demolition and excavation wastes, containing only a small proportion (under 1% by volume) of timber and steel, but no other biodegradable or soluble chemical material.

In addition to these materials included in Category A, this category may include brick, stone, broken concrete, plaster, slate, tiles, and a small proportion of timber, board or steel.

- C. Industrial wastes, as defined in Section 75 of the Environmental Protection Act 1990 and in Schedule 3 of The Controlled Waste Regulations 1992, containing only a small proportion (under 1% by volume) of timber and steel, but no other biodegradable or soluble chemical material.

In addition to those materials included in Categories A and B, this category may include ceramics, glass, graphite and spun minerals.

- D. Commercial and industrial wastes, as defined in Section 75 of the Environmental Protection Act 1990 and in Schedules 3 and 4 of The Controlled of Waste Regulations 1992, containing a minimal (under 1% volume) proportion of food wastes only.

In addition to those materials permitted in Categories A, B and C, this category may include paper, plastics, board, timber, iron and steel, floor sweepings, foundry sand, boiler ash or sawdust.

- E. Household, commercial and industrial wastes, as defined in Section 75 of the Environmental Protection Act 1990 and in Schedules 1, 2, 3 and 4 of The Controlled of Waste Regulations 1988.

In addition to those materials permitted in Categories A, B, C and D, this category may include normal household refuse and food wastes from bakeries and other food processors.

2. DIFFICULT WASTES:

Those wastes whose nature gives rise to a need for special handling in order to minimise their impact on the local environment and their safety within the site, excluding special and liquid wastes defined in Sections 3 and 4.

- F. Rubber tyres, conveyor belting and similar in bulk.
- G. Animal carcasses, not containing contagious diseases.
- H. Fish processing wastes.
- I. De-watered sewage sludge and screenings.
- J. De-watered sludges from industrial effluent treatment.
- K. De-watered sludges from water treatment.
- L. Gully emptyings and road-sweepings from normal highway maintenance works.
- M. Bonded asbestos-cement wastes.
- N. Fragmentiser wastes from scrapyards.
- O. Clinical Wastes, as defined by Regulation 2(1) of the Collection and Disposal of Wastes Regulations 1988.
- P. Municipal incinerator ash or residues.
- Q. Pulverised fuel ash.
- R. Wastes of any description contained in sealed drums.

3. SPECIAL WASTES:

Those wastes listed in Part 1 of Schedule 1 of the Control of Pollution Act (Special Wastes) Regulations 1980.

4. LIQUID WASTES:

Those liquid wastes arriving at site in a purpose-designed tank, or in any container greater than 5 litres as a part-load, or in containers as a part load in a total quantity greater than 150 litres.



ENVIRONMENT
AGENCY

ENVIRONMENTAL PROTECTION ACT 1990

Section 39

07597

NOTICE OF DETERMINATION OF APPLICATION FOR SURRENDER OF WASTE MANAGEMENT LICENCE

To City of Sunderland
City Building Services
Eden Vale
Eden House Road
Sunderland
Tyne & Wear
SR4 7LD

WHEREAS on 7 September 1995 the Tyne and Wear Waste Regulation Authority granted to you a Waste Management Licence (Reference TW 452 SL) relating to:-

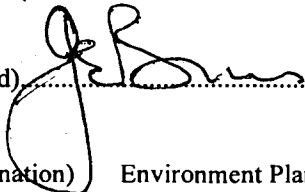
Address: The Old Railway Cutting to the Rear of
Kerrs Garage
Newbottle Street
Houghton le Spring
Tyne & Wear

Grid Reference: NZ 338 504

AND WHEREAS on 6 January 1999 you applied to the Agency to surrender said licence

The Agency hereby gives notice that it **ACCEPTS** the surrender of Waste Management Licence TW 452 SL for Houghton Colliery Site and has issued a Certificate of Completion in accordance with Section 39(9) of the Environmental Protection Act 1990

Waste Management Licence TW 452 SL shall cease to have effect from the date of issue of the Certificate of Completion

DATED 7th April 1999 (Signed) 

(Designation) Environment Planning
Manager





ENVIRONMENTAL PROTECTION ACT 1990

Section 39


CERTIFICATE OF COMPLETION

WASTE MANAGEMENT LICENCE	TW 452 SL
Name of licence holder	City of Sunderland City Building Services
Address of licence holder	Eden Vale Eden House Road Sunderland Tyne & Wear SR4 7LD
Location of site to which the licence relates	The Old Railway Cutting to the Rear of Kerrs Garage Newbottle Street Houghton le Spring Tyne & Wear
Grid Reference	NZ 338 504
Activities to which the licence relates	Disposal of waste

The Environment Agency hereby confirms that, with respect to the above waste management licence, it is satisfied that the condition of the land covered by that licence, so far as that condition is the result of the use of the land for the treatment, keeping or disposal of waste (whether or not in pursuance of the licence), is unlikely to cause pollution of the environment or harm to human health.

The Environment Agency hereby accepts the surrender of Waste Management Licence No. TW 452 SL and the licence shall cease to have effect on the date below.

DATED: 7th April.....1999

SIGNED: .....

DESIGNATION:  Environment Planning
Manager



APPENDIX D

COAL AUTHORITY



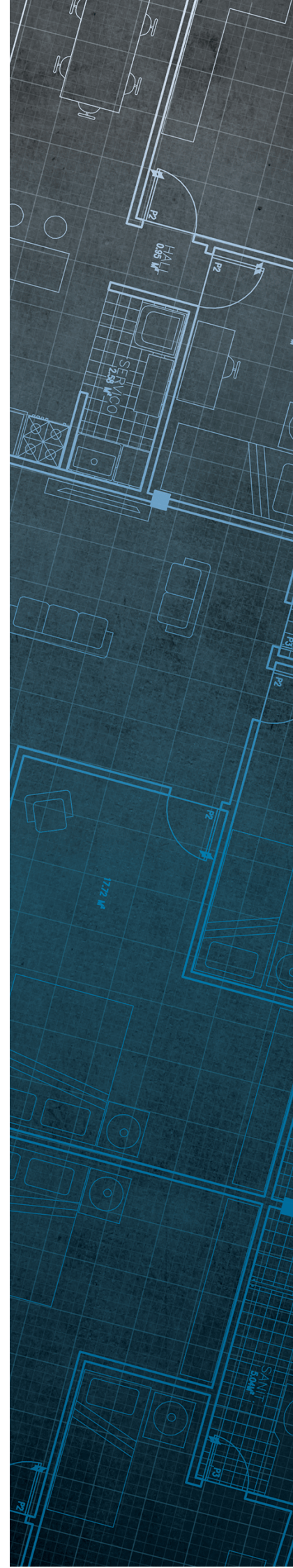
The Coal
Authority

Consultants Coal Mining Report

Former Houghton Colliery
Houghton Le Spring
Tyne & Wear

Date of enquiry: 20 March 2018
Date enquiry received: 20 March 2018
Issue date: 20 March 2018

Our reference: 51001813455001
Your reference: 2585



Consultants

Coal Mining Report

This report is based on and limited to the records held by the Coal Authority at the time the report was produced.

Client name

michael Taylor

Enquiry address

Former Houghton Colliery
Houghton Le Spring
Tyne & Wear

How to contact us

0345 762 6848 (UK)
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200 Lichfield Lane
Mansfield
Nottinghamshire
NG18 4RG

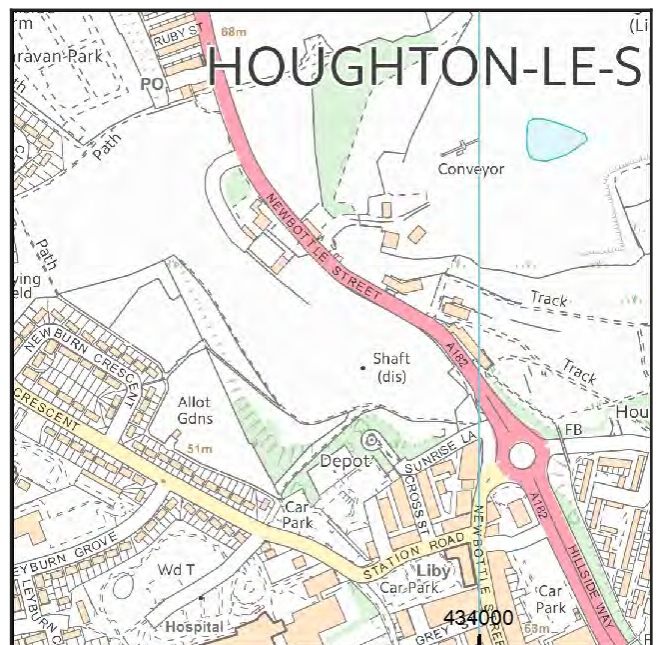
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 /company/the-coal-authority

 /thecoalauthority

 /thecoalauthority



Approximate position of property



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Ordnance Survey Licence number: 100020315

Section 1 – Mining activity and geology

Past underground mining

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
unnamed	MAIN	Coal	3HCA	122	South	2.3	East	110	1928
unnamed	MAIN	Coal	3HTM	136	Beneath Property	5.9	North-West	110	1900
HOUGHTON	YARD	Coal	3HOR	142	South	2.0	East	180	1900
HOUGHTON	MAIN	Coal	3HT8	149	North-West	3.5	North-East	110	1944
unnamed	MAUDLIN	Coal	3HSJ	164	South	2.1	North-East	150	1900
unnamed	MAUDLIN	Coal	3HL6	166	South	1.7	East	140	1943
HOUGHTON	YARD	Coal	3HCD	169	Beneath Property	8.1	North-West	200	1922
HOUGHTON	LOW MAIN	Coal	3NQO	177	Beneath Property	5.3	South-West	163	1900
HOUGHTON	YARD	Coal	3HED	181	North-West	3.3	North	200	1922
HOUGHTON	LOW MAIN	Coal	3SMH	185	East	1.7	East	130	1900
unnamed	MAIN	Coal	3HTN	187	North-East	3.0	South-East	110	1900
HOUGHTON	HARVEY	Coal	3RIM	193	Beneath Property	34.4	South-West	76	1950
unnamed	MAUDLIN	Coal	3HBY	198	West	4.1	West	150	1909
HOUGHTON	LOW MAIN	Coal	3NQE	199	Beneath Property	9.8	North	163	1900
HOUGHTON	LOW MAIN	Coal	3NQS	202	Beneath Property	6.0	North-West	163	1900
unnamed	YARD	Coal	3HOD	208	North-East	2.0	East	180	1900
unnamed	MAUDLIN	Coal	3HBK	215	Beneath Property	5.0	South-East	150	1900
unnamed	MAUDLIN	Coal	3HTJ	215	North-West	0.5	North	150	1900
unnamed	MAUDLIN	Coal	3HKK	228	North-East	6.5	North	120	1900
HOUGHTON	HUTTON	Coal	3SLI	237	Beneath Property	3.8	East	230	1900
HOUGHTON	HUTTON	Coal	3SRW	237	South-East	6.6	N/A	100	1900
HOUGHTON	HUTTON	Coal	3SLW	242	Beneath Property	3.9	North	230	1900

Colliery	Seam	Mineral	Coal Authority reference	Depth (m)	Direction to working	Dipping rate of seam worked (degrees)	Dipped direction of seam worked	Extraction thickness (cm)	Year last mined
HOUGHTON	LOW MAIN	Coal	3SLH	245	North-East	2.8	North-East	170	1900
HOUGHTON	HARVEY	Coal	3RYL	248	South	2.3	East	65	1954
HOUGHTON	HARVEY	Coal	3RXL	251	South	2.3	East	65	1949
HOUGHTON	HARVEY	Coal	3RK8	257	South	8.1	North	76	1952
HOUGHTON	HUTTON	Coal	3SSI	258	Beneath Property	2.3	North-West	100	1900
unnamed	BUSTY	Coal	3HH2	275	South-East	1.6	South-East	173	1945
unnamed	BUSTY	Coal	3HGU	276	South-East	1.7	South-East	173	1945
unnamed	BUSTY	Coal	3HFU	279	East	2.5	East	107	1945
unnamed	BUSTY	Coal	3HG2	279	East	0.7	North	173	1945
unnamed	BUSTY	Coal	3HGG	279	East	1.7	South-East	173	1945
HOUGHTON	HARVEY	Coal	3RI8	285	West	4.8	North-East	76	1946
unnamed	BUSTY	Coal	3HBU	286	South	4.4	North-West	170	1979
HOUGHTON	HARVEY	Coal	3RJM	286	North	3.6	East	76	1950
HOUGHTON	HARVEY	Coal	3RJ8	300	North-East	8.8	North-West	76	1950
HOUGHTON	HARVEY	Coal	3RWZ	313	North-East	3.2	North	76	1950

Probable unrecorded shallow workings

None.

Spine roadways at shallow depth

No spine roadway recorded at shallow depth.

Mine entries

Entry type	Reference	Grid reference	Treatment description	Mineral	Conveyancing details
Shaft	433550-001	433802 550398	This entry was originally capped in 1982 and used for washery tailings disposal until 1986. The shaft was filled from the top of the tailings to a depth of 20m from the surface with hardcore and completed to the surface with 40mm size stone in 1987. The fill was grouted from rockhead to the surface and the cap was reinstated to NCB specification in 1988.	Coal	Sunderland Borough Council 12/09/1989
Shaft	433550-002	433876 550358	This entry was originally capped in 1982 and used for washery tailings disposal until 1986. The shaft was filled from the top of the tailings to a depth of 20m from the surface with hardcore and completed to the surface with 40mm size stone in 1987. The fill was grouted from rockhead to the surface and the cap was reinstated to NCB specification in 1988.	Coal	Sunderland Borough Council 12/09/1989
Shaft	433550-003	433896 550402	This entry was located during demolition in 1982 and subsequently filled to an unknown specification.	Coal	

Abandoned mine plan catalogue numbers

The following abandoned mine plan catalogue numbers intersect with some, or all, of the enquiry boundary:

16754	D769	13451
D1096	D1464	4020
D1040	D1039	12739

Our records show we have more plans than those shown above which could affect the enquiry boundary.

Please contact us on 0345 762 6848 to determine the exact abandoned mine plans you require based on your needs.

Outcrops

No outcrops recorded.

Geological faults, fissures and breaklines

Please refer to the 'Summary of findings' map (on separate sheet) for details of any geological faults, fissures or breaklines either within or intersecting the enquiry boundary.

Faults under or close to the property recorded.

Opencast mines

None recorded within 500 metres of the enquiry boundary.

Coal Authority managed tips

None recorded within 500 metres of the enquiry boundary.

Section 2 – Investigative or remedial activity

Please refer to the 'Summary of findings' map (on separate sheet) for details of any activity within the area of the site boundary.

Site investigations

None recorded within 50 metres of the enquiry boundary.

Remediated sites

None recorded within 50 metres of the enquiry boundary.

Coal mining subsidence

The Coal Authority has not received a damage notice or claim for the subject property, or any property within 50 metres of the enquiry boundary, since 31st October 1994.

There is no current Stop Notice delaying the start of remedial works or repairs to the property.

The Coal Authority is not aware of any request having been made to carry out preventive works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991.

Mine gas

None recorded within 500 metres of the enquiry boundary.

Mine water treatment schemes

None recorded within 500 metres of the enquiry boundary.

Section 3 – Licensing and future mining activity

Future underground mining

None recorded.

Coal mining licensing

None recorded within 200 metres of the enquiry boundary.

Court orders

None recorded.

Section 46 notices

No notices have been given, under section 46 of the Coal Mining Subsidence Act 1991, stating that the land is at risk of subsidence.

Withdrawal of support notices

The property is not in an area where a notice to withdraw support has been given.

The property is not in an area where a notice has been given under section 41 of the Coal Industry Act 1994, cancelling the entitlement to withdraw support.

Payments to owners of former copyhold land

The property is not in an area where a relevant notice has been published under the Coal Industry Act 1975/Coal Industry Act 1994.

Section 4 – Further information

The following potential risks have been identified and as part of your risk assessment should be investigated further.

Development advice

The site is within an area of historical coal mining activity. Should you require advice and/or support on understanding the mining legacy, its risks to your development or what next steps you need to take, please contact us.

For further information on specific site or ground investigations in relation to any issues raised in Section 4, please call us on 0345 762 6848 or email us at groundstability@coal.gov.uk.

Section 5 – Data definitions

The datasets used in this report have limitations and assumptions within their results. For more guidance on the data and the results specific to the enquiry boundary, please **call us on 0345 762 6848** or **email us at groundstability@coal.gov.uk**.

Past underground coal mining

Details of all recorded underground mining relative to the enquiry boundary. Only past underground workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination, will be included.

Probable unrecorded shallow workings

Areas where the Coal Authority believes there to be unrecorded coal workings that exist at or close to the surface (less than 30 metres deep).

Spine roadways at shallow depth

Connecting roadways either, working to working, or, surface to working, both in-seam and cross measures that exist at or close to the surface (less than 30 metres deep), either within or within 10 metres of the enquiry boundary.

Mine entries

Details of any shaft or adit either within, or within 100 metres of the enquiry boundary including approximate location, brief treatment details where known, the mineral worked from the mine entry and conveyance details where the mine entry has previously been sold by the Authority or its predecessors British Coal or the National Coal Board.

Abandoned mine plan catalogue numbers

Plan numbers extracted from the abandoned mines catalogue containing details of coal and other mineral abandonment plans deposited via the Mines Inspectorate in accordance with the Coal Mines Regulation Act and Metalliferous Mines Regulation Act 1872. A maximum of 9 plan extents that intersect with the enquiry boundary will be included. This does not infer that the workings and/or mine entries shown on the abandonment plan will be relevant to the site/property boundary.

Outcrops

Details of seam outcrops will be included where the enquiry boundary intersects with a conjectured or actual seam outcrop location (derived by either the British Geological Survey or the Coal Authority) or intersects with a defined 50 metres buffer on the coal (dip) side of the outcrop. An indication of whether the Coal Authority believes the seam to be of sufficient thickness and/or quality to have been worked will also be included.

Geological faults, fissures and breaklines

Geological disturbances or fractures in the bedrock. Surface fault lines (British Geological Survey derived data) and fissures and breaklines (Coal Authority derived data) intersecting with the enquiry boundary will be included. In some circumstances faults, fissures or breaklines have been known to contribute to surface subsidence damage as a consequence of underground coal mining.

Opencast mines

Opencast coal sites from which coal has been removed in the past by opencast (surface) methods and where the enquiry boundary is within 500 metres of either the licence area, site boundary, excavation area (high wall) or coaling area.

Coal Authority managed tips

Locations of disused colliery tip sites owned and managed by the Coal Authority, located within 500 metres of the enquiry boundary.

Site investigations

Details of site investigations within 50 metres of the enquiry boundary where the Coal Authority has received information relating to coal mining risk investigation and/or remediation by third parties.

Remediated sites

Sites where the Coal Authority has undertaken remedial works either within or within 50 metres of the enquiry boundary following report of a hazard relating to coal mining under the Coal Authority's Emergency Surface Hazard Call Out procedures.

Coal mining subsidence

Details of alleged coal mining subsidence claims made since 31 October 1994 either within or within 50 metres of the enquiry boundary. Where the claim relates to the enquiry boundary confirmation of whether the claim was accepted, rejected or whether liability is still being determined will be given. Where the claim has been discharged, whether this was by repair, payment of compensation or a combination of both, the value of the claim, where known, will also be given.

Details of any current 'Stop Notice' deferring remedial works or repairs affecting the property/site, and if so the date of the notice.

Details of any request made to execute preventative works before coal is worked under section 33 of the Coal Mining Subsidence Act 1991. If yes, whether any person withheld consent or failed to comply with any request to execute preventative works.

Mine gas

Reports of alleged mine gas emissions received by the Coal Authority, either within or within 500 metres of the enquiry boundary that subsequently required investigation and action by the Coal Authority to mitigate the effects of the mine gas emission.

Mine water treatment schemes

Locations where the Coal Authority has constructed or operates assets that remove pollutants from mine water prior to the treated mine water being discharged into the receiving water body.

These schemes are part of the UK's strategy to meet the requirements of the Water Framework Directive. Schemes fall into 2 basic categories: Remedial – mitigating the impact of existing pollution or Preventative – preventing a future pollution incident.

Mine water treatment schemes generally consist of one or more primary settlement lagoons and one or more reed beds for secondary treatment. A small number are more specialised process treatment plants.

Future underground mining

Details of all planned underground mining relative to the enquiry boundary. Only those future workings where the enquiry boundary is within 0.7 times the depth of the workings (zone of likely physical influence) allowing for seam inclination will be included.

Coal mining licensing

Details of all licenses issued by the Coal Authority either within or within 200 metres of the enquiry boundary in relation to the under taking of surface coal mining, underground coal mining or underground coal gasification.

Court orders

Orders in respect of the working of coal under the Mines (Working Facilities and Support) Acts of 1923 and 1966 or any statutory modification or amendment thereof.

Section 46 notices

Notice of proposals relating to underground coal mining operations that have been given under section 46 of the Coal Mining Subsidence Act 1991.

Withdrawal of support notices

Published notices of entitlement to withdraw support and the date of the notice. Details of any revocation notice withdrawing the entitlement to withdraw support given under Section 41 of the Coal Industry Act 1994.

Payment to owners of former copyhold land

Relevant notices which may affect the property and any subsequent notice of retained interests in coal and coal mines, acceptance or rejection notices and whether any compensation has been paid to a claimant.




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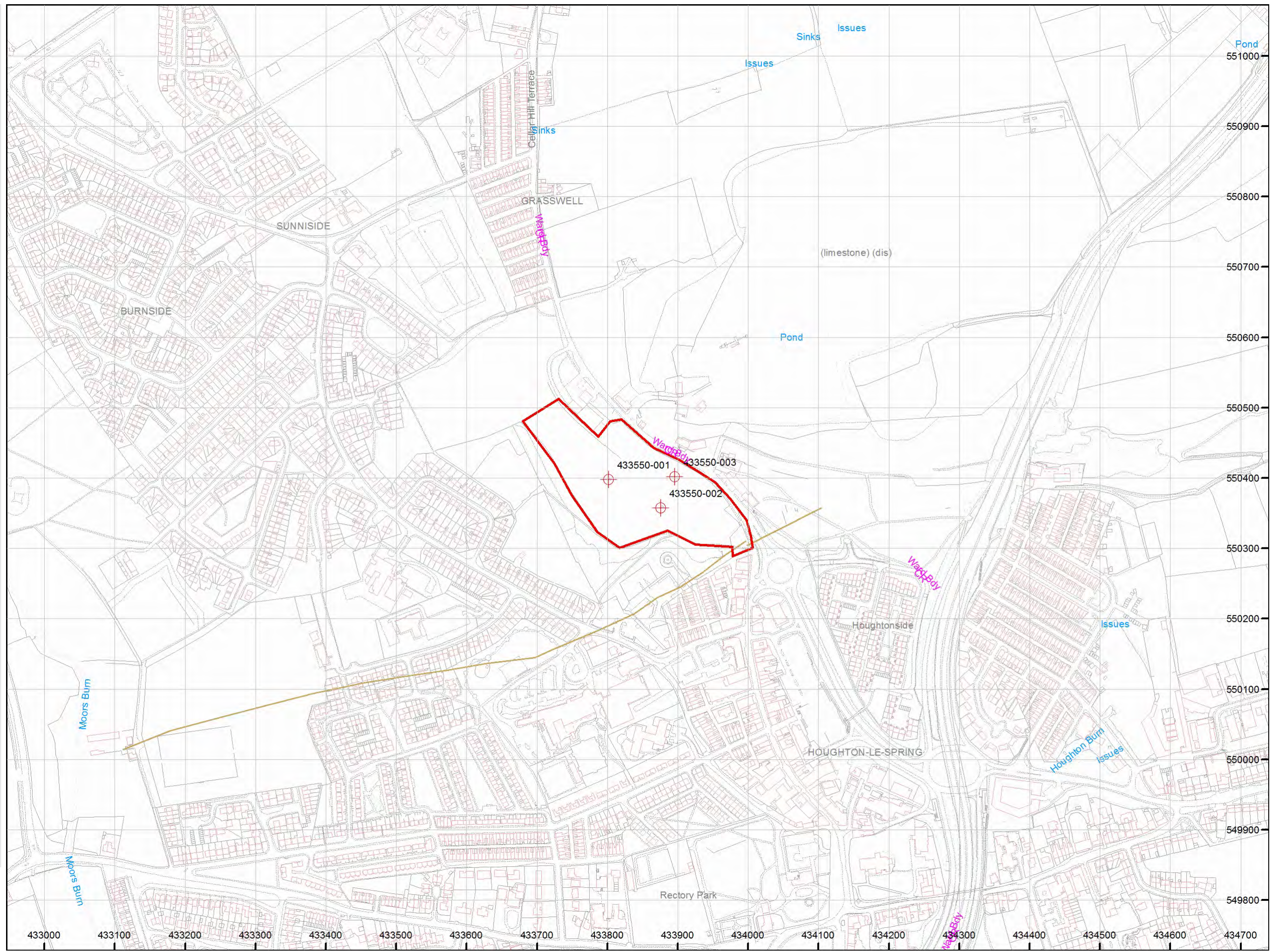
VAT receipt

Issued by	The Coal Authority 200 Lichfield Lane Mansfield Nottinghamshire NG18 4RG
Tax point date	20 March 2018
Issued to	MICHAEL TAYLOR 18 BEWICK ROAD BENSHAM GATESHEAD NE8 4DP
Property search for	FORMER HOUGHTON COLLIERY HOUGHTON LE SPRING TYNE & WEAR
Reference number	51001813455001
Date of issue	20 March 2018
Cost	£101.70
VAT @ 20%	£20.34
Total received	£122.04
VAT registration	598 5850 68

The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

- Approximate position of the enquiry boundary shown 
- Disused mine shaft 
- Geological faults 



How to contact us
 0345 762 6848 (UK)
 +44 (0)1623 637 000 (International)
 www.groundstability.com



The Coal Authority

Policy For Building Over Or Within The Influencing Distance Of A Mine Entry

Building over or within the influencing distance of a mine entry (shaft or adit) can be dangerous and has the potential for significant risks to both the development and the occupiers if not undertaken appropriately.

