



CORE Special Projects Limited

Gateway 36 Platform Development – Phase 3

Building Platform Earthworks Validation Report

323093-R02 (00)

RSK GENERAL NOTES

Project No.: 323093

Title: Building Platform Earthworks Validation Report: Gateway 36 Development Site-Phase 3

Client: CORE Special Projects Limited

Date: April 2023

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Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

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Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

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1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) was commissioned by CORE Special Projects Limited (CORE SP, the Client) to carry out a number of work elements in relation to earthworks over part (referred to as “the Wedge”) of the Gateway 36 Phase 3 development site, near Barnsley. The work elements included preparation of an earthworks specification; supervision of the earthworks; and subsequent preparation and issue of a validation report for the works. The project was carried out to an agreed brief as set out in RSK’s proposal 323093TL01(00) dated 16 September 2022. A site location plan is shown in **Figure 1**.

This document is the validation report, the objective of which is to demonstrate that the works on site have been undertaken in accordance with the specification: RSK document reference 323093-R01 (00) ‘Gateway 36 Development Site – Phase 3 Building Platform Earthworks Specification’. Where the works undertaken vary from the specification, this has been agreed in advance by RSK and justification for the amendment in approach has been detailed in this report.

This report is subject to the RSK Service Constraints in **Appendix A**.

1.2 Definition of roles

Firethorn Developments Limited – is the site owner and developer.

Quartz Project Services – is the project manager for the development appointed by the Firethorn.

CORE Special Projects Limited (CORE SP) – is the RSK Client (for this work) and enabling works Contractor responsible for the placement and compaction of engineered fill in the ‘Wedge’ area.

Glencar Construction Ltd (Glencar) – is the contractor responsible for the construction of the industrial unit and associated infrastructure, once earthworks have been completed.

RSK Environment Limited (RSK) – is the geotechnical and environmental consultant and were responsible for preparing the specification, supervising the earthworks and for preparing this validation report.

Construction Testing Solutions Limited (CTS) – is the geotechnical onsite and laboratory testing contractor employed by CORE SP.

1.3 Proposed development

It is proposed to develop the site for a future commercial development. A drawing showing the proposed development layout is presented as **Figure 2**.

In order to develop the site, it was necessary to carry out earthworks in order to create a suitable development platform for the proposed commercial property and associated infrastructure.

1.4 Background

Historically, the site was subject to deep underground mining (Rockingham Colliery from pre-1893 to 1980) and was used for opencast coal mining (1991 to 1997). The materials used to backfill the opencast voids include re-worked superficial soils and re-worked Pennine Middle Coal Measures moved locally to access the shallow coal seam and minimise haulage. This backfill material is recorded as being placed in an uncontrolled manner and restoration of the wider site was completed by 2002. It should be noted that the wider Gateway 36 site was a single opencast excavation and was backfilled with the reworked overburden.

The Phase 3 area of the Gateway 36 site is being developed by Firethorn to facilitate a commercial development with associated infrastructure. The building footprint has been subject to ground treatment by surcharging. This work is now complete, and the material used for surcharging is now to be incorporated (as engineered fill) into the final development landform.

Most of the building footprint area lies within an area where ground levels have been cut to achieve the final platform level. There is a relatively small area along the part of the northern building line where ground levels had to be temporarily raised with non-engineered fill as part of the surcharge works to allow construction of the overlying surcharge treatment mounds. Following completion of the surcharging, this material was to be excavated back to the levels prior to surcharging and replaced with engineered fill placed under engineering supervision.

This validation report has been prepared for this limited area of the building platform where these materials were present (referred to as 'the Wedge' by the client) and outlines whether the requirements outlined in the RSK Building Platform Earthworks Specification (see **Appendix B**) have been met. These requirements refer to the excavation of surcharge materials and replacement with engineered fill in order to create the final development platform beneath a limited part of the building footprint and tie-in to the external yard area where levels are being raised under a separate earthworks specification prepared by others.

It is understood from the client that at the onset of the earthworks there was a required cut of approximately 28,000m³ materials (base of the surcharge treatment mound), with approximately 11,000m³ of this being reused as engineered fill to achieve final levels beneath the building footprint and external yard area where surcharge materials were present.

CORE SP have undertaken their own assessment to determine the extent and depth to original ground levels of the Wedge area, which is provided in **Appendix C**.

Other parts of the Phase 3 development (outwith the areas outlined above) have been subject to earthworks designed by others and are outside the scope of this report. However RSK have supervised earthworks comprising approximately the 332,500m³ of cut and 325,000m³ of placement across the road on Phase 2 of the Gateway 36 development and have a large data set of soil classification and compaction tests. This data was used, in conjunction with the specific testing for the Wedge area and pre-testing

of the residual material in surcharge Mound 2, to set the target density for the presently validated works.

1.5 Contractual requirements

The earthworks were carried out in accordance with the RSK specification document 323093 R01(00) and the Specification of Highways Works (SHW) Series 600 Earthworks document. Except where otherwise specified, work was in accordance with the British Standards and other references referred to in the SHW.

1.6 Scope of works

The scope of this validation report is to:

- provide an overview of placement of engineered fill within the Wedge area
- collate and present the on-site field data and lab data provided by CTS
- confirm that the requirements of the RSK Building Platform Earthworks Specification have been met.

The works were undertaken when reasonable site ground conditions and fair weather was present at the site.

1.7 Previous reports

RSK have previously issued the specification report for this work (referenced 323093 R01 and dated 23 September 2022), which is presented as **Appendix B** and should be read in conjunction with this report.

2 SITE DETAILS

2.1 Site location and description

The site is located approximately 1km to the northeast of Junction 36 of the M1 motorway, on the northern side of the Dearne Valley Parkway (A6195). The approximate centre of the site is located at NGR E435425, N401190 and is shown in **Figure 1**. The site is an irregular shape covering an area of approximately 9.7ha.

The site comprises part of a restored former opencast mine (backfilled by the late 1990's and the wider site finally restored by 2002). The site has recently been subject to earthworks to form the final development platform. Some of these works, around the site access entrance off the new roundabout on Dearne Valley Parkway and in the car park area to the east are complete. Over the central part of the site a former surcharge mound was removed to provide material to be used as engineered fill to the proposed external yard areas and to form the final development platform.

2.2 Site information

The building footprint has been subject to ground treatment by surcharging. This work was predominantly completed by Howard Civil Engineering Ltd, under supervision by RSK. As part of this work, a set of soil classification data was generated and some of this information was used in deriving the earthwork specification for the Wedge area.

3 WORKS UNDERTAKEN

RSK produced a specification for the required work, document reference 323093-R01 Gateway 36 Development Site – Phase 3 Building Platform Earthworks Specification, which is included in **Appendix B**.

3.1 Earthworks

The main works undertaken at the subject site comprised the excavation of the residual material within the surcharge treatment mounds and replacement with engineered fill (under full engineering supervision) in order to create the final development platform beneath a limited part of the building footprint and tie-in to the external yard area.

These replacement works were a relatively small area along the part of the northern building line where ground levels had to be previously temporarily raised with non-engineered fill as part of the surcharge works to allow construction of the surcharge mounds. This small area was referred to as ‘the Wedge’ by the client.

3.2 Validation of earthworks

An RSK supervisor carried out full-time supervision during the earthworks to inspect the materials and confirm that the specification was followed. The supervisor inspected, overviewed testing and approved all formations prior to placement of engineered fill.

If any materials were considered unsuitable (in accordance with the SHW) then these materials were not used as engineered fill.

Validation testing of the works carried out by CTS (on behalf of CORE SP), which were overseen by the RSK supervisor, included the following:

- nuclear density gauge (NDG) testing to confirm the appropriate degree of compaction and required density of the placed and compacted soils has been achieved. The material was to be placed to an end product target compaction value of 95% of the target dry density, with maximum 5% air voids
- where engineered fill materials have been placed California bearing ratio (CBR) testing was completed. CBR tests were carried out using a 450mm diameter plate and all tests to confirm a CBR value equal to or greater than 5%
- in-situ testing comprising hand shear vanes were undertaken by the supervising RSK engineer as verification of the base of excavations before the placement of engineered fill
- any areas of wet, soft or otherwise unsuitable material were investigated if encountered. If any of these conditions or material types were encountered the material was removed and replaced with suitable material.

The required testing schedule is detailed within the RSK earthworks specification report included in **Appendix B** and is summarised below in Section 4.

4 VALIDATION AND COMPLIANCE TESTING

4.1 Site supervision

An RSK engineer was on site on a full-time basis throughout the earthworks to inspect and supervise operations and ensure that the methodology and requirements of the specification was followed. The material was inspected by RSK and any material which was deemed unsuitable were not incorporated into the works.

The RSK engineer kept a photographic record during the works and a selection of photographs are provided in **Appendix D**.

4.2 Site work chronology

Works commenced on 27 September 2022 and were programmed to take approximately 1 week. However, inclement weather caused the work to progress sporadically and works were halted on 19 October 2022, following the placement of 5 of the proposed 6 layers, and the surface sealed. Works were halted due to the wet weather causing an increase in the moisture content of the fill materials beyond a suitable level for achieving the RSK specification. Work recommenced on 3rd February 2023 and was completed on 9 February 2023. This comprised the placement of a single layer of material, following removal of unsuitable surface materials and other material that had been temporarily stockpiled in the work area. The final layer was placed with the addition of lime to help reduce the moisture content and increase the soil strength.

The second phase of earthworks (3 to 9 February 2023) comprised a significantly reduced area (see **Figure 3**), located entirely within the building footprint (approximately 1,200m²). This was due to the requirement for the loading dock foundation excavations to be made immediately under the northern edge of the proposed building. Given that completion of the whole wedge area would then require the placed engineered fill to be excavated for these foundations, it was considered more sustainable and technically acceptable to only bring those areas within the building footprint up to formation level.

4.3 Earthworks

The earthworks supervised by RSK were carried out between 27 September 2022 and 9 February 2023. Prior to this, other ongoing earthworks (unrelated to the CORE SP Phase 3 contract) were undertaken by Howard Civil Engineering Limited. Details of the work completed, validation testing undertaken, and supervision are included in the following sections. A photographic record of the earthworks is provided in **Appendix D**.

The RSK earthworks specification report (see **Appendix B**) required the contractor to place the materials to conform with the compaction requirements of Table 6/4 of the Specification for Highway Works (SHW) Series 600 (2017), which may then be refined to achieve the end-product in-situ requirements detailed in the specification (i.e. greater than 95% of maximum dry density and less than 5% air voids).

CORE used a Bomag BW216 DH-5 vibrating roller which has a mass per metre width of vibratory roller of greater than 5,000kg, and placed material in layers that were 250mm in thickness. Clause 612 (02/16) Compaction of Fills of the SHW Series 0600 February 2017

was used by CORE to guide the number of passes required to achieve 95% of target density and <5% air voids.

4.4 Pre-works classification testing

Prior to the earthworks, representative bulk samples were obtained from the materials proposed for reuse for pre-testing. This testing was undertaken to classify the materials in accordance with Table 6 of the SHW and the results confirmed the material as Class 2C. The results of pre-testing are included in the RSK earthworks specification report included in **Appendix B**.

Using these data, together with additional testing undertaken by CORE SP (see **Appendix F**), a target maximum dry density (MDD) of 1.91 Mg/m³ with less than 5% air voids, was specified.

4.5 Amendment of target density

The wider Gateway 36 site was a single opencast excavation and was backfilled with the reworked overburden. RSK have supervised earthworks comprising approximately 332,500m³ of cut and 325,000m³ of opencast backfill placement across the road on Phase 2 of the Gateway 36 development and consequently have a large data set of soil classification and compaction tests. This data was used, in conjunction with the specific testing for the wedge area and pre-testing of surcharge Mound 2, to set the target density.

Initial NDG testing of the first layer indicated that the target density of 1.91Mg/m³ was not being met, but concurrent sand replacement density (SRD) testing indicated that moisture contents appeared to be being incorrectly reported by the NDG.

Following the receipt of further bulk sample test results a revision of the target density to 1.86Mg/m³ was agreed and following the previous methodology of work, testing was able to meet RSK specification. The results of the initial NDG and SRD testing, together with the subsequent in-situ test results are included in **Appendix E**.

4.6 Soil contamination testing

In accordance with the RSK specification soil samples were obtained from the source material for laboratory chemical analyses to confirm their suitability for reuse.

