



**Legend**

Surface samples

● PRA-BK-34-S1

Potential Areas of Concern

Redline

▭ Prairie Phase 4 (formerly SSI3A)

Substations On Site

▭ 2.75kV Substation



Notes:

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CONTACT ARCADIS IN CASE OF ANY QUERIES.

**Title: Prairie Phase 4 - Sample Location Plan**

**Site:**  
Teesworks - Prairie Phase 4

**Client:**  
South Tees Development Corporation

**Project:**  
10035117

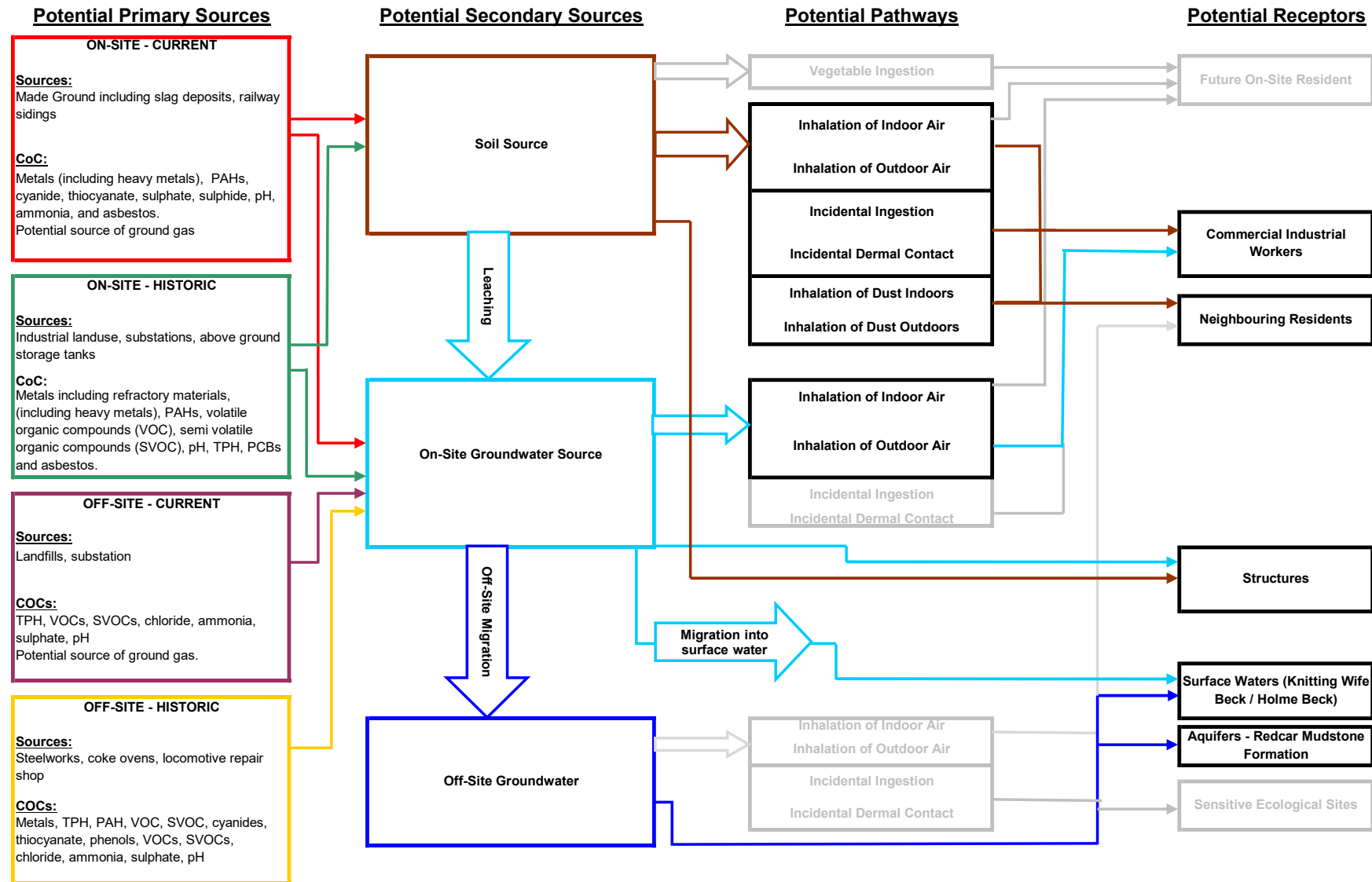
**Figure 2**

Date: 17/02/2022  
 Drawn By: DW  
 DRG No: 10035117-AUK-XX-XX-DR-ZZ-0485-01-P4\_Surface sample



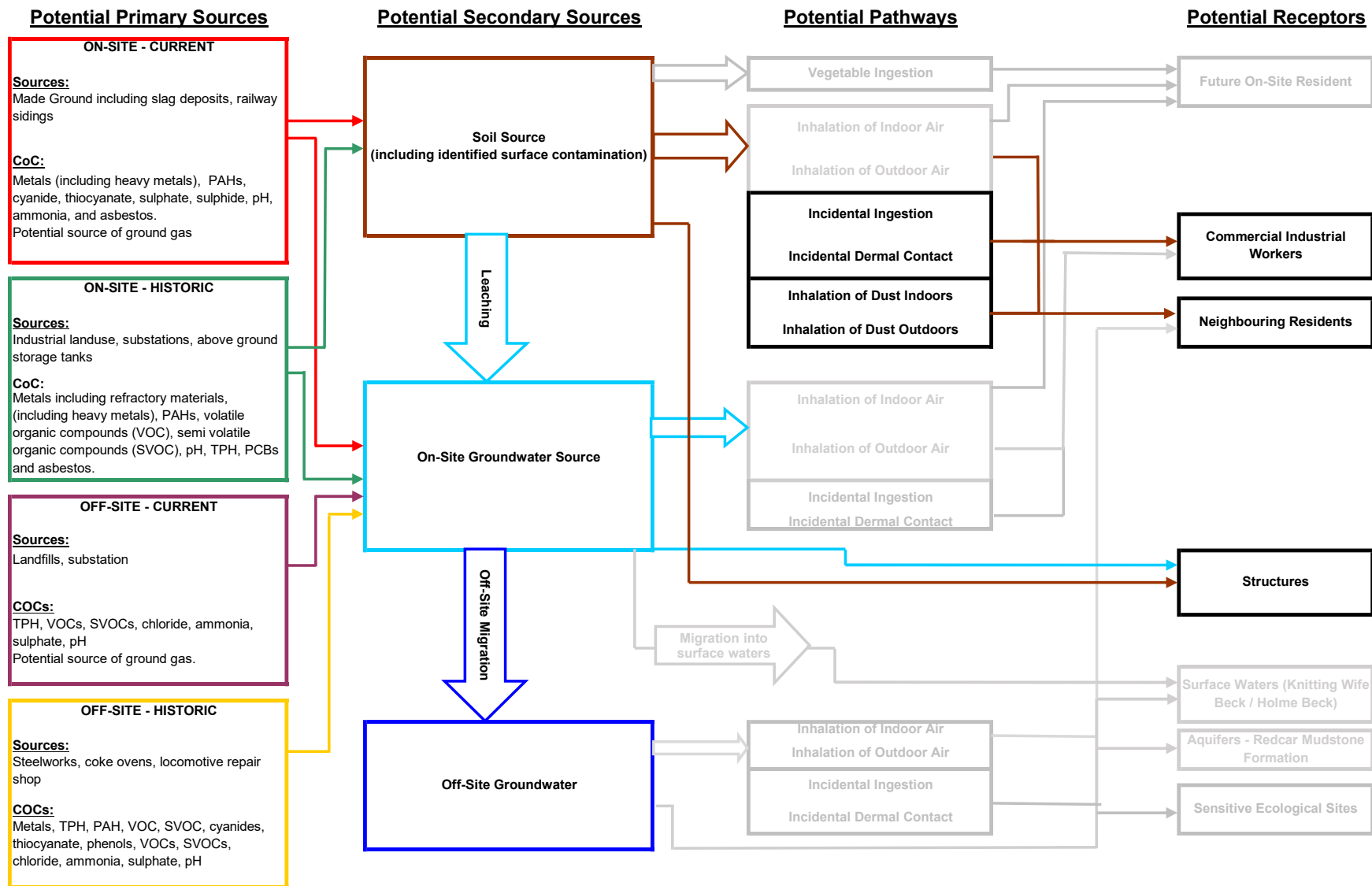


**Figure 3**  
**Outline Conceptual Site Model - Commercial Industrial End Use**



Key: — Pollutant linkage not considered to present a significant level of risk

**Figure 4**  
**Refined Conceptual Site Model - Commercial Industrial End Use**



Key: — Pollutant linkage not considered to present a significant level of risk

# Appendix B

## Study Limitations

**IMPORTANT:** This section should be read before reliance is placed on any of the information, opinions, advice, recommendations or conclusions contained in this report.