The Coal Authority own the majority of the coal mine entries in Britain and has adopted the following policy position for landowners and/or developers when considering building over or within the influencing distance of a mine entry.

1. Building over or within the influencing distance of a mine entry raises significant safety and engineering risks and exposes all parties to potential financial liabilities and as a general precautionary principle, should wherever possible be avoided
2. Building over or within the influencing distance of a mine entry will only be permissible when:
 - Expertise advice allows a suitable engineering design to be developed and agreed to take account of all the relevant safety and environmental risk factors including gas and mine-water.
 - The Coal Authority will not be responsible for financial or maintenance liabilities associated with the design and implementation of the works.
 - Appropriate engineering precautions are taken to safeguard the safety of the public and any structure during and following the completion of the works.
 - Approval for the works is obtained from The Coal Authority Permissions Service which will also monitor the implementation of the works to ensure public safety.
3. The position and recorded treatment details for the mine entry will be revealed in any future coal mining report produced for prospective purchasers of the property. Consequently it is necessary for the landowner and/or developer to undertake any work precisely in accordance with the agreed scheme and provide detailed information to The Coal Authority for inclusion within its records for future reference and disclosure.
4. Where any damages result as a consequence of failing to comply with this policy the Coal Authority will seek to recover any costs incurred.

Policy Approved by: S Reed, Director of Operations, January 2012

APPENDIX E

BGS LOGS

SECTION OF Houghton Colliery, downcast shaft.

(County, Sheet and Qtr.)

PURPOSE

NZ 35 SW 28
(Nat. Grid, Sheet and Qtr.)

EXACT SITE NZ. 33876. 50360.

Attach tracing from a map or sketch map if possible

7 SEP 1999

LEVEL AT WHICH ^{shaft}~~bore~~ COMMENCED RELATIVE TO O.D.C. 10213.54' A.A.D.

RECEIVED

DATE OF SINKING OR BORING

deepened 1941 to 1942
1823 to 1827

SINKER OR BORER

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
	Soil, black			1	0
	Peat			4	0
	Sand with water			18	0
	Seatearth, blue and grey			25	6
	Sandstone, brown/white, with water			44	6
	Shale with water			48	0
	COAL	0	9	48	9
	Seatearth			59	4
	COAL	0	4	59	8
	Shale with ironstone nodules			74	0
	Sandstone, with shale partings			85	0
	COAL	0	9	85	9
	Seatearth, brown			86	3
	COAL	0	9	87	0
	Seatearth			94	6
	Shale with hard patches			125	0
	Mudstone black			131	6
	COAL with water	0	2	131	8
	Seatearth			133	4
	COAL	0	6	133	10
	Seatearth			135	10
	Sandstone			140	10

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
	Shale with water			144	3
British Geological Survey	COAL	0	4	144	7
	Seatearth with water			155	9
	Sandstone with hard patches and water			169	0
	Shale			170	0
British Geological Survey	COAL	0	7		
Seam C	Seatearth	BGS REGISTRATION NO. NZ 35 SW 1 98		0	2
	COAL	PAGE NO. 2		0	4
	Seatearth			171	1
	Seatearth			174	0
British Geological Survey	Shale and sandstone			179	3
	COAL	0	7	179	10
	Seatearth			184	10
	Siltstone with hard patches			201	5
British Geological Survey	Sandstone, white, broken with water			205	5
	Shale			205	11
	Sandstone, white, broken with water			236	3
	Mudstone, black and carbonaceous			236	9
British Geological Survey	Siltstone			237	10
	Sandstone, white			239	2
	Siltstone			252	7
Seam D	COAL	2	5	255	0
	Seatearth			267	3
British Geological Survey	Shale and grey siltstone			300	9
	COAL	1	0	301	9
	Seatearth			302	8
	Siltstone with bands of sandstone			310	7
British Geological Survey	Mudstone, black and carbonaceous			311	4
	Sandstone, grey with siltstone partings			314	9
	COAL	0	9	315	6
British Geological Survey	Seatearth			315	11

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
	Siltstone			317	11
	Sandstone, white, broken			328	5
	Shale with ironstone nodules			339	11
	Seatearth			346	1
	Sandstone, grey			346	9
	Shale, dark			349	11
	Sandstone			350	7
	Siltstone with sandstone bands			364	7
	COAL	1	1	365	8
	Siltstone			381	8
	Shale with coaly streaks			383	2
	Sandstone, grey with hard patches			392	11
	Sandstone, white with hard patches			407	5
	Siltstone			428	5
	Shale with ironstone nodules			438	7
Top High Main (E1)	COAL	0	8		
	Band	0	3		
	COAL	1	0	440	6
	Seatearth			440	7
	Stone with coaly bands			444	0
Bottom High Main (E2)	COAL, coarse	3	3	447	3
	Siltstone			453	6
	Seatearth			458	0
Top Main (F1)	COAL	2	0	460	0
	Seatearth			463	0
	Siltstone			490	9
Bottom Main (F2)	COAL	3	4	494	1
	Seatearth			500	1
	Siltstone			524	10
	Sandstone			527	6
	Siltstone			537	9

30 SEP 1972

/98

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
British Geological Survey Yard (G) British Geological Survey	Sandstone			538	11
	Shale with ironstone nodules			570	1
	Band	0	2		
	COAL, top 10" coarse	3	8		
	Band	0	1		
	COAL, basal 8" coarse	2	4	576	4
	Seatearth			578	10
	Shale and siltstone			605	2
	Sandstone, white, strong			616	7
	Siltstone			617	11
	British Geological Survey Maudlin (H) British Geological Survey	Sandstone			625
Siltstone				629	2
COAL, top 10" coarse		3	6		
Splint		0	4		
COAL		1	3	634	3
Seatearth				637	0
Siltstone				657	0
Sandstone, broken coarse				698	9
Shale				699	1
COAL		1	1		
British Geological Survey Low Main (J) British Geological Survey		Splint	0	2	
	COAL	0	9		
	Splint	0	1		
	COAL	2	7	703	9
	Seatearth			704	10
	Shale and siltstone			732	7
	COAL	1	6	734	1
	Seatearth			736	1
	Sandstone			738	1
	Shale			738	8
	British Geological Survey Top Brass Thill (K1) British Geological Survey	COAL	1	9	740
Seatearth				742	8
COAL		1	9	740	5
British Geological Survey Bottom Brass Thill (K2)	Seatearth			742	8
	COAL	1	9	740	5

BGS REGISTRATION NO

NZ 35 SW 98

PAGE NO. 4

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
British Geological Survey	Shale and siltstone, some sandstone and ironstone bands			774	9
	Shale			780	0
Hutten (L)	COAL	4	5		
	Seatearth	1	7		
British Geological Survey	COAL	1	5	787	5
	Seatearth			793	10
	Sandstone, sandy			799	11
	Shale			803	3
British Geological Survey	Sandstone, sandy			807	7
	Shale, some sandstone bands			813	4
	Midstone, black, slaty			813	11
	COAL	0	5	814	4
British Geological Survey	Shale			828	9
	COAL	0	7	829	4
	Seatearth			829	7
	Sandstone, sandy with shale partings			843	0
	Shale			846	3
British Geological Survey	COAL	0	8	846	11
	Seatearth			847	5
	Sandstone, sandy with shale partings			851	4
British Geological Survey	Shale			853	8
	Sandstone, sandy			855	2
	Shale, strong			858	4
	Sandstone, sandy			860	11
	Shale, strong			862	2
British Geological Survey	Sandstone, flaggy some siltstone bands			869	7
	Shale			894	4
	COAL	0	3		
	Band	0	4		
British Geological Survey	COAL	0	8	895	7 1/2

BGS REGISTRATION NO.

NZ 35 SW / 98

PAGE NO. 5

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS		DEPTH	
		FEET	IN.	FEET	IN.
	Seatearth			897	0
	Shale, strong			901	7
	COAL	0	1½	901	8½
	Seatearth with coal partings			902	6
	Shale with siltstone			914	5
	Sandstone, sandy			920	9
	Shale			921	2
	COAL	2	1½	923	3½
	Seatearth			926	5
	Sandstone, flaggy			935	6
	Shale			938	7
	COAL	0	4	938	11
	Seatearth			940	11
	COAL	0	1	941	0
	Sandstone, sandy			957	4
	COAL	0	8	958	0
	Seatearth			962	4
	Sandstone, flaggy			963	10
	Base of Shaft				

Harvey (N)

DGS REGISTRATION NO.
NZ 35 SW / 98
PAGE NO. 6

Note
The shaft was sunk to the Hutten (L) in 1823 - 1827 and was deepened to its present depth in 1941 - 1942.



23 DEC 2010

ALLIED EXPLORATION & GEOTECHNICS LIMITED

Interpretative Report

FORMER SITE OF HOUGHTON COLLIERY

for

City of Sunderland

January 2006

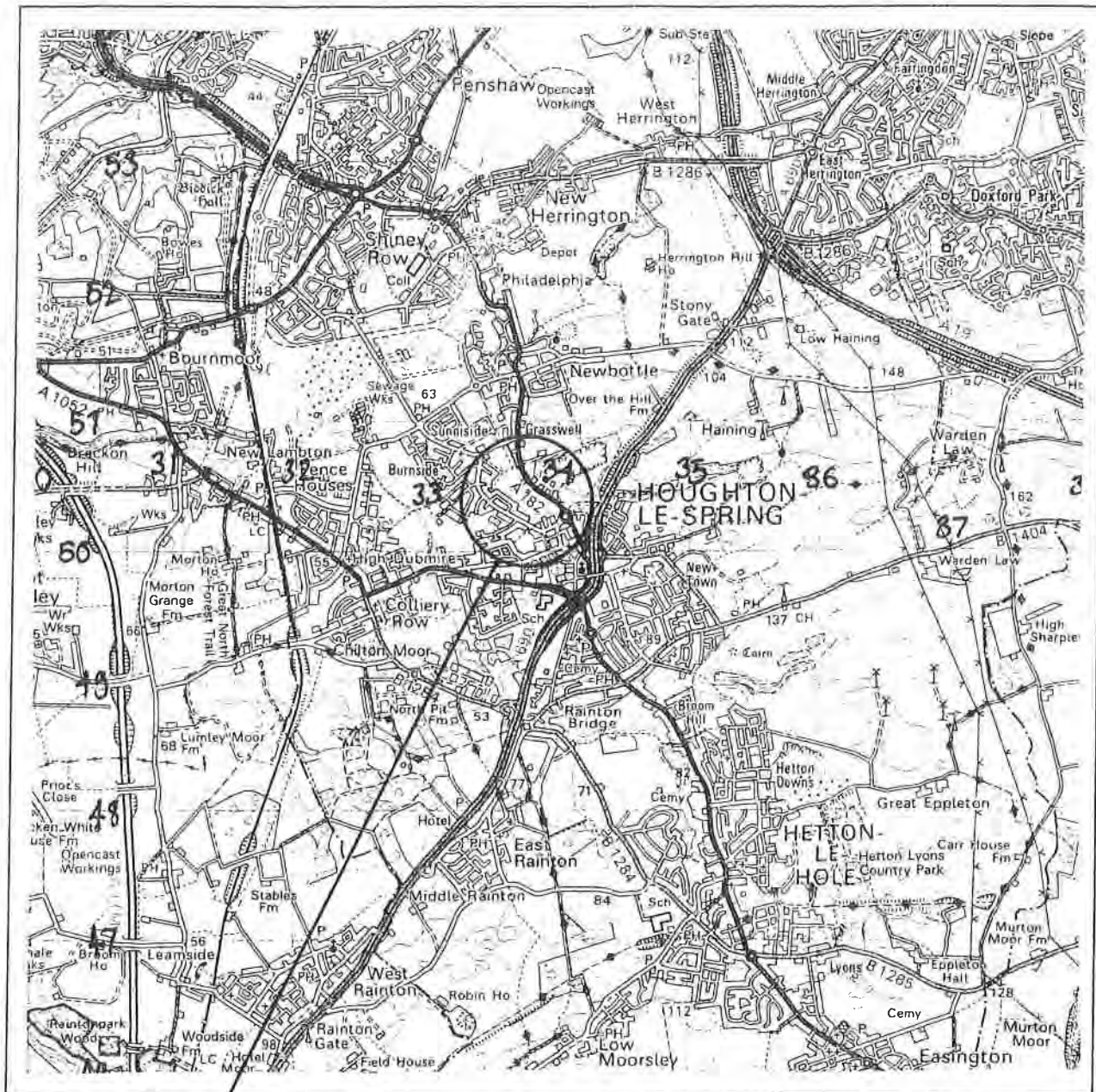
Contract No: 3455B

Head Office:
(Registered Office)
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FIGURE 1

Site Location Plan



THE SITE

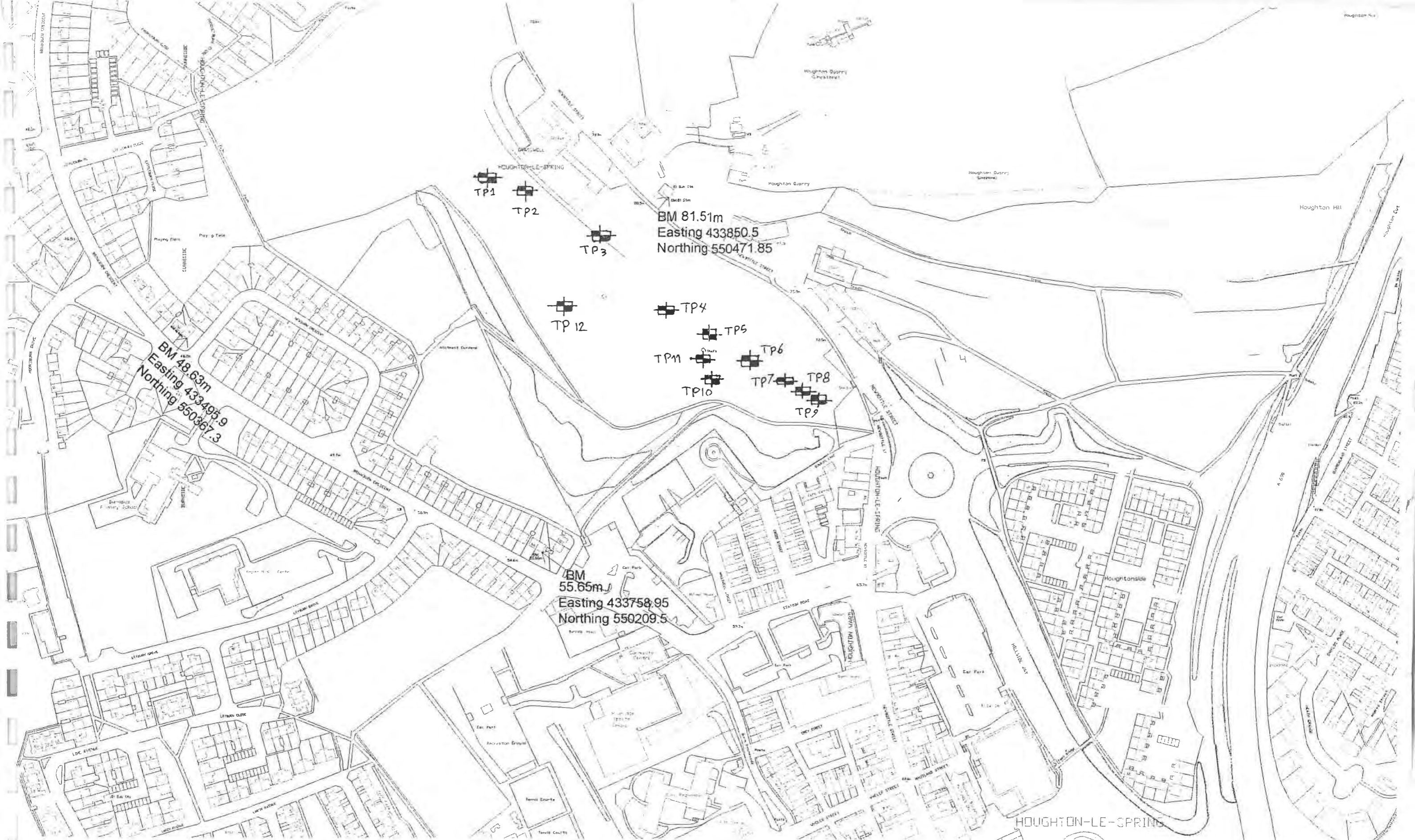
FORMER SITE OF HOUGHTON COLLIERY

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Contract No: 3455B

Figure 1

FIGURE 2
Exploratory Hole Location Plan



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Figure 2: Exploratory Hole Location Plan	Compiled by: BK
Client: City of Sunderland	Date: 09/09/05
AEG Contract No: 3455B	Last revised: 09/09/05
Title: Former Site of Houghton Colliery	Drawing No: AEG/3455B/01
Additional Information: Plans supplied by the Client	Checked by:

FIGURE 3

Key Sheets



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Key Sheet

INTRODUCTION

The following explanatory notes define the terminologies, abbreviations and symbols pertaining to each individual column or section of the Exploratory Hole records. 'Exploratory Hole' is used as a general term in this report to comprise borehole, drillhole, and trial pit. All exploratory hole records have been produced using 'gINT', which is an integrated software environment for the storage and manipulation of subsurface data.

The primary purpose of ground investigation exploratory holes is to probe the stratified sequences of soil and/or rock. From the results of these probings no conclusion should be drawn concerning the presence of size, lithological nature and numbers per unit volume of ground of cobbles and boulders in soil types such as glacial till (boulder clay).

INFORMATION COMMON TO ALL EXPLORATORY HOLE RECORDS

Status Box

The status box in the top right hand corner of each exploratory hole record gives the status of each individual record i.e. PRELIM1, PRELIM2, FINAL etc. The date shown relates to the last instance the data was revised. This information is for AEG Quality Assurance only.

Borehole/Trial Pit/Drillhole No

The exploratory hole identity number used throughout the report.

Project

The ground investigation project name. Occasionally the project name may be shortened or abbreviated due to string length restraints imposed by the gINT computer programme.

Client

Client's name responsible for funding the ground investigation project. The Client's name may be shortened or abbreviated due to string length restraints imposed by the gINT computer programme.

Location

The exploratory hole position given as either national grid co-ordinates, local grid if specified, or a reference name normally pertaining to the area of investigation.

Method & Equipment

Represents the drilling, excavation or boring method(s) or equipment used.

Ground Level (m(AOD))

The precise ground level in metres above Ordnance Datum at the exploratory hole location from which the reduced level for each stratigraphic boundary is calculated.

Date

The date relating to the start of the exploratory hole excavation.

Sheet

The sheet number and total number of sheets for the particular record.

Checked By

Signature of the person who has carried out the technical quality check on the log.

Logged By

The name of the engineer who has carried out the logging of the exploratory hole.

Contract No.

The Allied Exploration & Geotechnics Limited reference number for the project.



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Key Sheet

INFORMATION RELEVANT TO BOREHOLE RECORDS

Sample & Tests Columns

<i>Depth</i>	The depth over which a sample or test is taken is shown in depth column of the exploratory hole record in a "from...to" format.
<i>Type No</i>	Indicates the type of sample/test and number given by the driller.
<i>Test Result</i>	Result of the test given in the applicable units.

Water Column

Level of groundwater strike within an exploratory hole. The symbol  denotes a water strike and is suffixed with a number, which indicates the strike order. The corresponding unfilled symbol  is the depth the strike rose to.

Strata Columns

<i>Reduced Level</i>	The corresponding reduced level of each soil or rock boundary in metres Ordnance Datum.
<i>Legend</i>	A graphical representation of the materials encountered using BS 5930:1999 recommended symbols for soil and rock.
<i>Depth (Thickness)</i>	The depth below ground level of each soil or rock boundary in metres and the thickness of each individual stratigraphic unit (given in brackets).
<i>Description</i>	Engineering description of each individual soil or rock type following recommendations outlined in Section 6 of BS 5930:1999 with the following AEG in-house revisions. (1) Where both sand and gravel are present as secondary constituents in a fine grained soil the combined percentage of both sand and gravel is considered in defining the appropriate quantitative descriptive terms as follows (Ref.: 41.4.4.5, p121, BS 5930:1999): <ul style="list-style-type: none">• 'slightly sandy and gravelly CLAY' means that the soil contains up to 35% 'sand and gravel'.• 'sandy and gravelly CLAY' means that the soil contains between 35% and 65% 'sand and gravel'.• 'very sandy and gravelly CLAY' means that the soil contains more than 65% 'sand and gravel'. (2) Where 'rock weathering classification' can be applied it is 'Approach 2' which is generally used. If any other approach is used the factual text of the report will provide details of the applicable specific approach. (Ref.: Figure 19, p132, BS 5930:1999).

Instrument/Backfill Column

A graphical representation of backfill material or instrumentation detail using graphic legends. Its placement in the column is relative to depth in metres and corresponds to the exploratory hole in scale.

Boring Progress and Water Observations Columns

This section provides information on each days production as a daily log.

<i>Date</i>	Date of shift.
<i>Depth</i>	Depth of hole at the start of the shift.
<i>Casing</i>	Casing's depth at the start of the shift.
<i>Casing Dia</i>	Casing's diameter at the start of the shift.
<i>Water Depth</i>	Water level within the borehole at the start and end of shift.

Chiselling Columns

Indicates where hard strata occurred in the borehole and breaking out was carried out to advance the borehole.

<i>From</i>	The depth commenced.
<i>To</i>	The depth finished.
<i>Hours</i>	The time spent for breaking out.



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Key Sheet

Water Added Columns

Indicates the depth range where water was added to the borehole to facilitate boring or to prevent stress relief disturbance "blowing/boiling" in granular soils.

From Depth in metres from where water was added.
To Depth in metres to where water was added.

General Remarks

Any remarks believed to be relevant to the exploratory hole.

INFORMATION RELEVANT TO TRIAL PIT RECORDS

The trial pit records follow the same format as the borehole records for the Samples & Tests, Water and Strata columns. However, in addition to these there are the following:

Plan Column

A schematic plan view of the trial pit showing its excavated dimensions together with its orientation, given as a compass bearing to magnetic north.

Groundwater Column

Notes on water bearing horizons.

Remarks Column

The engineer's comments outlining the stability of the sides during trial pit excavation together with any other information relevant to construction of the exploratory hole.

INFORMATION RELEVANT TO DRILLHOLE RECORDS

Run Details Columns

Depth Each drill run is highlighted by a horizontal line with the top and bottom depths shown in metres.
TCR(SCR)RQD Information provided on the total core recovery, solid core recovery and rock quality designation. Refer to Abbreviations for further details.
(SPT)Fracture Index Information given relating to any SPT test carried out and/or a value for the fracture index of the rock.

Strata Columns

As the strata columns for borehole records except for description which is as follows:

Discontinuities/Detail Information on core discontinuities, localised variations in weathering, lithology, strength and structure following recommendations outlined in Section 6 BS 5930:1999:Clause 44.
Main Engineering description of each individual soil or rock type following recommendations outlined in Section 6 of BS 5930:1999 with the AEG in-house revisions as detailed for the 'Borehole Records' above.

Instrument/Backfill Column

A graphical representation of backfill material or instrumentation detail using graphic legends. Its placement in the column is relative to depth in metres and corresponds to the exploratory hole in scale.



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Key Sheet

Drilling Progress and Water Observations Columns

<i>Date</i>	Date of shift.
<i>Depth</i>	Depth of hole at the start of the shift.
<i>Casing</i>	Casing's depth at the start of the shift.
<i>Core Dia</i>	Diameter of core.
<i>Water Strike</i>	Depth at which water was encountered.
<i>Water Standing</i>	Depth at which water in the borehole levelled off.
<i>Flush Type</i>	Details of the type of flush used.
<i>Flush returns</i>	An indication of the percentage of the returned flush material



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Key Sheet

Abbreviations

SAMPLES

B	Bulk disturbed sample generally representative of the soil type for cohesive and fine granular soils.
G	Gas sample.
J	Small disturbed jar sample normally taken at intermediate depth between other sampling or testing operations. The sample is stored in an airtight container.
Ch	Sample of potentially contaminated materials. If prefixed by G, the sample is contained in a glass jar, if prefixed by a J, the sample is contained in a plastic air-tight container and if prefixed with a W the sample is a potentially contaminated water sample (ie GCh, JCh, WCh).
P	Undisturbed piston sample normally used in low strength fine grained soils to reduce the level of disturbance.
P*	An attempted but failed undisturbed piston sample.
U	General purpose 102mm diameter undisturbed sample.
U*	An attempted but failed general purpose undisturbed sample.
W	Water sample.

IN-SITU TESTS

CBR	California Bearing Ratio mould sample or test.
HSV	In-situ hand shear vane.
HP	Hand penetrometer test.
K (F)	Falling head permeability test.
K (R)	Rising head permeability test.
K (C)	Constant head permeability test.
K (P)	Packer permeability test.
PT	Pressuremeter test.
S	Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding 'N' value is given in the test result column.
C	Denotes SPT test using a solid cone in preference to the split barrel sampler (generally in coarse granular soil).
S*/C*	Denotes where full penetration has not been achieved in an SPT test. In such cases the number of blows against the amount of penetration is reported in the test result column.
SV	In-situ down the hole shear vane test. The remoulded shear strength is given in brackets.



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Key Sheet

ROCK QUALITY & 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 that are recovered with at least one full diameter, expressed as a percentage of the length of 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.
IF	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.