Selected samples were scheduled for a suite of chemical analysis and the results are provided in **Appendix G**. The results have been screened against the RSK Human Health Generic Assessment Criteria (GAC) for commercial end use (**Appendix H**), using a conservative value for the soil organic matter (SOM) of 1%. The reported results showed no exceedances for the soil laboratory results and therefore confirm its suitability for re use as engineered fill.

4.7 Liming operations

In advance of the works the top layer of placed material used as engineered fill (in February 2023) had elevated (above optimum) moisture content (~18.0%). Consequently lime (~1.5%) was therefore added to and mixed with these materials in-situ and the material then recompacted. These works were carried out to reduce the moisture content

and make the material suitable for meeting the RSK specification. The results of the in-situ NDG and SRD testing undertaken on the final layer, which confirm the suitability of the material for re-use and incorporation into the works, are included in **Appendix E**.

4.8 Compliance testing

Testing was carried out throughout works to demonstrate that the compaction achieved the requirements set out in the specification, including predominantly NDG testing supported by SRD tests, and with plate load testing on the final layer. This work was carried out in conjunction with laboratory tests to confirm the classification of the materials used in the works, particle density and the relationship between moisture content and dry density (compaction tests).

RSK have summarised all geotechnical and chemical testing provided by CORE SP, and these are presented in full in **Appendix E**.

4.8.1 Nuclear density gauge testing

Validation of the in-situ density and confirmation of moisture content was carried out using a Nuclear Density Gauge (NDG). A total number of 54 tests were undertaken in the first phase of the earthworks, with a further 5 undertaken during the second phase. The first 9 tests indicated that the target density of 1.91Mg/m^3 was not being met, but concurrent SRD testing indicated that moisture contents appeared to be being incorrectly reported by the NDG. Following adjustment of the target density to 1.86Mg/m^3 , all 50 remaining NDG tests indicated the placed materials met or exceeded the target density and air voids requirements.

The first and second phase test locations were set out using a GPS survey and are shown on **Figures 2** and **3**, respectively.

NDG testing was completed on placed and compacted layers between 28th September 2022 and 8th February 2023. The optimum moisture content based on the laboratory testing was in the range of 12% to 14% with material contained in stockpiles consistently generally ranging between 9.3% and 14%. However, material taken directly from the residual in situ surcharge mound seemed to have a higher moisture content. The moisture content in the material taken directly from the surcharge (without time to dry out in a stockpile) was over 20% in areas.

The NDG test moisture content results ranged between 13% and 17%. Where visual inspection of the placed materials confirmed elevated moisture contents, the unsuitable material was removed and replaced with suitable material (with a lower moisture content).

A number of NDG result also showed a negative percentage for air voids, this is most likely due to the variability in moisture content used to calibrate the NDG tests. The end product target was an objective of the works to inform design, with these parameters needing to be met to enable the desired construction methods.

On completion of works, it is considered that all layers have achieved the greater than 95% target density and less than 5% air voids.

4.8.2 Sand replacement density testing

Validation of the in-situ densities was also carried out using SRDs with approximately one test for every 5 NDGs. SRD results all exceeded 95% maximum dry density and corroborate the target densities used for the NDG testing.

The first and second phase test locations were set out using a GPS survey and are shown on **Figures 2** and **3**, respectively. The test certificates are provided in **Appendix E**. A total of 10 sand replacement tests were performed (9 in the first phase and 1 in the second phase).

4.8.3 Plate load testing

Results of the 7 PLTs undertaken following placement and compaction of the final layer were all well above the 5% target set out in the specification, with results ranging from 12.3% to 30.5%. The tests were completed on the final layer only and the test locations are shown on **Figure 3**. Test certificates are provided in **Appendix E**.

5 CONCLUSIONS

Earthworks operations have been completed to create the final development platform beneath a limited part of the proposed building footprint and tie-in to the external yard area (the Wedge area). A specification for these works was prepared by RSK. The required works were carried out between September 2022 and February 2023 and were fully supervised by RSK.

Fill materials were sourced from the residual part of the former surcharge treatment mound placed over the future building footprint. The material was reused as engineered fill and following testing was classified as type 2C material in accordance with the SHW. Engineered fill was placed throughout the earthworks in 250mm layer thicknesses and given sufficient passes to achieve the specified target density in accordance with the specification.

The earthworks were supervised on a full-time basis and in-situ validation tests were carried out throughout the works. The supervision included inspection of all formations prior to material placement and observations to ensure the agreed earthworks methodology (in terms of layer thicknesses, number of passes and compaction plant used) was followed. Daily diaries were produced which recorded the progress of the works and maintained a photographic record of operations completed. The results of the validation testing confirm that the engineered fill material achieved the required target in situ density (of >95% of the laboratory MDD) and that the final formation level achieved the agreed target value of a CBR value of >5% throughout. The frequency of testing completed was in accordance with the specification.

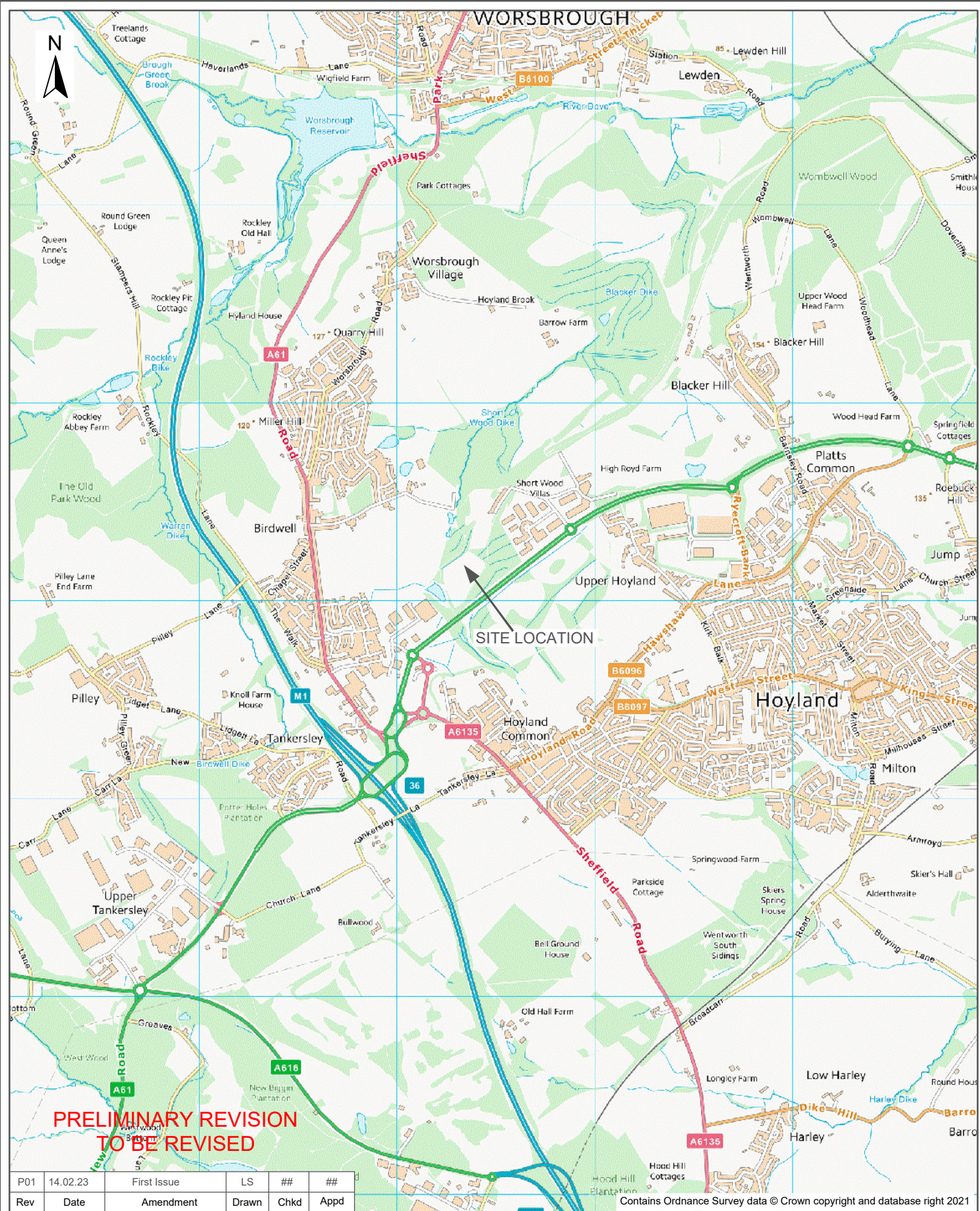
During the works all materials to be used, and all formations upon which fill was to be placed were inspected and approved by the RSK supervisor. Some localised pockets of unsuitable materials were recorded, comprising materials wet of optimum moisture content. These materials were removed off plot, and more suitable material (of a lower moisture content) used to fill the resulting void.

This validation report and the supporting appendices confirms and verifies that the works were carried out in accordance with the specification and any deviations from this were appropriate and to the satisfaction of RSK, as Geotechnical Consultant and Supervising Engineer, and that the Wedge site is now suitable for construction to commence.

FIGURES



FIGURE 1 SITE LOCATION PLAN



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Client

Core SP Limited

Project Name

Gateway 36 Phase 3 - Ground Treatment Validation

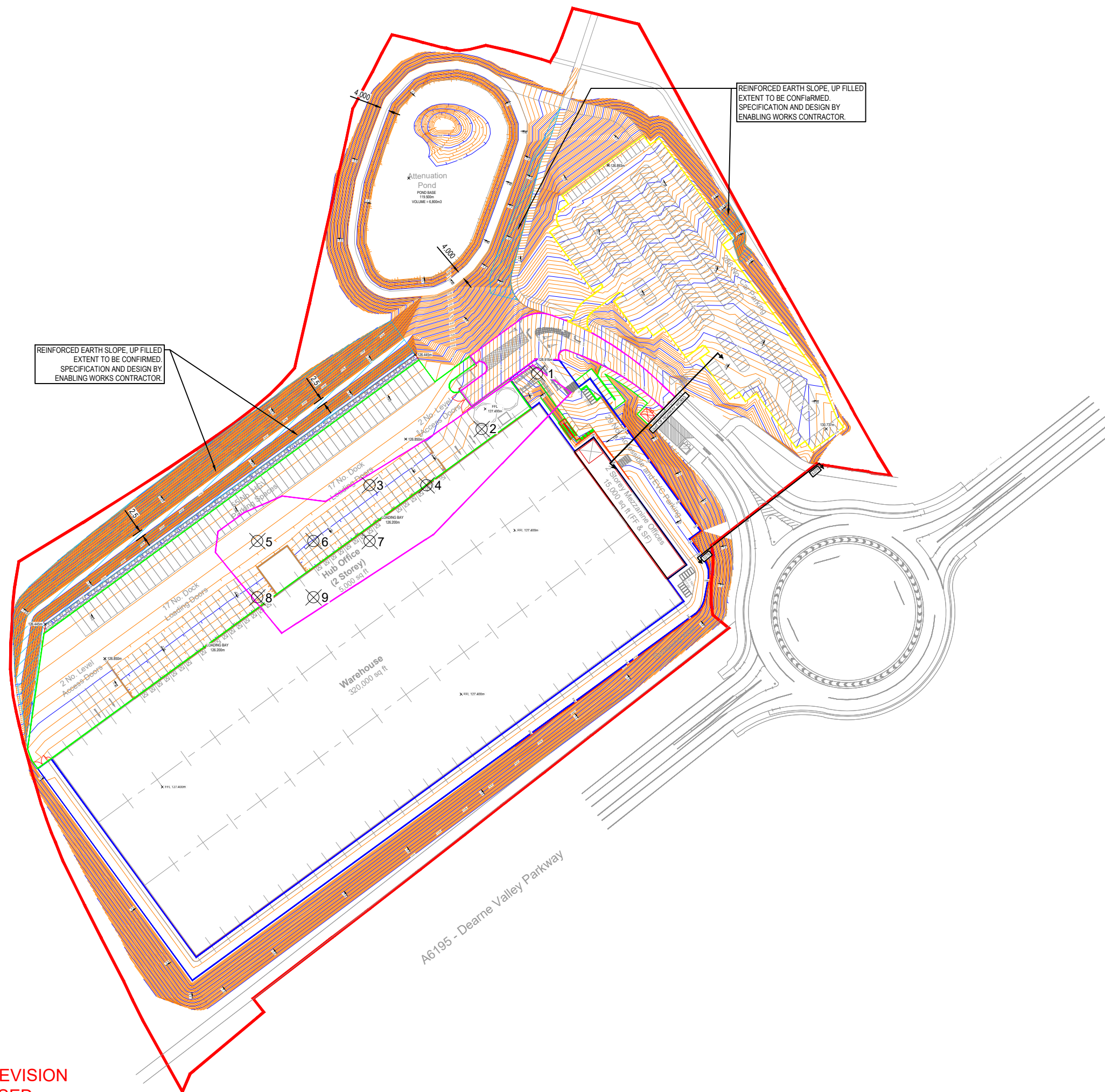
Description

Site Location Plan

Dimension	Size	Scale	Geolocation	Project ID	Drawing no.	Rev	File name
m	A4	1:25,000	435344, 401181	323093	11101	P01	323093-HE-111-SS-D-C-11102-P01