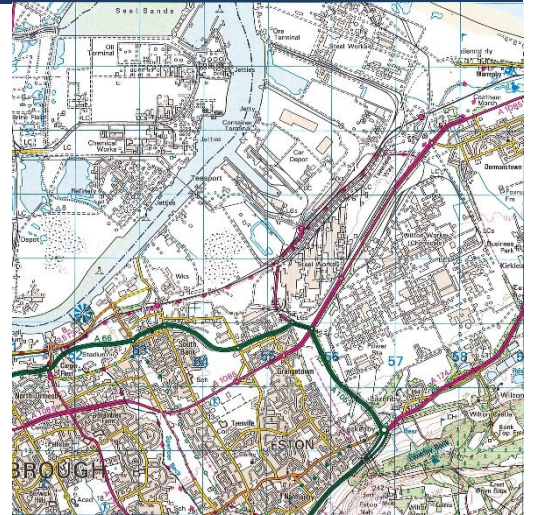
1. This report has been prepared by Arcadis UK Ltd (Arcadis), with all reasonable skill, care and diligence within the terms of the Appointment and with the resources and manpower agreed with **STDC** (the 'Client'). Arcadis does not accept responsibility for any matters outside the agreed scope.
2. This report has been prepared for the sole benefit of the Client unless agreed otherwise in writing.
3. Unless stated otherwise, no consultations with authorities or funders or other interested third parties have been carried out. Arcadis are unable to give categorical assurance that the findings will be accepted by these third parties as such bodies may have unpublished, more stringent objectives. Further work may be required by these parties.
4. All work carried out in preparing this report has used, and is based on, Arcadis' professional knowledge and understanding of current relevant legislation. Changes in legislation or regulatory guidance may cause the opinion or advice contained in this report to become inappropriate or incorrect. In giving opinions and advice, pending changes in legislation, of which Arcadis is aware, have been considered. Following delivery of the report, Arcadis have no obligation to advise the Client or any other party of such changes or their repercussions.
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6. Whilst this report and the opinions made are correct to the best of Arcadis' belief, Arcadis cannot guarantee the accuracy or completeness of any information provided by third parties.
7. This report has been prepared based on the information reasonably available during the project programme. All information relevant to the scope may not have been received.
8. This report refers, within the limitations stated, to the condition of the Site at the time of the inspections. No warranty is given as to the possibility of changes in the condition of the Site since the time of the investigation.
9. The content of this report represents the professional opinion of experienced environmental consultants. Arcadis does not provide specialist legal or other professional advice. The advice of other professionals may be required.
10. Where intrusive investigation techniques have been employed, they have been designed to provide a reasonable level of assurance on the conditions. Given the discrete nature of sampling, no investigation technique is capable of identifying all conditions present in all areas. In some cases, the investigation is further limited by site operations, underground obstructions and above ground structures. Unless otherwise stated, areas beyond the boundary of the site have not been investigated.
11. If below ground intrusive investigations have been conducted as part of the scope, service tracing for safe location of exploratory holes has been carried out. The location of underground services shown on any drawing in this report has been determined by visual observations and electromagnetic techniques. No guarantee can be given that all services have been identified. Additional services, structures or other below ground obstructions, not indicated on the drawing, may be present on Site.
12. Unless otherwise stated the report provides no comment on the nature of building materials, operational integrity of the facility or on any regulatory compliance issue.



# Appendix C

## 3<sup>rd</sup> Party Information

# PRAIRIE PHASE 4



Draft Factual Report  
(Rev.00)

**Allied  
Exploration &  
Geotechnics Ltd.**

Contract Number: 4355  
Client: Tees Valley Combined Authority  
Consulting Engineer: Arcadis

Date: January 2022

Head Office (Registered Office)  
Unit 25 Stella Gill Industrial Estate  
Pelton Fell  
Chester-le-Street  
Co. Durham  
DH2 2RG  
☎ 0191 3874700  
📖 0191 3874710

Regional Office  
Unit 20 Business Development Centre  
Eanam Wharf  
Blackburn  
BB1 5BL  
☎ 01254 503 200  
📖 01254 662 590



# REPORT CONTROL SHEET

## Contract Details

<b>Contract Title</b>	<b>Prairie Phase 4</b>
<b>Contract Number</b>	4355
<b>Location</b>	<b>Former Redcar Steelworks, Redcar</b>
<b>National Grid Reference</b>	NZ 548 211

## Report Details

<b>Report Status</b>	Draft (Rev.00)		
<b>Report Type</b>	<b>Factual</b>		
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<b>Copy Number</b>	<b>PDF</b>	<b>of</b>	<b>PDF</b>
<b>Report Recipient</b>	Jonathan Miles	Arcadis	

## Client/Consultant Engineer Details

<b>Client</b>	<b>Consultant Engineer</b>
<b>Tees Valley Combined Authority</b> <b>Teesside Management Office</b> <b>Trunk Road</b> <b>Redcar</b> <b>TS10 5QW</b>	<b>Arcadis</b> <b>1 Whitehall Riverside</b> <b>Leeds</b> <b>LS1 4BN</b>

## Signed & Approved On Behalf of Allied Exploration & Geotechnics Limited

<b>Reports Engineer</b>  <b>Laura Clarke</b> BSc (Hons).	<b>Approved:</b>	<b>Date:</b>
		18/01/2022
<b>Technical Manager</b>  <b>Kerry Wade</b> BSc (Hons), MSc, FGS, MCMI	<b>Approved:</b>	<b>Date:</b>
		18/01/2022
<b>Managing Director</b>  <b>Nick Vater</b> BSc (Hons), MSc, CGeol, EurGeol, FGS.	<b>Approved:</b>	<b>Date:</b>
		18/01/2022

<b>Head Office (Registered Office):</b>	Unit 25, Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG.	Tel: 01913874700 Fax: 01913874710
<b>Regional Office:</b>	Unit 20, Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL.	Tel: 01254503200 Fax: 01254662590

PRAIRIE PHASE 4

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Standard Penetration Test Results	1
Photo-ionisation Detector Test Results	2
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Laboratory Report Certificate	0
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Abbreviation	Definition
CP	Cable Percussion

**Text Abbreviations**

## 1. INTRODUCTION

The site works were commissioned in order to assess the current ground and groundwater conditions on the site prior to the proposed redevelopment of the former Recdar Steel Works, Redcar. This report was undertaken as an additional phase of works undertaken by Allied Exploration & Geotechnics Limited (AEG), refer to previous reports for further details (AEG/4155/2017).

AEG were contracted by Tees Valley Combined Authority with Arcadis acting in the capacity of Consulting Engineer to perform a ground investigation at this site in order to provide information on the subsurface ground and groundwater conditions as well as to obtain samples for geotechnical and specialist chemical testing.

### 1.1 Scope of Works

The investigation works consisted of the following main elements:

- Two cable percussion holes, both of which were further advanced using rotary coring techniques.
- Twelve machine excavated trial pits.
- Associated sampling.
- *In-situ* standard penetration, photo-ionisation detector and water quality parameter testing.
- Installation of gas/groundwater monitoring instrumentation.
- Post site works gas/groundwater monitoring, including existing historical installations.
- Groundwater sampling.

Site work was carried out between the 22<sup>nd</sup> and 30<sup>th</sup> September 2021 with subsequent post site work monitoring, laboratory testing and reporting thereafter. A factual report only 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 548 211. This can be found on Ordnance Survey 1:50,000 Sheet Number 93 (Middlesbrough, Darlington & Hartlepool). Part of this sheet is reproduced as Figure 1, the Site Location Plan.

The site is located approximately 3.9km north west of Wilton Castle and 1.7km south of Teesport Container Terminal 1.



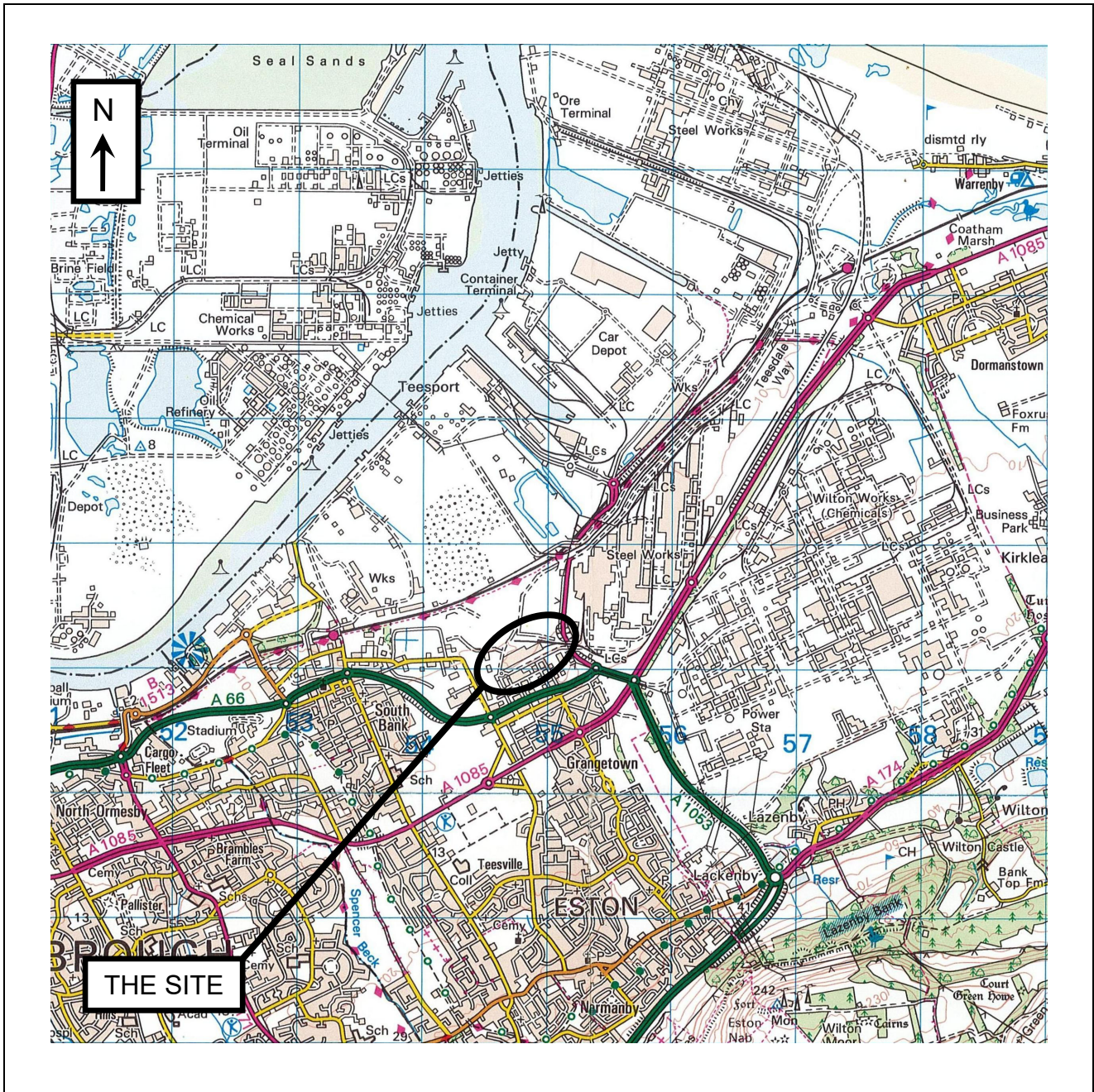


Figure 1: Site Location Plan

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## 2.2 Site Description and Topography

The site is located within the former Sahaviriya Steel Industries within Redcar Steelworks. The buildings on site have been demolished and the site comprises areas of hardstanding and derelict land. The site is bound to the south and east by the A66/A1053, and the northwest by a railway line and Tees Dock Road. The majority of the exploratory holes are located within the footprint of the former Sahaviriya building.