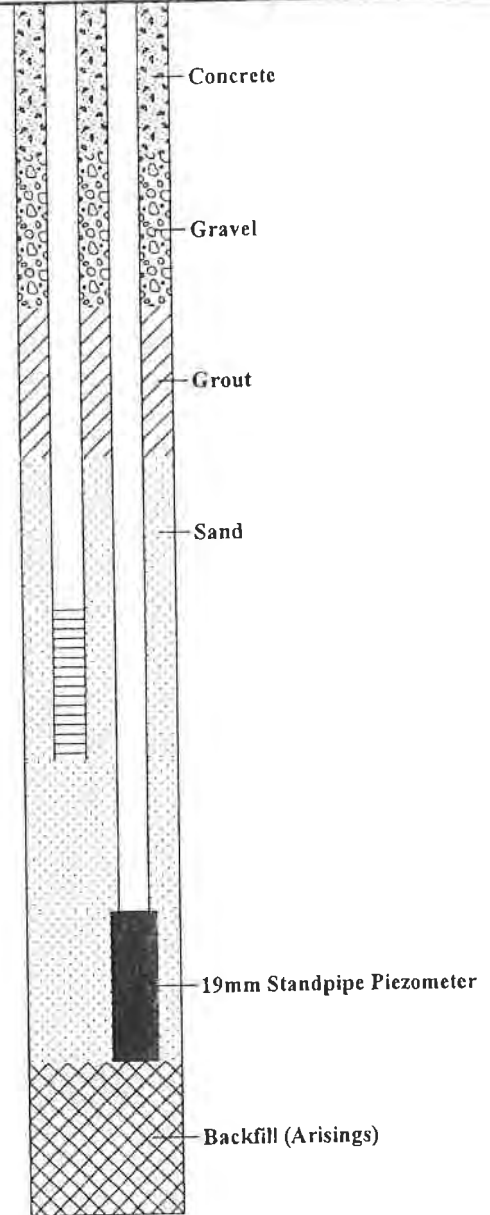
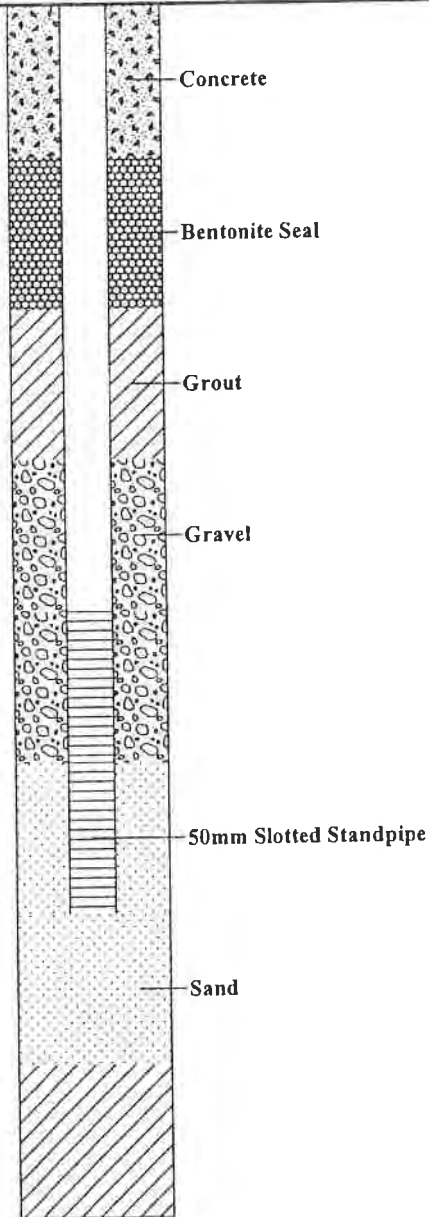
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Key Sheet

Symbols and Abbreviations : Explanation Of Instrumentation Legends Used

Single Instrument

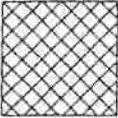
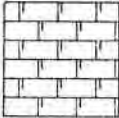
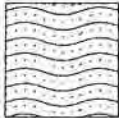
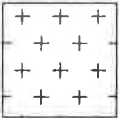


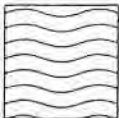
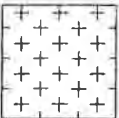

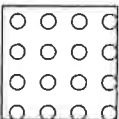
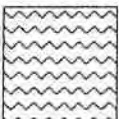




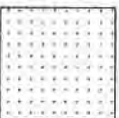





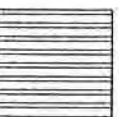


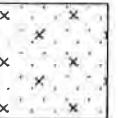

Double Instrument



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Key Sheet

Symbols and Abbreviations : Explanation Of Legends Used

Soils	Rocks		
	Sedimentary	Metamorphic	Igneous
 Made Ground	 Chalk	 Coarse Grained	 Coarse Grained
 Boulders & Cobbles	 Limestone	 Medium Grained	 Medium Grained
 Gravel	 Conglomerate	 Fine Grained	 Fine Grained
 Sand	 Breccia		
 Silt	 Sandstone		
 Clay	 Siltstone		
 Peat	 Mudstone		
 Topsoil	 Shale		
	 Coal		
	 Pyroclastic (Volcanic Ash)		
 Silty Sand	 Gypsum		

Note. Composite soil types will be signified by combined symbols e.g.



FORMER SITE OF HOUGHTON COLLIERY

1. INTRODUCTION

It is proposed to redevelop an open field at the site of the former Houghton Colliery.

Allied Exploration & Geotechnics Limited (AEG) were contracted by City of Sunderland to perform a preliminary ground investigation at this site in order to provide information on subsurface ground and groundwater conditions and to obtain samples for chemical testing.

The site works consisted of twelve mechanically excavated trial pits all with associated sampling.

Site work was carried out between 10th and 11th February 2005. A factual report with general comments on the subsurface ground conditions and a chemical contamination assessment was requested.

The comments and opinions expressed in this report are based on the ground conditions encountered during the site work and on the results of tests carried out in the field and in the laboratory. There may, however, be special conditions prevailing on the site which have not been disclosed by this investigation and which have not been taken into account by this report.

2. THE SITE

2.1 Location

The National Grid Reference of the approximate centre of the site is NZ 338 504. This can be found on Ordnance Survey 1:50,000 Sheet Number 88 (Newcastle upon Tyne, Durham and Sunderland). Part of this sheet is reproduced as Figure 1, the Site Location Plan.

The site is located 9km southwest of Sunderland City Centre around 1.5km north of Houghton le Spring town Centre.

2.2 Site Description and Topography

The site comprises a former colliery site and is surrounded by residential and industrial areas. The site has got an uneven surface and is covered by rough grass. The level differences for all trial pits locations are between 0.30 to 1.00m. There are two colliery shafts 75m from each other at the centre of the site. There are no footpaths on site but as have seen it seems local people use the site for walking and jogging. There is no proper boundary for the site except the north side of the site which is bounded by some industrial units and a petrol station and some trees. There is an old wooden fence bearing from South East to North West of the site between the shafts and trial pits TP-10, 11 and 12.

The only access for machinery and vehicles is a private road located on the northwest side and (west of the petrol station) which has been used for accessing the industrial units. The site is bounded to the North and East by Newbottle Street (A-182), to the west by allotment gardens which are located at the northeast side of Newburn Crescent and Brinkburn Crescent and to the south by Sunrise Lane.

3. SITE OPERATIONS

3.1 General

All exploratory hole work, associated sampling, *in-situ* testing and logging was carried out in accordance with techniques outlined in BS 5930:1999 or BS 1377:1990 as appropriate, at positions as near as practicable to those supplied by the Client. These are shown on the Exploratory Hole Location Plan, Figure 2.

The depths of all exploratory holes, descriptions of the material encountered, details of any groundwater encountered, samples taken and *in-situ* testing carried out together with any other relevant information can be found on the Trial Pit Records, Figure 4. A key to all symbols and abbreviations used throughout the report is included in the Key Sheets, Figure 3.

3.2 Exploratory Holes

Twelve trial pits were mechanically excavated using a CAT to depths of between 1.90m (TP-04) and 4.80m BGL (TP-07 and 10).

Photographs of the trial pits and spoil were taken prior to backfilling with compacted arisings. The photographs are presented as Appendix II.

3.3 Samples

Representative samples of soil were obtained from the exploratory holes and were taken to the laboratory for selected chemical testing.

3.4 Groundwater

The comments on groundwater conditions are based on the observations made at the time of investigation. It should be noted that groundwater levels may vary due to seasonal and other effects.

Groundwater was encountered in the exploratory holes during the site works operation. Details are given on the relevant Exploratory Hole Records.



4. LABORATORY TESTING

4.1 Specialist Chemical Testing

Selected soil samples have been screened for a range of contaminants specified by the Consulting Engineer. The results of these analyses, conducted under a subcontract arrangement with Derwentside Environment Testing Services (DETS) are presented as Appendix I.

5. GROUND CONDITIONS

5.1 General

This preliminary investigation has been carried out to provide a general understanding of the subsurface ground conditions by means of excavating 12 trial pits. No geotechnical testing and limited chemical contamination testing has also been carried out as part of this investigation.

The preliminary ground conditions revealed by these trial pits comprise made ground over possibly a thin layer of glacial drift which in turn overlies suspect sandstone bedrock. Only some of the pits which were close to the northwest boundary of the studied site revealed the full thickness of made ground. At the remainder of the site, the made ground proved to extend to depths of beyond 4.5m, beyond the maximum reach of the conventional soft ground excavators. A brief summary of the encountered material is given in this section of the report. For further details reference must be made to the trial pit records which are provided as Figure 4 in this report.

5.2 Made Ground

The whole site is covered by extensive made ground deposits which proved to be variable in thickness and heterogeneous in composition. Trial pits TP-01 to TP-06 which were located along the northwest boundary of the site proved a thickness of around 1.5 to 3.8m of made ground although this can not be stated with certainty as some of the underlying material are identified as possible made ground. It appears that over the majority of the site the made ground is much thicker, hence its full thickness could not be reached by conventional soft ground excavators with the maximum proven thickness being in excess of 4.8m.

In terms of its composition, the made ground proved to be very heterogeneous but mainly consisting of either a cohesive deposit with a variable proportion of demolition rubble including brick, concrete, clay pipe, wire, timber, plastic, glass, metal and tiles or a granular colliery spoil type fill with coal, sandstone, mudstone and ash. Although generally the cohesive demolition rubble type overlies the colliery spoil fill they can be in places interlaid or partially mixed. Based on visual assessments made during the site works the cohesive made ground is possibly firm (although it can vary between stiff and very soft) with the granular fill being probably medium dense.

5.3 Natural Soil Deposits

In TP-01 and TP-03 the made ground is underlain by natural soil deposits which are probably of glacial origin. In TP-05 and TP-06 it appears that the made ground directly overlay the completely weathered sandstone described as yellow fine sand. The remaining pits have been terminated within the made ground.

5.4 Solid Geology

Suspect rock head comprising completely weathered sandstone has been encountered in TP-01, TP-02, TP-05 and TP-06. However this has not been positively identified as bedrock by rotary coring. The maximum penetration into the suspect sandstone in these pits ranges between 0.30 to 1.00m.

5.5 Groundwater

A groundwater seepage has been reported at 3.00m BGL in TP-02 and fast flow of water at 1.5m BGL in TP-04. All other pits have been dry at the time of investigation to their maximum excavation depths. No standpipe has been installed in any of the exploratory holes to allow future monitoring of the groundwater.

6. GEOTECHNICAL CONSIDERATIONS AND DISCUSSIONS

From discussions with the client it is understood that the preferred redevelopment of the studied site is for residential concerns. No layout plans or other details have been made available at this stage. Besides, the present preliminary investigation did not include any in-situ testing or collection of undisturbed samples and geotechnical testing to allow assessment of the geotechnical properties of subsurface material to be carried out. The following discussion is therefore of preliminary and general nature.

The made ground is assessed to be in an uncontrolled fill with very variable and suspect engineering properties. The age and origin of this deposit is also unknown. Given the present level of information it is not recommended to consider the made ground as load bearing strata. Over limited area of the studied site (to the north-northwest) it may be feasible to transfer the loads to the underlying natural deposits by means of trench filling or similar measures. The very thick nature of made ground over the majority of the site, however, would prevent such options. Besides although the limited chemical contamination testing has not revealed any significant contamination (see section 7) presence of degradable material in the made ground can potentially generate methane gas.

If this site is to be seriously considered after uses such as residential housing considerations must be given to conducting a full scale detailed investigation. The main scope of such a ground investigation should include the following:

- Cable percussive boreholes with associated in-situ testing and undisturbed sampling.
- Installation of gas/groundwater standpipes.
- Geotechnical laboratory testing.
- Further chemical contamination screening including Waste Acceptance Criteria (WAC) testing.
- Obtaining and compiling a full desk study report.

7. CHEMICAL CONTAMINATION ASSESSMENT

The chemical data determined by laboratory testing on six representative samples of soil from six trial-pits, has been assessed to provide information on the potential ground contamination and its impact on human health and the future use of the site. The material was analysed for a range of contaminants based on those given in ICRCCL Guidance Note 59/83 (2nd edition June 1987). The selected samples were submitted for this screening under a subcontract agreement with Derwentside Environmental Testing Services (DETS).

It is understood that the proposed redevelopment at the site is to comprise a residential end-use. Access to the development is to be provided by a new road and roundabout layout at its western boundary.

Based on this information the assessment for soil is made in accordance with the CLEA (DEFRA, 2002), Soil Guideline Values (SGVs) for a residential with plant uptake end-use of the site. The New Dutch Contamination Standards from the Dutch Ministry of Environment 'Dutch Circular on Target Values and Intervention Values for Soil Remediation' (2000) is referenced in the absence of suitable SGVs. The threshold and action/intervention levels selected for this purpose are presented in Tables A and B.

7.1 Soil

It has been established by this investigation that the site is underlain by a variable thickness of made ground which was proven to increase in thickness eastwards to a maximum depth of 4.80m BGL. This material was encountered above natural glacial till type deposits of sand, gravels and clay.

No visual evidence of contamination was observed in any of the exploratory holes during this investigation. However a slight organic odour was detected in colliery spoil type deposits below 3.00m BGL (TP-06) in an isolated south-eastern region of the site.

Materials tested consisted of granular and cohesive material.

In accordance with the material encountered during this ground investigation the Site Designation as outlined in the 'Guidelines for Safe Drilling of Landfills and Contaminated Land' (Thomas Telford, 1993) is Green.

CLEA soil Guideline Values

The SGVs represent 'intervention values' to indicate the risk posed to the health of site users. An unacceptable risk may require further investigation and/or remediation of the site. The maximum detected concentrations and guideline values for a selected range of contaminants are presented below.

Table A – Soil

Determinand	Minimum (mg/kg)	Maximum (mg/kg)	SGV Residential with Plant Uptake (mg/kg)	No of samples exceeding SGV (Total No of samples screened)
Arsenic	6	21	20	1 (6)
Chromium	12	24	130	0 (6)
Inorganic Mercury	<0.3	0.4	8	0 (6)
Selenium	1.3	2.0	35	0 (6)
Lead	26	220	450	0 (6)
Cadmium	0.5	0.9	2	0 (6)
Nickel	8	35	50	0 (6)

In exception to a slightly elevated level of arsenic in TP-01 at 0.80m BGL, all of the detected values are below their respective SGV based on a residential with plant uptake after use of the site.

New Dutch List

The New Dutch Contamination Standards for the Dutch Ministry of Environment has been used where CLEA does not provide appropriate values. The Dutch Ministry guidance separates the level of contamination into two categories; an optimum and an action threshold. Effectively these guidelines work in a similar way to the former ICRCCL list, although more determinants are covered in the Dutch reference.



Table B – Soil

Determinant	Minimum (mg/kg)	Maximum (mg/kg)	Dutch Optimum Threshold Concentration (mg/kg)	Dutch Action Threshold Concentration (mg/kg)	No of samples exceeding Optimum (Total No of samples screened)	No of samples exceeding Action (Total No of samples screened)
Copper	28	120	36	190	5 (6)	0 (6)
Zinc	66	210	140	720	2 (6)	0 (6)
Cyanide (free)	<0.1	<0.1	1	20	0 (6)	0 (6)
Phenol-total	<0.3	0.7	<0.3	40	2 (6)	0 (6)
PAH-total	<5	17	<5	40	3 (6)	0 (6)

Slightly elevated concentrations of copper, zinc, phenol and PAH were detected above their relevant optimum threshold in TP-01, 05, 08, 10, and 12. It is considered that the values as given in this assessment criterion are exceptionally low in the context of the proposed development at the site and this contamination is not a significant human risk.

No soils were identified above the action threshold level.

7.2 Groundwater

No samples were analysed for contamination in this investigation.

8. DEVELOPMENT OF A CONCEPTUAL RISK MODEL

The UK approach to contaminated land (defined under Part IIA of Environmental Protection Act 1990, implemented through section 57 of the Environmental Act 1995) is based on the principles of a site risk assessment. This involves an assessment of the potential sources of significant harm being caused to a receptor. A conceptual source-pathway-receptor model, considers the contaminants present on the site in relation to plausible pollutant linkages. For a risk of pollution or environmental harm to occur as a result of ground contamination, all three of the following elements should be present:

- a contaminant i.e. a source that is capable of causing pollution or harm
- a receptor (or target), i.e. an animate/inanimate which could be adversely affected by the contaminant
- a pathway, i.e. a route by which the contaminant can reach the receptor based on the current or proposed use of the site.

If one of these elements is absent then there is no significant risk. If all are present, then the magnitude of the risk is a function of the magnitude and mobility of the source, the sensitivity of the receptor and the nature of the migration pathway.

Where significant pollutant linkages are present they require the adoption of appropriate mitigation (or remedial) measures based on a "suitable for use" appraisal of the site. This could instigate a suitable cost effective remediation strategy and impose other commercial and physical restraints.

Contamination Sources

It is understood that the site formerly comprised a colliery and thus is identified to be situated in a likely zone of influence of known worked seams and disused mine shafts.

A variable thickness of made ground of possible reclaimed colliery type fills and demolition rubble, potentially associated with former land restoration operations at the site, was encountered in the exploratory holes from a depth ranging between 1.15 and below 4.80m BGL. A full description of this material is given in section 5.2.

It is considered that the principle source of contamination hazard at the site is linked to such material. This may present a source of heavy metals, sulphates, combustible wastes and deleterious gases.

Coal measures strata which exist directly beneath the site are also a potential source of hazardous gas. However the potential risk associated with such is not expected to be significant given the depth of the workings and the barrier created by the upper contact of magnesium limestone.

Primary Receptors

- Human health (e.g. construction workers and site personnel involved in development works and future site users).
- Vegetation
- Construction materials (foundations, services runs and buried concrete)
- Controlled waters (groundwater and surface water resources)

Primary Pathways

The theoretical pathways by which the contaminants may reach the identified receptors include: the migration of surface water or groundwater, atmospheric dispersion of particulates, inhalation or ingestion and dermal contact.

Discussion of Significant Pollutant Linkages

For land to be defined as contaminated land there must be a significant pollutant linkage. This will involve a source of contamination (pollutant) which is linked to a receptor (humans, controlled waters etc) by a pathway of exposure (for example ingestion or dermal contact).

The geo-environmental appraisal of the site can be summarised as follows:

Risk to Human Health

A slightly elevated concentration of arsenic was encountered in surface made ground deposits in an isolated region in the south eastern corner of the site.

In accordance with the EA R&D Publication CLR 7, 2002 'Assessment of Risks to Human Health from Land Contamination' the upper 95% percentile bound value (US_{95}) for this concentration of arsenic (at 12.89) is less than the respective SGV. It can therefore be concluded that the site may be considered not to present a significant possibility of significant harm to human health in the context of Part IIA.

However during site development workers should adhere to good working practices and health and safety procedures. This should include the use of protective clothing and the strict observance of hygiene requirements.

Risk to Plant Growth

Slightly elevated levels of copper and zinc were detected in isolated surface regions of the made ground. At the levels detected and at the depth encountered such contaminants may act as a phytotoxin, however there has been no recorded evidence on site of damage to plant growth. Based on the relatively neutral to alkaline pH conditions detected in the samples, the copper and zinc are not considered to pose a significant risk to landscape areas.

Risk to Construction Materials

In accordance with BRE Special Digest 1, 2001, the soil water soluble sulphate levels, as detected in the made ground ranged between 0.11 and 0.79%, for which the Site Design Sulphate Class DS1 (ACEC class AC-1) can be considered. Based on the diffuse nature of the fill encountered, this class should be considered for use throughout the site for the protection of buried concrete foundations in aggressive ground.

The sulphate is likely to be associated with the colliery spoil type fill within the made ground at the site.

Risk to Controlled Waters (Surface Water and Groundwater)

A full investigation into the groundwater contamination at the site was not within the scope of this report.

The potential impact of the identified contamination from the site on any receiving water and aquatic life it supports is considered to be low.

Based on the low level of contamination and the poor groundwater recovery encountered during this investigation it is considered that no remedial or further action is required at the site. However during excavation works it is recommended that strict health and safety measures are implemented.

Suitability for disposal to Landfill

Material at the site has not been classified for disposal to landfill. It is recommended that soils which are excavated during future earthworks and subsequently removed off-site are tested in accordance with the Environment Agency Waste Acceptance Criteria (WAC) to BS EN 12457-3.

Post Redevelopment Risks

It is recommended as a precautionary measure during future earthwork operations, an environmental specialist is in attendance on-site to monitor for evidence of any visual/olfactory contamination which has not been revealed by this or any subsidiary ground investigations. Any suspected contaminated arisings should be stockpiled separately for verification testing.

Assessment of Ground gas

The site is identified to be situated in a likely zone of influence on the surface of known worked coal seams. However the potential risk associated with such is not expected to be significant given their depth.

The most likely source of the soil gas is from the variable thickness of made ground beneath the site.

No gas standpipes were installed in the trial pits during this investigation. In order to monitor for the presence of landfill and other potentially deleterious gases at the site, it is recommended that during further ground investigations, standpipes are installed within a response zone that is extended into the made ground.



Interpretative Report

Control Sheet

Contract Title: Former Site of Houghton Colliery

Location: Houghton le Spring

AEG Contract Number: 3455B

Report Status: FINAL

Volume Number: 1 of 1

Copy Number: 1 of 4

Issued to: City of Sunderland

Client: City of Sunderland
PO Box 102
Civic Centre
Sunderland
SR2 7DN

Consultant:

Signed

For Allied Exploration and Geotechnics Limited

M. Dickin

pp Geotechnical Engineer



Date: 13-01-06

H. E. Rowshanaei BSc, MSc, PhD, CEng, CGeol

pp Technical Director



Date: 13-01-2006

Quality Assurance Controlled



Date: 13/01/06

FIGURE 4

Trial Pit Records



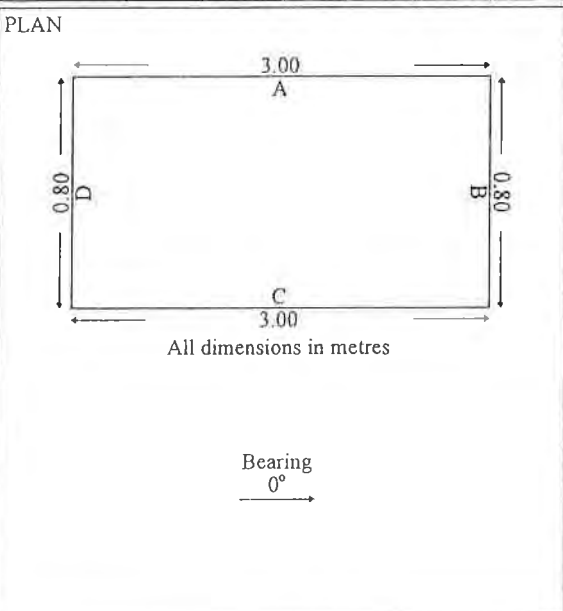
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery			Exploratory Hole No	
Client: City of Sunderland		Location: Houghton Le Spring E:433719 961 N:550486 28		TP-01
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 70.800	Date: 10/02/2005	Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.05	J1			70.700		(0.10)	MADE GROUND (Topsoil consists of brown sandy clay with some rootlets).
0.20	J2					(0.50)	MADE GROUND (Brown sandy gravelly clay Gravel is fine to coarse angular and consists of sandstone, brick, mudstone and coal).
0.50	B3			70.200		0.60	
0.80	B4					(0.50)	MADE GROUND (Black very sandy gravel with some cobbles Gravel is fine to coarse angular to subrounded and consists of coal, sandstone, mudstone, ash, wood and metal).
1.00	J5			69.700		1.10	
1.20	B6			69.500		(0.20)	MADE GROUND (Dense pink brown sandy gravel with occasional cobbles and boulders Gravel is fine to coarse angular and consists of burnt mudstone. Boulders consist of grey sandstone).
1.20	J7					(1.20)	Firm brown very sandy gravelly CLAY with occasional cobbles Gravel is fine to medium angular to subrounded and consists of sandstone Cobbles consist of sandstone. Becomes more sandy with depth. (Possible Made Ground).
2.00	B8					2.50	
2.50	J9			68.300		(0.60)	Brown slightly clayey slightly gravelly SAND Gravel is fine to coarse angular to subrounded and consists of sandstone (Possible Made Ground).
3.00	B10			67.700		3.10	
3.50	B11					(0.90)	Pink brown very gravelly SAND. Gravel is fine to coarse angular and consists of sandstone (Possibly Completely Weathered Sandstone).
4.00	J12			66.800		4.00	Trial pit complete at 4.00m BGL.



GROUNDWATER
No Groundwater inflow observed

STABILITY
Sides and base stable throughout excavation.