**FIGURE 2 PROPOSED ENABLING WORKS LEVEL PLAN WITH
'WEDGE' AREA**



LEGEND

— Wedge area boundary

 In-situ testing location

P01	15.02.23	First Issue	LS	##	##
Rev	Date	Amendment	Drawn	Chkd	Appd



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	Client
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Core SP Limited

Project Name	
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Gateway 36 Phase 3 – Ground Treatment Validation

ID	Description	Status	Priority	Assignee	Due Date	Created At	Updated At
1	Task 1	In Progress	High	John Doe	2023-10-25	2023-10-20 10:00	2023-10-20 10:00
2	Task 2	Not Started	Medium	Jane Smith	2023-10-26	2023-10-21 15:30	2023-10-21 15:30
3	Task 3	Completed	Low	John Doe	2023-10-15	2023-10-15 09:00	2023-10-15 09:00
4	Task 4	In Progress	Medium	Jane Smith	2023-10-27	2023-10-22 11:15	2023-10-22 11:15
5	Task 5	Not Started	High	John Doe	2023-10-28	2023-10-23 14:45	2023-10-23 14:45

Level Plan with 'Wedge' Area

Project ID	Drawing no.	Revision
323093	31503	P02

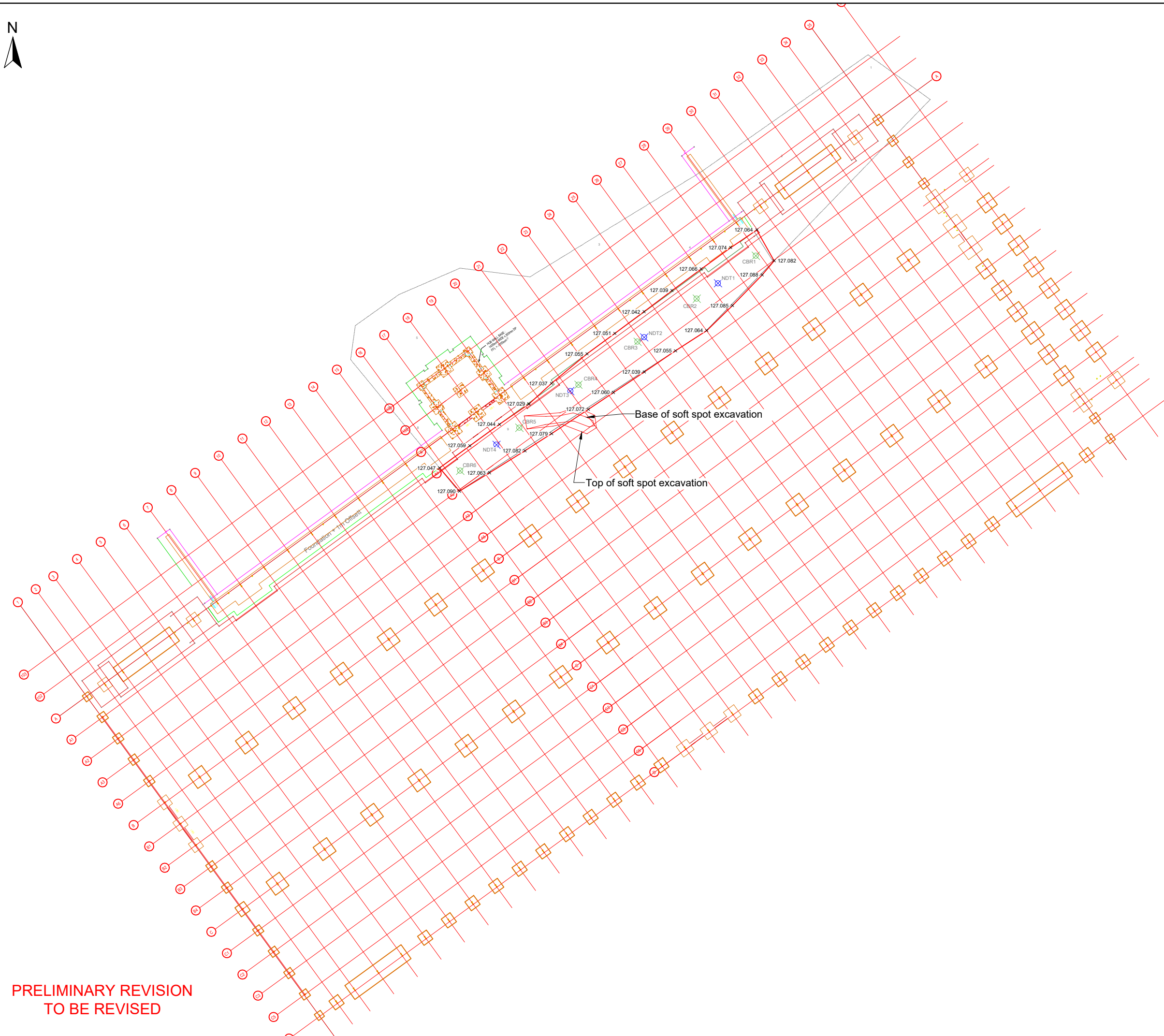
File name	
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323093-HE-315-SS-D-C-31503-P02

Dimensions	Scale	Size
m	NTS	A3

[illegible]

FIGURE 3 FOUNDATION PLAN WITH SECOND PHASE 'WEDGE' AREA



LEGEND

- Modified Wedge Area
- NDT Test Locations
- CBR Test Locations
- Final Survey Levels

Notes:

Foundation layout based on Fairhurst drawings:

G1144-FRH-XX-FN-DR-S-03010_FOUNDATION GENERAL
ARRANGEMENT - SHEET 1
and G1144-FRH-XX-FN-DR-S-03011_FOUNDATION GENERAL
ARRANGEMENT - SHEET 2

P02	14.02.23	First Issue	LS	##	##
Rev	Date	Amendment	Drawn	Chkd	Appd



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Client
Core SP Limited

Project Name
Gateway 36 Phase 3 - Ground Treatment Validation

Description
Foundation Plan with Second Phase 'Wedge' Area

Project ID	Drawing no.	Revision
323093	31504	P02

File name
323093-HE-315-SS-D-C-31504-P02

Dimensions	Scale	Size
m	NTS	A3

APPENDICES

APPENDIX A

RSK SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for CORE SP Limited (the "Client") in accordance with the terms of a contract between RSK and the Client. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK 's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas, persistent, bioaccumulative or toxic chemicals (including PFAS/ PFOS) or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):
 - a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.

- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

- 8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
- 9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
- 10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
- 11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
- 12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.



APPENDIX B

RSK 'WEDGE AREA' EARTHWORKS SPECIFICATION



CORE SPECIAL PROJECTS LIMITED

Gateway 36 Development Site – Phase 3

Building Platform Earthworks Specification

323093-R01 (00)

RSK GENERAL NOTES

Project No.: 323093-R01 (00)

Title: Building Platform Earthworks Specification: Gateway 36 Development Site – Phase 3

Client: CORE SPECIAL PROJECTS LIMITED

Office: RSK Environment Limited, Spring Lodge, 172 Chester Road, Helsby, Cheshire, WA6 0AR. Contact: Siôn Roberts, Tel: 01928 726006.

Status: Rev 00

Author Siôn Roberts **Technical reviewer** Gary McGuicken

Signature  Signature 

Project manager Siôn Roberts **Quality reviewer** Ang Wallis

Signature  Signature 

Revision control sheet				
Revision ref.	Date	Reason for revision	Amended by:	Approved by:
Rev 00	23/09/2022	First issue	n/a	see above

RSK Environment Limited (RSK) has prepared this report for the sole use of the client, showing reasonable skill and care, for the intended purposes as stated in the agreement under which this work was completed. The report may not be relied upon by any other party without the express agreement of the client and RSK. No other warranty, expressed or implied, is made as to the professional advice included in this report.

Where any data supplied by the client or from other sources have been used, it has been assumed that the information is correct. No responsibility can be accepted by RSK for inaccuracies in the data supplied by any other party. The conclusions and recommendations in this report are based on the assumption that all relevant information has been supplied by those bodies from whom it was requested.

No part of this report may be copied or duplicated without the express permission of RSK and the party for whom it was prepared.

Where field investigations have been carried out, these have been restricted to a level of detail required to achieve the stated objectives of the work.

This work has been undertaken in accordance with the quality management system of RSK Environment Ltd.

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APPENDICES

Appendix A	Service constraints
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1 INTRODUCTION

1.1 Commissioning

RSK Environment Limited (RSK) was commissioned by Core Special Projects Limited (Core SP, the Client) to prepare this earthworks specification of the building footprint area referred to as 'the wedge' for the Gateway 36 Phase 3 development site, near Barnsley. The project was carried out to an agreed brief as set out in RSK's proposal 323093TL01(00) dated 16 September 2022. A site location plan is shown in Figure 1.

This report is subject to the RSK service constraints in Appendix A.

1.2 Background

The Phase 3 area of the Gateway 36 site is being developed by Firethorn to facilitate a commercial development with associated infrastructure. The building footprint has been subject to ground treatment by surcharging. This work is now complete, and the material used for surcharging is now to be incorporated (as engineered fill) into the final development landform.

Most of the building footprint area lies within an area where ground levels have been cut to achieve the final platform level. There is a relatively small area along the part of the northern building line where ground levels had to be temporarily raised with non-engineered fill as part of the surcharge works to allow construction of the surcharge mounds. This material was to be replaced on completion of the surcharge works with engineered fill placed under engineering supervision. This specification has been prepared for this limited area of the building platform where these materials are present (referred to as 'the wedge' by the client) and outlines the requirements for excavation and replacement with engineered fill in order to create the final development platform beneath a limited part of the building footprint and tie-in to the external yard area where levels are being raised under a separate earthworks specification prepared by others.

Core have undertaken their own assessment to determine the extent and depth to original ground levels of the Wedge area, which is provided in Appendix B.

Other parts of the Phase 3 development (outwith the areas outlined above) have been subject to earthworks designed by others and are outside the scope of this specification.

1.3 Proposed development

It is proposed to prepare the site for a future commercial development. A drawing showing the proposed development is shown in Appendix B.

In order to develop the site, it will be necessary to carry out earthworks in order to create suitable development platforms for the proposed commercial properties and associated infrastructure.

It is understood from the Client that these earthworks will include a cut of approximately 28,000m³ materials currently within the surcharge treatment mound and approximately 11,000m³ of this will be reused as engineered fill to achieve final levels beneath the building footprint and external yard area where surcharge materials were present.

1.4 Objectives

The objectives of this earthworks specification is to detail the requirements for the placement and compaction of engineered fill in areas of the proposed building platform where uncompacted materials remain in situ from the now completed surcharge treatment works. In these areas existing levels have to be cut to pre-surcharging ground levels and reinstated to the required final formation level with engineered fill.

1.5 Definition of roles

Firethorn Developments Limited – is the site owner and developer.

Quartz Project Services – is the project manager for the development appointed by the Firethorn.

Core Special Projects Limited – is the Client and enabling works Contractor responsible for the placement and compaction of engineered fill in the 'wedge area'.

RSK Environment Limited – is the geotechnical and environmental consultant and are responsible for preparing this specification, supervising the earthworks and for preparing the validation report.

Construction Testing Solutions Limited – is the onsite and laboratory testing contractor employed by Core.