## 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 Table 1, as appropriate; at positions as near as practicable to those supplied by the Consulting Engineer. These are shown on the Exploratory Hole Location Plan, Field Data Enclosure 1.

Reference Code Number	Title
BS 1377:1990	Methods of Test for Soils for Civil Engineering Purposes (where not in contravention or superseded by Eurocode references)
BS 5930:2015 + A1:2020	Code of Practice for Ground Investigation (where not in contravention or superseded by Eurocode references)
BS EN ISO 14689-1:2018	Identification and Classification of Rock
BS EN ISO 14688-1:2018 & 14688-2:2018	Identification and Classification of Soil
BS 10175:2011+A2:2017	Investigation of Potentially Contaminated Sites
BS EN ISO 22476-3: 2005	Geotechnical investigation and testing - Field testing - Part 3 Standard Penetration Testing

**Table 1: British Standard Reference Code Number**

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 Borehole and Trial Pit Records, Field Data Enclosures 2 and 3 respectively. A key to all symbols and abbreviations used throughout the report is included in the Key Sheets.

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 cobbles and boulders in soil types such as glacial till (boulder clay). With respect to rotary coring, driller's records and observations of the recovered core are used to determine any zones of no recovery (core loss). These zones are based on the interpretation of the logging engineer and are therefore subjective. Refer to the Key Sheets for further information.

### 3.2 Health & Safety Considerations: Services

Before the commencement of any exploratory hole a search for underground services was conducted as prescribed in HSE publication '*Avoiding Underground Services (HSG47)*' and in accordance with in-house internal safety procedure AEG-14.



Service plans were provided by the Client and were consulted prior to using a service locating device (such as a Cable Avoidance Tool or C.A.T.) to scan a working area around the proposed exploratory hole location. Where no services were indicated a 'Permit-to-Work' form was issued by the investigation supervisor and, with the exception of trial pits, the position was commenced with a hand excavated inspection pit. The inspection pit was also scanned during the excavation procedure. It should be noted that the digging of an inspection pit only confirms or guards against the possible presence of underground public utility services within the excavated pit. Where no services were indicated by the scanning procedure or inspection pit the exploratory hole was commenced in accordance with the Contract Specification.

Where services were located or there was reasonable belief that they were present, the position was relocated in agreement with the Client. Details of any services uncovered/located during this investigation are given in Table 2.

Exploratory Hole Number	Type of Service	Orientation & Depth (size where indicated)	Status (Damaged/Undamaged)	Additional Remarks
No services were encountered within the inspection pits dug for the purposes of the exploratory hole works. Services were known to exist within the vicinity of exploratory holes, The location and nature of these services are beyond the scope of this report.				

**Table 2: Services Encountered**

### 3.3 Exploratory Holes: Boreholes

Two boreholes were sunk using a Dando 2000 drilling rig, utilising cable percussive (shell and clay cutter) techniques, to depths of 7.20m (S3\_BHA04) and 10.00m BGL (S3\_BHA03). Both boreholes were further advanced using a Boart Longyear DB540 drilling rig, utilising rotary coring methods, to depths of 12.30m (S3\_BHA04) and 15.00m BGL (S3\_BHA03).

Rotary coring employed a 'S' (146mm OD) barrel in combination with a P.C.D. drill bit together with water flushing medium. This coring assembly was used to recover 113mm lined cylindrical specimens of rock core.

The Borehole Records are presented as Field Data Enclosure 2 and a summary of any relevant remarks are detailed in Table 3.

Exploratory Hole Number	Drilling Method	Completion Depth (m BGL)	Installation	Remarks
S3_BHA03	CP/RC	15.00	Yes – refer to Section 3.7	Advanced to required depth.
S3_BHA04	CP/RC	12.30	Yes – refer to Section 3.7	Advanced to required depth.
Any relevant photographs are presented after the applicable Borehole Record				

**Table 3: Borehole Summary**

### 3.4 Exploratory Holes: Mechanically Excavated Trial Pits

Twelve trial pits were mechanically excavated using the back-hoe bucket of a 14 Tonne 360 Tracked Excavator to depths of between 1.50m (S3\_TPA\_TP101) and 5.00m BGL (S3\_TPA\_TP108). The Trial Pit

Records are presented as Field Data Enclosure 3 and a summary of any relevant remarks are detailed in Table 4.

Exploratory Hole Number	Excavation Method	Completion Depth (m BGL)	Remarks
S3_TPA_TP101	Machine Excavated	1.50	Advanced to required depth.
S3_TPA_TP102	Machine Excavated	2.50	Terminated due to difficulty getting through concrete (clients instructions).
S3_TPA_TP102A	Machine Excavated	2.20	Terminated due to concrete obstruction.
S3_TPA_TP103	Machine Excavated	2.00	Advanced to required depth.
S3_TPA_TP104	Machine Excavated	2.00	Advanced to required depth.
S3_TPA_TP105	Machine Excavated	1.50	Advanced to required depth.
S3_TPA_TP106	Machine Excavated	2.00	Advanced to required depth.
S3_TPA_TP107	Machine Excavated	1.60	Advanced to required depth.
S3_TPA_TP108	Machine Excavated	5.00	Advanced to required depth.
S3_TPA_TP109	Machine Excavated	2.20	Advanced to required depth.
S3_TPA_TP110	Machine Excavated	2.00	Advanced to required depth.
S3_TPA_TP111	Machine Excavated	3.50	Terminated due to close proximity of railway lines.

Any relevant photographs are presented after the applicable Trial Pit Record

**Table 4: Trial Pit Summary**

### 3.5 Samples

Representative samples of soil and rock were obtained from the boreholes and trial pits and were taken to the laboratory for selected geotechnical and specialist chemical testing.

In addition, one surface sample (PRA-BK-34-S1) was obtained from the material surrounding a former substation at the site, by the Consulting Engineer.

Environmental samples were taken in accordance with the contract specification during the investigation using an approved selection of container types in order to suit the encountered material properties and designated laboratory analytical parameters. Full chain of custody procedures were in place post sampling and during the transportation stage to the nominated specialist chemical laboratory. Environmental samples were administered appropriately following the best practice guidance provided in the contract specification.

### 3.6 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. Furthermore, water was added during advancement of the boreholes in order to facilitate drilling operations. As a consequence there is a possibility that this could have masked the discrete ingress of natural groundwater into the boreholes, which subsequently may have been sealed as a result of progressing the casing.

Groundwater was encountered in the boreholes and trial pits during the site works operation. Where groundwater observations were made details are given on the relevant Borehole and Trial Pit Record and in greater detail (collectively in tabulated format) as Field Data Enclosure 4: Groundwater Observations Made at the Time of Site Works. Standing groundwater levels were recorded in a number of boreholes and trial pits at the beginning and/or end of each drilling shift. The water level is indicated on the applicable Borehole and Trial Pits Record as part of the boring progress information.

**3.7 Instrumentation & Monitoring**

Both boreholes were installed with monitoring instrumentation in accordance with the requirements of the Consulting Engineer. Details of the installations are shown in Table 5 and on the relevant Borehole Records.

Exploratory Hole Number	Instrumentation	Installation Depth (m BGL)	Response Zone (m BGL)
S3_BHA03	1 No. 25mm diameter slotted standpipe and 1 No. 50mm diameter slotted standpipe	5.00 and 15.00	1.50-5.00m and 10.00-15.00
S3_BHA03	1 No. 25mm diameter slotted standpipe and 1 No. 50mm diameter slotted standpipe	4.00 and 12.30	1.00-4.00 and 7.00-12.30

**Table 5: Instrumentation Summary**

Instruments were monitored for gas and/or groundwater on five occasions after the completion of the site works in accordance with the Contract Specification. The Consulting Engineer requested that we also monitor two existing historical installations during the fourth and fifth monitoring rounds. These instruments had been drilled as part of a previous investigation at the site (AEG/4155/2017).

A record of the readings is presented as Field Data Enclosure 5 (Groundwater Monitoring Results) and Field Data Enclosure 6 (Gas Monitoring Results).

Groundwater sampling was undertaken from selected installations during one round of monitoring. Water Quality Parameters were recorded for the purged water prior to sampling (see Section 4.5).

At the time of writing this report AEG had not been instructed to add any lengths of pipe to the installations due to ongoing earthworks. However, it should be noted that another party may add extra sections at any time due to the earthworks without AEG’s knowledge.

**3.8 Operative Observations: Potential Contamination**

For the purposes of determining the condition of the site, with regard to human health and environmental issues, reference should specifically be made to any specialist chemical testing undertaken as part of the investigation scheme, as well as any supporting desk study and risk assessment documentation. The information given herein collates the observations made by the operatives involved in the investigation only and comments that have been indicated on the engineering records.

Where there was potential evidence of contamination, principally as a consequence of olfactory and visual identification, information is provided in Table 6.

Exploratory Hole Number	Occurrence ( <i>in-situ</i> /surface/ laboratory sample)	Visual / Olfactory / Laboratory Testing	Depth (m BGL)	Occurrence Type	Additional Remarks
S3_TPA_TP106	<i>In-situ</i>	Visual	1.10-1.20	Potentially contaminated with cyanide	None

Table 6: Potential Contamination Encountered

It should be stressed that the information provided herein is subjective, as it is based on the perceptions of individuals and not specialists routinely involved in the chemical determination of contaminated residues, liquors, vapours or solid contaminants.

### 3.9 Surveying

The investigation positions were surveyed after completion of site works using a Leica Smartrover (Model ATX 1230+ GNSS) GPS based instrument which provides corrected Ordnance Survey co-ordinates in real time to an accuracy of within  $\pm 30$ mm vertical and  $\pm 30$ mm horizontal. These positions have been subsequently plotted in AutoCAD® software and are shown on the Exploratory Hole Location Plan, Field Data Enclosure 1.

The surveying of the exploratory holes took place after the completion of site works. It should be noted that the ground levels across the site may have been altered since the positions were surveyed due to ongoing earthworks.