GENERAL REMARKS



ALLIED EXPLORATION & GEOTECHNICS LIMITED

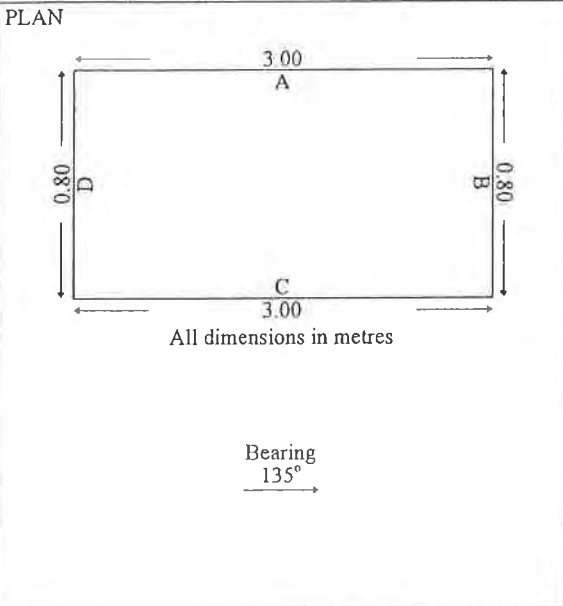
TRIAL PIT RECORD

Status:- **FINAL**

Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No TP-02	
Client: City of Sunderland		Location: Houghton Le Spring E:433744 637 N:550476 795	
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 71.188	Date: 10/02/2005
			Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.10	J1			70.938		(0.25) 0.25	MADE GROUND (Topsoil consists of brown sandy gravelly clay with many rootlets)
0.30	B2			70.488		(0.45) 0.70	MADE GROUND (Yellow sandy gravel of dolerite. Gravel is fine to coarse angular and consists of dolerite).
0.80	B3			70.038		(0.45) 1.15	MADE GROUND (Stiff brown sandy gravelly clay. Gravel is fine to coarse angular to subrounded and consists of sandstone, mudstone and coal)
1.00	J4						Light brown very gravelly SAND. Gravel is fine to coarse angular to subrounded and consists of sandstone and mudstone.
1.50	B5						
2.00	J6					(1.85)	
2.50	B7						
3.00	B8			68.188		3.00	Stiff red and grey slightly sandy CLAY.
3.50	J9			67.388		(0.80) 3.80	Very weak grey and brown fine grained SANDSTONE. (Recovered as fine to coarse subangular gravel). Trial pit complete at 4.10m BGL.
4.00	J10			67.088		(0.30) 4.10	



GROUNDWATER

Seepage at 3.00m BGL.

STABILITY

Sides and base stable throughout excavation

GENERAL REMARKS



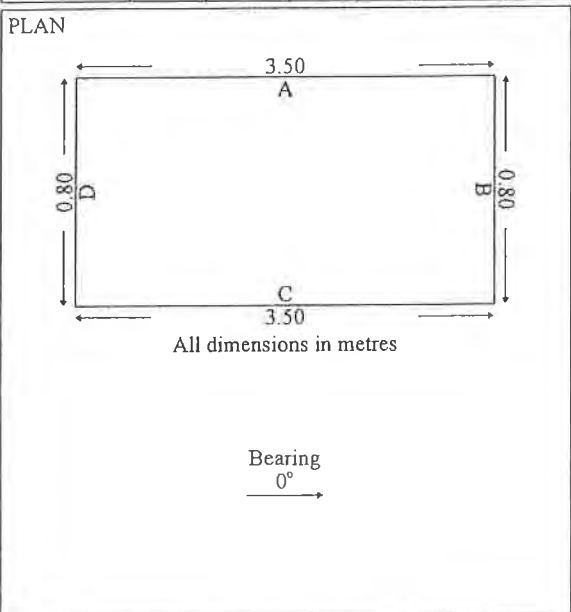
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No	
Client: City of Sunderland	Location: Houghton Le Spring E:433778 185 N:550444 576		TP-03
Method & Equipment: Machine Excavated using a CAT 428C	Ground Level (m(AOD)): 72.297	Date: 10/02/2005	Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.10	J1			72.197	[Cross-hatched pattern]	(0.10) 0.10	MADE GROUND (Topsoil consists of brown sandy gravelly clay. Gravel is fine to coarse angular to subrounded and consists of sandstone and limestone)
0.50	B2					(0.85)	MADE GROUND (Brown sandy very gravelly clay with some cobbles. Gravel is fine to coarse angular to subrounded and consists of sandstone, concrete, brick, dolerite, concrete kerbstone, claypipe, wires, timber and plastic).
0.95	J3			71.347	[Cross-hatched pattern]	0.95	MADE GROUND (Yellow sandy gravel of dolerite. Gravel is fine to coarse angular and consists of dolerite)
1.00	B4			71.097		(0.25) 1.20	MADE GROUND (Black and brown sandy gravelly clay. Gravel is fine to coarse angular and consists of coal, sandstone and mudstone)
1.30	B5				[Cross-hatched pattern]	(0.35)	MADE GROUND (Light brown gravelly sand with some cobbles. Gravel is fine to coarse angular to subrounded and consists of sandstone. Cobbles consist of sandstone)
1.50	J6			70.747		1.55	
2.00	B7				[Cross-hatched pattern]		
2.50	J8					(2.25)	
3.00	B9				[Cross-hatched pattern]		
3.80	J10			68.497		3.80	Stiff grey and red slightly sandy CLAY
				68.297		(0.20) 4.00	Trial pit complete at 4.00m BGL



GROUNDWATER
No Groundwater inflow observed.

STABILITY
Unstable in made ground.

GENERAL REMARKS



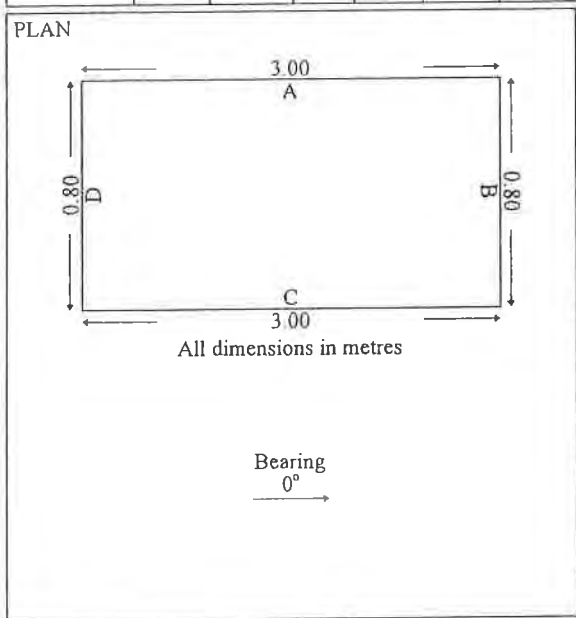
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No	
Client: City of Sunderland	Location: Houghton Le Spring E:433849.505 N:550386.393		TP-04
Method & Equipment: Machine Excavated using a CAT 428C	Ground Level (m(AOD)): 73.291	Date: 10/02/2005	Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10	J1			73.191	[Cross-hatched pattern]	(0.10) to (1.20)	MADE GROUND (Topsoil consists of brown sandy gravelly clay with rootlets. Gravel is fine to medium angular and consists of sandstone and mudstone). MADE GROUND (Brown sandy gravelly clay with many cobbles. Gravel is fine to coarse angular and consists of brick, sandstone, concrete and glass. Cobbles consist of brick, concrete, wood, tiles, plastic bags and pipe).	
0.50	B2					(1.20)		
1.00	J3			71.991			1.30	
1.50	B4						(0.60)	MADE GROUND (Yellow sandy gravel and cobbles. Gravel is fine to coarse angular and consist of sandstone. Cobbles consist of sandstone and concrete).
1.70	W5			71.391			1.90	
							Trial pit terminated at 1.90m BGL - due to water ingress.	



GROUNDWATER
Fast inflow of groundwater at 1.50m BGL.

STABILITY
Sides and base stable throughout excavation.

GENERAL REMARKS



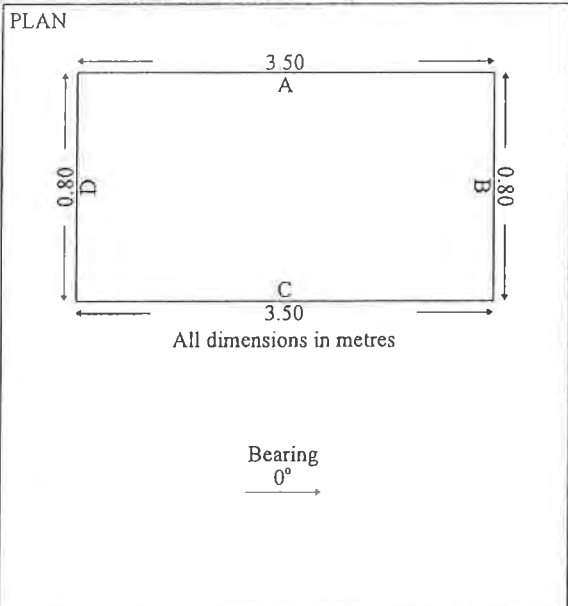
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No	
Client: City of Sunderland	Location: Houghton Le Spring E:433883 815 N:550371 259		TP-05
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 73 280	Date: 10/02/2005 Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.10	J1			73.180	(0.10)	0.10	MADE GROUND (Topsoil consists of brown sandy clay with some rootlets)
0.50	B2					(0.70)	MADE GROUND (Brown sandy gravelly clay with many cobbles. Gravel is fine to coarse angular to subrounded and consists of sandstone, brick, concrete, tiles and glass. Cobbles consist of brick, thermalite block, wood, metal, wire, plastic and concrete kerbstone).
0.80	J3			72.480		0.80	MADE GROUND (Yellow and brown sandy gravel with many cobbles and some boulders. Gravel is fine to coarse angular to subrounded and consists of dolerite, sandstone and concrete. Cobbles and boulders consist of concrete, sandstone and granite with geotextile)
1.30	B4					(0.80)	
1.50	J5			71.680		1.60	MADE GROUND (Firm brown sandy gravelly clay with occasional boulders. Gravel is fine to coarse angular to subrounded and consists of sandstone, tarmacadam and brick. Boulders consist of tarmacadam with concrete paving slabs, concrete and kerbstone).
2.00	B6					(0.90)	
2.50	J7			70.780		2.50	MADE GROUND (Yellow sandy gravel with many cobbles. Gravel is fine to coarse angular and consist of dolerite)
3.00	B8					(0.80)	
3.20	J12			69.980		3.30	MADE GROUND (Firm brown very sandy gravelly clay. Gravel is fine to coarse angular and consists of dolerite).
3.40	J9			69.780		(0.20)	Fine yellow SAND.
3.80	B10					(1.00)	
4.30	J11			68.780		4.50	Trial pit complete at 4.50m BGL.



GROUNDWATER
No Groundwater inflow observed

STABILITY
Sides and base stable throughout excavation.

GENERAL REMARKS



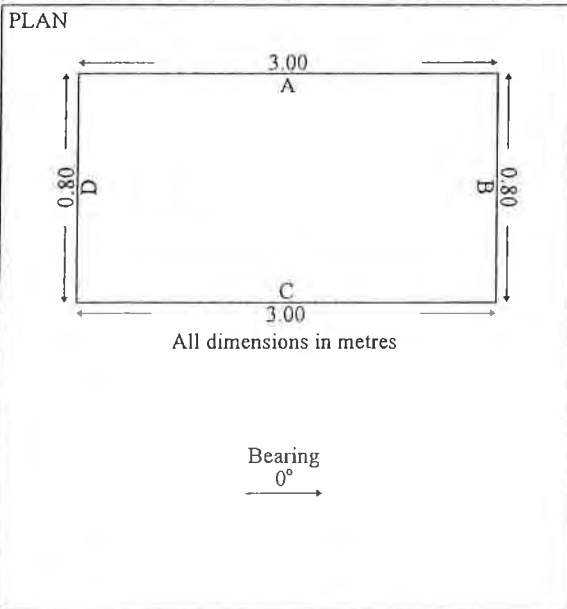
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery			Exploratory Hole No		
Client: City of Sunderland			Location: Houghton Le Spring E:433912 341 N:550353 121		
Method & Equipment: Machine Excavated using a CAT 428C			Ground Level (m(AOD)): 72 112		Date: 10/02/2005
					Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.10	J1			72.012		(0.10) 10	MADE GROUND (Topsoil consists of brown sandy gravelly clay with some rootlets. Gravel is fine to medium angular and consists of sandstone and coal).
0.50	B2						MADE GROUND (Firm brown sandy gravelly clay with occasional boulders. Gravel is fine to coarse angular to subangular and consists of bricks, sandstone, dolerite, coal and tarmacadam. Boulders consist of brick and mortar with geotextiles, steel banding, tarmacadam, tiles, wood, kerbstone and polystyrene tiles).
1.00	J3					(2.60)	
2.00	B4						
2.50	J5			69.412		2.70	
2.60	B6						
2.70	J7			69.112		(0.30) 3.00	MADE GROUND (Yellow sandy gravel of dolomite. Gravel is fine to coarse angular).
						(0.70)	MADE GROUND (Firm brown sandy gravelly clay. Gravel is fine to coarse angular to subrounded and consists of dolomite, coal, sandstone and mudstone slight organic odour).
3.50	B8			68.412		3.70	
3.70	J9						
4.00	B10					(0.80)	
4.50	J11			67.612		4.50	Trial pit complete at 4.50m BGL.



GROUNDWATER
No Groundwater inflow observed.

STABILITY
Sides and base stable throughout excavation.

GENERAL REMARKS



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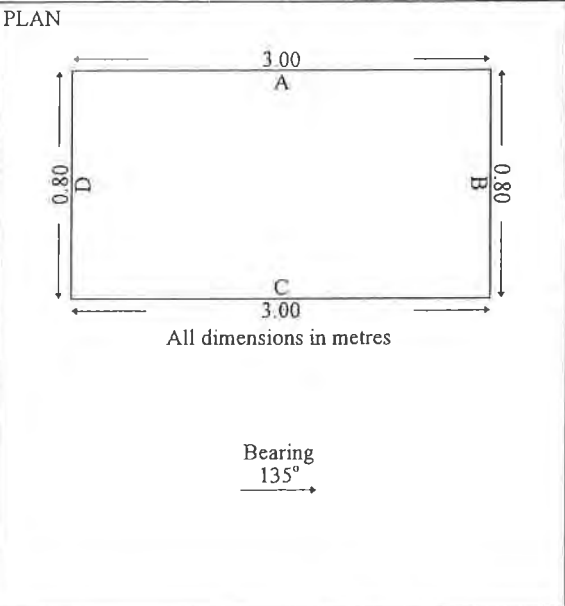
TRIAL PIT RECORD

Status:- **FINAL**

Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No TP-07	
Client: City of Sunderland	Location: Houghton Le Spring E:433941 374 N:550334 369		
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 72.085	Date: 11/02/2005
		Sheet: 1 of 1	

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10	J1			71.985		(0.10)	MADE GROUND (Topsoil consisting of soft brown sandy gravelly clay with some rootlets. Gravel is fine to medium subangular to subrounded and consists of coal, mudstone, bricks and sandstone)	
0.50	B2					(2.80)	MADE GROUND (Firm brown very sandy very gravelly clay with occasional boulders. Gravel is fine to coarse angular and consists of concrete, sandstone, brick, glass and coal. Boulders consist of concrete, concrete kerbstone, slabs, wires, wood, plastics, pop bottles, tarmacadam, concrete lamp posts, security warning signs).	
1.00	J3							
1.50	B4							
2.00	J5							
2.50	B6							
				69.185			2.90	
3.00	J7						(0.40)	MADE GROUND (Yellow sandy gravel consists of dolerite. Gravel is fine to coarse angular).
3.20	B8			68.785			3.30	MADE GROUND (Brown very clayey very gravelly sand with some cobbles. Gravel is fine to coarse angular and consists of sandstone, dolerite and coal. Cobbles consist of sandstone).
3.50	B9							
4.00	J10						(1.50)	
4.40	B11							
4.80	B12			67.285		4.80	Trial pit complete at 4.80m BGL.	



GROUNDWATER
No Groundwater inflow observed

STABILITY
Unstable in made ground.

GENERAL REMARKS



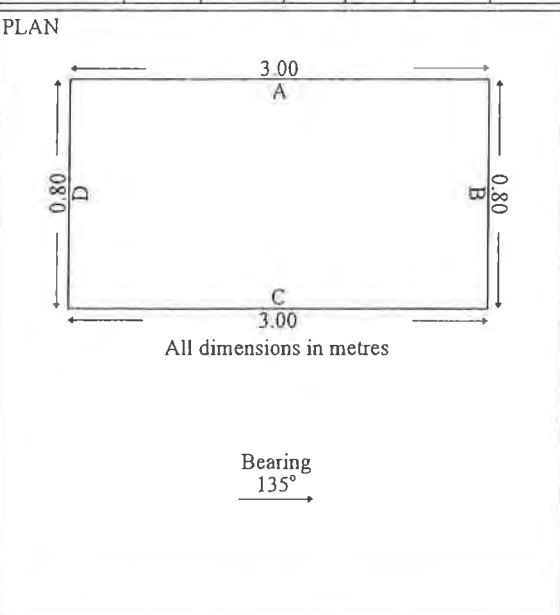
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TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No TP-08	
Client: City of Sunderland	Location: Houghton Le Spring E:433950.712 N:550531.88		
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 71.217	Date: 11/02/2005 Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.10	J1			71.117		(0.10) to 1.00	MADE GROUND (Topsoil consists of soft brown sandy clay with some rootlets) MADE GROUND (Firm brown sandy gravelly clay with some cobbles. Gravel is fine to coarse angular and consists of brick, sandstone, mudstone and coal)
0.50	B2					(0.90)	
1.00	J3			70.217		1.00	
1.50	B4						
2.00	J5					(2.40)	
2.50	B6						
3.10	J7			67.817		3.40	
							Trial pit terminated at 3.40m BGL.



GROUNDWATER
No Groundwater inflow observed

STABILITY
Sides and base unstable throughout excavation.

GENERAL REMARKS



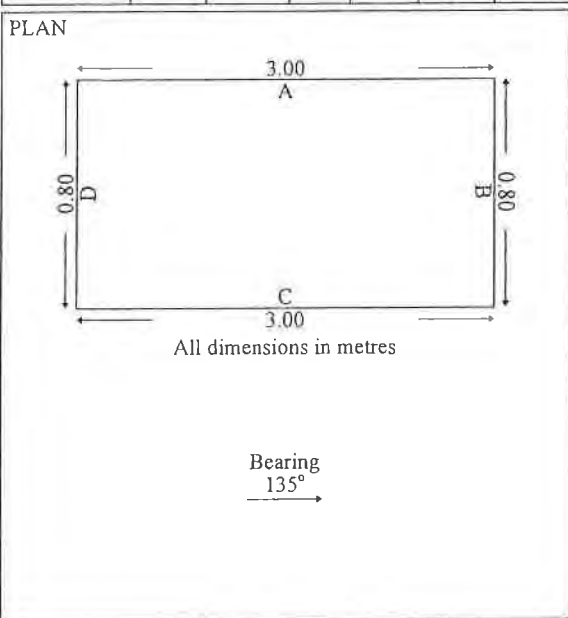
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No	
Client: City of Sunderland		Location: Houghton Le Spring E.433959 868 N 550329 112	
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 71 636	Date: 11/02/2005
		Sheet: 1 of 1	

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10	J1			71.536		(0.10) 0.10	MADE GROUND (Topsoil consists of brown sandy gravelly clay with rootlets. Gravel is fine to medium angular and consists of sandstone and dolerite).	
0.50	B2					(1.30)	MADE GROUND (Brown very clayey gravelly sand with many cobbles and occasional boulders. Gravel is fine to coarse angular and consists of coal, tarmacadam, sandstone, brick, concrete, mudstone and glass. Cobbles consist of brick, concrete and sandstone. Boulders consist of concrete, plastics, wire, steel bonding and paving slabs)	
1.00	J3			70.236		1.40		
1.50	B4							MAE GROUND (Stiff brown sandy gravelly clay with some cobbles. Gravel is fine to coarse angular and consists of sandstone, mudstone and dolerite. Cobbles consist of brick).
2.00	J5						(1.40)	
2.50	B6			68.836		2.80		
3.00	B7			68.436		(0.40)	3.20	MADE GROUND (Firm brown sandy gravelly clay with lenses of grey soft black clay. Gravel is fine to coarse angular to subrounded and consists of wood, brick and concrete).
3.20	J8						(0.60)	MADE GROUND (Very soft black slightly sandy clay).
3.50	B9			67.836		3.80		trial pit terminated at 3.80m BGL.



GROUNDWATER
No Groundwater inflow observed

STABILITY
Sides and base stable throughout excavation

GENERAL REMARKS



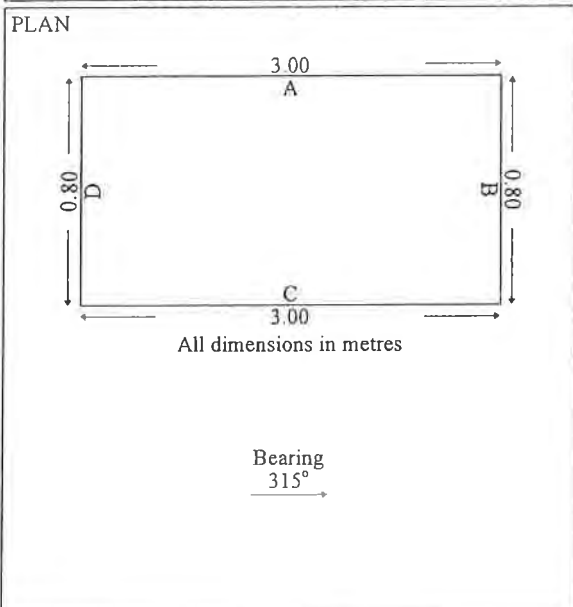
ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

Status:- **FINAL**
Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No
Client: City of Sunderland	Location: Houghton Le Spring E:433884 248 N:550336 647	TP-10
Method & Equipment: Machine Excavated using a CAT 428C	Ground Level (m(AOD)): 72 609	Date: 11/02/2005 Sheet: 1 of 1

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION
0.10	J1			72.509		(0.10)	MADE GROUND (Topsoil consists of soft brown sandy clay with some rootlets)
0.20	B2			72.209		(0.30)	MADE GROUND (Light brown sandy gravelly clay)
0.40	J3						MADE GROUND (Black and dark brown very clayey gravelly sand Gravel is fine to coarse angular and consists coal, ash, burnt mudstone, sandstone, slag and dolomite)
1.00	B4					(1.80)	
1.50	J5						
2.00	B6			70.409		2.20	MADE GROUND (Firm brown sandy gravelly clay with some cobbles Gravel is fine to coarse angular and consists of sandstone and dolomite)
2.50	B7					(0.70)	
2.90	J8			69.709		2.90	MADE GROUND (Black gravelly sand of ash. Gravel is fine to coarse angular and consists of ash and coal).
3.20	B9						
3.80	J10					(1.90)	
4.30	B11						
4.80	J12			67.809		4.80	Trial pit complete at 4.80m BGL.



GROUNDWATER
No Groundwater inflow observed.

STABILITY
Sides and base stable throughout excavation.

GENERAL REMARKS



ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

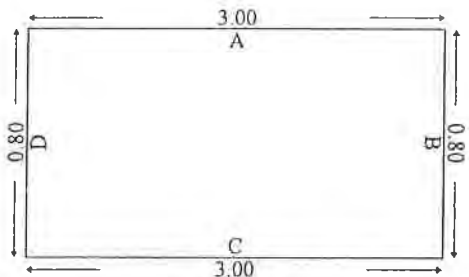
Status:- **FINAL**

Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No TP-11	
Client: City of Sunderland		Location: Houghton Le Spring E:433821.854 N:550349.231	
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 73.019	Date: 11/02/2005 Sheet: 1 of 1

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10	J1			71.919		(0.10) 10	MADE GROUND (Topsoil consists of soft brown sandy clay with rootlets)	
0.30	B2			72.719		(0.20) 30	MADE GROUND (Stiff brown slightly sandy slightly gravelly clay. Gravel is fine to coarse angular to subangular and consists of dolomite)	
0.50	B3						MADE GROUND (Black and brown slightly clayey very gravelly sand with some cobbles. Sand consists of coal. Gravel is fine to coarse angular and consists of sandstone, coal and ash. Cobbles consist of sandstone and brick)	
1.00	J4							
1.50	B5						(2.70)	
2.00	J6							
2.50	B7							
3.20	B8			70.019			3.00	MADE GROUND (Grey and brown slightly sandy gravel with some cobbles. Gravel is fine to coarse angular and consists of coal, mudstone and sandstone. Cobbles consist of mudstone and sandstone)
3.80	J9						(1.50)	
4.50	B10			68.519			4.50	Trial pit complete at 4.50m BGL

PLAN



All dimensions in metres

Bearing
45°

GROUNDWATER

No Groundwater inflow observed.

STABILITY

Sides and base stable throughout excavation.

GENERAL REMARKS

All dimensions in metres
Scale 1:50

For explanation of symbols and abbreviations see Key Sheets

Checked by:
SWAGUP

Logged by:
M Dickin

Contract No.
3455B



ALLIED EXPLORATION & GEOTECHNICS LIMITED

TRIAL PIT RECORD

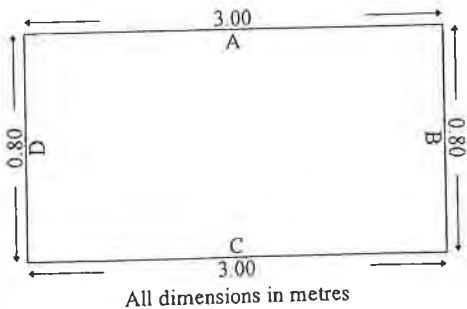
Status:- **FINAL**

Date:- 12/01/2006

Project: Former Site of Houghton Colliery		Exploratory Hole No	
Client: City of Sunderland		Location: Houghton Le Spring E:433765.673 N:550391 882	
Method & Equipment: Machine Excavated using a CAT 428C		Ground Level (m(AOD)): 72.335	Date: 11/02/2005
		Sheet: 1 of 1	

SAMPLES & TESTS			STRATA					
Depth	Type No	Test Results	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION	
0.10	J1			71.935		(0.40)	MADE GROUND (Topsoil consists of soft brown sandy clay with few rootlets).	
0.50	B2					(0.80)	MADE GROUND (Pink brown sandy gravel. Gravel is fine to coarse angular and consists of sandstone and mudstone)	
1.00	J3			71.135		1.20	MADE GROUND (Black sandy gravel. Gravel is fine to coarse angular and consists of coal and mudstone).	
1.50	B4			70.535		1.80	MADE GROUND (Grey sandy gravel. Gravel is fine to coarse angular and consists of coal and mudstone).	
2.00	J5			70.435		(0.10) 1.90		
2.50	B6							MADE GROUND (Black sandy gravel. Gravel is fine to coarse angular and consists of coal and mudstone).
3.00	J7					(2.80)		
3.50	B8							MADE GROUND (Black sandy gravel. Gravel is fine to coarse angular and consists of coal and mudstone).
4.00	J9							
4.50	B10			67.635			4.70	Trial pit complete at 4.70m BGL.