1.6 Standards and general comments

The earthworks shall be carried out in general accordance with the Manual of Contract Documents for Highways Works, Volume 1 Specification for Highway Works, Series 600 Earthworks (hereinafter referred to as the SHW).

Except where otherwise specified, work shall be in accordance with the British Standards and other references referred to in the SHW. The latest editions shall be used, including all current amendments and additions.

The Supervisor referred to in this specification shall mean the Geotechnical/Geo-environmental Consultant (RSK).

The expressions approved and approval shall mean the written approval of the Supervisor.

All British standards, specifications and British Standard Codes of Practice or any other standards referred to in this specification shall be the latest standards including all amendments published before the last day of returning tenders, unless otherwise stated.

The works described in this specification shall be carried out to the entire satisfaction of the Supervisor.

2 SITE DETAILS

The site is located approximately 1km to the northeast of Junction 36 of the M1 motorway, on the northern side of the Dearne Valley Parkway (A6195). The approximate centre of the site is located at NGR E435425, N401190 and is shown in Figure 1. The site is an irregular shape covering an area of approximately 9.7ha.

The site comprises restored former opencast mine (backfilled by the late 1990's and the wider site finally restored by 2002). The site is currently subject to earthworks to form the final development platform. Some of these works, around the site access entrance off the new roundabout on Dearne Valley Parkway and in the car park area to the east are largely complete. Over the central part of the site a former surcharge mound is currently being removed to provide material to be used as engineered fill external yard areas and to form the final development platform.

2.1 Pertinent information

A combined desk study and coal mining risk assessment report for the site has been prepared by RSK. This report, which is referenced below and should be read in conjunction with this specification:

- RSK. J36 Phase 2A, Phase 2B and Phase 3, Rockingham. Preliminary Risk Assessment and Coal Mining Risk Assessment. Report no. 322638-R01(01). Dated December 2019. For Harworth Estates Investments Limited.

RSK subsequently prepared a separate Phase 2 Geoenvironmental site investigation report for both the Phase 2 and Phase 3 development areas. This report, which is referenced below, should also be read in conjunction with this specification:

- RSK. J36 Phase 2A, Phase 2 and Phase 3 Rockingham. Phase 2 Geo-environmental and Geotechnical Site Investigation. Report no. 322368-R02. Dated March 2020. For Harworth Estates Investments Limited.

During construction of surcharge Mound 2, which comprised of cut materials from the southern part of the Phase 3 area, bulk samples were collected for geotechnical testing. Pertinent information (in relation to earthworks) is summarised below, and laboratory test certificates are provided in Appendix C.

The laboratory tests for maximum dry density (MDD) / moisture content relationship indicated that most of the materials tested achieved a MDD in the range 1.91 Mg/m³ to 1.98 Mg/m³) and adequate air voids (<5% air voids) based on the 4.5kg rammer method. These density values were recorded over a range of between 6.9% and 12.0%. Natural moisture content from 6.8% to 18.0%.

Materials were classified in accordance with SHW as Class 2C. Laboratory geotechnical tests confirmed a range of liquid limits from 36% to 40%, plastic limits from 17% to 27%, and plasticity index ranging from 9% to 22%. The Moisture Condition Value ranged from 7.4 to 14.9.

The opencast backfill within the surcharge mound may contain significant quantities of oversized materials (cobbles and boulders) which will require processing (i.e. breaking up) if they are to be incorporated into the earthworks.

3 EARTHWORKS REQUIREMENTS

3.1 Introduction

The Contractor shall comply at all times with this Specification and the works will be supervised on a full-time basis by RSK.

The Contractor is to remove the existing Mound 2 surcharge mound to original ground levels, as determined by the Client and provided in Appendix B.

The Contractor is to place engineered fill to achieve the required final formation levels, as determined by the Client and provided in Appendix B.

The existing surcharge materials shall be removed to original (pre-surcharging) ground level and be free of any unsuitable material, soft, loose or organic deposits. When the formation level is exposed, this should be inspected by the Supervisor (and tested using a hand shear vane or similar) to confirm it is a suitable founding stratum. Once approved, the formation which should be sensibly level, will be subject to preparatory compaction proof rolling before any materials are placed. A survey of the proof rolled formation level shall be undertaken by the Client and provided to RSK. An adequate period of notice should be provided to the Supervisor as areas at formation level become available to ensure inspections can be carried out appropriately.

The earthworks will then proceed with selection of suitable fill materials placed and compacted in layers to an end product specification. In-situ testing shall be undertaken and field results provided to RSK for review on the day of testing. Formations will be sensibly level and layers shall be benched into existing formations until final levels are attained. Further details on the earthworks requirements are provided below.

3.2 Materials to be used

Suitable materials shall comprise all that which is acceptable for the contract.

The movement of materials across the site will be managed under a Materials Management Plan (MMP). An MMP has been produced by RSK for the wider site and is included in RSK report reference 322638-R06(01) J36 Rockingham Phase 2&3 - MMP, dated May 2021. Due to a change in site ownership for Phase 3 this document is likely to be amended and re-issued, however the requirements for materials handling will remain unaltered and should be followed by the contractor for the specified earthworks.

3.3 Unsuitable materials

A summary of unsuitable materials is provided below:

- material from swamps, marshes, etc., all organic or part organic material
- material susceptible to spontaneous combustion
- frozen materials - such material may be re-defined as suitable when thawing has occurred at the discretion of the Supervisor
- clay if the liquid limit exceeds 80% and/or the plasticity index exceeds 55%

- materials having a moisture content greater than the maximum permitted for such materials as defined by the Supervisor. The Supervisor may redefine such materials when sufficient drying has occurred
- oversized materials, including cobbles and boulders, which will require breaking down if they are to be incorporated into the earthworks.

3.4 Method of working

The Contractor shall employ only that plant which is suitable for the soils to be handled and in accordance with Table 6/4 of SHW. He shall not use plant that damages or reduces the natural strength of the soil either in its in situ state or during handling, placing and compacting. The Contractor shall confirm the plant that is to be used in advance of the works.

Where excavation reveals a combination of suitable and unsuitable materials the Contractor shall, unless otherwise agreed by the Supervisor, carry out the excavation in such a manner that the suitable materials are excavated separately for use in the works without contamination by the unsuitable materials.

Excavation from a cutting shall not proceed unless sufficient plant is available in the fill area to comply with the compaction requirements.

The gradient of slopes formed by cutting and filling areas shall be kept at safe working angles to prevent any slope instability and shall be well graded, trimmed and free of loose material.

The Contractor shall be deemed to have included for temporarily supporting as necessary any services, drains or ducts encountered.

The Contractor shall be deemed to have allowed for the deterioration of material as a result of inclement weather and the replacement with suitable material as appropriate.

Throughout the works the Contractor shall maintain the whole area of his operations in a clean, tidy and safe condition by arranging his materials in an orderly manner. All rubbish, waste, material, debris etc. shall be systematically cleared from the working areas (and removed off site) as it accumulates.

3.5 Excavation

3.5.1 Surcharge materials

Part of the surcharge mound has been formed from materials generated from a surface scrape of surface vegetation and weathered surface soils (topsoil). This material has been segregated in the surcharge mound and must only be used in the final earthworks in suitable end-use areas and NOT within the present works for the building platform. These will include those locations where it is required as a surface layer of topsoil in areas of landscaping/ vegetation. It can also be used outwith the building and hardstanding areas (i.e. over areas for landscaping including perimeter side slopes) as general fill at shallow depth.

3.5.2 Earthwork support

The Contractor shall be entirely responsible for the sufficiency of all temporary earthwork support to excavations and allow safe access for all plant and personnel.

3.5.3 Formations

It is the responsibility of the Contractor to satisfy himself as to the suitability of his equipment and methods based on the recorded soil and ground conditions existing on the site.

In areas where fill is to be placed the surface should be trimmed to provide a suitably level platform for filling and the base formation inspected by the Supervisor to confirm suitability. This should include in situ testing (with a hand shear vane or similar) to confirm a minimum of firm strength of the formation soils. If any soft or loose soils are present these should be locally removed.

The Contractor shall proof roll the formation level to give the compactive effort of a minimum of 4No. passes with the compaction plant (agreed and approved by the Supervisor).

RSK shall inspect the formation before new materials are laid on them. The Contractor shall give not less than 24 hours' notice of when formations shall be ready for inspection.

3.6 Filling

3.6.1 General

For approval to be given for filling the Contractor shall be required to demonstrate that the material is suitable and that the placing of the material conforms to the compaction requirements of Table 6/4 of SHW Series 600, which may then be refined to achieve the end product in-situ requirements detailed in Section 3.9.

Fill areas shall be built up evenly over the full area, and sufficient camber shall be maintained at all times to enable surface water to drain from them. The containment or disposal of surface water, during the construction period shall be the Contractor's responsibility.

The Contractor shall ensure that excavations and areas to be filled are free from organic material, loose soil, rubbish and standing water.

Plant employed for transporting, laying and compacting shall be suited to the type of material being handled.

The Contractor shall lay differing materials separately so that only one type of material occurs in each layer.

3.6.2 Benching in fill

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

3.6.3 Cold weather working

Frozen material or materials containing ice shall not be used. Fill material shall not be placed on a frozen surface.

3.6.4 Materials wet of optimum moisture content

In order to achieve the required compaction, the placed materials will have to have a limited range of moisture content, around the optimum value. Where materials are wet of optimum and unable to meet the requirements detailed in Section 3.9, there may be a requirement for a drying method or lime/lime-cement stabilisation of the fill material to achieve the required moisture content range.

If consideration is given to the addition of lime and/or cement, then this should be carried out in accordance with the following document which provides guidance on the assessment of the suitability of materials for improvement or stabilisation. Reference in this document is made to the SHW.

- the Highways Agency Design Manual for Roads and Bridges, Advice Note HA 74/07, Volume 4, Section 1, Part 6, 'Treatment of Fill and Capping Materials Using Either Lime or Cement or Both' (HA74/07).

Any proposals, including methods and pre-testing to use lime/cement to improve materials shall be provided in advance to RSK for review, with all methods and testing provided in advance for review.

3.6.5 Final formation levels

The Contractor is responsible for ensuring the long-term performance of the final plateau formation. They must ensure that it is protected and not susceptible to physical degradation e.g. saturation, erosion or significant wetting.

3.7 Specification for testing

A minimum of four laboratory compaction tests (4.5kg), particle size distribution, liquid/plastic limit and particle density tests per material type or 1 per 2,500m³ placed, will be required for comparison against the validation test results. The full pre-testing frequency and suite is provided in Appendix D.

Cohesive materials require placement and compaction to achieve greater than or equal to 95% of the maximum dry density (based on the laboratory 4.5kg rammer method) and <5% air voids. RSK will determine the target density to be used for the works, as determined by the pre-testing supplied by the Contractor and data provided in Appendix C.

The full depth of each layer of fill material shall be tested using a suitably calibrated nuclear density gauge to demonstrate compliance with this standard on not less than a staggered 10m by 10m grid. One sand replacement test will be carried out per five nuclear density gauge tests.

Any variation to the testing method and frequency prescribed above will require prior approval by the Supervisor.

The Contractor is to sample and test for a broad suite of chemical determinands of 1 per 2,500m³ as specified in Appendix D.

When final formation levels have been reached, CBR testing shall be undertaken using 450mm diameter plate on a minimum testing frequency of 1 No. test per 20m by 20m. CBR values should be equal to or greater than 5%. Test positions are to be agreed with RSK prior to testing.

All test locations shall be accurately surveyed for co-ordinate and level and supplied to RSK within a week.

3.8 Supervision

RSK will carry out full-time supervision of the earthworks to inspect the materials and to confirm that the specification is followed. RSK will inspect, witness in-situ testing and approve all formations prior to placement of engineered fill and will also inspect the arisings for areas of cut.

The Contractor shall allow safe access to the works at any reasonable time and shall provide reasonable facilities to enable him to check the adequacy of the works.

In the event of ground or other conditions changing such that the Contractor feels that a change in his plant or his method of working is required, he shall give the Supervisor 36 hours' notice for approval of the proposed plant and working method.

It is the Contractor's responsibility to arrange, carry out and report/review all earthworks testing and fill testing in accordance with the appropriate specification and provide results in an orderly and timely manner to RSK for review. Following review, there may be requirements for further testing or remedial earthworks in the case of non-compliances.