## 4. IN-SITU TESTING

### 4.1 General

*In-situ* testing as specified by the Consulting Engineer was carried out in selected boreholes and trial pits in accordance with techniques outlined in the relevant British Standard and/or AEG Quality Procedure. The results are presented in the *In-situ* Testing Enclosures with a number of the test results summarised at the relevant depth on the Borehole and Trial Pit Records.

### 4.2 Standard Penetration Test Results

Standard Penetration Testing (SPT) was carried out in the boreholes and trial pit in accordance with techniques outlined in BS EN ISO 22476-3: 2005 in order to determine the relative density and consistency of the strata encountered. The 'N' value (number of blows per 300mm penetration) or the penetration per blow was recorded for each test. Uncorrected 'N' values or penetration per blow data are provided on the applicable Borehole and Trial Pit Records. (Refer to page 6 of the key sheets for further details).

More detailed information concerning the standard penetration testing is given in *In-situ* Testing Enclosure 1 which includes the following;



- Initial exploratory hole conditions prior to the test procedure.
- Calibration and energy ratio ( $E_m$ ) information for the SPT hammer device used to carry out the test.
- A breakdown of blows for each 75mm penetration interval.
- Rod length ( $C_R$ ) and energy ( $C_E$ ) correction ratios.
- Uncorrected 'N' value.
- Corrected 'N<sub>60</sub>' value that applies the rod ( $C_R$ ) and energy ( $C_E$ ) corrections indicated.
- Pertinent remarks corresponding to the test procedure.

In addition to the above, a graph has been prepared for each exploratory hole which plots the uncorrected and corrected 'N' value results against depth. Calibration certificates for the SPT apparatus used during the testing procedure are also presented for reference within this *In-situ* Testing Enclosure.

#### 4.3 Photo Ionisation Detector (PID)

Photo-ionisation detector (PID) screening for semi-volatile and volatile organic compounds was conducted on selected environmental samples taken during the investigation using a MiniRAE 2000. PID screening was also undertaken from gas taps on selected monitoring instruments in conjunction with the post site work gas and groundwater monitoring visits. The results for the sample based PID tests are recorded in tabular format as *In-situ* Testing Enclosure 2 and, where applicable, on the Borehole and Trial Pit Records. Installation based PID monitoring is presented in Field Data Enclosure 6.

#### 4.4 *In-situ* Water Quality Parameter Testing

Groundwater sampling was undertaken from selected installations during one round of post site works monitoring in accordance with techniques outlined in the relevant British Standard and/or AEG Quality Procedure. Water Quality Parameters were recorded for the purged water prior to sampling. The parameters tested were pH, temperature, electrical conductivity, redox potential and dissolved oxygen. The results are presented in tabular format as *In-situ* Testing Enclosure 3.

### 5. LABORATORY TESTING

#### 5.1 General

Laboratory testing as scheduled by the Consulting Engineer was carried out on selected samples in accordance with techniques outlined in BS 1377:1990, AEG Laboratory Quality Procedures or other appropriate standard as quoted.

#### 5.2 Geotechnical Testing

The results are presented in the Laboratory Enclosures with an outline list of the procedures undertaken given in Table 7.

Test	Procedure
Moisture Content	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)
Plasticity Index and Moisture Content	BS 1377 Part 2 1990 (BS EN ISO 17892-1:2014)
Determination of Particle Density	BS 1377 Part 2 1990
Particle Size Distribution Sieving	BS 1377 Part 2 1990
Particle Size Distribution Sedimentation	BS 1377 Part 2 1990
Determination of Chloride, Sulphate and pH (Tested externally)	See External Laboratory Certificates
Determination of Dry Density/Moisture Content Relationship	BS 1377 Part 4 1990
Determination of MCV / Moisture Relationship	BS 1377 Part 4 1990
Determination of California Bearing Ratio	BS 1377 Part 4 1990
Determination of One Dimensional Consolidation Properties	BS 1377 Part 5 1990
Undrained Shear Strength in Triaxial Cell without Pore Water Pressure Measurement	BS 1377 Part 7 1990
Determination of Moisture Content of Rock	ISRM 1981
Determination of Point Load Index	ISRM 1985

**Table 7: Geotechnical Testing**

### 5.3 Specialist Chemical Testing

Selected samples have been submitted for chemical analysis as specified by the Consulting Engineer, conducted under a subcontract arrangement with Derwentside Environmental Testing Services (DETS). The results of this testing are presented as Appendix I.

### 5.4 Laboratory Identified Asbestos

Selected samples were analysed for asbestos content as specified by the Consulting Engineer. Any identified asbestos is presented in Table 8 which has been summarised from specialist chemical testing results (see Appendix I for further details).

Exploratory Hole Number	Occurrence	Depth (m BGL)	Occurrence Type	Additional Remarks
S3_TPA_TP103	Laboratory Sample	0.40	White asbestos	Small bundle of Chrysotile fibres
S3_TPA_TP104	Laboratory Sample	0.40	White asbestos	Small bundle of Chrysotile fibres

**Table 8: Laboratory Identified Asbestos**

## Key Sheets





# Allied Exploration and Geotechnics Limited

## Key Sheets



### 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 cobbles and boulders in soil types such as glacial till (boulder clay). With respect to rotary coring, driller's records and observations of the recovered core are used to determine any zones of no recovery (core loss). These zones are based on the interpretation of the logging engineer and are therefore potentially subjective. In addition, where relevant, every effort is made to highlight material/zones that may relate to suspected old workings. However, it should be noted that this is not straightforward (especially without detailed information regarding anticipated subsurface conditions) and therefore no guarantee can be made with regards to the accuracy of the interpretation of the recovered core.

### 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, PRELIM3 FINAL etc. The date shown relates to the last instance the data was revised. This information is for AEG Quality Assurance only.

#### Exploratory Hole No

The 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

Printed 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.





# Allied Exploration and Geotechnics Limited

## Key Sheets






### INFORMATION RELEVANT TO BOREHOLE AND WINDOW/WINDOWLESS SAMPLE HOLE RECORDS

#### Sample & Tests Columns

- Depth 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.
- Type No Indicates the type of sample/test and number given by the driller.
- Test Result Result of the test given in the applicable units.

#### Water Column

- Water Strike 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.
- Seepage Groundwater seepage within an exploratory hole is denoted by the  symbol.

#### Strata Columns

- Reduced Level The corresponding reduced level of each soil or rock boundary in metres Ordnance Datum.
- Legend A graphical representation of the materials encountered using BS 5930 recommended symbols for soil and rock.
- Depth (Thickness) The depth below ground level of each soil or rock boundary in metres and the thickness of each individual stratigraphic unit (given in brackets).
- Description Engineering description of each individual soil or rock type follows recommendations outlined in the current BS 5930 with the following implementation:
- The amendment of section 6 incorporates the guidance indicated in BS EN ISO 14688-1, BS EN ISO 14688-2 and BS EN ISO 14689-1 European Standard with particular emphasis on current UK practice.
  - Supplementary laboratory or in-situ assessed measurements of undrained strength are provided where applicable information is available in parenthesis in accordance with BS 5930 after the field strength determined consistency. The description based measurement table indicating the quantitative undrained strength classification divisions is provided in Key Sheets Table 1.

Term based on measurement	Undrained strength classification definition cu, in kPa (from BS EN ISO 14688-2, 5.3, Table 6)
Extremely low	<10
Very low	10-20
Low	20-40
Medium	40-75
High	75-150
Very High	150-300
Extremely High	300-600

KEY SHEETS TABLE 1

- Cobble and boulder content is expressed in accordance with the terms provided in BS5930 where visually identified in trial pit excavations, or inferred/recovered during the drilling operations. The assessment of frequency and spatial occurrence of coarse and very coarse rock material should not be considered as precise, but only an indicator or estimate of the potential conditions. It should be noted that the recovery of coarse or very coarse particles in boreholes is dependent on the limitations imposed by the casing diameter. The terminology used is outlined in Key Sheets Table 2.



# Allied Exploration and Geotechnics Limited

## Key Sheets



Fraction	Percent by Mass	Term
Boulders	<5	Low boulder content
	5 to 20	Medium boulder content
	>20	High boulder content
Cobbles	<10	Low cobble content
	10 to 20	Medium cobble content
	>20	High cobble content

KEY SHEETS TABLE 2

- 4 Rock Strength based on assessed field or measured unconfined compressive strength follows the classification scheme given in BS5930 as outlined in Key Sheets Table 3.

Term for use in field or based on measurement	Definition for field use	Definition on basis of Unconfined Compressive Strength measurement (MPa)	Superseded Classification of Rock Strength: Terminology (Strength Range MPa)	Definition for field use
Extremely weak	Scratched by thumbnail, gravel size lumps can be crushed between finger and thumb.	0.6-1.0	Extremely weak (0.6-1.0)	Can be indented by thumbnail. Gravel sized lumps crush between finger and thumb.
Very weak	Scratched by thumbnail, lumps can be broken by heavy hand pressure, can be peeled easily by a pocket knife, crumbles under firm blows with point of geological hammer.	1-5	Very weak (1-5)	Crumbles under firm blows with point of geological hammer. Can be peeled by a pocket knife.
Weak	Thin slabs, corners or edges can be broken off with hand pressure, can be peeled by a pocket knife, shallow indentations made by firm blow with point of geological hammer.	5-12.5	Weak (5-25)	Can be peeled by a pocket knife with difficulty. Shallow indentations made by firm blow with the point of geological hammer.
Moderately Weak	Thin slabs, corners or edges can be broken off with hand pressure, can be scratched with difficulty by pocket knife, hand-held specimen can be broken with single firm blow of geological hammer.	12.5-25		
Medium Strong	Cannot be scraped or peeled with a pocket knife, specimen on a solid surface can be fractured with single firm blow of geological hammer.	25-50	Medium Strong (25-50)	Cannot be scraped with pocket knife. Can be fractured with a single firm blow of geological hammer.
Strong	Specimen requires more than one blow of geological hammer to fracture it.	50-100	Strong (50-100)	Requires more than one blow of geological hammer to fracture.
Very Strong	Specimen requires many blows of geological hammer to fracture it.	100-250	Very Strong (100-250)	Requires many blows of geological hammer to fracture.
Extremely strong	Specimen can only be chipped with geological hammer.	>250	Extremely strong (<250)	Can only be chipped with geological hammer.
Based on BS EN ISO 14689-1 4.2.7, Table 2			Based on BS EN ISO 14689-1:2003 4.2.7, Table 5 (Superseded Version)	

KEY SHEETS TABLE 3

- 5 Where 'rock weathering classification' can be applied it is 'Approach 4' which will be used. If any other approach is used the factual text of the report will provide details of the applicable specific approach. (Ref.: BS5930). An outline of the 'Approach 4' rock weathering classification scheme is provided as Key Sheets Table 4.