PLAN



GROUNDWATER

No Groundwater inflow observed.

STABILITY

Weak sides but stable.

GENERAL REMARKS

All dimensions in metres
Scale 1:50

For explanation of symbols and abbreviations see Key Sheets

Checked by:

SWAGUP

Logged by:
M Dickin

Contract No.
3455B

FIELD DATA ENCLOSURES

FORMER SITE OF HOUGHTON COLLIERY

CONTENTS		PAGE No
1.	INTRODUCTION	1
2.	THE SITE	1
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2.2	Site Description and Topography	1
3.	SITE OPERATIONS	2
3.1	General	2
3.2	Exploratory Holes	2
3.3	Samples	2
3.4	Groundwater	2
4.	LABORATORY TESTING	3
4.1	Specialist Chemical Testing	3
5.	GROUND CONDITIONS	3
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5.2	Made Ground	3
5.3	Natural Soil Deposits	4
5.4	Solid Geology	4
5.5	Groundwater	4
6.	GEOTECHNICAL CONSIDERATIONS AND DISCUSSIONS	4
7.	CHEMICAL CONTAMINATION ASSESSMENT	5
7.1	Soil	5
7.2	Groundwater	7
8.	DEVELOPMENT OF CONCEPTUAL RISK MODEL	7



FIELD DATA ENCLOSURES:

Site Location Plan

Figure 1

Exploratory Hole Location Plan

Figure 2

Key Sheets

Figure 3

Trial Pit Records

Figure 4

Appendix I: Specialist Chemical Testing

Appendix II: Trial Pit Photographs



APPENDIX I

Specialist Chemical Testing



2139



Certificate of Analysis

Certificate Number : 05-00506

Client Reference: 3455B **Date of issue:** 06/07/2005
Our Reference: 05-00506
Clients Name: Allied Exploration & Geotechnics Limited
Clients Address: Unit 25
Stella Gill Industrial Estate
Pelton Fell
DH2 2RJ

Contract Title: Former Site of Houghton Colliery
Description: 6 soil samples
Date Received: 21/06/2005
Date Commenced: 21/06/2005
Date Completed: 06/07/2005

Notes: Test procedures are identified by prefix DETSn (details available upon request)
Observations and Interpretations are outside the UKAS Accreditation
* Denotes test not included in laboratory scope of accreditation
\$ Denotes test carried out by approved subcontractor

Approved By:

Richard Bennett

Director

Rob Brown

Laboratory Manager

Page: 1 of 4

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 except in full, without the prior written approval of the laboratory.

Client Reference 3455B

Laboratory Reference 05-00506

Former Site of Houghton Colliery

Summary of Chemical Analysis

Borehole or Trial Pit	Depth	Sample No	Sample Type	Lab Ref No	DETS 042 Arsenic mg/kg	DETS 042 Cadmium mg/kg	DETS 042 Chromium mg/kg	DETS 042 Copper mg/kg	DETS 042 Lead mg/kg	DETS 015 Mercury mg/kg	DETS 042 Nickel mg/kg	DETS 042 Selenium mg/kg	DETS 042 Zinc mg/kg	DETS 055 Chloride Aqueous Extract g/l
TP1	0.80	B4	Soil	4213	21	0.9	12	120	44	0.3	17	1.5	120	0.03
TP3	0.50	B2	Soil	4214	6	0.5	15	28	26	<0.3	13	1.3	66	-----
TP5	0.50	B2	Soil	4215	12	0.7	24	39	220	0.4	8.0	1.7	210	-----
TP8	1.50	B4	Soil	4216	13	0.9	12	65	70	<0.3	18	1.7	200	0.02
T10	1.00	B4	Soil	4217	14	0.8	12	59	55	<0.3	20	1.7	96	-----
TP12	0.50	B2	Soil	4218	11	0.6	19	37	39	<0.3	35	2.0	110	-----

Client Reference 3455B

Laboratory Reference 05-00506

Former Site of Houghton Colliery

Summary of Chemical Analysis

Borehole or Trial Pit	Depth	Sample No	Sample Type	Lab Ref No	DETS 055 Nitrate Aqueous Extract g/l as NO3	DETS 055 Sulphate Aqueous Extract g/l as SO4	DETS 020 Boron (water soluble) mg/kg	DETS 067* Cyanide total mg/kg	DETS 067* Cyanide free mg/kg	DETS 024 Sulphide mg/kg	DETS 004 Total Sulphate as SO3 %	DETS 004 Total Sulphate as SO4 %	DETS 042* Sulphur Total %	DETS 008 pH
TP1	0.80	B4	Soil	4213	0.01	0.52	0.8	0.3	<0.1	52	0.17	0.20	0.15	8.4
TP3	0.50	B2	Soil	4214	-----	-----	0.9	<0.2	<0.1	<10	-----	0.20	-----	8.3
TP5	0.50	B2	Soil	4215	-----	-----	1.1	3.6	<0.1	88	-----	0.11	-----	9.5
TP8	1.50	B4	Soil	4216	0.01	0.46	1.3	0.3	<0.1	28	0.17	0.20	0.14	8.1
T10	1.00	B4	Soil	4217	-----	-----	1.5	<0.2	<0.1	160	-----	0.26	-----	7.8
TP12	0.50	B2	Soil	4218	-----	-----	3.6	<0.2	<0.1	12	-----	0.79	-----	8.3

Client Reference 3455B

Laboratory Reference 05-00506

Former Site of Houghton Colliery

Summary of Chemical Analysis

Borehole or Trial Pit	Depth	Sample No	Sample Type	Lab Ref No	DETS 050 PAH mg/kg	DETS 051 TPH mg/kg	DETS 023 Phenol mg/kg	DETS 042 Magnesium Aqueous Extract g/l
TP1	0.80	B4	Soil	4213	12	<0.30	0.02	0.02
TP3	0.50	B2	Soil	4214	<5.0	<20	<0.30	<0.30
TP5	0.50	B2	Soil	4215	17	<0.30	0.70	<0.30
TP8	1.50	B4	Soil	4216	6.4	<0.30	0.40	0.02
T10	1.00	B4	Soil	4217	<5.0	43	<0.30	<0.30
TP12	0.50	B2	Soil	4218	<5.0	<0.30	<0.30	<0.30

APPENDIX II

Trial Pit Photographs

Trial Pit Photographs TP-01



Trial Pit Photographs TP-01



Trial Pit Photographs TP-02



Trial Pit Photographs TP-02



Trial Pit Photographs TP-03



Trial Pit Photographs TP-03



Trial Pit Photographs TP-04



Trial Pit Photographs TP-04



Trial Pit Photographs TP-05



Trial Pit Photographs TP-05



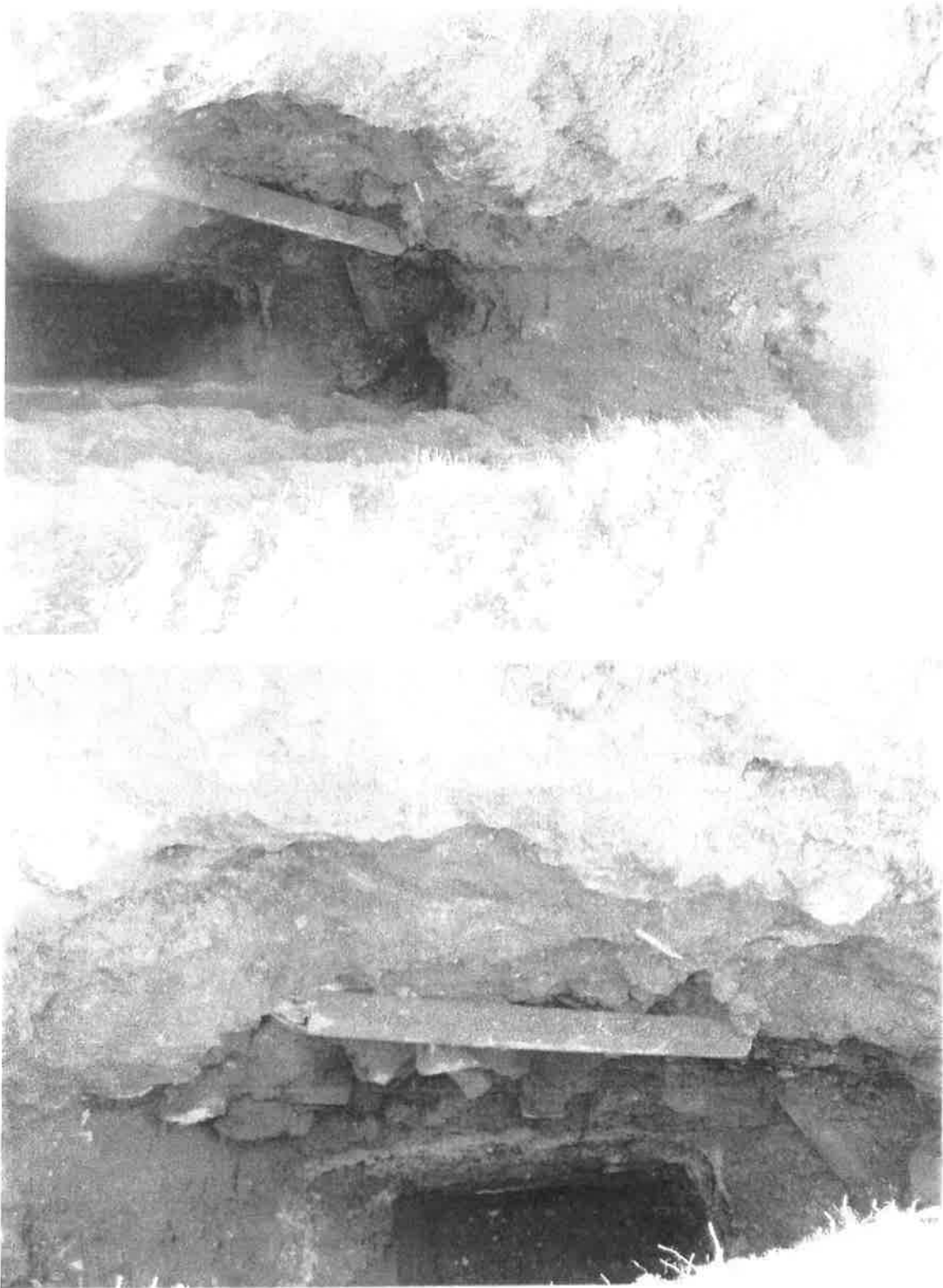
Trial Pit Photographs TP-06



Trial Pit Photographs TP-06



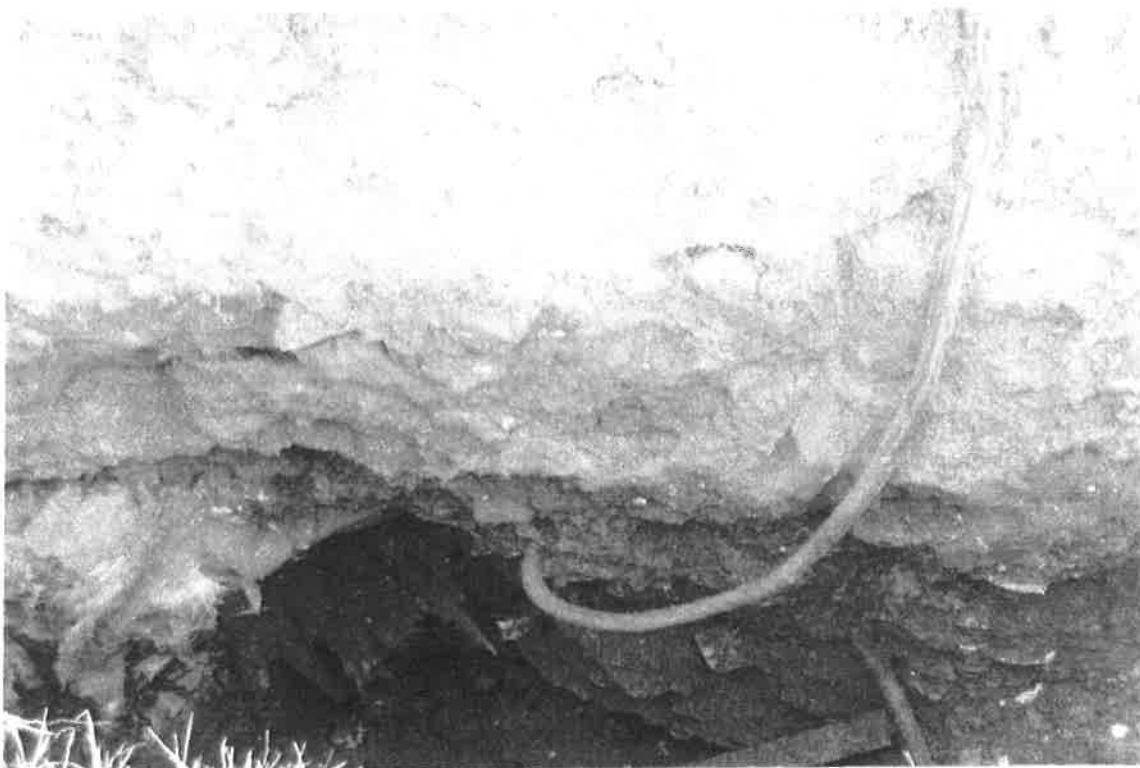
Trial Pit Photographs TP-07



Trial Pit Photographs TP-07



Trial Pit Photographs TP-08



Trial Pit Photographs TP-09



Trial Pit Photographs TP- 10



Trial Pit Photographs TP- 11



Trial Pit Photographs TP- 12



Trial Pit Photographs TP- 12



APPENDIX F

SITE WALKOVER PHOTOS





2585 – Newbottle Street, Houghton Le Spring



APPENDIX G

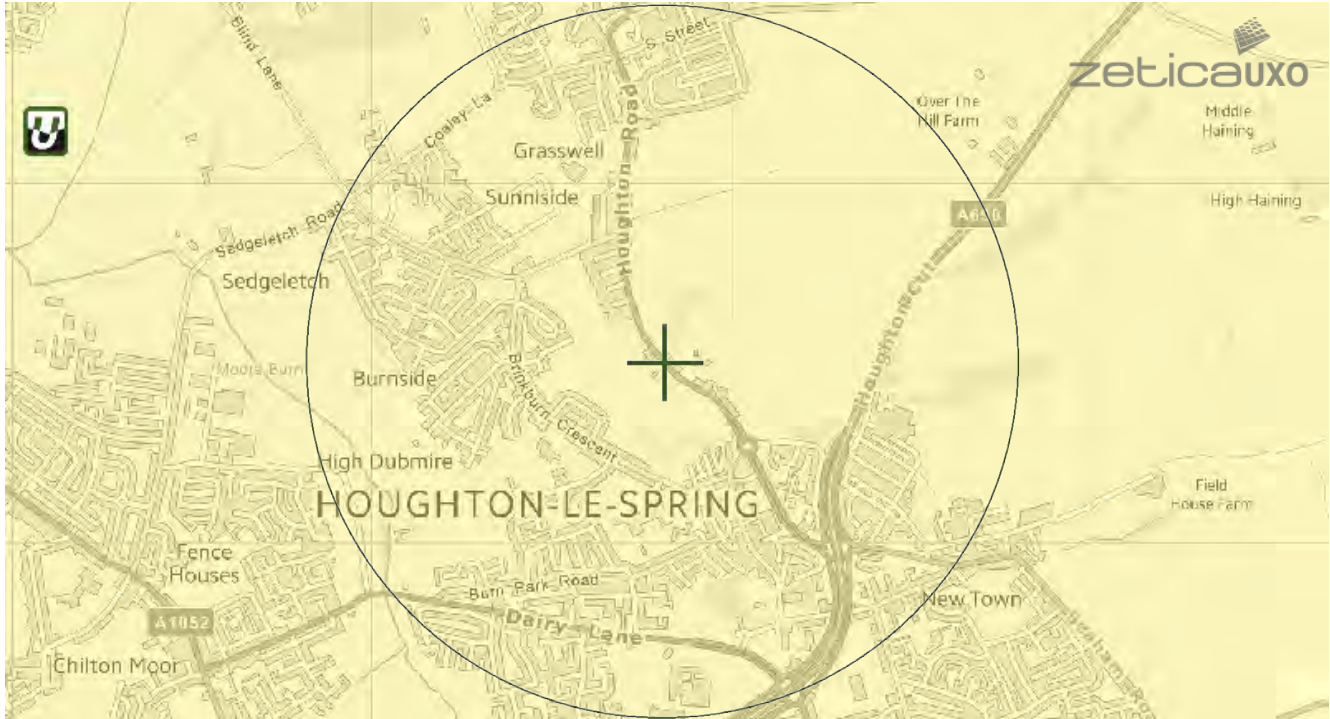
UNEXPLODED BOMB MAP

UNEXPLODED BOMB RISK MAP



SITE LOCATION

Location: DH4 4AU,
Map Centre: 433820,550506



LEGEND

- High:** Areas indicated as having a bombing density of 50 bombs per 1000acre or higher.
- Moderate:** Areas indicated as having a bombing density of 15 to 49 bombs per 1000acre.
- Low:** Areas indicated as having 15 bombs per 1000acre or less.

- military
- industry
- UXO find
- transport
- dock
- Luftwaffe targets
- utilities
- Bombing decoy
- other

How to use your Unexploded Bomb (UXB) risk map?

The map indicates the potential for Unexploded Bombs (UXB) to be present as a result of World War Two (WWII) bombing.

You can incorporate the map into your preliminary risk assessment* for potential Unexploded Ordnance (UXO) for a site. Using this map, you can make an informed decision as to whether more in-depth detailed risk assessment* is necessary.

What do I do if my site is in a moderate or high risk area?

Generally, we recommend that a detailed UXO desk study and risk assessment is undertaken for sites in a moderate or high UXB risk area.

Similarly, if your site is near to a designated Luftwaffe target or bombing decoy then additional detailed research is recommended.

More often than not, this further detailed research will conclude that the potential for a significant UXO hazard to be present on your site is actually low.

Never plan site work or undertake a risk assessment using these maps alone. More detail is required, particularly where there may be a source of UXO from other military operations which are not reflected on these maps.

If my site is in a low risk area, do I need to do anything?

If both the map and other research confirms that there is a low potential for UXO to be present on your site then, subject to your own comfort and risk tolerance, works can proceed with no special precautions.

A low risk really means that there is no greater probability of encountering UXO than anywhere else in the UK.

If you are unsure whether other sources of UXO may be present, you can ask for one of our **pre-desk study assessments (PDSA)**

If I have any questions, who do I contact?

tel: **+44 (0) 1993 886682**

email: **uxo@zetica.com**

web: **www.zeticauxo.com**

The information in this UXB risk map is derived from a number of sources and should be used in conjunction with the accompanying notes on our website: (<https://zeticauxo.com/downloads-and-resources/risk-maps/>)

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It is important to note that this map is not a UXO risk assessment and should not be reported as such when reproduced.

*Preliminary and detailed UXO risk assessments are advocated as good practice by industry guidance such as CIRIA C681 'Unexploded Ordnance (UXO), a guide for the construction industry'.

APPENDIX H

PROPOSED DEVELOPMENT PLAN



Key

- Existing Buildings
- Retail Buildings
- Ancillary Buildings
- Landscaped Areas
- Paved Areas
- Concrete Service Yards
- Tarmac
- Totem Sign
- PFS Sign
- Mineshaft
- Planning Application Boundary Line



Parking Provision

Standard Parking Spaces 4800 x 2500mm	274no
Accessible Spaces	22no
Parent & Child Spaces	17no
Electric Charging Spaces	16no
Total Spaces	329no

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IBA ARCHITECTS
 Keel Row 4 | The Watermark | Colnehead | NE11 9SE
 E: info@iba-architects.com T: 0191 461 1411
 www.iba-architects.com

Project: HOUGHTON COLLIERY RETAIL
 Newboothle Street
 Houghton le Spring

Title: Proposed Site Layout

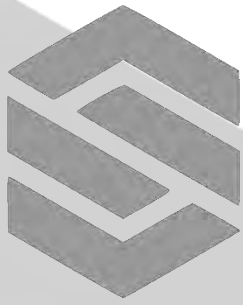
Client: Hellens Land / Finty Estates

Drawn: KW Scale: 1:500 @ AD
 Checked: FW Date: 04.10.21

TENDER

1485 (SP)040 T1

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SHADBOLT GROUP

DESIGN | MANAGE | CONSTRUCT

APPENDIX 5

Foundation Works Risk Assessment (Version 4, October 2022)



SHADBOLT
ENVIRONMENTAL



Newbottle Street, Houghton-le-Spring
Foundation Works Risk Assessment

Hellens Land

Issue 3

October 2022



SHADBOLT
GROUP

Newbottle Street, FWRA Houghton-le-Spring

Foundation Works Risk Assessment

Project Reference: 2585

Client	Hellens Land
Our Reference	2585 – Newbottle Street, FWRA
Produced by	Tim Shepherd
Checked by	Mike Taylor
Submitted	Issue 3 – October 2022



Accclaim
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APPENDICES

Appendix A	Report Conditions
Appendix B	Drawings

1.0 INTRODUCTION

Shadbolt Group (SG) were commissioned by the Client, **Hellens Land** to prepare Foundation Works Risk Assessment associated with the proposed supermarket, retail unit and petrol filling station (PFS) development at the former Houghton Colliery, Houghton Le Spring.

1.1 Aims and Objectives

The purpose of the report is assess the risk associated with piling works required to be undertaken at the site.

In reviewing this Foundation Works Risk Assessment reference should be made to the following documents.

- Newbottle Street, Houghton-le-Spring, Revised Preliminary Risk Assessment, for Hellens Land, Issue V2, July 2022. Author Shadbolt Group
- Newbottle Street, Houghton-le-Spring, Ground Investigation Interpretive Report and Groundwater Risk Assessment, for Hellens Land, Issue V3, September 2022. Author Shadbolt Group
- Newbottle Street, Houghton-le-Spring, Remediation Strategy, for Hellens Land, Issue V3, October 2022. Author Shadbolt Group

1.2 Limitations

The recommendations and opinions expressed in this report are based on the strata observed in the borings and excavations; together with the results of the site and laboratory tests as detailed within the report. Shadbolt Group take no responsibility for ground conditions which occur between the exploratory hole positions.

Every effort has been made to interpret the conditions between investigation locations; however, such information is indicative. A detailed review of the extent of limitations of this report is included in the **Report Conditions** included in **Appendix A** and the standard terms and conditions of the agreement.

2.0 SITE INFORMATION

2.1 General

The site is located to the south of Newbottle Street (A182), northeast of Houghton le Spring town centre. The site is an irregular, elongated plot orientated roughly northwest to south east with an area in the order of 3.35ha.

The approximate National Grid Reference (NGR) for the centre of the site is **433840,550400**.

A general site location plan of the site is presented as Figure 1 and an aerial photograph as Figure 2.

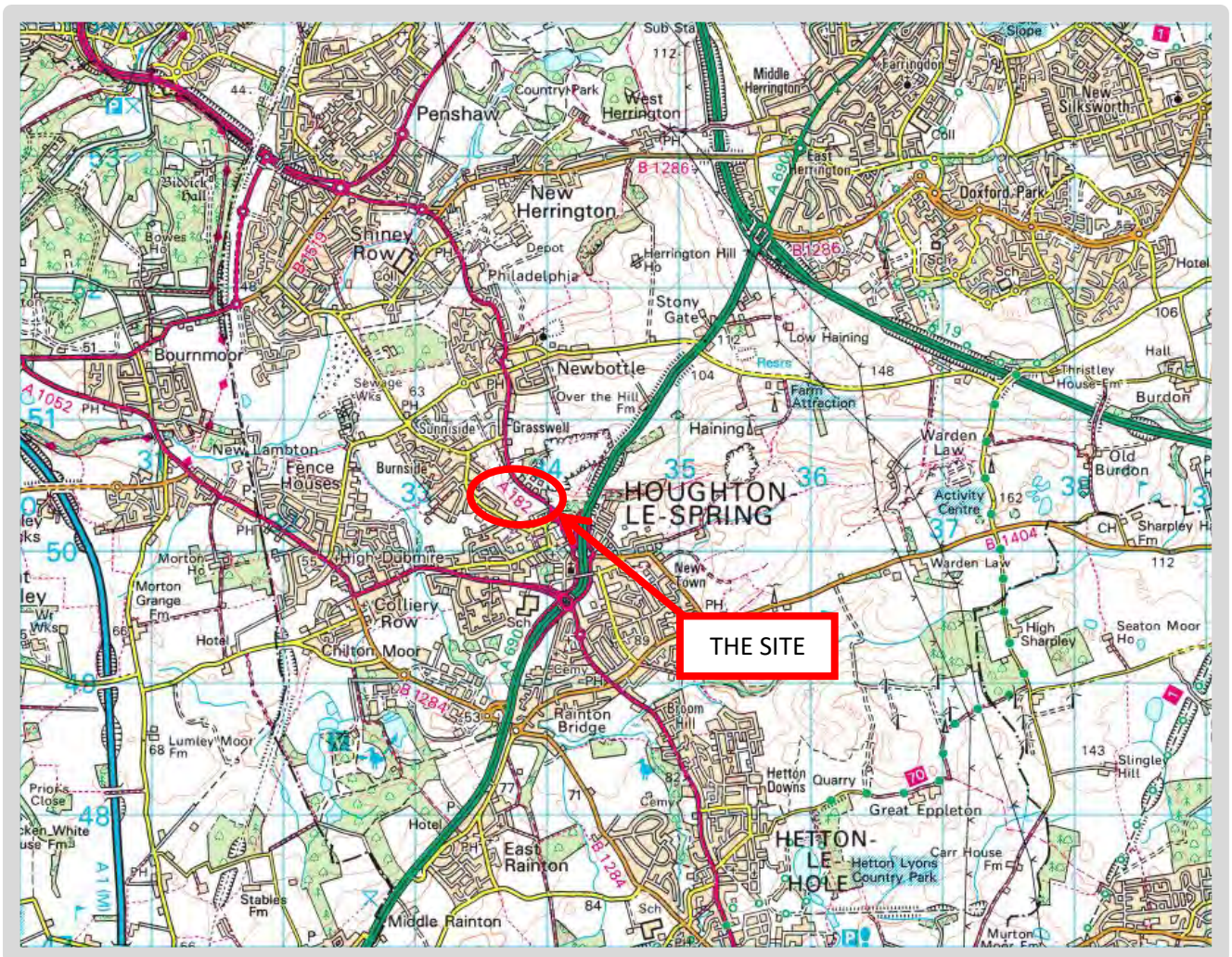


Fig. 1 – General Site Location Plan

2.2 Site Description

An initial site walkover was undertaken by TSG in March 2018.