4 REPORTING REQUIREMENTS

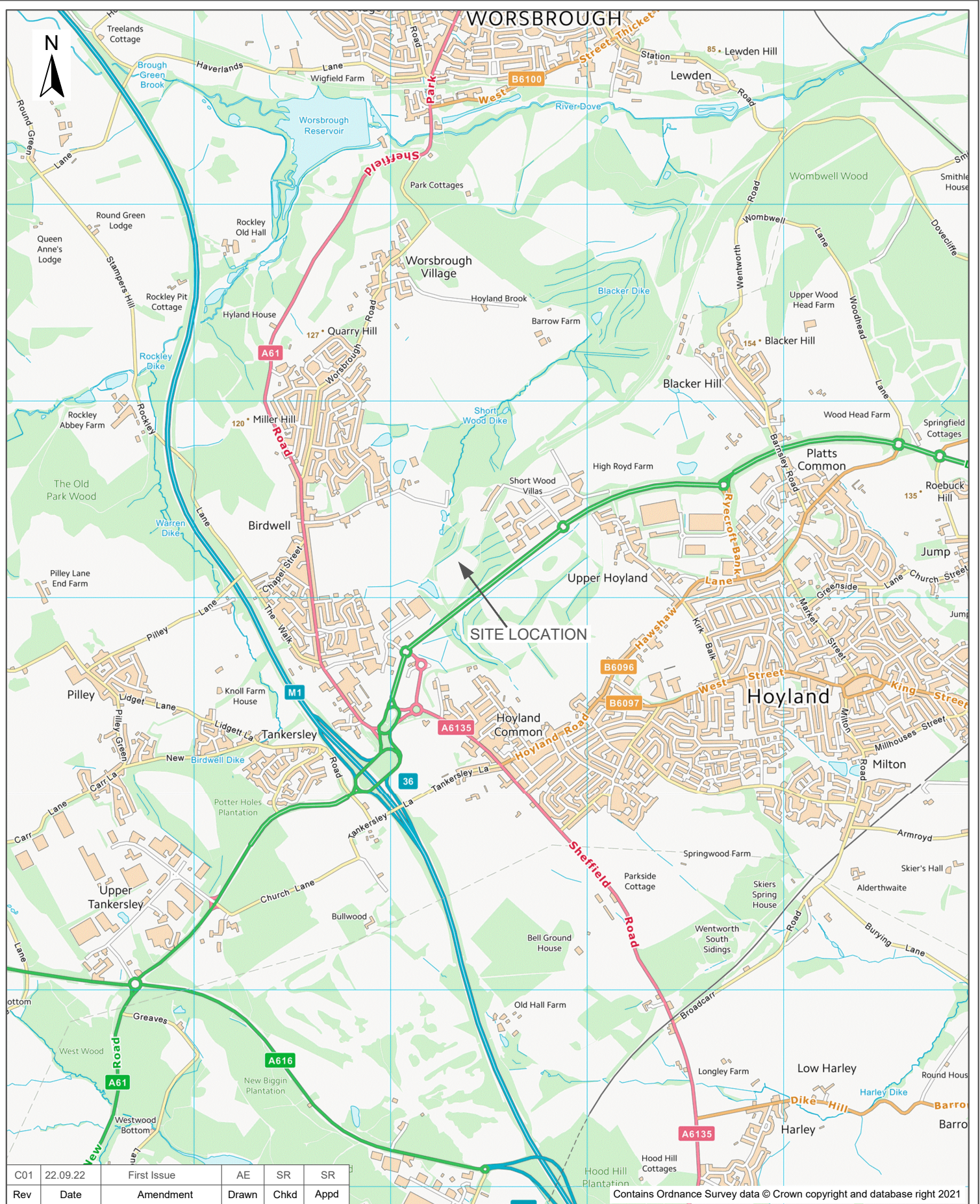
The Contractor will maintain records of the works and provide these to RSK for inclusion in the validation report, which are to include the following:

- daily record sheets to include a summary of the day's activities
- weather conditions
- plant, personnel and visitors present
- aspects relating to Health and Safety, environmental control or non-compliance with the Specifications or the Contractors Method Statement
- the Contractor shall provide regular up to date records of all testing results. These records should be updated at a minimum of once a week. The Contractor is required to review the results and highlight any issues immediately, along with details on how any issues will be rectified
- all laboratory test certificates
- total volumes of cut and fill
- surveys of all in-situ test locations in CAD (to national grid co-ordinates)
- as built surveys (including final level survey, and base of excavation survey) in CAD (to national grid co-ordinates).

All of the above aspects will need to be completed to the satisfaction of RSK for the work to be deemed complete.

On completion of the earthworks, RSK will prepare a Validation Report to confirm that the works have been carried out in accordance with the agreed methodology and specification.

FIGURES



C01	22.09.22	First Issue	AE	SR	SR
Rev	Date	Amendment	Drawn	Chkd	Appd

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Client		Core SP Limited			
Project Name		Gateway 36 Phase 3 - Earthworks Specification			
Description		Site Location Plan			
Dimension	Size	Scale	Geolocation	Project ID	Drawing no.
m	A4	1:25,000	435344, 401181	323093	11101
Rev		File name			
C01		323093-HE-111-SS-D-C-11101-C01			

APPENDIX A

SERVICE CONSTRAINTS

1. This report and the site investigation carried out in connection with the report (together the "Services") were compiled and carried out by RSK Environment Limited (RSK) for Firethorn Developments Ltd (the "Client") in accordance with the terms of a contract between RSK and the Client, dated 1st August 2022. The Services were performed by RSK with the reasonable skill and care ordinarily exercised by an environmental consultant at the time the Services were performed. Further, and in particular, the Services were performed by RSK taking into account the limits of the scope of works required by the client, the time scale involved and the resources, including financial and manpower resources, agreed between RSK and the Client.
2. Other than that, expressly contained in paragraph 1 above, RSK provides no other representation or warranty whether express or implied, in relation to the Services.
3. Unless otherwise agreed in writing, the Services were performed by RSK exclusively for the purposes of the Client. RSK is not aware of any interest of or reliance by any party other than the Client in or on the Services. Unless expressly provided in writing, RSK does not authorise, consent or condone any party other than the client relying upon the Services. Should this report or any part of this report, or otherwise details of the Services or any part of the Services be made known to any such party, and such party relies thereon that party does so wholly at its own and sole risk and RSK disclaims any liability to such parties. **Any such party would be well advised to seek independent advice from a competent environmental consultant and/or lawyer.**
4. It is RSK's understanding that this report is to be used for the purpose described in the introduction to the report. That purpose was a significant factor in determining the scope and level of the Services. Should the purpose for which the report is used, or the proposed use of the site change, this report may no longer be valid and any further use of or reliance upon the report in those circumstances by the client without RSK's review and advice shall be at the client's sole and own risk. Should RSK be requested to review the report after the date of this report, RSK shall be entitled to additional payment at the then existing rates or such other terms as agreed between RSK and the client.
5. The passage of time may result in changes in site conditions, regulatory or other legal provisions, technology or economic conditions which could render the report inaccurate or unreliable. The information and conclusions contained in this report should not be relied upon in the future without the written advice of RSK. In the absence of such written advice of RSK, reliance on the report in the future shall be at the Client's own and sole risk. Should RSK be requested to review the report in the future, RSK shall be entitled to additional payment at the then existing rate or such other terms as may be agreed between RSK and the client.
6. The observations and conclusions described in this report are based solely upon the Services which were provided pursuant to the agreement between the Client and RSK. RSK has not performed any observations, investigations, studies or testing not specifically set out or required by the contract between the client and RSK. RSK is not liable for the existence of any condition, the discovery of which would require performance of services not otherwise contained in the Services. For the avoidance of doubt, unless otherwise expressly referred to in the introduction to this report, RSK did not seek to evaluate the presence on or off the site of asbestos, invasive plants, electromagnetic fields, lead paint, heavy metals, radon gas or other radioactive or hazardous materials, unless specifically identified in the Services.
7. The Services are based upon RSK's observations of existing physical conditions at the Site gained from a visual inspection of the site together with RSK's interpretation of information, including documentation, obtained from third parties and from the Client on the history and usage of the site, unless specifically identified in the Services or accreditation system (such as UKAS ISO 17020:2012 clause 7.1.6):

- a. The Services were based on information and/or analysis provided by independent testing and information services or laboratories upon which RSK was reasonably entitled to rely.
- b. The Services were limited by the accuracy of the information, including documentation, reviewed by RSK and the observations possible at the time of the visual inspection.
- c. The Services did not attempt to independently verify the accuracy or completeness of information, documentation or materials received from the client or third parties, including laboratories and information services, during the performance of the Services.

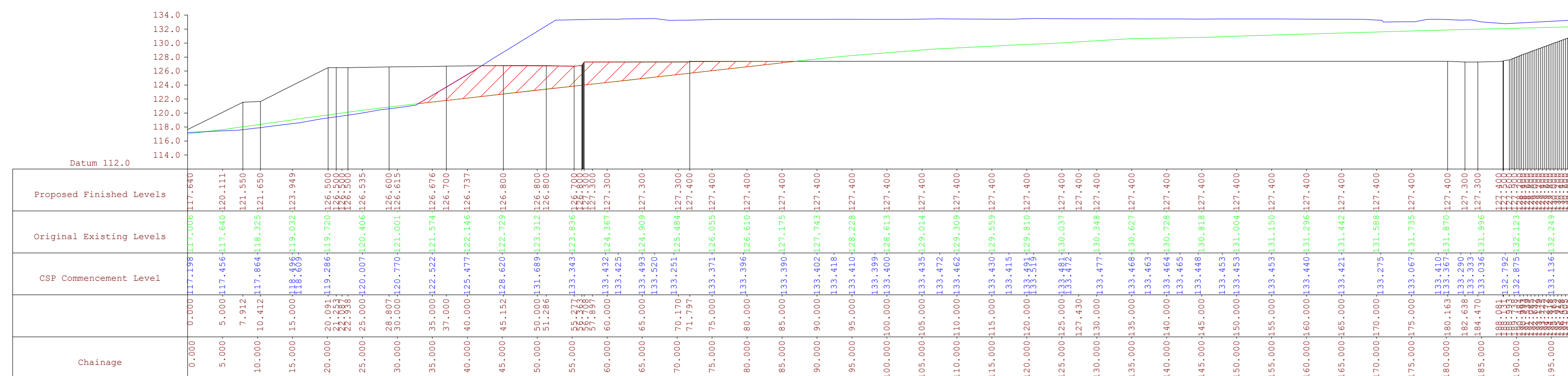
RSK is not liable for any inaccurate information or conclusions, the discovery of which inaccuracies required the doing of any act including the gathering of any information which was not reasonably available to RSK and including the doing of any independent investigation of the information provided to RSK save as otherwise provided in the terms of the contract between the Client and RSK.

8. The intrusive environmental site investigation aspects of the Services are a limited sampling of the site at pre-determined locations based on the known historic / operational configuration of the site. The conclusions given in this report are based on information gathered at the specific test locations and can only be extrapolated to an undefined limited area around those locations. The extent of the limited area depends on the properties of the materials adjacent and local conditions, together with the position of any current structures and underground utilities and facilities, and natural and other activities on site. In addition, chemical analysis was carried out for a limited number of parameters (as stipulated in the scope between the client and RSK, based on an understanding of the available operational and historical information) and it should not be inferred that other chemical species are not present.
9. Any site drawing(s) provided in this report is (are) not meant to be an accurate base plan but is (are) used to present the general relative locations of features on, and surrounding, the site. Features (intrusive and sample locations etc) annotated on site plans are not drawn to scale but are centred over the approximate location. Such features should not be used for setting out and should be considered indicative only.
10. The comments given in this report and the opinions expressed are based on the ground conditions encountered during the site work and on the results of tests made in the field and in the laboratory. However, there may be conditions pertaining to the site that have not been disclosed by the investigation and therefore could not be taken into account. In particular, it should be noted that there may be areas of made ground not detected due to the limited nature of the investigation or the thickness and quality of made ground across the site may be variable. In addition, groundwater levels and ground gas concentrations and flows, may vary from those reported due to seasonal, or other, effects and the limitations stated in the data should be recognised.
11. Asbestos is often observed to be present in soils in discrete areas. Whilst asbestos-containing materials may have been locally encountered during the fieldworks or supporting laboratory analysis, the history of brownfield and demolition sites indicates that asbestos fibres may be present more widely in soils and aggregates, which could be encountered during more extensive ground works.
12. Unless stated otherwise, only preliminary geotechnical recommendations are presented in this report and these should be verified in a Geotechnical Design Report, once proposed construction and structural design proposals are confirmed.