APPROACH 4 CLASSIFICATION INCORPORATING MATERIAL AND MASS FEATURES		
Class	Classifier	Typical characteristics
A	Unweathered	Original strength, colour, fracture spacing
B	Partially weathered	Slightly reduced strength, slightly closer fracture spacing, weathering penetrating in from fractures, brown oxidation
C	Distinctly weathered	Further weathered, much closer fracture spacing grey reduction
D	Destructured	Greatly weakened, mottled, ordered lithorelics in matrix becoming weakened and disordered, bedding disturbed.
E	Residual or reworked	Matrix with occasional altered random or 'apparent' lithorelics, bedding destroyed. Classed as reworked when foreign inclusions are present as a result of transportation.

KEY SHEETS TABLE 4



# Allied Exploration and Geotechnics Limited

## Key Sheets



### 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 day's production as a daily log.

Date	Date of shift.
Depth	Depth of hole at the start of the shift.
Casing	Casing's depth at the start of the shift.
Casing Dia	Casing's diameter at the start of the shift.
Water Depth	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.

From	The depth commenced.
To	The depth finished.
Hours	The time spent for breaking out.

### 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 PIT/TRENCH RECORDS

The pit/trench records follow the same format as the borehole and window/windowless sample hole records for the Samples & Tests, Water and Strata columns. However, in addition to these there are the following:

#### Plan

A schematic plan view of the pit showing its excavated dimensions together with its orientation, given as a compass bearing to magnetic north.

#### Groundwater

Notes on water bearing horizons.

#### Stability

The engineer's comments outlining the stability of the sides during pit excavation.

#### General Remarks

The engineer's comments of any other information relevant to construction of the pit.

#### Additional Information

An indication if a sketch and/or photographs accompany the record.



# Allied Exploration and Geotechnics Limited

## Key Sheets



### Underground Services

Depth	Depth service was encountered.
Orientation	Orientation given as a compass bearing to magnetic north.
Type	Type of service encountered.
Diameter	Diameter of service encountered.
Condition	Condition the service encountered was noticed in.

### INFORMATION RELEVANT TO DRILLHOLE RECORDS AND ROTARY CONTINUATION

#### Run Details Columns

Depth	Each drill run is highlighted by a horizontal line with the top and bottom depths shown in metres. Core diameter (C Dia) is presented also within each run.
TCR (SCR) RQD	Information provided on the total core recovery, solid core recovery and rock quality designation. Refer to Abbreviations for further details.
Fracture Index	Information given relating to the fracture index of the rock.

#### Strata Columns

As the strata columns for borehole and window/windowless sample hole records except for description which is as follows:

Discontinuities Detail	Information on core discontinuities, localised variations in weathering, lithology, strength and structure follows recommendations outlined in BS5930.
Main	Engineering description of each individual soil or rock type follows recommendations outlined in BS5930.

#### 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.

#### Drilling Progress and Water Observations Columns

Date	Date of shift.
Depth	Depth of hole at the start of the shift.
Casing	Casing's depth at the start of the shift.
Water Strike	Depth at which water was encountered.
Water Standing	Depth at which water in the hole levelled off.
Water Remarks	Any remarks believed to be relevant to the water e.g. Artesian.

#### Standard Penetration Test

Depth	The depth commenced.
Type	Type of standard penetration test (SPT).
Result	Result of SPT.

#### Flush

From	The depth commenced.
To	The depth finished.
Type	Details of the type of flush used. A = Air, F = Foam, W = Water and Pol = Polymer.
Returns	An indication of the percentage of the returned flush material.

#### General Remarks

Any remarks believed to be relevant to the exploratory hole.





# Allied Exploration and Geotechnics Limited

## Key Sheets



### SAMPLES

B	Bulk disturbed sample.
ES	Environmental soil sample.
EW	Environmental water sample.
G	Gas sample.
J	Small disturbed sample.
LB	Large bulk disturbed sample.
P	Piston sample.
P*	An attempted but failed undisturbed piston sample.
U	Undisturbed sample.
U*	An attempted but failed general purpose undisturbed sample.
U <sub>(ss)</sub>	Sample has been subsampled.
ES <sub>(U)</sub>	Brackets following a sample denotes a subsample. The sample information within the brackets is the origin of the subsample.
W	Water sample.

### IN-SITU TESTS

CBR	California Bearing Ratio mould sample or test.
HSV	In-situ hand shear vane.
HSV*	An attempted but failed in-situ hand shear vane.
HSV result of e.g. 80(20)kPa	Denotes average HSV peak result followed by average HSV residual result (in brackets).
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.
PID	Photo ionisation detector test.
FID	Flame ionisation detector test.
S	Standard Penetration Test (SPT) using the split barrel sampler (shoe). The corresponding uncorrected 'N' value is given in the test result column with more detailed information provided in the In-Situ Testing Enclosures where applicable. Testing has been conducted in accordance with BS EN ISO 22476-3.
C	Denotes SPT test using a solid cone in preference to the split barrel sampler (usually in coarse granular soil) with all other reporting requirements as outlined above for the split barrel sampler.
S/C result of e.g. 1/2.94	Denotes where full penetration has not been achieved during the SPT test. In such cases the penetration (mm) per blow is recorded in the test result column e.g. 1/2.94 is 2.94mm of penetration per single blow.
SV	In-situ down-the-hole shear vane test. The remoulded shear strength is given in brackets.

### ROCK QUALITY AND CORE RECOVERY

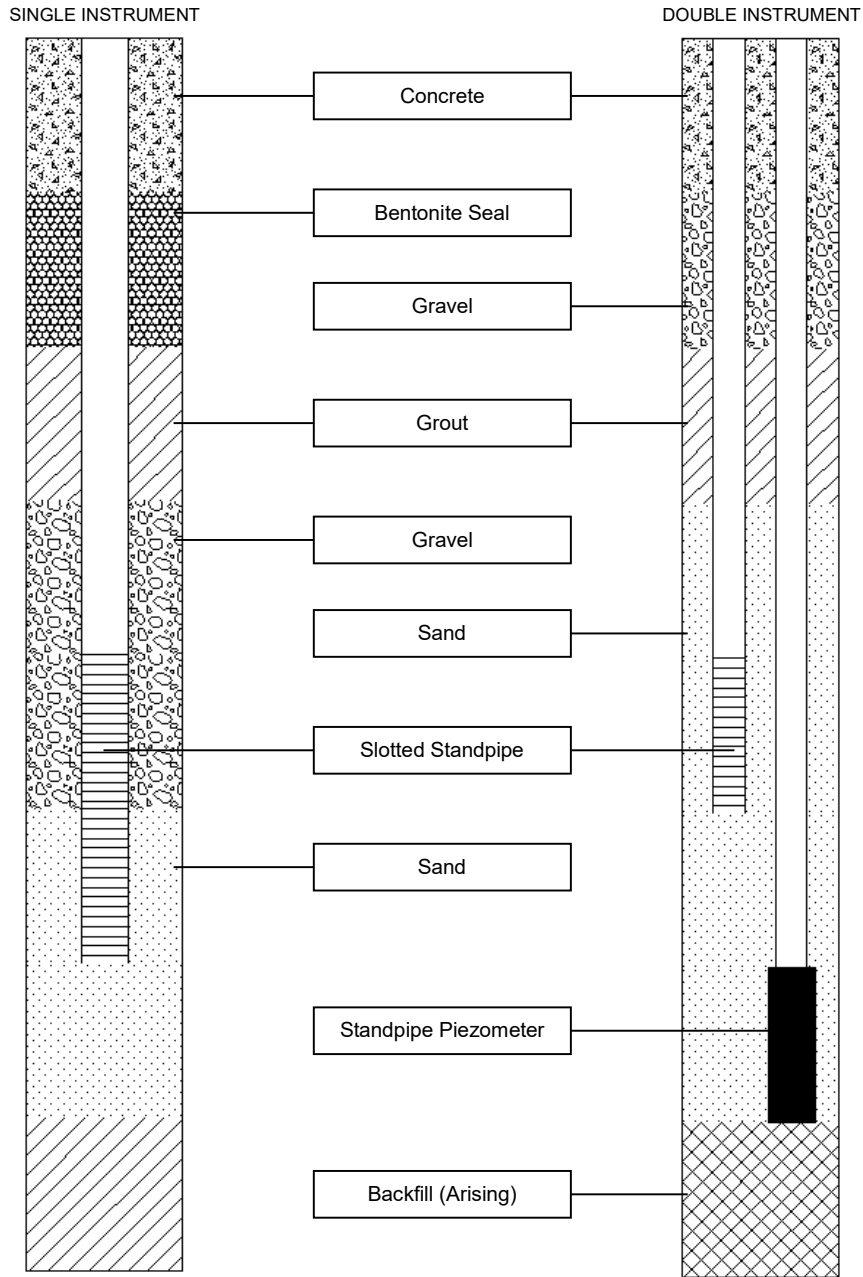
TCR	Total Core Recovery - the length of the recovered core expressed as a percentage of the length of core run.
SCR	Solid Core Recovery - the sum length of all core pieces that are recovered with at least one full diameter, expressed as a percentage of the length of core run.
RQD	Rock Quality Designation - 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.
FI	Fracture Index - The number of fractures per 1000mm length of solid core.
NI	Non-intact - The material recovered in a non-intact state.
NR	No recovery from the core run. These zones are based on the interpretation of the logging engineer and are therefore potentially subjective.