The site comprises a large terrace of maintained grassland bound by slopes to the north east and south west. In the north of the site the slope up to Newbottle Street is taken up by a stone-faced retaining wall in the order of 4m tall along the boundary with a storage yard to the rear of the adjacent petrol filling station.

Stands of Japanese Knotweed were noted at the top of the northern end of the retaining wall and along the crest of the slope to the north.

The embankments at the fringes of the site are planted with small trees with the main body of the site comprising grass with a central ridge of rough grass / vegetation along the line of a former fence of which some components still remain. 2 No. roughly circular areas are not grassed and concrete is visible; these broadly align with given location of shafts recorded by the Coal Authority which have been capped at the surface.

The boundary along Newbottle Street is fenced with close boarded timber fencing up to a pair of billboards adjacent to a van hire depot and petrol filling station at the northern end of the site.

Vehicular access is available via a track leaving a service road to the rear of the petrol filling station but is blocked by a boulder placed along the perimeter of additional grassland extending to the north of the site.



Fig.2 – Aerial Photograph Showing Development Area

3.0 SUMMARY GROUND CONDITIONS

The site has been developed through much of the mapped history as Houghton Colliery and associated infrastructure including railway sidings and reservoirs. The colliery was demolished / reclaimed in the 1990s and as part of these works the site was operated as an inert landfill.

The EA have confirmed that the three records relate to the same "landfill site" (License TW452SL) with one of the EA records stating the site is known as Houghton Colliery, which was operated by City of Sunderland, City Building Services.

The site was licensed to receive clean hardcore and brick and Category A Wastes i.e.

"Excavation Wastes only, containing no biodegradable or soluble chemical material. This category may include subsoil, sand, clay, shale or rock, provided they are not contaminated with any other materials".

The landfill was licensed to receive 400 tonnes per day or 50 loads with a maximum capacity of 10,000m³.

Several phases of ground investigations have been undertaken due to site constraints and various Correspondence received from Sunderland City Council and the Environment Agency during the planning process.

The physical ground investigation work was carried out by Shadbolt Environmental during July 2019, December 2019, July 2020, November 2020 and most recently in July 2022.

The detailed findings of the ground investigation works are reported within the following document, with a summary of the ground conditions described below;

- Newbottle Street, Houghton-le-Spring, Ground Investigation Interpretive Report and Groundwater Risk Assessment, for Hellens Land, Issue V3, September 2022. Author Shadbolt Group

3.1 Ground Conditions

Made Ground

Made Ground was encountered in all exploratory holes undertaken across the site to a depth of up to 11m and generally comprised of dark grey, reddish, brown, CLAY with varying amounts of sand, gravel and cobbles (slag, sandstone, shale, brick, concrete, mudstone). The soils have been interpreted as typical of colliery spoil / demolition materials encountered on former colliery sites. Made Ground was typically 3-10m in thickness.

Superficial Deposits

Superficial deposits were recorded in 16 No. of the exploratory holes and generally comprised Glacial Till comprising stiff, grey, brown gravelly Clay and laminated Clay. The gravel was typically fine to coarse angular sandstone. The deposit was typically 3-10m in thickness but absent within the eastern and western parts of the site.

Superficial glacial clays were encountered within all rotary cored boreholes with the exception of RC01, RC02, RC11 and RC12 and was encountered at depths of between 6.4m bgl and 19.8m bgl.

Solid Deposits

Solid geology was encountered during the works within all 6 No. rotary open boreholes and 12 No. rotary cored boreholes as Red/Brown weathered Mudstone or Grey Yellow Sandstone / Mudstone. Whilst potential limestone bedrock was noted within the rotary open boreholes (drillers description) the rotary cored boreholes have confirmed that solid geology encountered beneath the site is Sandstone and Mudstone and no limestone was encountered.

Bedrock was encountered between 3.1m bgl and 14.8m bgl. Possible bedrock was encountered within the base of BH10 at 16.2m bgl. Bedrock was subsequently proven to the full depth of RO-02 at 21m bgl. Interbedded Limestone and Sandstone was encountered within RO-04 and RO-05 underlain by Mudstone and Sandstone respectively.

The rotary cored boreholes encountered sandstone, mudstone and siltstone from depths ranging from 5.39m bgl to 19.8m bgl and extended to a maximum depth of 25m bgl (where the majority of the rotary cored boreholes terminated).

As stated above, no deposits of limestone were encountered during the drilling of the rotary cored boreholes and the piling / deep foundation works have been demonstrated to lie outwith the Groundwater Source Protection Zone / Principal Aquifer.

Groundwater

Ground water strikes / levels were generally encountered during drilling / monitoring (of the deep boreholes) are summarised below.

Borehole with response zone with the underlying rock	Depth to standing water m aOD	Comments
RC01	57.23 – 57.25	Approximate Strike Similar to Monitoring Level - 3 visits. Borehole response zone located within clayey Made Ground
RC02	56.32 – 53.42	Approximate Strike Similar to Monitoring Level - 3 visits. Borehole response zone located within Sandstone
RC03	65.64 – 65.71	Borehole terminated within shallow soils- 3 visits. Borehole response zone located with clayey Made Ground and natural clays
RC04	54.49 - 54.51	Strike Similar to Monitoring Level - 3 visits. Borehole response zone located within Siltstone / Sandstone and Mudstone
RC05	57.29 – 57.33	Strike Similar to Monitoring Level - 3 visits. Borehole response zone located within Siltstone and Sandstone
RC06	56.40 – 60.58	Water Strike (rose to 60.59m aOD on monitoring – potential silting up of borehole) - 3 visits. Borehole response zone located within Siltstone and Sandstone
RC07	56.27 – 63.96	Water Strike (rose to 63.96 m aOD on monitoring – potential silting up of borehole) - 3 visits. Borehole response zone located within natural Clay.
RC08	57.97 – 61.94	Water Strike (rose to 61.92m aOD on monitoring – potential silting up of borehole) - 3 visits. Borehole response zone located within Siltstone and Mudstone
RC09	55.40 – 55.44	Strike Similar to Monitoring Level - 3 visits. Borehole response zone located within Siltstone.
RC10	68.11 – 68.14	Borehole terminated within shallow soils- 3 visits. Borehole response zone located within clayey Made Ground
RC11	68.08 – 68.11	Borehole terminated within shallow soils- 3 visits. Borehole response zone located within Sand (no recovery)
RC12	55.19 - 55.28 -	Strike Similar to Monitoring Level - 3 visits. Borehole response zone located within Sandstone
CP-01	67.25 - 66.85	Borehole terminated within shallow soils – 12 visits. Borehole response zone located within clayey Made Ground
CP-02	68.75 - 67.50	Borehole terminated within shallow soils – 12 visits. Borehole response zone located within clayey Made Ground
CP-03	65.30 - 66.25	Borehole terminated within shallow soils – 12 visits. Borehole response zone located within clayey Made Ground

CP-04	64.50 – 65.00	Borehole terminated within shallow soils – 12 visits. Borehole response zone located within clayey Made Ground
CP-07	63.35 – 64.90	Borehole terminated within shallow soils – 12 visits
CP-10	63.70 – 64.85	Borehole terminated within shallow soils – 12 visits
CP-16b	64.90 - 65.25	Borehole terminated within shallow soils – 12 visits

- All CP and RC03, RC10 and RC11 had response zones within the shallow soils.

Shallow groundwater was encountered within the boreholes (shallow response zones) and it would appear that the shallow / perched water table is separate and distinct from the deeper groundwater table where the low permeable glacial till exists (glacial till is not evident towards to the far eastern part of the site and the far western part of the site) and acts as a partial barrier to vertical migration.

Mining Legacy

No coal seams are indicated to outcrop within the site boundary; however, 8 No. are recorded within 500m of the site.

4 No. faults are present within 500m of the site including 1 No. which runs through the site close to and parallel with the south eastern boundary on a bearing in the order of 070°. This fault is recorded as inferred with an unknown displacement. The inferred fault is unlikely to impact on the development proposals due to its location on the site boundary.

In brief the Coal Authority report states the following:

- *The site is within the zone of influence of workings of 7 No. seams recorded at depths of 122m to 313m bgl.*
- *No probable shallow mine workings are recorded on site.*
- *No records of spine roadways at shallow depth are recorded on site.*
- *3 No. shafts are recorded on site.*
- *There have been no damage claims within 50m of the site since 1994.*

As part of the ground investigation works 3 No. shafts were investigated and remedial works are required to treat and recap the shafts. No shallow workings or broken ground / voids associated with the coal mining legacy during the Shadbolt Group ground investigations.

3.2 Hydrogeology

Information on the hydrogeological characteristics of the site has been obtained from the following:

- The Environment Agency Groundwater Vulnerability Maps
- The GroundSure Enviro Insight Report

The solid geology located beneath the site is designated as **Principal and Secondary (A) Aquifers**; Principal Aquifers comprise of high intergranular and fracture permeability, usually providing a high level of water storage and may support water supply to rivers on a strategic scale. This includes the Yellow Sand Formation which is designated as a Principal Aquifer by the Environment Agency. The site is situated at the geological base of the limestone classified as a Principal Aquifer and is considered the most sensitive receptor rather than the underlying Middle Coal Measures strata which is a secondary (A) aquifer.

However, it should be noted that no Limestone associated with the Rasby Formation (Principal Aquifer /

Groundwater Protection Zone) has been identified during the ground investigations.

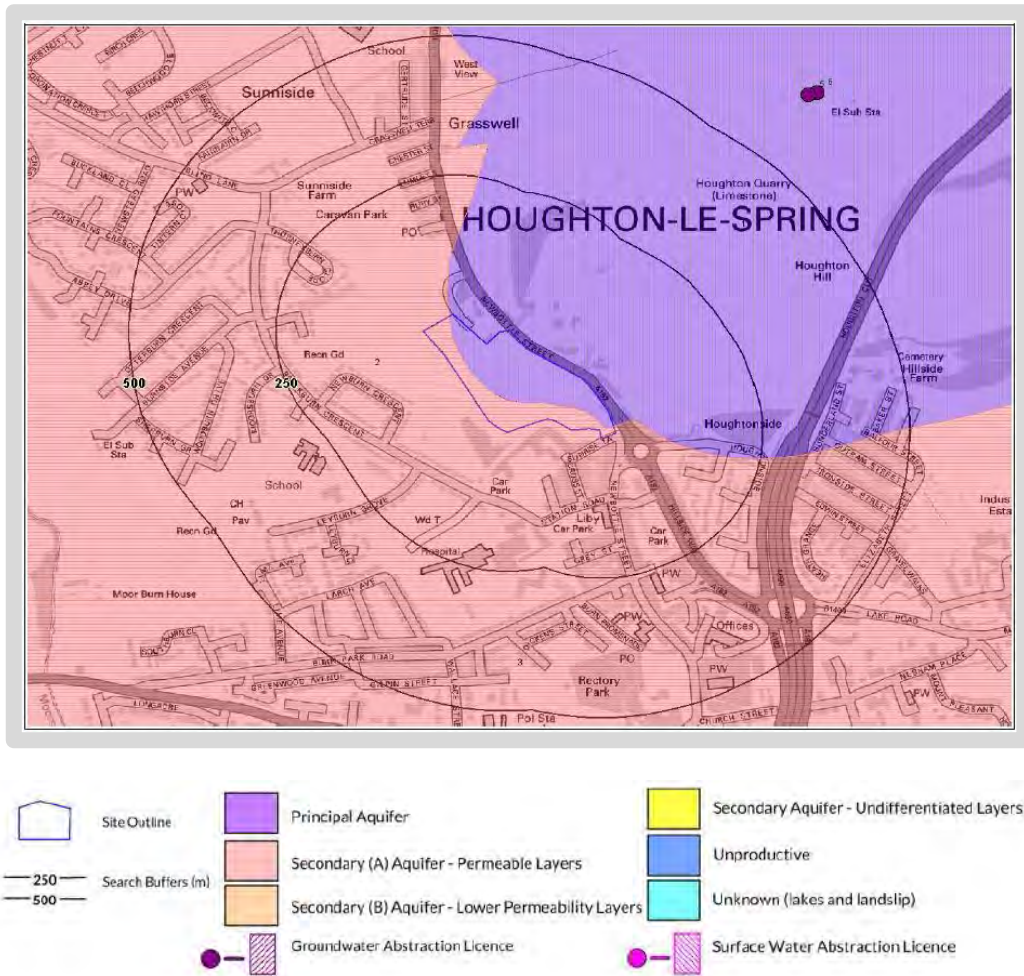


Fig.3 -Bedrock Aquifer Classification

The -eastern edge of the site is located within a Source Protection Zone 3 – Total Catchment area as shown below.

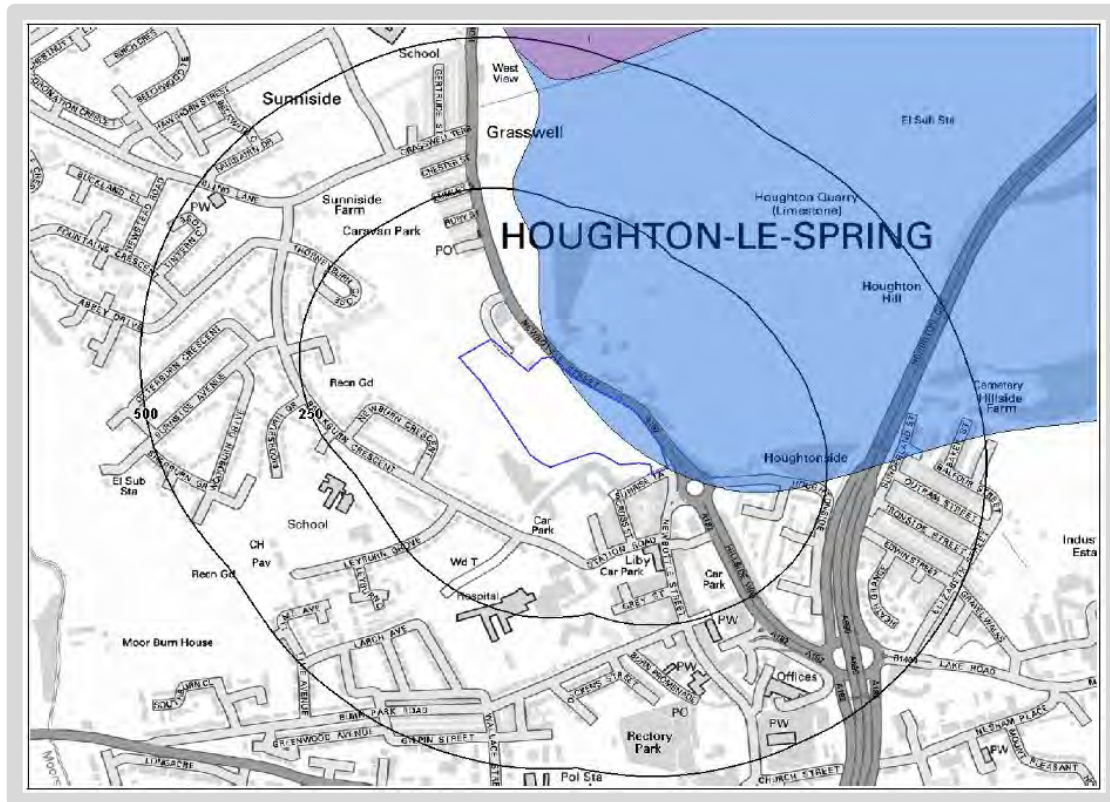


Figure 4 – Source Protection Zones

There are 2 No. Potable Water Abstraction Licences within 2000m of the site. These records are located 1953m NE of the site and relate to water supply.

The ground installations undertaken at the site have confirmed that the development / piling works lie within Coal Measures strata rather than limestone of the Principal Aquifer / Groundwater Source Protection Zone.

3.4 Hydrology

The site does not lie within 250m of an indicated Environment Agency Zone 2 and Zone 3 flood plain and information from the Environment Agency RoFRaS (Risk of Flooding from Rivers and Sea) database indicates that the risk of flooding at the centre of the site is Very Low (less than 1 in 1000 chance of flooding in a given year).

Additionally, there are no Flood Defences or areas benefitting from Flood Defences or Flood Storage within 250m of the site.

The BGS indicate that the site lies within 50m of groundwater flooding susceptible areas. The BGS note that there is Potential at Surface relating to Superficial Deposits Flooding and their confidence in this classification is high.

Where potential for groundwater flooding to occur at surface is indicated, this means that given the geological conditions in the area groundwater flooding hazard should be considered in all land-use planning decisions. It is recommended that other relevant information e.g. records of previous incidence of groundwater flooding, rainfall, property type, and land drainage information be investigated in order to establish relative, but not absolute, risk of groundwater flooding.

There are no Environment Agency River quality records within 1500m of the site.

There are 3 No. river network features recorded within 500m of the site the closest of which relates to a culvert 223m NE of the site.

There are no surface water features recorded within 250m of the site. There are 4 No. Surface Water Abstraction Licence within 2000m of the site. These are located 1681m to 1880m W of the site and are historical permits for mineral washing and dust suppression.

3.5 Contamination

In total 70 No. soil samples were submitted for testing for a suite of common contaminants during the several phases of Shadbolt Group ground investigations.

The laboratory chemical results have reported concentrations of potential contaminants to be within / below SE TSVs for a Commercial end use (human health criteria).

Soils analyses undertaken which reported concentrations above laboratory detection limit but beneath the human health criteria for a commercial enduse included heavy metals and metalloids, Cyanide, sulphate, Total Petroleum Hydrocarbons, Polyaromatic Hydrocarbons, occasional VOCs and SVOCs.

The potential for soils contamination to impact groundwater resources is dictated by the leachability of the soils located at the site and the potential for the soils to come into contact with water. No Light Non-Aqueous Phase Liquids (LNAPL) or Dense Non Aqueous Phase Liquids (DNAPL) were observed / recorded during all phases of ground investigations works and groundwater monitoring.

Leachate analysis undertaken on soils (17 No.) retrieved from the site has reported low concentrations of contaminants below the laboratory detection limits and compared to Threshold Values for Groundwater. However, several contaminants were reported to be slightly elevated when compared to Threshold Values as shown in the table below.

Analyte	Concentration ug/l	EQS Surface Water (ug/l)	Multiple of Threshold	UK Drinking Water Standards (ug/l)	Multiple of Threshold	Location / Strata
Fluoranthene	1.1	0.0063	x 174	N/A		TP209 @ 1.5m bgl (Made Ground)
	0.01		1.6			RC01@4.76-4.89mbgl (Made Ground)
	0.03		4.8			RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		1.6			RC06 @ 5.0-5.2m bgl(Glacial Till)
Benzo (b)flouranthene	0.6	N/A	N/A	0.1 (sum of 4)	x6	TP209 @ 1.5m bgl (Made Ground)
	0.13					1.3
Benzo(a)pyrene	1.8	0.0017	x1058	0.01	x180	TP209 @ 1.5m bgl (Made Ground)
	0.06					

Table 3.5.1 - Leachate Analysis Summary Table

Several contaminants were also reported to be above the laboratory detection limit and are as follows;

Analyte	Concentration (ug/l)	Lab' L.O.D (ug/l)	Location
EPH (C10-C40)	29	10	RC01 @ 4.76-4.89m bgl (Made Ground)
	69		RC02 @5.5-5.6m bgl (Made Ground)
	120		RC11@0.1-0.2m bgl (Made Ground)
	97		RC12@0.5-0.6m bgl (Made Ground)
	21		TP209 @ 1.5m bgl (Made Ground)
Acenaphthene	0.02	0.01	RC08 at 5.6-5.7m bgl (Made Ground)
	0.03		RC08 @ 6.5-6.6m bgl (Glacial Till)
	0.00.01		RC12@0.5-0.6m bgl (Made Ground)
Fluorene	0.04	0.01	RC01 @ 6.23m-6.4m bgl (Mudstone)
	0.02		RC02 @ 5.5 -5.6m bgl (Made Ground)
	0.01		RC08 at 5.6-5.7m bgl (Made Ground)
	0.02		RC08 @ 6.5-6.6m bgl (Glacial Till)
Phenanthrene	0.01	0.01	RC01 @4.76-4.89m bgl (Made Ground)
	0.02		RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.02		RC08 at 5.6-5.7m bgl (Made Ground)
	0.09		RC08 @ 6.5-6.6m bgl (Glacial Till)
	0.01		RC11@0.1-0.2m bgl (Made Ground)
	0.02		RC12@0.5-0.6m bgl (Made Ground)
	0.4		TP209 @ 1.5m bgl (Made Ground)
Anthracene	0.03	0.01	RC08 @ 6.5-6.6m bgl (Glacial Till)
	0.01	0.01	RC11@0.1-0.2m bgl (Made Ground)
	0.01	0.01	RC12@0.5-0.6m bgl (Made Ground)
Fluoranthene	0.01	0.01	RC01 @4.76-4.89m bgl(Made Ground)
	0.03		RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		RC06 @ 5.0-5.2m bgl (Glacial Till)
	0.01		RC11@0.1-0.2m bgl (Made Ground)
	0.02		RC12@0.5-0.6m bgl (Made Ground)
	1.1		TP209 @ 1.5m bgl (Made Ground)
Pyrene	0.02	0.01	RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.01		RC11@0.1-0.2m bgl (Made Ground)
	0.02		RC12@0.5-0.6m bgl (Made Ground)
	0.9		TP209 @ 1.5m bgl (Made Ground)
Chrysene	0.01	0.01	RC05 @ 9.4-9.5m bgl (Glacial Till)
	0.4		TP209 @ 1.5m bgl (Made Ground)

Table 3.5.2 -Leachate Analysis Above Laboratory Detection Limit Summary Table

As can be seen several of the samples retrieved reported concentrations of PAH above laboratory detection limit but where no Shadbolt TSV currently exists.

No significant groundwater strikes were encountered during the initial ground investigations and insufficient groundwater was encountered initially within the cable percussions monitoring standpipes to retrieve representative samples.

However, recent monitoring of the deeper rotary cored boreholes has enable the retrieval of water samples from BH01, BH02, BH03 and BH10 and RC01 to RC12. The remainder of the cable percussion boreholes remained dry.

Table 3.5.3 below shows the elevated concentrations of contaminants that have been reported above EQS / UKDWS.