APPENDIX B

CLIENT EARTHWORK DRAWINGS

- 21056-EXT-003-A- Indicative Surcharge Area Long Section
- 21056-EXT-001-A- Proposed Enabling Works Level Plan
- 20379_OGL_REV3 (2) Model (1)



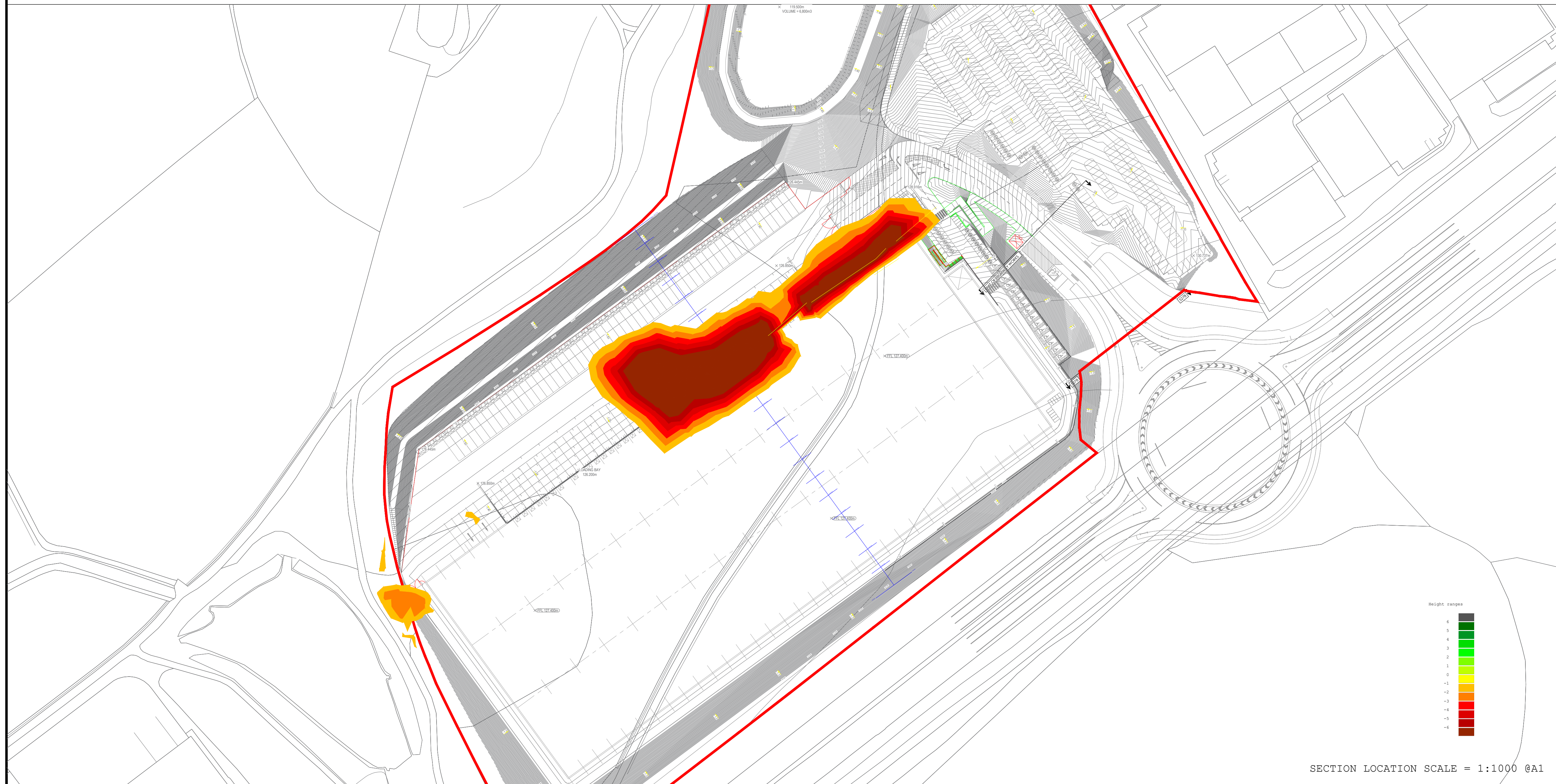
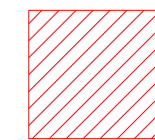
Notes:

Proposed development levels taken from
drawing ref '079577-CUR-XX-XX-DR-C-91001-P11
-Indicative Proposed Site Levels'

Construction Depths applied to form proposed enabling works level in line with drawing ref: 21056-EXT-002 (Proposed Enabling Works Level Plan)

Existing Ground Levels taken from topographical
survey ref: 20379_OGL_3D_REV10

Previous 'Phase 3' Levels taken from DWG file
'PHASE 3 TOPO SURVEY 07-06-21'





Notes:

Proposed development levels taken from drawing ref '079577-CUR-XX-XX-DR-C-91001-P11 -Indicative Proposed Site Levels'

<REL 127.000>

Proposed Finished Development Level

Proposed Finished Level Contour

Construction depths applied as below to define proposed enabling works (formation) level.

Building Area -330mm

Service Yard - 300mm

Pedestrian Areas -160mm

Access Road -310mm

Car Park -200mm

Office/ Hub Area -450mm

All other Developable Areas -300mm

Revision		By	Date
0	For Information	BG	14/06/2022
A	Updated Construction Depths	BG	19/08/2022
B			
C			

CORE SPECIAL PROJECTS LIMITED
2175 Century Way
Thorpe Park
Leeds LS15 8ZB

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E-mail: mail@coresp.co.uk
www.coresp.co.uk

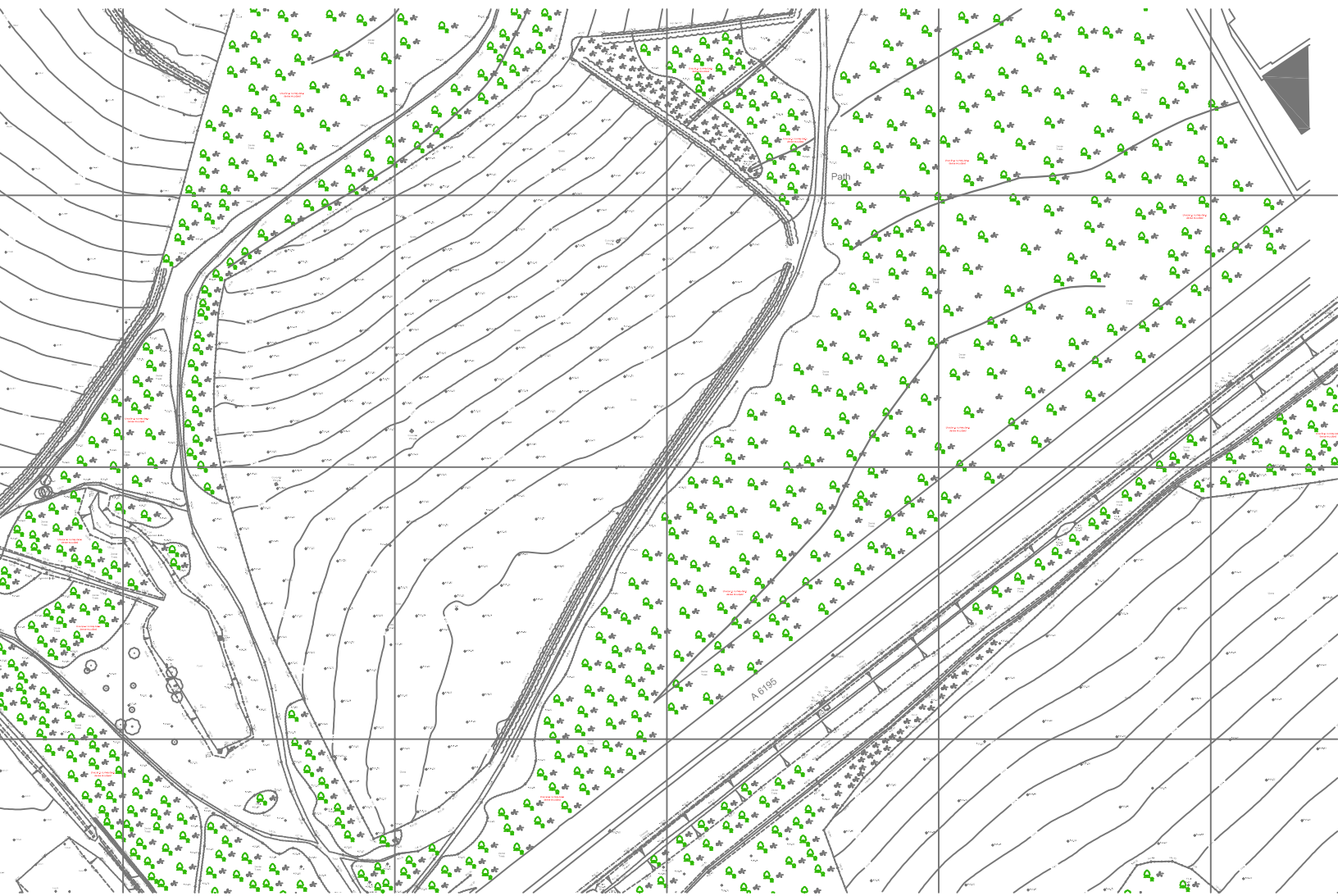
Project:

Gateway 36

Title:

Proposed Enabling Works Level Plan

Drawing No: 21056-EXT-001		Revision: A	
Drawn By: BG		Approved By: LF	
Scale: NTS	Date: 14 June 2022	Sheet Size: A0	



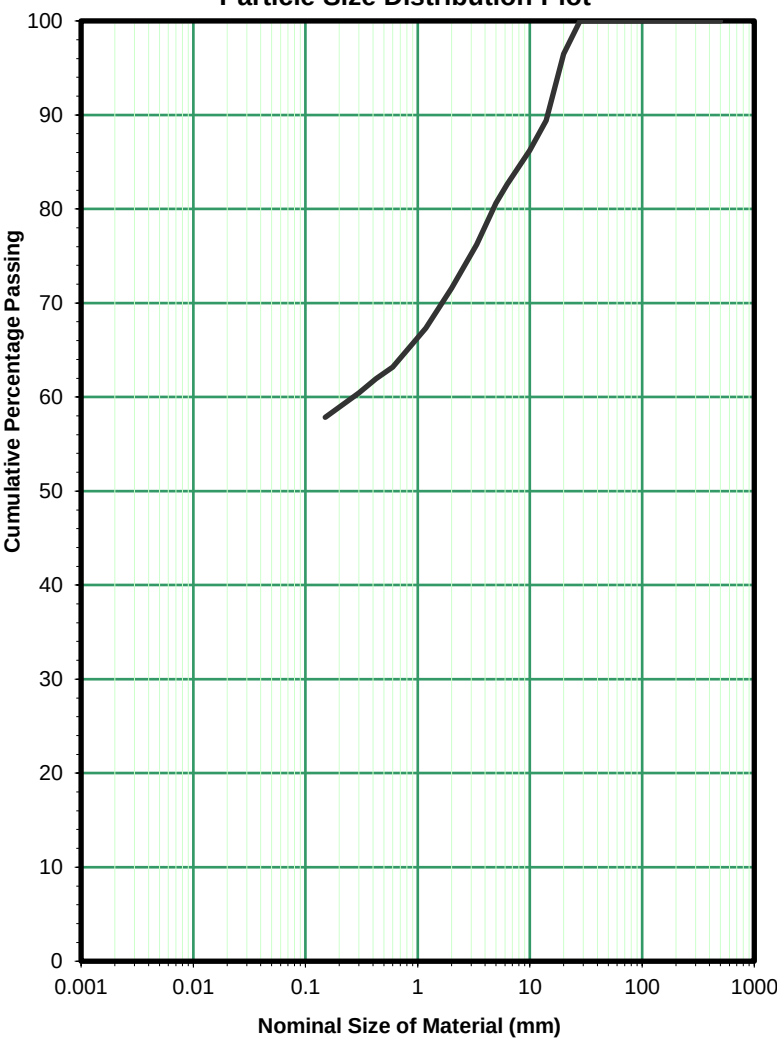


APPENDIX C

SURCHARGE MOUND 2 LABORATORY TEST CERTIFICATES

Laboratory Report	DNR-92929	Contract Sample No	DN2474/206	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	17/01/2021	Clients Reference	DN2474/206		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay			
	Date Sampled	13/12/2021			
	Sampling Plan	Client Specification			
	Source	Ex-Site			
	Supplier	Ex-Site			
	Sampled By	CTS			
	Sampling Environment	Overcast/Moist			
	Sample Type	Bulk			
Date Received	13/12/2021				
Location in sample	N/A	Date Tests Completed	12/01/2022		
Sample Location	Phase 3-Mound 2	TEST REPORT			