# Allied Exploration and Geotechnics Limited Key Sheets



Symbols and Abbreviations: Explanation of Instrumentation Legends Used





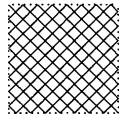
# Allied Exploration and Geotechnics Limited

## Key Sheets



Symbols and Abbreviations: Explanation of Legends Used

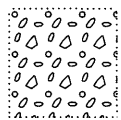
Soils	Rocks		
	<i>Sedimentary</i>	<i>Metamorphic</i>	<i>Igneous</i>



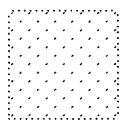
Made Ground



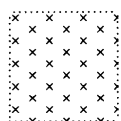
Cobbles and Boulders



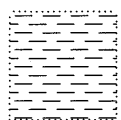
Gravel



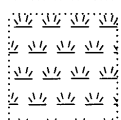
Sand



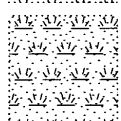
Silt



Clay

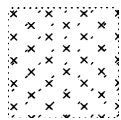


Peat

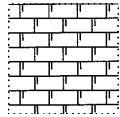


Topsoil

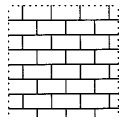
Note: Composite soil types will be signified by combined symbols e.g.



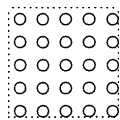
Silty Sand



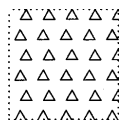
Chalk



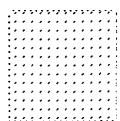
Limestone



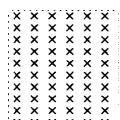
Conglomerate



Breccia



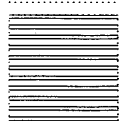
Sandstone



Siltstone



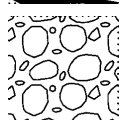
Mudstone



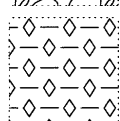
Shale



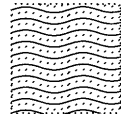
Coal



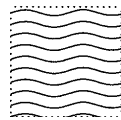
Pyroclastic  
(Volcanic Ash)



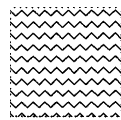
Gypsum



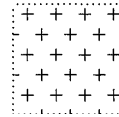
Coarse  
Grained



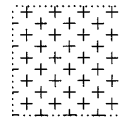
Medium  
Grained



Fine Grained



Coarse  
Grained



Medium  
Grained



Fine Grained






## Exploratory Hole Location Plan

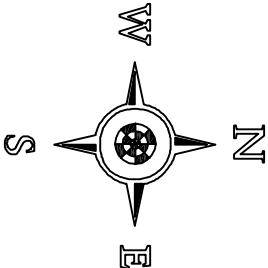




Allied Exploration and Geotechnics Limited  
 Unit 25 Stalla Hill Industrial Estate  
 Panton Hill  
 Chester - Le - Street  
 Cheshire  
 CH2 2RG  
 (Tel): 0191 387 4700  
 (Fax): 0191 387 4710  
 (Email): enquiries@aeguk.net

**KEY:**

-  BOREHOLE
-  TRIAL PIT
-  SAMPLE LOCATIONS



Base Plan Supplied by Consulting Engineer

**Drawing Title:**

ENC 01 : Exploratory Hole Location Plan

**Drawing No.:**

AEG/4355/01

**Contract Title:**

Prairie Phase 4

**Client:**

Tees Valley Combined Authority

**Consultant:**

Arcadis  
 1 Whitehall Riverside,  
 Leeds, LS1 4BN

**Contract No.:**

4355

**Scale:**

1:2500 @ A3

**Date:**

17/01/2022

## Borehole Records





# ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG  
 Regional Office: Unit 20 Business Development Centre, Eaman Wharf, Blackburn, BB1 5BL

Tel: 0191 387 4700 Fax: 0191 387 4710  
 Tel: 01772 735 300 Fax: 01772 735 999

## BOREHOLE RECORD

Status:-  
**PRELIM3**

Project: <b>Prairie Phase 4</b>		Exploratory Hole No. <b>S3_BHA03</b>	
Client: <b>Tees Valley Combined Authority</b>	Location: <b>Former Redcar Steelworks, Redcar</b> E:454937.990 N:521170.836		
Method (Equipment): <b>Percussion/Coring (Dando 2000/Boart Longyear DB540)</b>	Ground Level (m): <b>9.898</b>	Start Date: <b>23/09/2021</b>	Sheet: <b>1 of 2</b>

SAMPLES & TESTS			STRATA					Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	Description	
0.30 0.30 0.30 0.30	J1 B2 ES3 PID	0.3ppm					MADE GROUND (Brown black slightly clayey sandy gravel with medium cobble and boulder content and timber, ceramic, rebar and glass fragments. Gravel is fine to coarse angular to subangular and includes brick, concrete and slag. Cobbles and boulders are angular to subangular and include brick and concrete. Slag is 0-25%. Slag is dark grey mostly vesicular. Increasing clay content with depth).	
1.30 1.30 1.30	J4 B5 PID	<0.1ppm						
2.30 2.30 2.30	J6 B7 PID	<0.1ppm				(4.70)		
3.30 3.30 3.30	J8 B9 PID	<0.1ppm						
4.50	J1			5.20		4.70		
4.80 4.80 4.80 4.80 5.00 5.10	J10 B11 ES12 PID B2 J3	<0.1ppm		4.90		5.00	Firm to stiff thinly laminated yellow brown with blue grey mottling sandy silty CLAY with interlaminations of fine sand. Firm and friable laminated brown slightly sandy CLAY. Sand is fine to medium. 5.10-6.30m BGL ... driller notes pushing obstruction.	
5.80	B4							
6.50-6.95	U5	(30)				(3.20)		
6.90	J6							
7.50-7.95 7.50-7.95	B8 SJ7	N12						

Boring Progress and Water Observations					Chiselling		Water Added	General Remarks
Date	Depth	Casing	Casing Dia (mm)	Water Standing	From - To	Duration (hh:mm)	From - To	
23/09/2021	0.00	0.00	200				4.00 - 9.95	(1) Description derived from drillers daily report. (2) Trial pit excavated to 5.00m BGL prior to drilling (3.00x2.00m in size). (3) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 3.50-5.00m and 10.00-15.00m BGL respectively.
23/09/2021	5.00	5.00	200					
24/09/2021	5.00	5.00	200	Dry				

All dimensions in metres Scale 1:50.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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# ALLIED EXPLORATION & GEOTECHNICS LIMITED

Head Office: Unit 25 Stella Gill Industrial Estate, Pelton Fell, Chester-le-Street, Co. Durham, DH2 2RG  
 Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL

Tel: 0191 387 4700 Fax: 0191 387 4710  
 Tel: 01772 735 300 Fax: 01772 735 999

## BOREHOLE RECORD

Status:-  
**PRELIM3**

Project: Prairie Phase 4		Exploratory Hole No. <b>S3_BHA03</b>	
Client: Tees Valley Combined Authority		Location: Former Redcar Steelworks, Redcar E:454937.990 N:521170.836	
Method (Equipment): Percussion/Coring (Dando 2000/Boart Longyear DB540)		Ground Level (m): 9.898	Start Date: 23/09/2021
		Sheet: 2 of 2	

SAMPLES & TESTS			STRATA				Instrument/ Backfill	
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)		Description
8.30	J9			1.70		8.20	Stiff brown red slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse subangular to subrounded and includes sandstone and mudstone.	
8.45	B10							
8.50-8.95	U11	(45)						
8.90	J12			(1.80)				
9.50-9.95	SJ13	N39						
10.00	B14			-0.10		10.00	<i>continued by rotary drilling.</i>	

Boring Progress and Water Observations					Chiselling		Water Added	General Remarks
Date	Depth	Casing	Casing Dia (mm)	Water Standing	From - To	Duration (hh:mm)	From - To	
24/09/2021	9.95	9.00	200	Dry	10.35 - 10.50	1:00	9.95 - 10.60	(1) Description derived from drillers daily report. (2) Trial pit excavated to 5.00m BGL prior to drilling (3.00x2.00m in size). (3) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 3.50-5.00m and 10.00-15.00m BGL respectively.
27/09/2021	9.95	9.00	200	Damp				
27/09/2021	10.00	10.00	200	Dry				

All dimensions in metres Scale 1:50.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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Tel: 0191 387 4700 Fax: 0191 387 4710  
 Tel: 01772 735 300 Fax: 01772 735 999

## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: <b>Prairie Phase 4</b>		Exploratory Hole No. <b>S3_BHA03</b>	
Client: <b>Tees Valley Combined Authority</b>	Location: <b>Former Redcar Steelworks, Redcar E:454937.990 N:521170.836</b>		
Method (Equipment): <b>Percussion/Coring (Dando 2000/Boart Longyear DB540)</b>	Ground Level (m): <b>9.898</b>	Start Date: <b>23/09/2021</b>	Sheet: <b>1 of 5</b>

RUN DETAILS				STRATA				Instrument/ Backfill	
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description		
						Discontinuity Detail		Main	
10.00 (113mm)	100 (45) 34	NI		-0.10 -0.20	X X X X X	10.00 10.10 (0.25)	10.00-10.28m ... non-intact.	Very soft reddish brown slightly gravelly silty CLAY. 10.00-10.80m ... drillers notes loss of flush to 20% returns.	
		7		-0.45	X X X X X	10.35 (0.65)	10.28-11.03m ... subhorizontal (10-30 degrees) closely spaced planar smooth tight occasionally open clean discontinuities.	Extremely weak dark grey slightly gravelly SILTSTONE destructured. (Recovered as firm and stiff grey gravelly clay).	
10.80	100 (28) 13	NI		-1.10	X X X X X	11.00	11.03-11.45m ... non-intact.	Medium strong light grey fine grained SANDSTONE partially weathered. 10.80-12.00m ... drillers notes loss of flush to 50% returns.	
		18			X X X X X	11.20	11.45-11.75m ... horizontal to subhorizontal (5-15 degrees) and oblique to subvertical (60-80 degrees) very closely spaced planar smooth very tight occasionally open clean discontinuities.	Very weak to weak dark grey thinly to thickly laminated slightly silty MUDSTONE partially weathered to destructured with occasional thin to medium interbeds of light grey clayey siltstone/sandstone and pyrite mineralisation.	
		NR			X X X X X		11.75-12.10m ... no recovery.	11.46-11.60m ... interbed of medium strong light grey fine grained sandstone partially weathered.	
12.00	100 (45) 0	NI		-2.30	X X X X X	12.20	12.10-12.20m ... non-intact.	11.60-12.00m ... calcareous material (fossils) along laminations.	
		18			X X X X X		12.20-12.87m ... horizontal to subhorizontal (5-15 degrees) and oblique to subvertical (60-80 degrees) very closely spaced planar smooth very tight occasionally open clean discontinuities.	12.00-13.00m ... drillers notes loss of flush to 70% returns.	
13.00	100 (49) 22	NI			X X X X X		12.87-13.09m ... non-intact.	Weak dark grey thinly to thickly laminated slightly silty MUDSTONE partially weathered, in places distinctly weathered, with occasional thin to medium interbeds of light grey clayey siltstone/sandstone and pyrite mineralisation.	
		18			X X X X X		13.09-13.85m ... horizontal to subhorizontal (5-15 degrees) and oblique to subvertical (60-80 degrees) very closely spaced planar smooth very tight occasionally open clean discontinuities.	13.00-14.00m ... drillers notes loss of flush to 90% returns.	
14.00		NI			X X X X X		13.85-14.37m ... non-intact.	13.63m ... siltstone with pyrite mineralisation	