Analyte	Concentration ug/l	EQS Surface Water (ug/l)	Multiple of Threshold	UK Drinking Water Standards (ug/l)	Multiple of Threshold	Location / Response Zone
Selenium	11.5 - 60.01	N/A	N/A	10	x1 – x6	BH01, BH04 and BH10 (all Made Ground / Glacial Till - Elevated concentrations reported during 3 No. monitoring visits)
Naphthalene	7.7	2	3.85	N/A	N/A	RC12 (Visit No.1) - Sandstone
Benzo(b)fluoranthene	7.7	N/A	N/A N/A N/A N/A	0.1	x77	RC12 (Visit No.1) - Sandstone
Benzo(k)fluoranthene	4.3	N/A	N/A	0.1	x43	RC12 (Visit No.1) - Sandstone
Benzo(ghi)perylene	3.0	N/A	N/A	0.1	x30	RC12 (Visit No.1) - Sandstone
Indeno(123CD) pyrene	3.8	N/A	N/A	0.1	x38	RC12 (Visit No.1) - Sandstone
Benzo(a)pyrene	0.4 0.04 7.2	0.00017	x 2352 x 235 x 42352	0.01	x40 x400	BH10 (1 st monitoring visit only) RC11 (Visit No. 2) – Sand RC12 (Visit No.1) - Sandstone
Fluoranthene	0.2-0.3 0.03 0.12, 0.07 15, 0.03 1.3	0.0063	x47 x33 x19 x5 x2380 x33 x206	N/A	N/A	BH01, BH02, BH03 (1 st monitoring visit) RC08 (visit No.3) RC11 (Visit No.2 and 3) – Sand / Sandstone RC12 (Visit No.1 and 3) – Sandstone RC07 (visit No.3)

Table 3.5.4 – Groundwater Analysis Summary Table

Analyte	Concentration (ug/l)	Lab' L.O.D (ug/l)	Location / Response Zone
EPH (C10-C40)	<20 to 410 <20 to 15,000	10	RC01 to RC12 (Visit No. 1) RC01 to RC12 (Visit No. 2)
Acenaphthene	0.04 0.04 0.01 2.8 0.02 0.02 0.66	0.01	RC01(Visit No. 1) - Sandstone RC10 (Visit No. 1) – Made Ground RC11 (Visit No. 1) – Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) – Sand / Sandstone RC08 (Visit No.3) – Mudstone RC07 (Visit No.3) – Clay / Mudstone
Fluorene	0.02 4.0 0.02 0.02 0.88	0.01	RC10 (Visit No. 1) – Made Ground RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) – Sand / Sandstone RC08 (Visit No.3) – Mudstone RC07 (Visit No.3) – Clay / Mudstone
Phenanthrene	0.02 0.02 0.04 0.06 0.06 0.04 27 0.03 0.06 0.03 0.06 0.02 0.3 0.2 0.03 0.02 0.04 0.02 1.3	0.01	RC01 (Visit No. 1) - Sandstone RC03 (Visit No. 1) – Made Ground RC04 (Visit No. 1) - Siltstone/ Sandstone RC05 (Visit No. 1) - Sandstone RC10 (Visit No. 1) – Made Ground RC11 (Visit No. 1) – Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC01 (Visit No. 2) - Sandstone RC05 (Visit No. 2) - Sandstone RC10 (Visit No. 2) – Made Ground RC11 (Visit No. 2) – Sand / Sandstone RC12 (Visit No. 2) - Sandstone BH01 (Visit No.1) – Made Ground BH10 (Visit No.1) – Made Ground RC08 (Visit No. 3) – Mudstone RC09 (Visit No. 3) – Siltstone RC11 (Visit No. 3) – Sand / Sandstone RC12 (Visit No.3) Sandstone RC07 (Visit No.3) – Clay / Mudstone
Anthracene	0.01 2.9 0.03 0.03 0.02 0.88	0.01	RC11 (Visit No. 1) – Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) – Sand / Sandstone RC08 (Visit No.3) - Mudstone RC11 (Visit No. 3) – Sand / Sandstone RC07 (Visit No.3) – Clay / Mudstone
Fluoranthene	0.02 0.01 0.02 0.05 15 0.02 0.12 0.02 0.03 0.07 0.03 1.0	0.01	RC04 (Visit No. 1) - Siltstone/ Sandstone RC05 (Visit No. 1) - Sandstone RC10 (Visit No. 1) – Made Ground RC11 (Visit No. 1) – Sand / Sandstone RC12 (Visit No. 1) – Sandstone RC10 (Visit No. 2) – Made Ground RC11 (Visit No. 2) – Sand / Sandstone RC12 (Visit No. 2) – Sandstone RC08 (Visit No. 3) – Mudstone RC11 (Visit No. 3) – Sand / Sandstone RC12 (Visit No.3) Sandstone RC07 (Visit No.3) – Clay / Mudstone
Pyrene	0.02 0.03 0.08 20 0.02 0.3 0.2 0.3 0.06 0.1 0.03 2.8	0.01	RC05 (Visit No.1) - Sandstone RC10 (Visit No. 1) - Made Ground RC11 (Visit No. 1) – Sand / Sandstone RC12 (Visit No. 1) - Sandstone RC05 (Visit No.2) - Sandstone BH01 (Visit No. 1) – Made Ground BH02 (Visit No. 1) – Made Ground BH10 (Visit No. 1) – Made Ground RC08 (Visit No. 3) – Mudstone RC11 (Visit No. 3) – Sand / Sandstone RC12 (Visit No.3) Sandstone RC07 (Visit No.3) – Clay / Mudstone
Chrysene	7.6 0.06 0.2 0.03 0.02 0.78	0.01	RC12 (Visit No. 1) - Sandstone RC11 (Visit No. 2) – Sand / Sandstone BH10 (Visit No. 1) – Made Ground RC08 (Visit No. 3) – Mudstone RC11 (Visit No. 3) – Sand / Sandstone RC07 (Visit No.3) – Clay / Mudstone

Table 3.5.5 – Groundwater Analysis Above Laboratory Detection Limit Summary Table

All other chemical analysis results, including BTEX, VOCs, PCBs and PAHs were reported to be below the laboratory detection limits “with the exception of several VOC’s” i.e. di-n-butyl phthalate, bis(2-ethylhexyl)ester, bis(2-ethylhexyl)phthalate and chloroform.

The leachate analysis table and the groundwater analysis table show elevated leachable hydrocarbons in the soils whilst elevated selenium and hydrocarbons were recorded within the groundwaters.

As such, it appears that the groundwaters have been slightly impacted with dissolved phase hydrocarbons in places but is not considered significant.

4.0 SELECTION OF PILING METHOD

The requirement to support a tall building (retail / supermarket structure) with high column loads and also limit total and differential settlements has resulted in the most suitable foundation solution being a piled foundation for Unit 1 (deep areas of Made Ground) and vibro stone columns for Unit 2 from a structural, geotechnical and financial standpoint.

Shallow foundations including a raft alone could not be utilised due to the high column loads and the excessive settlement which may result if the near surface soils are overstressed (without the requirement for deep soils treatment). The use of a raft foundation alone could result in excessive total and differential settlements (please note the PFS is lightly loaded a raft is considered a suitable foundations solution for this scenario.)

The potential exists (although considered to be very low) for potential mobile contaminants to migrate to the adjacent Principal Aquifer during the piling works and post piling works if a preferential pathway is created from the surface to the aquifer.

The ground investigations undertaken at the site have shown that both Unit 1 and Unit 2 will be constructed outwith the Principal Aquifer and foundations will be formed within the Coal Measures Strata. Whilst dissolved phase hydrocarbons have been reported within the Coal Measures strata they are not considered to pose a significant risk to the Groundwater Source Protection Zone / Principal Aquifer within the area.

It is anticipated that the piles will be formed at approximately 15m bgl within the Coal Measures strata and the vibro stone columns at a depth of 6m bgl formed within the underlying boulder clay and Coal Measures Strata.

Ground remedial works are programmed to be undertaken prior to the piling works (in accordance with Newbottle Street, Houghton-le-Spring, Remediation Strategy, for Hellens Land, Issue V3, October 2022. Author Shadbolt Group). The agreed remediation strategy and will involve the cut / fill across the site to an end product specification (at least 95% maximum dry density and less than 5% air voids) and will provide the appropriate levels and placement of a piling mat and will further reduce the environmental risk, including any potential hotspot removal works.

The following section briefly describes the foundations considered;

Rotary Bored Piles are used to bore into the ground repeatedly, removing spoil as the pile is progressed, until the design depth is reached. Rotary cased piles utilising high viscosity / low slump grout minimises risks associated with contamination migration and preferential pathways. However, disposal of spoil arisings will be required. The diameter of a rotary bored pile tends to be larger than a driven pile

Rotary Bored Piles **are considered suitable** but may not be financially viable due to off site disposal costs.

Continuous Flight Auger Piles (CFA)

The pile auger supports the bore sides during construction without the need for temporary casing. This type of pile has been used successfully in similar ground conditions. However, disposal of spoil arisings will be required. The diameter of CFA piles tends to be larger than a driven pile

CFA piles **are not considered suitable** for economic and environmental reasons as Made Ground soils may be required to be disposed off-site to enable designed levels to be constructed. This method would increase vehicle movements and create waste and the pile length of 15m bgl may approach the depth of the water table.

Driven Cast Insitu Piles

A Driven Cast Insitu Pile is designed to make maximum use of the available skin friction and end bearing potential of the surrounding soil. It is capable of achieving high working loads in a variety of weak subsoil conditions, regardless of water table.

The construction method used is ideally suited to piling 'brownfield sites' where obstructions can frequently create programme and cost control problems. In addition to the key benefit of not producing spoil, the cast insitu construction process also provides a tight bond to the surrounding soil and limits the potential of vertical migration of soil contaminants. The pile length of 15m bgl may approach the depth of the water table.

Driven Cast in Place piles **are considered suitable**.

Driven Pre-Cast Piles

A Precast Concrete Piling System is quick to install and very cost effective in most ground conditions. This pile is environmentally attractive as no spoil or arisings are generated from pile installation. The diameter of the driven piles should be kept to the minimum to minimise potential environmental impact.

The use of modern rigs with hydraulic hammers to avoid excessive noise, which when combined with low drop heights, means enables installation near other buildings or services.

Driven Pre-Cast in Place piles **are considered suitable**.

Bored Piles

The presence of Made Ground would require the use of temporary casing to construct traditional bored piles.

Bored piles are considered suitable.

Auger Displacement Pile

The pile auger supports the bore sides and displaces soil, and limited spoil is generated.

Although some arisings are generated, auger displacement piles **are considered suitable**.

Vibro-stone Piles

Vibro stone columns are quick and the most cost-effective foundation solution available to depths of approximately 6m bgl. Targeted to enhance density and soil strength in weak and made ground conditions and settlement characteristics. An economical and sustainable alternative to deep foundation piling. Vibro stone columns do not produce any spoil.

Vibro stone columns **are considered suitable** for Unit 2.

Selected Piling Method for Unit 1

As can be seen several of the piling methods are suitable for the site, however, the driven pile has been chosen as it is the most suitable technique which will allow construction of the piles through the soils present at the site, will not cause a pathway to be created at the site (narrow diameter and tight seal) and will not generate a large volume of waste soils.

It is understood that the piles will be founded in the clays / coal measures at an approximate depth of **15mbgl**, and a potential pathway will not be created to the underlying principal aquifer and groundwater protection zone.

The general construction sequence for the foundation works will comprise the following:

- Cut and fill earthworks to achieve the required levels
- Preparation and construction of the piling mats.
- Undertake the main foundation works forming the large diameter driven bored piles.
- Commence superstructure construction.

5.0 CONCEPTUAL SITE MODEL

5.1 Introduction

In order to meet the expectation of the planning permission for the development Shadbolt Group have undertaken an assessment of the environmental risks at the site due to the proposed foundation works using the pollutant linkage methodology usually referred to as the South-Pathway-Target assessment.

5.2 Potential Contamination Sources

In accordance with current UK best practice and in line with the Environment Agency guidance on piling on land affected by contamination, the potential environmental hazards created by piling on the Site have been considered in the context of the following Conceptual Site Model (CSM), representing the relationships between contaminant sources, pathways and receptors (specific to the proposed piling works), to support the identification and assessment of Possible Pollutant Linkages (PPL).

Source	Contaminants of Concern
Hotspots of contaminants within the Made Ground	PAH, TPH, Selenium
Low levels of Ground Gas within the Made Ground	Potential Carbon Dioxide and Methane
Residual contamination in the historical Made Ground at depth.	PAH, TPH, Selenium
Localised contamination residual within the Coal Measures Strata	PAH, TPH, Selenium

5.3 Potential Contamination Receptors

Relevant potential receptors include:

- Future Site Users (Commercial) – principally from ground gas
- Underlying Coal Measures Strata – Secondary A Aquifer
- Nearby Principal Aquifer and Groundwater Protection Zone.
- Local Watercourses – Houghton Burn

5.4 Pathways

The piling scheme for Unit 1 proposes to found the piles in the Coal Measures Strata. This necessitates piling through the Made Ground and underlying glacial till (where present) into the underlying Coal Measures Strata, resulting in a potential preferential pathway between the isolated contamination identified in the Made Ground Deposits and the Secondary A Aquifer below.

The Limestone Principal Aquifer noted to be potentially located on site was not identified during the ground investigations but is known to be located to the east of the site.

The formation of the piles may also create a preferential pathway for upward migration of ground gas.

The nearest watercourse is the culverted Houghton Burn, located approximately 223m to the northeast, of the site. Although the overall regional hydraulic gradient is understood to be to the east (the hydraulic gradient at the site suggests northeast to southwest), the watercourse is culverted and is likely to be at an elevation above the site and therefore it is unlikely that potential mobile contaminants, that may exist at the site, (impacted groundwater, leachate from soils contamination, unidentified dense / light non-aqueous phase liquids (DNAPL and LNAPL)) would have an impact on the watercourse.

The site is currently vacant and no surface water drainage and or service ducts are known to exist at the site and therefore it is unlikely that potential mobile contaminants could currently migrate and impact surface waters via service conduits and existing site drainage and surface run off.

5.4 Plausible Pollutant Linkages

From the above CSM, the following plausible pollutant linkages have been identified, in relation to the proposed piling works on the Site:

Sources(s)	Pathway(s)	Receptor(s)
PAH, TPH and Selenium within the Made Ground	Vertical migration of leachable contaminants, mobilised by the action of piling through impacted soils, via the pathway created by piling through the Made Ground and underlying clay	Principal Aquifer & SPZ (Sandstone - Yellow Sands Formation & Limestone - Raisby Formation), Secondary A Aquifer (Sandstone / Mudstone – Pennine Middle Coal Measures Formation) Local Watercourses.
Potential localised groundwater PAH, TPH and Selenium contamination in Made Ground	Vertical migration of dissolved phase contamination by groundwater flow along preferential pathway created by piling into the underlying bedrock.	Principal Aquifer & SPZ (Sandstone - Yellow Sands Formation & Limestone - Raisby Formation) Secondary A Aquifer (Sandstone / Mudstone – Pennine Middle Coal Measures Formation) Local Watercourses.
Low levels of ground gas within Made Ground	Accumulation of ground gas in confined spaces via upward migration of gas via formed piles	Commercial end users of the Site

6.0 PILING RISK ASSESSMENT

Based on the above identified plausible pollutant linkages, the following assessment of the risk that piling presents is discussed below. No significant source of contamination has been reported at the site with low concentrations of soils contamination being reported with limited perched waters encountered. However, slightly elevated concentrations of leachate PAH within the shallow soils and dissolved phase PAHs within the deep groundwaters (Coal Measures Strata (Secondary A Aquifer) have been reported).

No deposits of limestone were encountered during the drilling of the rotary cored boreholes and the piling / deep foundation works have been demonstrated to lie outwith the Groundwater Source Protection Zone / Principal Aquifer.

6.1 Driven Pre-Cast Piles or Steel Piles (Unit 1)

As described in Section 4.0 Pre a Precast Concrete Piling System is quick to install and very cost effective in most ground conditions. This pile is environmentally attractive as no spoil or arisings are generated from pile installation thus protecting workforce and future site users from potential soil contamination and is a more sustainable approach for the development as a whole – no off-site disposal.

It is acknowledged that dissolved phase hydrocarbons have been reported within the Coal Measures Strata with the local hydraulic gradient to the southwest. It is considered unlikely that the low levels of reported hydrocarbon contamination reported within the Coal Measures Strata will migrate and impact the Principal Aquifer and Groundwater Source Protection Zone to the northeast of the site.

The action of piling through the Made Ground and underlying clays is unlikely to create long term preferential pathways to the underlying aquifers as no soils / significant mobile hydrocarbon contamination has been reported within the upper layers and following development the site will be covered in hardstanding / buildings and formal drainage which will significantly reduce the potential for rainwater to impact on the Made Ground and significantly reducing the potential for potential soils contamination to each into solution. Infiltration drainage is not being proposed as this could present an unacceptable risk to the underlying groundwaters associated with leachate generation. Should the proposed drainage solution be changed (i.e., to include infiltration) this would change the risk assessment and conclusions with regards to the proposed remedial works and a revision to this risk assessment would be required and the proposed remediation works amended.

The construction of the driven piles founded within the clays/underlying Coal Measures Strat, do not create a pathway through the Made Ground and underlying clays (Secondary A aquifer) to the adjacent Principal Aquifer as the piles are to be limited in depth to approximately **15m bgl and formed within the Coal Measures Strata**. The short-term risks during construction would be mitigated by the measures detailed within the Remediation Strategy, e.g. cut and fill works, potential hotspot removal works, appropriate compaction and installation of monitoring boreholes.

The structure to be piled also lies out with the Groundwater Zone Protection area and no significant contamination has been reported.

The pile construction should not create a pathway to the nearest watercourse as this is culverted.

Contamination / pollution of a groundwater source by cement paste, wet concrete and grout are of primary significance in fast flowing groundwater environments, such as fractured or jointed chalk or permeable sand and gravel formations and the use of driven (precast or steel) piles removes this risk.

Therefore, in general the assessment of the site using a source-pathway-target model indicates the risk of the above proposed piled foundation works will not significantly harm the groundwater resources present at the site.

As part of the piling works to be undertaken at the site it is recommended that the groundwater within the existing perimeter boreholes are monitored for potential mobile contaminants on a weekly basis during the piling works and during construction as detailed within the Remediation Strategy.

6.2 Vibro Stone Columns (Unit 2)

The action of creating stone columns through the Made Ground and underlying clays is unlikely to create long term preferential pathways to the underlying aquifers as no soils / significant mobile hydrocarbon contamination has been reported within the upper layers and following development the site will be covered in hardstanding / buildings and formal drainage which will significantly reduce the potential for rainwater to impact on the Made Ground and significantly reducing the potential for potential soils contamination to each into solution.

The construction of the vibrio stone columns founded within the clays/underlying Coal Measures Strata, do not create a pathway through the Made Ground and underlying clays (Secondary A aquifer) to the adjacent Principal Aquifer as the piles are to be limited in depth to approximately **6m bgl and formed within the underlying clays Coal Measures Strata.**

The structure to be developed with vibro stone columns also lies out with the Groundwater Zone Protection area and no significant contamination has been reported.

The pile construction should not create a pathway to the nearest watercourse as this is culverted.

Therefore, in general the assessment of the site using a source-pathway-target model indicates the risk of the above proposed vibro stone foundation works will not significantly harm the groundwater resources present at the site.

As part of the piling works to be undertaken at the site it is recommended that the groundwater within the existing perimeter boreholes are monitored for potential mobile contaminants on a weekly basis during the piling works and during construction as detailed within the Remediation Strategy.

6.3 Ground Gas Migration via Piling Pathways

Gas protection measures will be employed for the proposed development to meet the requirements of Characteristic Situation 2 gas protection as required in British Standard BS 8485:2015 'Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings'.

Therefore, it is considered that the risk of ground gas migrating into buildings is negligible.

7.0 CHANGES TO PREFERRED METHOD

There are no significant changes to the preferred construction method. It is not considered that any other alternative foundation option is structurally feasible and will cause less environmental harm. It is also considered that there are no major improvements to the construction methodology that will reduce the environmental risk.

8.0 JUSTIFICATION OF FINALLY SELECTED METHOD

Based on our assessment it is considered that the use of a driven precast concrete / steel piles founded within the clays and underlying mudstone is the most suitable foundation solution with respect to structural, geotechnical, environmental and financial considerations for Unit 1. The requirement to support high building loads, minimise ground movements, minimise the volume of airings, has resulted in driven cast insitu driven piling being the most appropriate piling technique for the development.

Based on our assessment it is considered that the use of vibro stone columns within the clays and underlying mudstone is the most suitable foundation solution with respect to structural, geotechnical, environmental and financial considerations for Unit 2.

The Lightly loaded PFS may be founded by using a raft foundations .

Using the Source-Pathway-Target model both the 'Pathway' and 'Source' are significantly reduced or absent and thus the potential for significant harm is also minimized.

- with respect to the 'Source' no significant contamination has been reported.
- In respect to 'Pathway', construction and founding of the piles within the clays and underlying Mudstone will not create a preferential pathway to the underling Principal Aquifer (receptor).

9.0 CONCLUSION

This piling risk assessment and the results of Shadbolt Group previous investigations has shown that there is low risk of mobilising significant contamination or ground gas through a preferential pathway, as such the overall risk associated with piling are considered to be to be **LOW** subject to the mitigation measures (regarding hotspot, monitoring and compaction) detailed within the Remediation Strategy are implemented to mitigate the short-term risks during the construction works.

APPENDIX A

REPORT CONDITIONS

REPORT CONDITIONS

GEO-ENVIRONMENTAL GROUND INVESTIGATION

*This report is produced for the benefit of **Hellens Land** in accordance with the terms of the appointment.*

This report has been prepared in accordance with the terms and conditions of the appointment and relates to the condition of the site at the time of ground investigations. No warranty is provided as to the possibility of future changes in the condition of the site.

Shadbolt Environmental takes no responsibility for conditions which occur between the individual exploratory holes. Whilst every effort has been made to interpret the conditions between investigation locations, such information is only indicative.

Whilst the contamination assessment detailed within this report reflects our view, because there are no exact UK definitions of these matters, being subject to risk analysis, Shadbolt Environmental are unable to give categoric assurances that they will be accepted by authorities or funds without question. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to Shadbolt Environmental. In time, improved practices or amended legislation may necessitate a re-assessment.

The report is limited to the geotechnical and environmental aspects detailed within the report, and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents.

APPENDIX B
DRAWINGS



Key

- Existing Buildings
- Retail Buildings
- Ancillary Buildings
- Landscaped Areas
- Paved Areas
- Concrete Service Yards
- Tarmac
- Totem Sign
- PFS Sign
- Mineshaft
- Planning Application Boundary Line



Parking Provision

Standard Parking Spaces 4800 x 2500mm	274no
Accessible Spaces	22no
Parent & Child Spaces	17no
Electric Charging Spaces	16no
Total Spaces	329no

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FINTRY | ESTATES

IBA ARCHITECTS

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Project: HOUGHTON COLLIERY RETAIL
Newboothle Street
Houghton le Spring

Title: Proposed Site Layout

Client: Hellens Land / Finty Estates

Drawn: KW Scale: 1:500 @ AD
Checked: FW Date: 04.10.21

TENDER

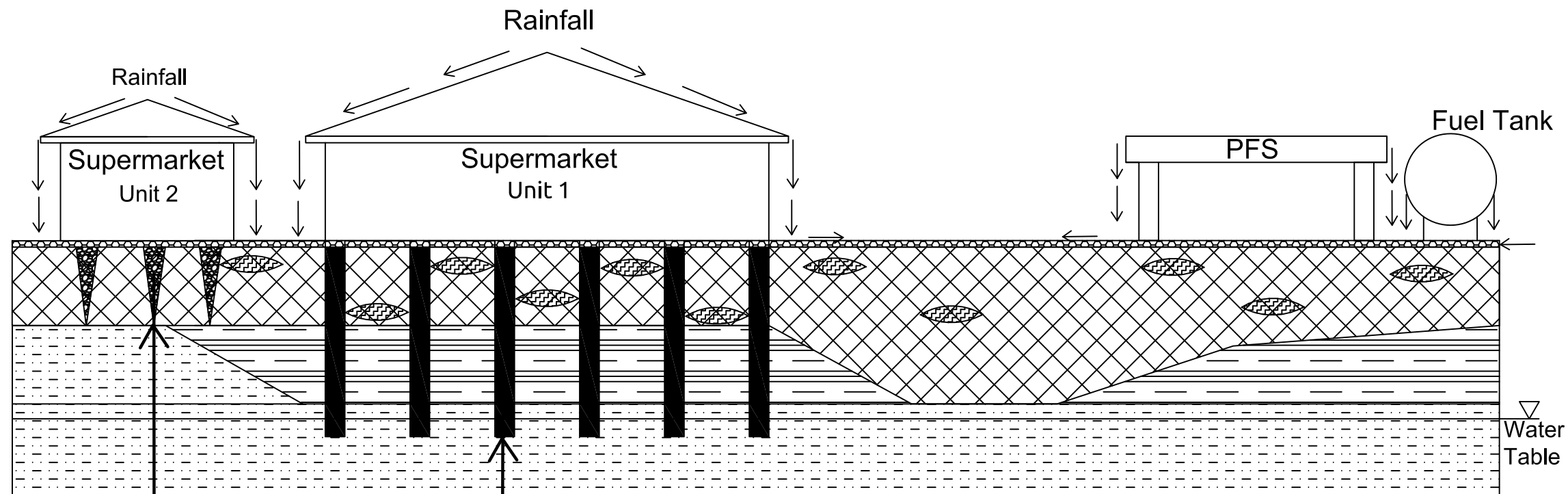
1485 (SP)040 T1

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DO NOT SCALE






GENERAL NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER INFORMATION BY RELEVANT PARTIES CLASSED AS DESIGNERS UNDER THE CONSTRUCTION (DESIGN & MANAGEMENT) REGULATIONS 2015.
2. ONLY FIGURED DIMENSIONS ARE TO BE WORKED FROM. THE CONTRACTOR IS TO CHECK ALL DIMENSIONS ON SITE AND REPORT ANY DISCREPANCIES TO THE ENGINEER.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.