Determination of moisture content	
Prepared and tested in Accordance with BS 1377: Part 2: 1990 Clause 3.2 - Oven drying	
Moisture Content	15 %

Particle size distribution (wet sieving method) - Tested in accordance with BS 1377: Part 2: 1990 Clause 9.2 Sample prepared in Accordance with BS 1377: Part 1: 2016 clause 8.3.4(a)		Specification MCHW SHW Vol 1 Series 600 Table 6/2 Class 2C																																																																																						
<table border="1"> <thead> <tr> <th>BS Sieve Size (mm)</th> <th>Passing BS Sieve (%)</th> </tr> </thead> <tbody> <tr><td>500</td><td>100</td></tr> <tr><td>300</td><td>100</td></tr> <tr><td>125</td><td>100</td></tr> <tr><td>100</td><td>100</td></tr> <tr><td>90</td><td>100</td></tr> <tr><td>75</td><td>100</td></tr> <tr><td>63</td><td>100</td></tr> <tr><td>50</td><td>100</td></tr> <tr><td>37.5</td><td>100</td></tr> <tr><td>28</td><td>100</td></tr> <tr><td>20</td><td>96</td></tr> <tr><td>14</td><td>89</td></tr> <tr><td>10</td><td>86</td></tr> <tr><td>6.3</td><td>83</td></tr> <tr><td>5</td><td>81</td></tr> <tr><td>3.35</td><td>76</td></tr> <tr><td>2</td><td>72</td></tr> <tr><td>1.18</td><td>67</td></tr> <tr><td>0.600</td><td>63</td></tr> <tr><td>0.425</td><td>62</td></tr> <tr><td>0.300</td><td>60</td></tr> <tr><td>0.150</td><td>58</td></tr> <tr><td>0.063</td><td>54</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	BS Sieve Size (mm)	Passing BS Sieve (%)	500	100	300	100	125	100	100	100	90	100	75	100	63	100	50	100	37.5	100	28	100	20	96	14	89	10	86	6.3	83	5	81	3.35	76	2	72	1.18	67	0.600	63	0.425	62	0.300	60	0.150	58	0.063	54																			Particle Size Distribution Plot 	<table border="1"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>100</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>15 - 80</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>15 - 80</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>			100										15 - 80				15 - 80			
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Laboratory Report	DNR-92929	Contract Sample No	DN2474/206	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 	
Report Date	17/01/2021	Clients Reference	DN2474/206		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay	Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk		
	Date Sampled	13/12/2021			
	Sampling Plan	Client Specification	Date Received		13/12/2021
	Source	Ex-Site	Date Tests Completed		12/01/2022
	Supplier	Ex-Site	TEST REPORT		
	Sampled By	CTS			
	Sampling Environment	Overcast/Moist			
	Sample Type	Bulk			
Location in sample	N/A				
Sample Location	Phase 3-Mound 2				

Determination of Plastic Limit, Liquid Limit and Plasticity Index - Tested in Accordance with BS 1377: Part2: 1990 The sample was prepared from a natural soil specimen and in accordance with BS1377: Part 1: 2016: Clause 8.3.4(b)		% Passing Sieve taken from Particle Size Distribution test.
Liquid Limit (BS 1377: Part 2: 1990 Clause 4.4 - One Point)	38 %	
Plastic Limit (BS 1377: Part 2: 1990 Clause 5.3)	20 %	
Plasticity Index (BS 1377: Part 2: 1990 Clause 5.4)	18 %	
Material Passing 425 µm test sieve	62 %	
Material Retained on 425 µm test sieve	38 %	
Determination of Moisture Condition Value (MCV) at Natural Moisture Content Prepared and Tested on a Single Sample in Accordance with BS 1377: Part 4: 1990: Clause 5.4		
MCV - interpreted from the steepest straight line of the plot.	7.4	
Moisture Content in Accordance with BS 1377: Part 2: 1990: Clause 3.2	16 %	
Percentage of material retained on 20mm test sieve	4 %	
Determination of Particle Density Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)		Sample prepared in Accordance with BS 1377-1:2016, clause 8.4
Average Particle Density	2.63 Mg/m³	

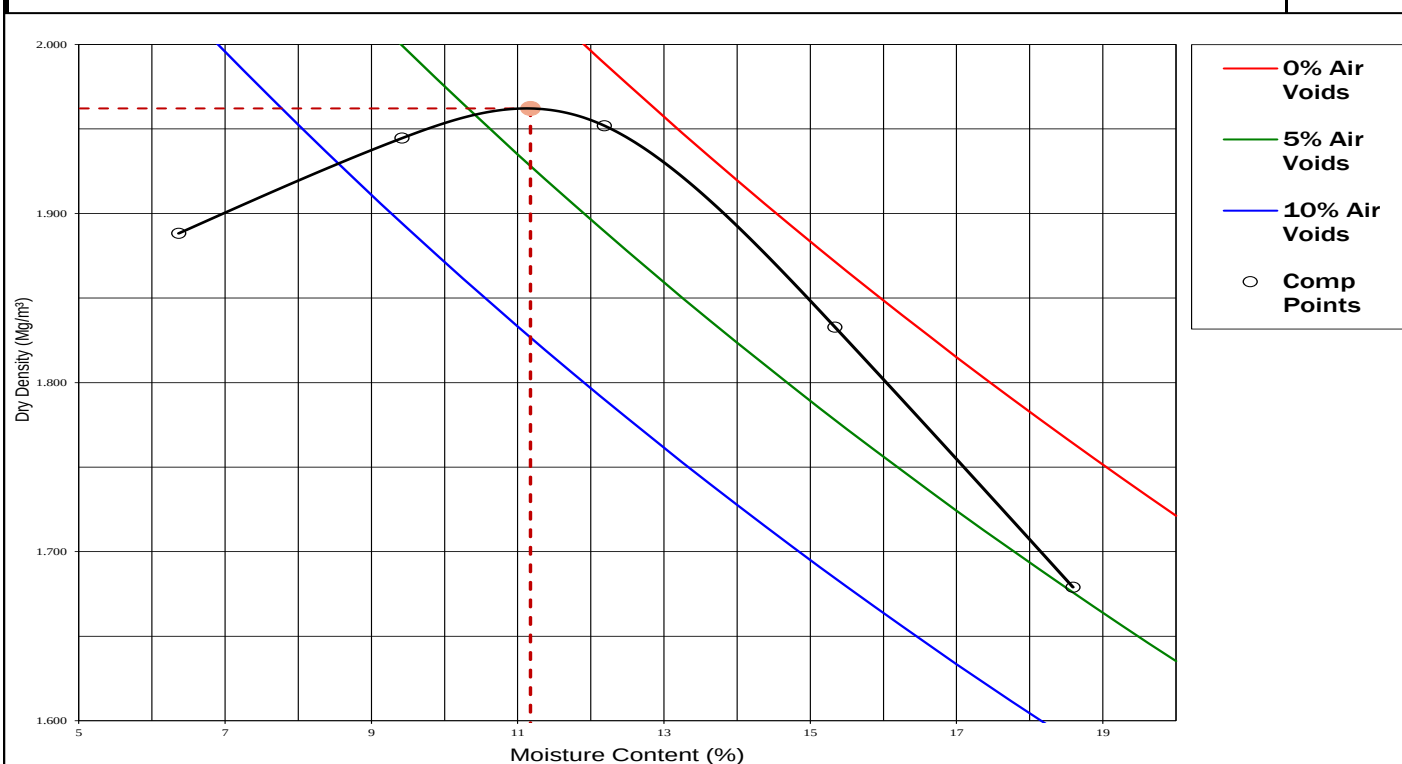
Laboratory Report	DNR-92929	Contract Sample No	DN2474/206	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 	
Report Date	17/01/2021	Clients Reference	DN2474/206		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay	Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
	Date Sampled		13/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site	Date Received 13/12/2021 Date Tests Completed 12/01/2022	
	Sampled By		CTS		
	Sampling Environment		Overcast/Moist		
	Sample Type		Bulk	TEST REPORT	
	Location in sample		N/A		
	Sample Location		Phase 3-Mound 2		

Determination of Dry Density / Moisture Content Relationship

Tested In Accordance with BS 1377: Part 4: 1990 Clause 3.6.4.2 (4.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment: +20mm particles removed



Optimum Moisture Content (%)

11 %

Maximum Dry Density

1.96 Mg/m³

Material Retained on 37.5mm test sieve

0 %

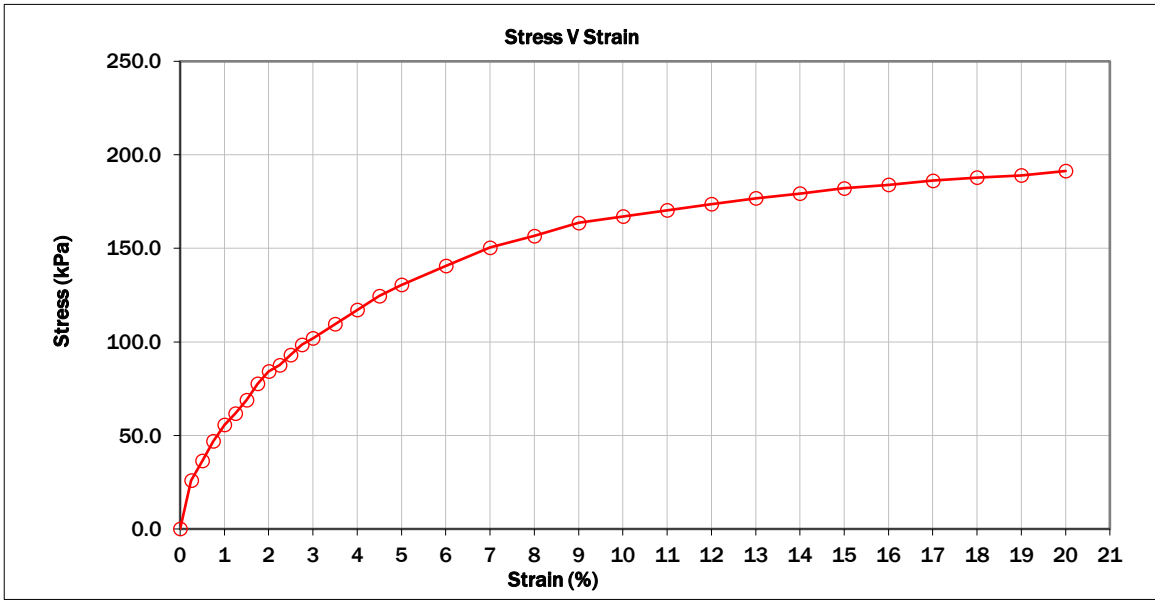
Material Retained on 20.0mm test sieve

4 %

Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2

2.63 Mg/m³

Laboratory Report	DNR-92929	Contract Sample No	DN2474/206	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	17/01/2021	Clients Reference	DN2474/206		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay			
	Date Sampled	13/12/2021			
	Sampling Plan	Client Specification			
	Source	Ex-Site			
	Supplier	Ex-Site			
	Sampled By	CTS			
	Sampling Environment	Overcast/Moist			
	Sample Type	Bulk			
	Location in sample	N/A			
	Sample Location	Phase 3-Mound 2			
TEST REPORT					

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement Tested in Accordance with BS 1377: Part 7: 1990 Clause 8 Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.			Laboratory Temperature 18-22 °C
Initial specimen height	200	mm	
Initial specimen diameter	99.07	mm	
Initial bulk density	2.11	Mg/m³	
Initial moisture content	16	%	
Initial dry density	1.81	Mg/m³	
Rate of strain applied	1.00	%/min	
Membrane thickness (latex)	0.33	mm	
Membrane correction	1.3	kPa	
Cell pressure	200	kPa	
Corrected maximum deviator stress at failure	190	kPa	
Strain at failure	20.0	%	
Time at Failure	20 Minutes, 0 Seconds		
Mode of failure	Plastic		
			Undrained Shear Strength, c_u 95 kPa
Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633 Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.			