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
29/09/2021	10.00	10.00	Dry	10.50	S	100/54mm	10.00 - 10.80	Water	20	(1) Description derived from drillers daily report. (2) Trial pit excavated to 5.00m BGL prior to drilling (3.00x2.00m in size). (3) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 3.50-5.00m and 10.00-15.00m BGL respectively.
29/09/2021	13.00	11.00	8.12				10.80 - 12.00	Water	50	
30/09/2021	13.00	11.00	5.10				12.00 - 13.00	Water	70	
							13.00 - 14.00	Water	90	
							14.00 - 15.00	Water	100	

All dimensions in metres Scale 1:25.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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Tel: 0191 387 4700 Fax: 0191 387 4710  
 Tel: 01772 735 300 Fax: 01772 735 999

## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: Prairie Phase 4		Exploratory Hole No. <b>S3_BHA03</b>	
Client: Tees Valley Combined Authority		Location: Former Redcar Steelworks, Redcar E:454937.990 N:521170.836	
Method (Equipment): Percussion/Coring (Dando 2000/Boart Longyear DB540)		Ground Level (m): 9.898	Start Date: 23/09/2021
		Sheet: 2 of 5	

RUN DETAILS			STRATA					Instrument/ Backfill	
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description		
							Discontinuity Detail		Main
(113mm)	100 (52) 0	12		-5.10		14.37-15.00m ... horizontal (0-5 degrees) closely spaced planar smooth tight clean discontinuities.	15.00	Weak dark grey thinly to thickly laminated slightly silty MUDSTONE partially weathered, in places distinctly weathered, with occasional thin to medium interbeds of light grey clayey siltstone/sandstone and pyrite mineralisation. (continued)	
						14.55-14.70m ... non-intact.			
Complete at 15.00m BGL.									

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
30/09/2021	15.00	11.00	3.30							(1) Description derived from drillers daily report. (2) Trial pit excavated to 5.00m BGL prior to drilling (3.00x2.00m in size). (3) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 3.50-5.00m and 10.00-15.00m BGL respectively.

All dimensions in metres Scale 1:25.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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Tel: 01772 735 300 Fax: 01772 735 999

## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: Prairie Phase 4		Exploratory Hole No. S3_BHA03	
Client: Tees Valley Combined Authority	Location: Former Redcar Steelworks, Redcar E:454937.990 N:521170.836		S3_BHA03
Method (Equipment): Percussion/Coring (Dando 2000/Boart Longyear DB540)	Ground Level (m): 9.898	Start Date: 23/09/2021	Sheet: 3 of 5

Figure S3\_BHA03.1  
Trial Pit for S3\_BHA03



Figure S3\_BHA03.2  
Trial Pit for S3\_BHA03







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Tel: 01772 735 300 Fax: 01772 735 999

## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: Prairie Phase 4		Exploratory Hole No. S3_BHA03	
Client: Tees Valley Combined Authority	Location: Former Redcar Steelworks, Redcar E:454937.990 N:521170.836		Sheet: 4 of 5
Method (Equipment): Percussion/Coring (Dando 2000/Boart Longyear DB540)	Ground Level (m): 9.898	Start Date: 23/09/2021	

Figure S3\_BHA03.3  
Trial Pit for S3\_BHA03



Figure S3\_BHA03.4  
S3\_BHA03 - 10.00-12.00m BGL







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## DRILLHOLE RECORD

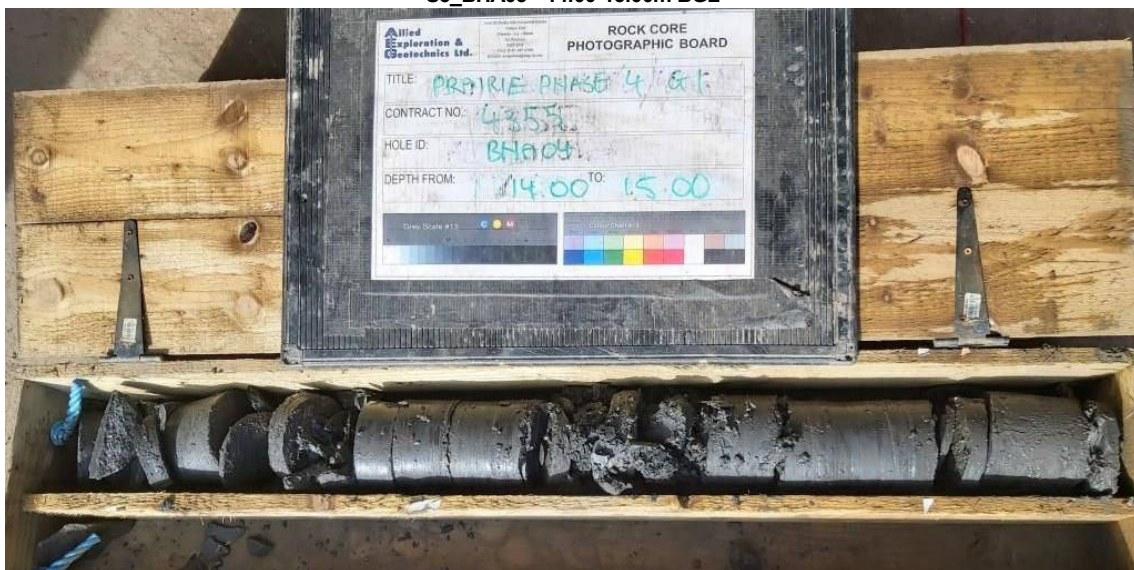
Status:-  
**PRELIM3**

Project:	Prairie Phase 4			Exploratory Hole No. <b>S3_BHA03</b>			
Client:	Tees Valley Combined Authority	Location:	Former Redcar Steelworks, Redcar E:454937.990 N:521170.836				
Method (Equipment):	Percussion/Coring (Dando 2000/Boart Longyear DB540)	Ground Level (m):	9.898	Start Date:	23/09/2021	Sheet:	5 of 5

Figure S3\_BHA03.5  
S3\_BHA03 - 12.00-14.00m BGL



Figure S3\_BHA03.6  
S3\_BHA03 - 14.00-15.00m BGL





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Tel: 0191 387 4700 Fax: 0191 387 4710  
 Tel: 01772 735 300 Fax: 01772 735 999

## BOREHOLE RECORD

Status:-  
**PRELIM3**

Project: <b>Prairie Phase 4</b>		Exploratory Hole No. <b>S3_BHA04</b>	
Client: <b>Tees Valley Combined Authority</b>		Location: <b>Former Redcar Steelworks, Redcar E:454744.940 N:521116.693</b>	
Method (Equipment): <b>Percussion/Coring (Dando 2000/Boart Longyear DB540)</b>		Ground Level (m): <b>10.020</b>	Start Date: <b>22/09/2021</b>
		Sheet: <b>1 of 1</b>	

SAMPLES & TESTS			STRATA					Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	Description	
				9.72		0.30	MADE GROUND (Concrete).	
0.40 0.40 0.40 0.40	J1 B2 ES3 PID	0.3ppm				(1.10)	MADE GROUND (Brown black slightly clayey sandy gravel with medium cobble and boulder content and timber, rebar, ceramic and glass fragments. Gravel is fine to coarse angular to subangular and includes brick, concrete and slag. Cobbles and boulders are angular to subangular and include brick and concrete. Slag is 25-50%. Slag is dark grey mostly vesicular).	
1.50 1.50 1.50 1.50 1.80 2.00-2.45 2.00-2.45	J4 B5 ES6 PID J1 B3 SJ2	<0.1ppm     N16		8.62 8.52		1.40 1.50	Firm to stiff thinly laminated yellow brown with blue grey mottling sandy silty CLAY with interlaminations of fine sand. Firm and friable brown occasionally laminated slightly sandy CLAY. Sand is fine to medium.	
3.00-3.45	U4	(30)				(2.40)		
3.80 3.90 4.00-4.45 4.00-4.45	J5 B6 B8 SJ7	N17		6.12		3.90	Stiff brown red slightly sandy slightly gravelly CLAY. Sand is fine to medium. Gravel is fine to coarse subangular to subrounded and includes sandstone and mudstone.	
5.00-5.45	U9	(40)				(3.10)		
5.80	J10							
6.50-6.95 6.50-6.95	B12 SJ11	N31						
7.10	J13			3.02 2.82		7.00 7.20	Extremely weak grey MUDSTONE. (Recovered as a grey gravel. Gravel is fine to medium angular). <i>continued by rotary drilling.</i>	

Boring Progress and Water Observations					Chiselling		Water Added	General Remarks
Date	Depth	Casing	Casing Dia (mm)	Water Standing	From - To	Duration (hh:mm)	From - To	
22/09/2021	0.00	0.00	200		7.30 - 7.70	1:00	1.50 - 8.00	(1) Description derived from drillers daily report. (2) Trial pit dug excavated to 1.50m BGL prior to drilling (3.00x1.50m in size). (3) Water strike at 8.00m - water level rose to 7.25m BGL (20mins). (4) Redrilled through hole collapse 7.20-7.70m BGL (28/09/2021). (5) On 29/09/21 borehole cleaned out due to collapse at 9.70m BGL. (6) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 1.00-4.00m and 7.00-12.30m BGL respectively.
22/09/2021	1.50	1.50	200					
23/09/2021	1.50	1.50	200					
23/09/2021	7.20	7.30	200	7.25				