Stone Column Foundations into Underlying Clay/Rock

Piled Foundations into Underlying Rock

-  Hard Standing
-  Made Ground
-  Low Permeability Clay
-  Mudstone / Sandstone
-  Pockets of Leachate / Soil Contamination

Typical Stone Column Length 6m
 Typical Pile Length 15 m
 Typical Depth to Water Table 13 - 18m Below Ground Level

B	Updated Following further Information	TJS	MT	22/09/22
A	Updated Following further Investigation	GH	MT	25/08/22
Rev	Description	By	Ckd	Date



Drawing Status: **PRELIMINARY**

Project: **Houghton Colliery**

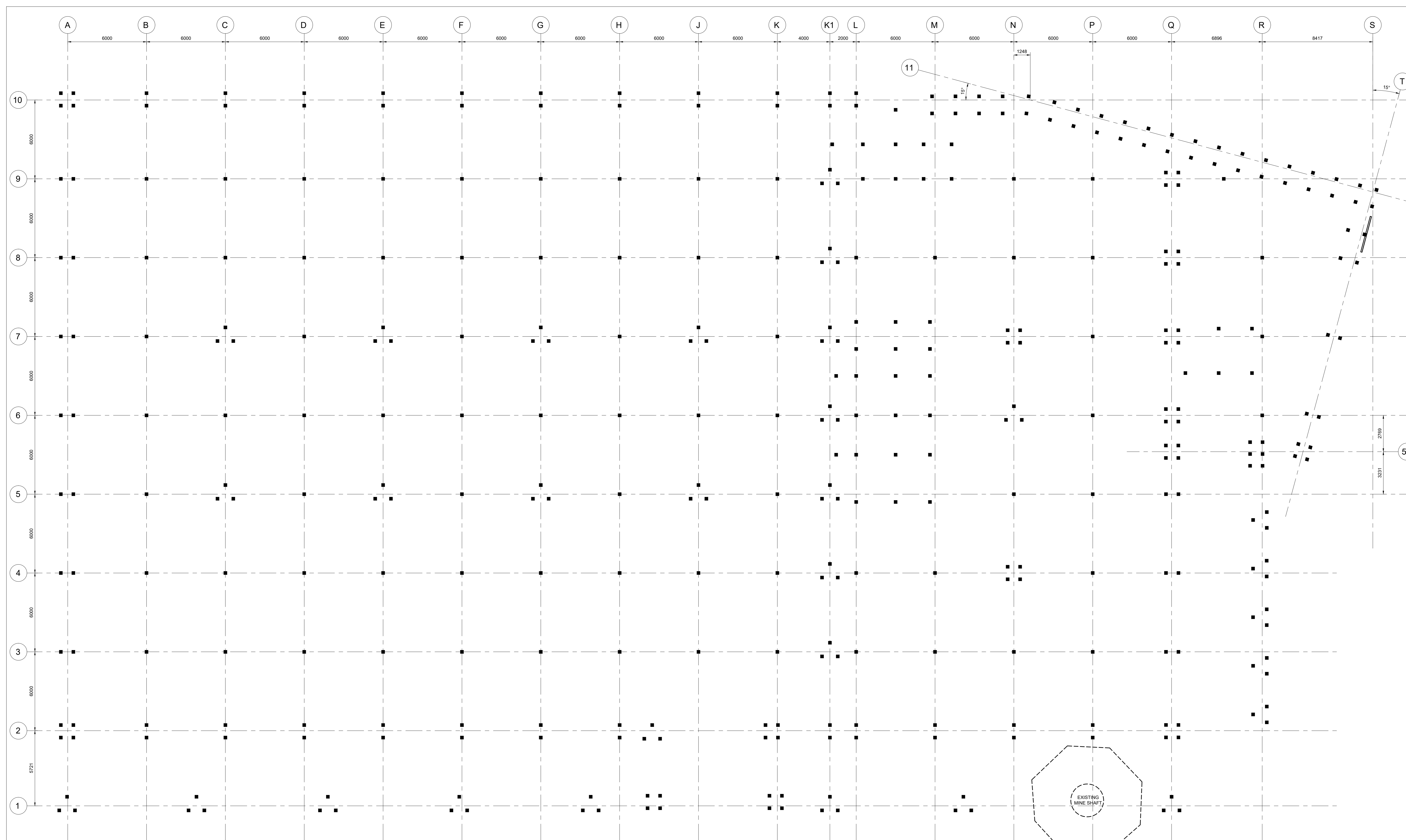
Drawing No: **2585E - 201** Rev: **B**

Client: **Hellens Group**

Drawing Title: **Conceptual Site Model**

Scale: As indicated @ A3 By: DRW Ckd: CKD Date: Jan 2022

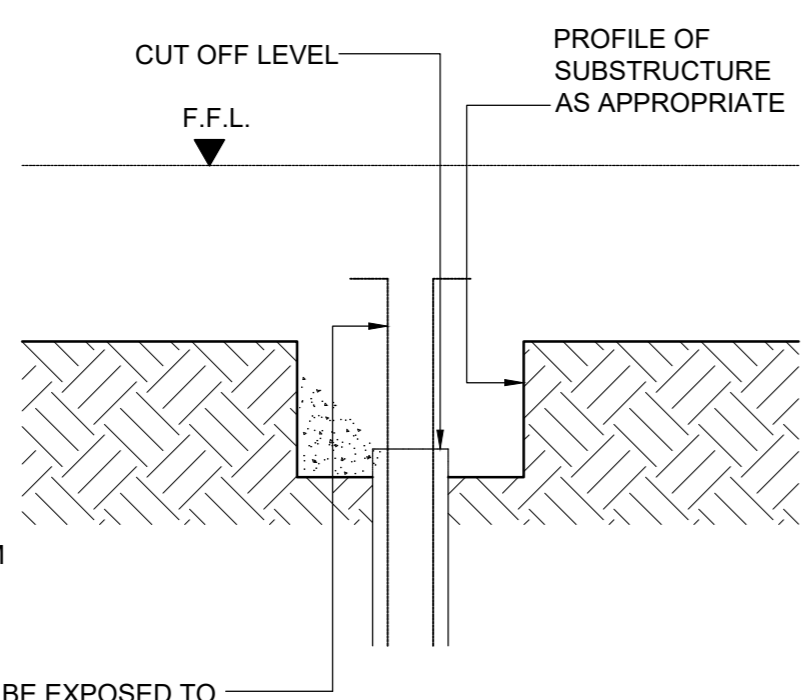
Health and Safety Notes:
 The following key residual health and safety risks have not been eliminated by design and are identified below:
 - Refer Design Risk Assessments Ref: 2020011-DRA
 Safe methods and systems of work remain the responsibility of the contractor.
 This drawing shall be read in conjunction with specification ref: 2020011-SP-007 Piling



PLAN
1:100

NOTES
 ALL PILING TO BE IN ACCORDANCE WITH ICE SPECIFICATION FOR PILING AND EMBEDDED RETAINING WALLS
 ■ DENOTES PILE POSITION.
 ALL PILES TO HAVE A WORKING LOAD OF 600kN VERTICAL UNLESS NOTED OTHERWISE.
 ALL PILES TO HAVE HORIZONTAL CAPACITY OF 25kN UNLESS NOTED OTHERWISE. PILE CUT-OFF LEVEL TO BE 1125mm BELOW F.F.L.
 FLARED HEAD CUT PILE CUT OFF LEVELS TO BE 750mm BELOW F.F.L. D.O.

WORKING PLATFORM AS REQUIRED BY PILING SUBCONTRACTOR AND DESIGNED / INSTALLED / MAINTAINED IN ACCORDANCE WITH BRE REPORT 470 - WORKING PLATFORMS FOR TRACKED PLANT.
 TOP SURFACE TO BE 150mm MINIMUM OF COMPACTED TYPE 1 SUB BASE WITH 25mm SAND BLINDING.



PILE CUT OFF DETAIL
1:20

1. REFER TO FPS DOCUMENT - 'BREAKING DOWN OF PILES'
2. TOP OF PILE TO BE BROKEN OUT TO 100mm ABOVE CUT OFF LEVEL WITH HYDRAULIC BREAKER LEAVING REINFORCEMENT INTACT. HANDHELD BREAKER TO BE USED TO FURTHER BREAKOUT PILE TO CUT OFF LEVEL. DO NOT USE VERTICALLY. SURFACE TO BE SCABBLED TO EXPOSE AGGREGATE.
3. BARS TO BE BENT TO PROVIDE MINIMUM DISTANCE FROM FFL AS SHOWN. NOTE: BARS MUST PROJECT VERTICALLY FROM PILE CUT OFF LEVEL.

B	Issued for Tender	MG	MG	MG	AD	05/11/21
A	Stage 4 Issue	MG	MG	MG	MG	09/06/21
Q	Issued for Comment	MG	MG	MG	MG	18/06/21
Rev.	Description	By	CHK	App	Date	

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Client: **Hellens Land / Fintry Estates**

Project: **Retail Development
Newbottle Street
Houghton le Spring**

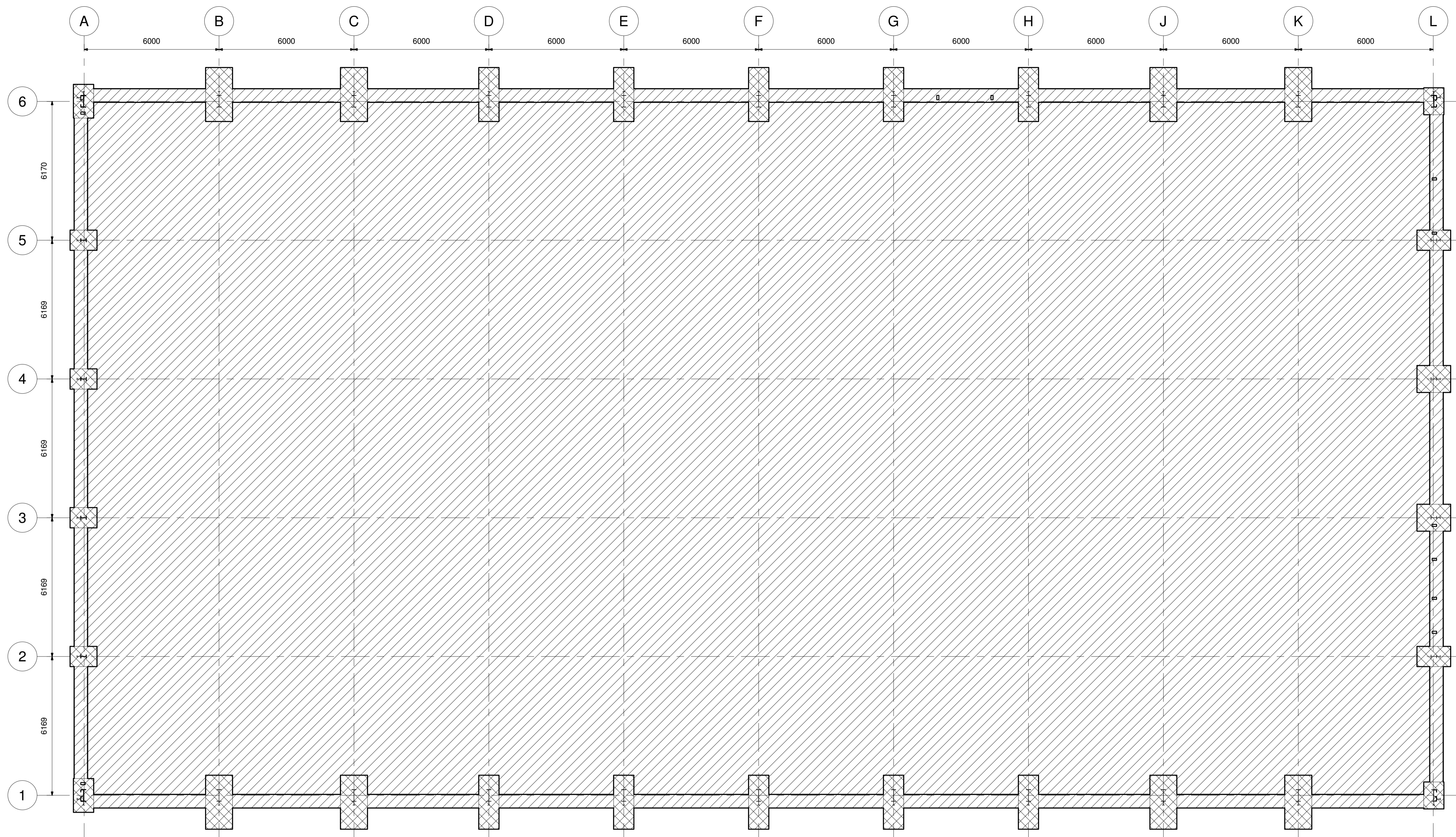
Drawing Title: **Piling Layout**

Scale	As Shown	Sheet Size	A0
Drawn By	MG	Checked By	MG
Approved By	MG	Date	10/06/21
Drawing Status	Tender		

Project No.	2020011	Drawing No.	11-010	Revision	B
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ISO 9001 REGISTERED




Health and Safety Notes:
 The following key residual health and safety risks have not been eliminated by design and are identified below:
 - Refer to Design Risk Assessments, Ref: 2020011-DRA
 Safe methods and systems of work remain the responsibility of the contractor.
 This drawing shall be read in conjunction with the following specification: 2020011-SP-002 Foundations and Substructures

B	Issued for Tender	MQ	CJB	MG	05/11/21
A	Issued for Stage 4 Costing	MQ	CJB	MG	28/09/21
Ø	Issued for Comment / Approval	MQ	CJB	MG	11/06/21
Rev.	Description	By	Chk	App	Date

VIBRO COMPACTION LEGEND:

 GROUND TO BE IMPROVED TO PROVIDE ALLOWABLE GROUND BEARING PRESSURE OF 150kN/m².

 GROUND TO BE IMPROVED TO PROVIDE ALLOWABLE GROUND BEARING PRESSURE OF 25kN/m²

GROUND IMPROVEMENT LAYOUT

1 : 100

NOTE: THE CONTRACTOR IS TO SELECT METHOD OF GROUND IMPROVEMENT TO SUIT COST AND AVAILABILITY TO SUIT PROGRAMME.

- VIBRO COMPACTION NOTES:**
- 1.THE WORKS SHALL CONSIST OF IMPROVEMENT OF THE GROUND TO PROVIDE THE ALLOWABLE GROUND BEARING PRESSURES AS INDICATED ON THIS DRAWING.
 - 2.FOR THE PURPOSES OF THIS DRAWING, SUB-CONTRACTOR REFERS TO THE SPECIALIST GROUND IMPROVEMENT CONTRACTOR
 - 3.SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND EXECUTION OF THE GROUND IMPROVEMENT TO IMPROVE THE SETTLEMENT AND LOADBEARING PROPERTIES OF THE GROUND, IN ACCORDANCE WITH THIS DRAWING.
 - 4.GROUND CONDITIONS ARE INDICATED IN THE GROUND INVESTIGATION REPORT REF. 2585-NEWBOTTLE STREET DATED FEBRUARY 2020 BY SHADBOLT ENVIRONMENTAL.
 - 5.SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING DESIGN DRAWINGS FOR APPROVAL BY MAIN CONTRACTOR AND PORTLAND CONSULTING ENGINEERS. APPROVAL PERIOD TO BE AGREED.
 - 6.IF STONE COLUMNS ARE USED, THESE SHALL BE POSITIONED TO A PLAN TOLERANCE OF 150mm FROM THE THEORETICAL POSITION (MEASURED CENTRE TO CENTRE). VERTICAL TOLERANCE SHALL BE MAXIMUM 1:20 OUT OF VERTICALITY.
 - 7.IF BURIED OBSTRUCTIONS PREVENT THE INSTALLATION OF ANY STONE COLUMNS, THE OBSTRUCTION WILL EITHER BE REMOVED BY THE MAIN CONTRACTOR IF THE OBSTRUCTION IS AT A REASONABLE DEPTH, OR THE GROUND IMPROVEMENT WILL BE MODIFIED / REPOSITIONED AND ADDITIONAL TREATMENT UNDERTAKEN INCLUDED IF NECESSARY. COURSE OF ACTION IS TO BE AGREED BETWEEN SUB-CONTRACTOR, MAIN CONTRACTOR AND PORTLAND CONSULTING ENGINEERS.
 - 8.SUB-CONTRACTOR SHALL BE RESPONSIBLE FOR UNDERTAKING ALL NECESSARY TESTING TO SATISFY HIMSELF AND THE MAIN CONTRACTOR THAT THE GROUND IMPROVEMENT HAS BEEN EXECUTED TO A SUFFICIENT STANDARD TO PROVIDE THE REQUIRED ALLOWABLE BEARING PRESSURE. METHOD OF TESTING, PROCEDURE, TEST LOCATIONS AND NUMBERS SHALL BE AGREED WITH THE MAIN CONTRACTOR AND PORTLAND CONSULTING ENGINEERS.
 - 9.SETTLEMENT DESIGN OF GROUND POST TREATMENT SHALL BE DONE SO AS TO PROVIDE A MAXIMUM SETTLEMENT OF: FOUNDATIONS - 25mm OVERALL WITH NO MORE THAN 10MM BETWEEN ADJACENT PADS. SLABS - 10mm MAXIMUM.



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Client **Hellens Land / Fintry Estates**

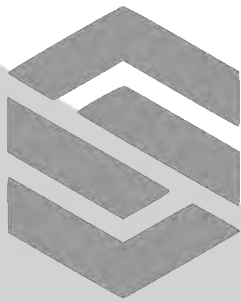
Project
**Retail Development
 Newbottle Street
 Houghton Le Spring**

Drawing Title
**Ground Improvement Layout
 Unit 2 - Home Bargains**

Scale	As indicated	Sheet Size	A1
Drawn By	Checked By	Approved By	Date
MQ	CB	MG	11/06/21
Drawing Status			
Tender			
Project No.	Drawing No.	Revision	
2020011	12-011	B	

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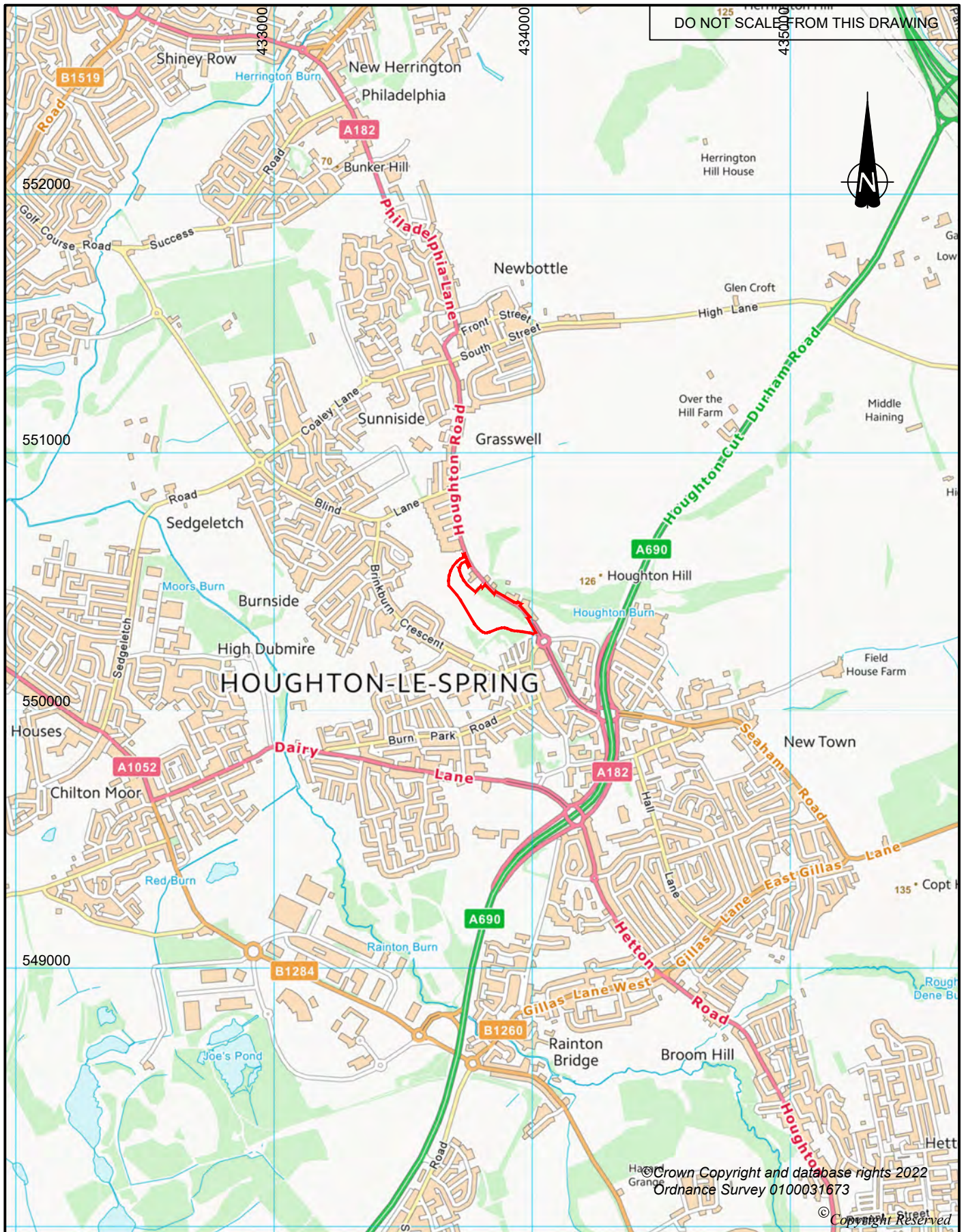






SHADBOLT GROUP

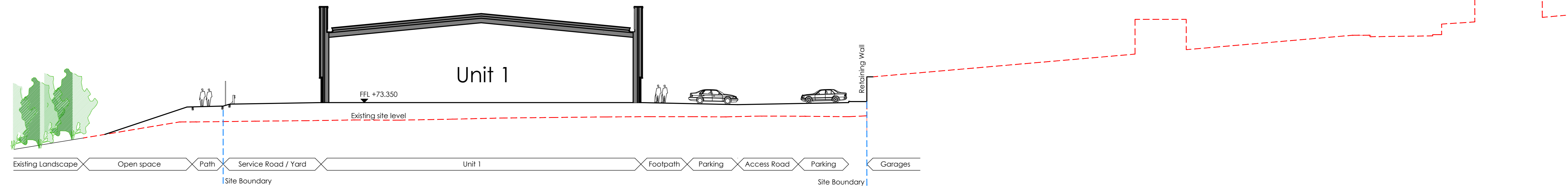
DESIGN | MANAGE | CONSTRUCT

DRAWINGS

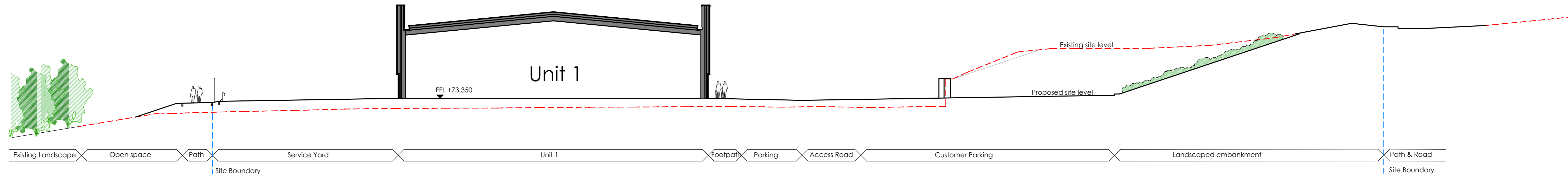


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DRAWING TITLE		SITE LOCATION PLAN		DRAWN BY	DR			
			CHECKED BY					
				APPROVED BY				

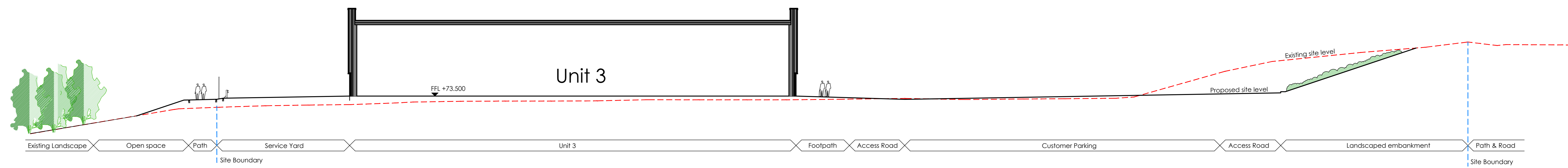
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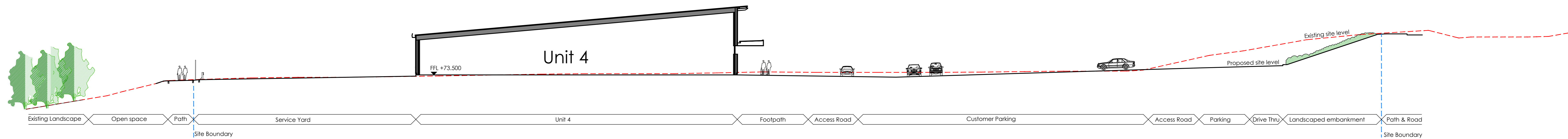
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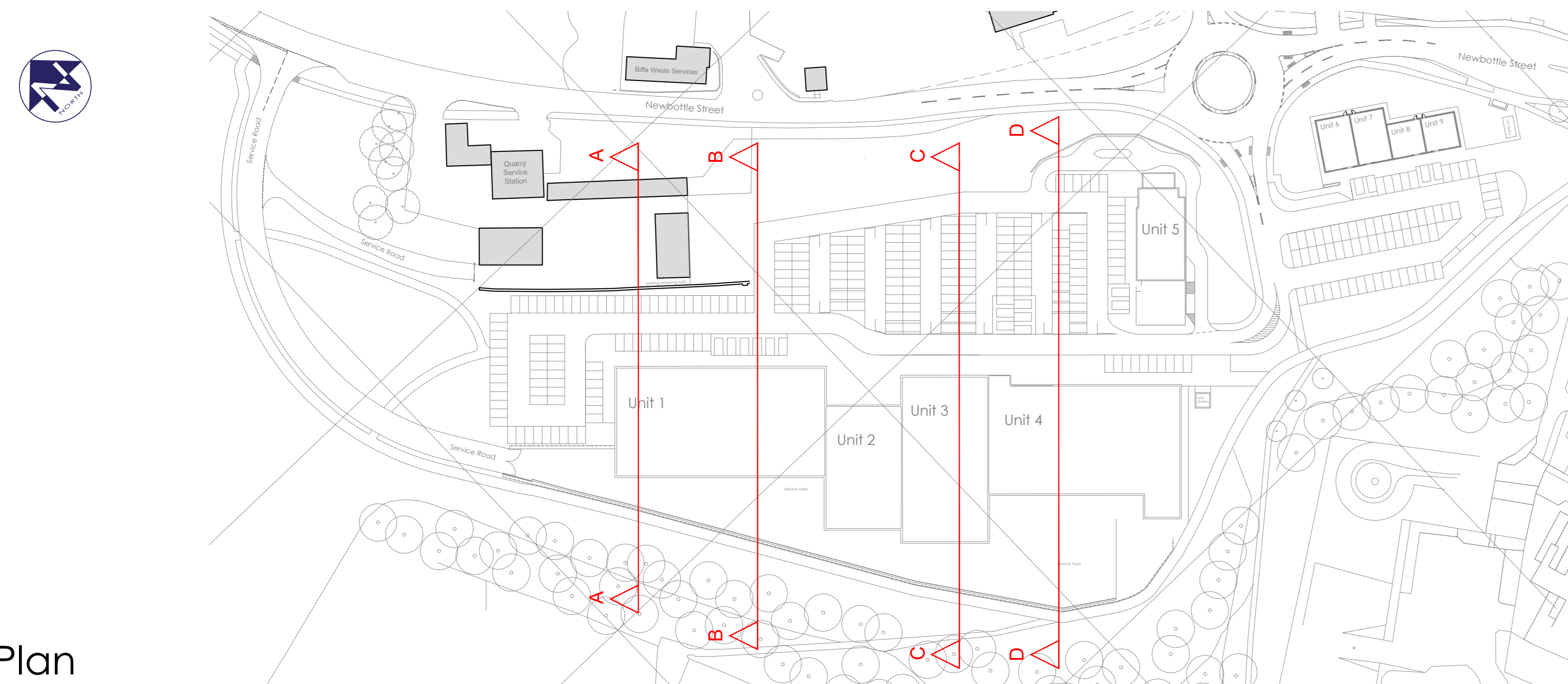
Section C



Section D



Key Plan



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