All dimensions in metres Scale 1:50.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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Tel: 0191 387 4700 Fax: 0191 387 4710  
 Tel: 01772 735 300 Fax: 01772 735 999

## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: <b>Prairie Phase 4</b>		Exploratory Hole No. <b>S3_BHA04</b>	
Client: <b>Tees Valley Combined Authority</b>		Location: <b>Former Redcar Steelworks, Redcar E:454744.940 N:521116.693</b>	
Method (Equipment): <b>Percussion/Coring (Dando 2000/Boart Longyear DB540)</b>		Ground Level (m): <b>10.020</b>	Start Date: <b>22/09/2021</b>
		Sheet: <b>1 of 5</b>	

RUN DETAILS			STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Reduced Level	Legend	Depth (Thickness)	Description		
						Discontinuity Detail	Main	
7.20 (113mm)	92 (0) 0	NI	2.82	XXXXXX	7.20	7.20-7.65m ... non-intact.	Extremely weak to weak grey thinly to thickly laminated weak SILTSTONE destructured. (Recovered as predominantly gravel sized fragments). 7.46m ... thin interbed of stiff grey gravelly clay.  8.25m ... thin interbed of stiff grey gravelly clay.  Weak to moderately weak light grey thinly bedded and thickly laminated SILTSTONE partially weathered, in places distinctly weathered. Occasionally micaceous along laminations.	
7.70	100 (13) 0	NR	1.67	XXXXXX	(1.15)	7.65-7.80m ... no recovery.		
		NI				7.80-8.40m ... non-intact.		
8.70	100 (40) 0	9	8.35	XXXXXX		8.40-8.60m ... horizontal to subvertical (60-80 degrees) closely spaced planar smooth occasionally stepped striated very tight clean discontinuities.		
		NI				8.60-8.70m ... non-intact.		
		NI				8.70-9.40m ... horizontal to subvertical (60-80 degrees) closely spaced planar smooth occasionally stepped striated very tight clean discontinuities.		
9.80	100 (40) 0	7	(3.95)	XXXXXX		9.40-9.80m ... non-intact.		
		NI				9.80-9.90m ... no recovery.		
10.80	100 (35) 11	NR		XXXXXX		9.90-10.29m ... horizontal and subvertical (80 degrees) closely spaced planar rough smooth tight clean discontinuities.		
				XXXXXX		10.29-10.80m ... non-intact.		
				XXXXXX		10.80-11.17m ... no recovery.		

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
28/09/2021	7.20	7.30	Dry	7.70	S	100/61mm	7.20 - 7.70	Water	20	(1) Description derived from drillers daily report. (2) Trial pit dug excavated to 1.50m BGL prior to drilling (3.00x1.50m in size). (3) Water strike at 8.00m - water level rose to 7.25m BGL (20mins). (4) Redrilled through hole collapse 7.20-7.70m BGL (28/09/2021). (5) On 29/09/21 borehole cleaned out due to collapse at 9.70m BGL. (6) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 1.00-4.00m and 7.00-12.30m BGL respectively.
							7.70 - 8.70	W	20	
							8.70 - 9.80	Water	10	
							9.80 - 10.80	Water	50	
							10.80 - 12.30	Water	20	

All dimensions in metres Scale 1:25.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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Tel: 0191 387 4700 Fax: 0191 387 4710  
Tel: 01772 735 300 Fax: 01772 735 999

## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: <b>Prairie Phase 4</b>		Exploratory Hole No. <b>S3_BHA04</b>
Client: <b>Tees Valley Combined Authority</b>	Location: <b>Former Redcar Steelworks, Redcar E:454744.940 N:521116.693</b>	
Method (Equipment): <b>Percussion/Coring (Dando 2000/Boart Longyear DB540)</b>	Ground Level (m): <b>10.020</b>	Start Date: <b>22/09/2021</b> Sheet: <b>2 of 5</b>

RUN DETAILS				STRATA					Instrument/ Backfill
Depth & (Core Ø)	TCR (SCR) RQD	Fracture Index	Water	Reduced Level	Legend	Depth (Thickness)	Description		
							Discontinuity Detail	Main	
(113mm)		NI			X X	11.17-11.45m ... non-intact.	Weak to moderately weak light grey thinly bedded and thickly laminated SILTSTONE partially weathered, in places distinctly weathered. Occasionally micaceous along laminations. (continued)		
		9				11.45-12.30m ... horizontal, subvertical (80 degrees) and vertical closely spaced planar stepped and smooth tight partly open clean discontinuities.			
				-2.28		12.30	Complete at 12.30m BGL.		

Drilling Progress and Water Observations				Standard Penetration Test			Flush			General Remarks
Date	Depth	Casing	Water Standing	Depth	Type	Result	From - To	Type	Returns (%)	
28/09/2021	12.30	7.30	9.12							

(1) Description derived from drillers daily report. (2) Trial pit dug excavated to 1.50m BGL prior to drilling (3.00x1.50m in size). (3) Water strike at 8.00m - water level rose to 7.25m BGL (20mins). (4) Redrilled through hole collapse 7.20-7.70m BGL (28/09/2021). (5) On 29/09/21 borehole cleaned out due to collapse at 9.70m BGL. (6) Double installation: 1No. 25mm diameter slotted standpipe and 1No. 50mm diameter slotted standpipe installed to between 1.00-4.00m and 7.00-12.30m BGL respectively.

All dimensions in metres Scale 1:25.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: RC/DP	Contract No. <b>4355</b>
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## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project:	Prairie Phase 4			Exploratory Hole No. <b>S3_BHA04</b>			
Client:	Tees Valley Combined Authority	Location:	Former Redcar Steelworks, Redcar E:454744.940 N:521116.693				
Method (Equipment):	Percussion/Coring (Dando 2000/Boart Longyear DB540)	Ground Level (m):	10.020	Start Date:	22/09/2021	Sheet:	3 of 5

Figure S3\_BHA04.1  
Trial Pit for S3\_BHA04



Figure S3\_BHA04.2  
Trial Pit for S3\_BHA04







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## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: Prairie Phase 4		Exploratory Hole No. S3_BHA04	
Client: Tees Valley Combined Authority	Location: Former Redcar Steelworks, Redcar E:454744.940 N:521116.693		Sheet: 4 of 5
Method (Equipment): Percussion/Coring (Dando 2000/Boart Longyear DB540)	Ground Level (m): 10.020	Start Date: 22/09/2021	

Figure S3\_BHA04.3  
Trial Pit for S3\_BHA04



Figure S3\_BHA04.4  
S3\_BHA04 - 7.20-8.70m BGL







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## DRILLHOLE RECORD

Status:-  
**PRELIM3**

Project: Prairie Phase 4		Exploratory Hole No. S3_BHA04	
Client: Tees Valley Combined Authority	Location: Former Redcar Steelworks, Redcar E:454744.940 N:521116.693		
Method (Equipment): Percussion/Coring (Dando 2000/Boart Longyear DB540)	Ground Level (m): 10.020	Start Date: 22/09/2021	Sheet: 5 of 5

Figure S3\_BHA04.5  
S3\_BHA04 - 8.70-10.80m BGL



Figure S3\_BHA04.6  
S3\_BHA04 - 10.80-12.30m BGL



## Trial Pit Records





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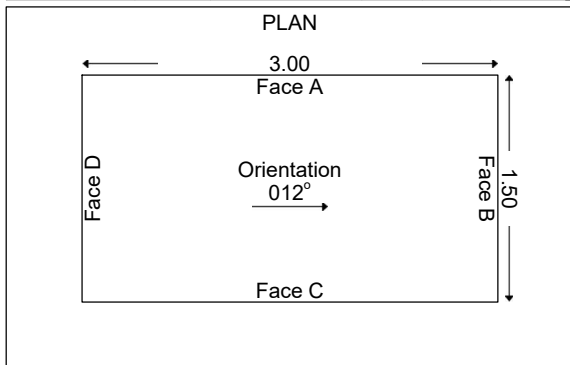
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 Regional Office: Unit 20 Business Development Centre, Eanam Wharf, Blackburn, BB1 5BL Tel: 01772 735 300 Fax: 01772 735 999

## TRIAL PIT RECORD

Status:-  
**PRELIM3**

Project: <b>Prairie Phase 4</b>			Exploratory Hole No. <b>S3_TPA_TP101</b>	
Client: <b>Tees Valley Combined Authority</b>		Location: <b>Former Redcar Steelworks, Redcar E:454852.518 N:521166.223</b>		
Method (Equipment): <b>Machine Excavated (14 Tonne 360 Tracked Excavator)</b>		Ground Level (m): <b>9.729</b>	Start Date: <b>24/09/2021</b>	Sheet: <b>1 of 3</b>

SAMPLES & TESTS			STRATA				
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	Description
0.20 0.20 0.20 0.20	J1 B2 ES3 PID	<0.1ppm		8.73		1.00	MADE GROUND (Dark brown slightly clayey sandy gravel with medium cobble and boulder content and timber, rebar, ceramic and glass fragments. Gravel is fine to coarse angular to subangular and includes brick, concrete and slag. Cobbles and boulders are angular to subangular and include brick and concrete. Slag content is 0-25%. Slag is dark grey mostly vesicular).
1.10 1.10 1.10 1.10	J4 B5 ES6 PID	<0.1ppm		8.23		1.50	Firm to stiff thinly laminated dark yellow brown sandy silty CLAY with interlaminations of fine grey brown sand.
							<i>Complete at 1.50m BGL.</i>



**GROUNDWATER**  
No groundwater inflow observed.

**STABILITY**  
Pit sides and base stable throughout excavation.

ADDITIONAL INFORMATION		
Sketch Diagram:	No Sketch Taken	
Photographs:	Yes	See additional sheets.

**GENERAL REMARKS**

All dimensions in metres Scale 1:50.00	For explanation of symbols and abbreviations see Key Sheets	Checked by:	Logged by: R. Clarke	Contract No. <b>4355</b>
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