Template Version: 1.6 Authorised Signatory	Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. Results relate only to the sample(s) as received. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.
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** END OF REPORT **

Construction Testing Solutions is a trading division of Construction Testing Solutions Ltd - Company No. 05998333

Laboratory Report	ARC-92929-92931	Contract Sample No	DN2474/206-208
Report Date	07 January 2022	Clients Reference	DN2474/206-208
Howard Civil Engineering Unit 11, Acom Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay
		Source	Ex-Site
		Supplier	Ex-Site
		Date Sampled	13/12/2021
		Date Received	13/12/2021
		Date Completed	06/01/2022
		Sample Location	Phase 3 Mound 2



**Construction Testing
Solutions Ltd**

Broomfield Lane Industrial Estate

Doncaster | Doncaster | DN7 4JU

T | (01302) 352682

E | enquiries@constructiontesting.co.uk

W | www.constructiontesting.co.uk

BS1377 pH, BS 1377 LOI, 2 Stage WAC, ENV1, Asbestos & Bre Suite

Please find enclosed test certificate (L21/04785/CTS-21-22883) supplied by our approved Sub-contract Laboratory, Nicholls Colton

Authorised Signatory

M O'Hara – Laboratory Manager



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

Construction Testing Solutions
Bootham Lane Industrial Estate
Dunscroft
Doncaster
DN7 4JU

Analytical Test Report: L21/04785/CTS - 21-22883

Your Project Reference: **21185 Upper Hoyland Road Rockingham**

Your Order Number: 21185 Samples Received / Instructed: 15/12/2021 / 15/12/2021

Report Issue Number: 1 Sample Tested: 15/12 to 06/01/2022

Samples Analysed: 3 soil samples Report issued: 06/01/2022

Signed

James Gane
Data Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Asbestos

Please note: Where further analysis is required samples identified as containing asbestos are screened and tested on an as received basis. No correction is made for moisture content and these results are not covered by our accreditation

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

WAC Testing

Samples were leached in accordance with BS EN 12457-3: 2002.

Eluate Results are reported as the cumulative release at L/S 10 from eluates of L/S 2 and L/S 8. These results have been calculated in accordance with BS EN 12457-3:2002.

Comparative values are taken from the Council Decision Annex - CRITERIA AND PROCEDURES FOR THE ACCEPTANCE OF WASTE AT LANDFILLS, (2003/33/EC).

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue 10/12/2020

Owned by Emily Blissett - Customer Services Supervisor

Authorised by James Gane - Commercial Manager

L:\DATA\REPORTS\CTS\777\ (L21-04785-CTS - 21-22883.XLSX)\TPH Codes



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Analytical Test Results - Soil

NC Reference			207814	207815	207816
Client Sample ID			DN2474/206	DN2474/207	DN2474/208
Client Sample Location			Phase 3 Mound 2	Phase 3 Mound 2	Phase 3 Mound 2
Client Sample Type			-	-	-
Client Sample Number			-	-	-
Depth - Top (m)			-	-	-
Depth - Bottom (m)			-	-	-
Date of Sampling			13/12/2021	13/12/2021	13/12/2021
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	Units	Accreditation			
Arsenic	(mg/kg)	MCERTS	< 10	< 10	< 10
Boron (w/s)	(mg/kg)	u	< 2.5	< 2.5	< 2.5
Cadmium	(mg/kg)	MCERTS	0.6	0.5	0.5
Chromium (Total)	(mg/kg)	UKAS	15	16	15
Copper	(mg/kg)	MCERTS	38	34	34
Lead	(mg/kg)	MCERTS	23	23	23
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	< 2.5
Nickel	(mg/kg)	MCERTS	32	32	32
Selenium	(mg/kg)	u	< 8.0	< 8.0	< 8.0
Zinc	(mg/kg)	MCERTS	90	75	76
Total Phenols	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0
Cyanide (Total)	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0
Cyanide (Free)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
Chromium (Hexavalent)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
Acid Soluble Sulphate	(%)	u	0.30	0.25	0.19
pH	pH Units	MCERTS	7.9	7.3	7.7
Sulphate (Water soluble)	(mg/l)	u	500	670	730
Sulphide	(mg/kg)	u	< 15	84	42
Thiocyanate	(mg/kg)	u	< 5.0	< 5.0	< 5.0
Acenaphthene	(mg/kg)	MCERTS	0.02	0.03	< 0.02
Acenaphthylene	(mg/kg)	UKAS	< 0.02	< 0.02	< 0.02
Anthracene	(mg/kg)	UKAS	< 0.02	0.03	< 0.02
Benzo (a) anthracene	(mg/kg)	MCERTS	0.03	0.07	0.06
Benzo (a) pyrene	(mg/kg)	MCERTS	0.02	0.07	0.05
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.04	0.12	0.08
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.03	0.08	0.05
Benzo (k) fluoranthene	(mg/kg)	MCERTS	< 0.02	0.04	0.03
Chrysene	(mg/kg)	MCERTS	0.04	0.10	0.08
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
Fluoranthene	(mg/kg)	MCERTS	0.06	0.11	0.12
Fluorene	(mg/kg)	MCERTS	0.03	0.04	< 0.02
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	< 0.02	0.06	0.04
Naphthalene	(mg/kg)	MCERTS	0.18	0.30	0.16
Phenanthrene	(mg/kg)	MCERTS	0.14	0.25	0.18
Pyrene	(mg/kg)	MCERTS	0.06	0.12	0.12
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	0.77	1.5	1.1
Gasoline Range Organics (>C ₈ to C ₁₀) [EH_1D_Total]	(mg/kg)	UKAS	8.1	13	11
Diesel Range Organics (>C ₁₀ to C ₂₁) [EH_1D_Total]	(mg/kg)	MCERTS	27	37	33
Mineral Range Organics (>C ₂₁ to C ₄₀) [EH_1D_Total]	(mg/kg)	MCERTS	49	68	60
Total TPH (>C ₈ to C ₄₀) [EH_1D_Total]	(mg/kg)	MCERTS	84	120	100
SOM (via TOC)	(%)	UKAS	3.8	5.1	4.8



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Analytical Test Results - Soil

NC Reference		207814	207815	207816
Client Sample ID		DN2474/206	DN2474/207	DN2474/208
Client Sample Location		Phase 3 Mound 2	Phase 3 Mound 2	Phase 3 Mound 2
Client Sample Type		-	-	-
Client Sample Number		-	-	-
Depth - Top (m)		-	-	-
Depth - Bottom (m)		-	-	-
Date of Sampling		13/12/2021	13/12/2021	13/12/2021
Time of Sampling		-	-	-
Sample Matrix		Clay	Clay	Clay
Determinant	Units	Accreditation		
Asbestos	-	UKAS	No asbestos detected	No asbestos detected

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Analytical Test Results - Chemical Analysis

NC Reference			207814	207815	207816
Client Sample ID			DN2474/206	DN2474/207	DN2474/208
Client Sample Location			Phase 3 Mound 2	Phase 3 Mound 2	Phase 3 Mound 2
Client Sample Type			-	-	-
Client Sample Number			-	-	-
Depth - Top (m)			-	-	-
Depth - Bottom (m)			-	-	-
Date of Sampling			13/12/2021	13/12/2021	13/12/2021
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	Units	Accreditation			
Water soluble sulphate	(mg/l)	u	500	670	730
Acid Soluble Sulphate	(%)	u	0.30	0.25	0.19
Total Sulphur	(%)	UKAS	0.15	0.19	0.22
pH Value	pH Units	MCERTS	7.9	7.3	7.7
pH Value (BS 1377)	(pH Units)	UKAS	8.0	8.0	8.6
Loss on Ignition (BS 1377)	(%)	UKAS	6.2	8.8	8.7

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	207814
--------------	--------

Client Sample ID	DN2474/206
Client Sample Location	Phase 3 Mound 2
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	13/12/2021
Time of Sampling	-
Sample Description	Grey slightly sandy slightly gravelly silty clay
Sample Matrix	Clay
Moisture Content (%)	13
Stone content (%)	34

	Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
--	-------------------	----------------------	---	--------------------------

Solid Analysis

Total Organic Carbon	%	MCERTS	2.2	3.0	5.0	6.0
Loss on Ignition	%	UKAS	6.2	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) (EH_1D_Total)	mg/kg	u	75	500	-	-
PAH	mg/kg	u	0.8	100	-	-
pH	units	MCERTS	7.9	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	13	800	15000	25000
Fluoride	mg/kg	u	1	10	150	500
Sulphate (as SO ₄)	mg/kg	u	550	1000	20000	50000
Total Dissolved Solids	mg/kg	u	700	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	21.0	500	800	1000

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	207815
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Client Sample ID	DN2474/207
Client Sample Location	Phase 3 Mound 2
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	13/12/2021
Time of Sampling	-
Sample Description	Grey slightly sandy slightly gravelly silty clay
Sample Matrix	Clay
Moisture Content (%)	12
Stone content (%)	0

	Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
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Solid Analysis

Total Organic Carbon	%	MCERTS	2.9	3.0	5.0	6.0
Loss on Ignition	%	UKAS	8.8	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) (EH_1D_Total)	mg/kg	u	105	500	-	-
PAH	mg/kg	u	1.5	100	-	-
pH	units	MCERTS	7.3	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	9	800	15000	25000
Fluoride	mg/kg	u	2	10	150	500
Sulphate (as SO ₄)	mg/kg	u	800	1000	20000	50000
Total Dissolved Solids	mg/kg	u	820	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	207816
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Client Sample ID	DN2474/208
Client Sample Location	Phase 3 Mound 2
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	13/12/2021
Time of Sampling	-
Sample Description	Grey slightly sandy slightly gravelly silty clay
Sample Matrix	Clay
Moisture Content (%)	11
Stone content (%)	23

	Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
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Solid Analysis

Total Organic Carbon	%	MCERTS	2.8	3.0	5.0	6.0
Loss on Ignition	%	UKAS	8.7	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) (EH_1D_Total)	mg/kg	u	94	500	-	-
PAH	mg/kg	u	1.1	100	-	-
pH	units	MCERTS	7.7	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	12	800	15000	25000
Fluoride	mg/kg	u	2	10	150	500
Sulphate (as SO ₄)	mg/kg	u	1000	1000	20000	50000
Total Dissolved Solids	mg/kg	u	1000	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	23.0	500	800	1000

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
207814	DN2474/206	Phase 3 Mound 2	-	-	Grey slightly sandy slightly gravelly silty clay	13	34	90
207815	DN2474/207	Phase 3 Mound 2	-	-	Grey slightly sandy slightly gravelly silty clay	12	0.0	100
207816	DN2474/208	Phase 3 Mound 2	-	-	Grey slightly sandy slightly gravelly silty clay	11	23	97

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Project Reference - 21185 Upper Hoyland Road Rockingham

Sample Comments

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
207814	DN2474/206	Phase 3 Mound 2	-	-	VOC/BTEX - Sample taken from container with headspace.
207815	DN2474/207	Phase 3 Mound 2	-	-	VOC/BTEX - Sample taken from container with headspace.
207816	DN2474/208	Phase 3 Mound 2	-	-	VOC/BTEX - Sample taken from container with headspace.

L21/04785/CTS - 21-22883

Project Reference - 21185 Upper Hoyland Road Rockingham

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
TOCL	MS - CL - DOC	As received	BSEN:12457 Leaching	Determination of Dissolved Organic Carbon in leachates
ANIONSL	MS - CL - Anions by Aquakem	As received	-	Determination of Anions (inc Sulphate, chloride etc.) in leachate samples by Aquakem
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
BTEXS	MS - CL - VOC and MBTEX	As received	Passing 10mm test sieve	Determination of BTEX in soils via Headspace-GC-MS
PCB7S	MS - CL - PCB Soils	As received	Passing 10mm test sieve	Determination of PCB's (7 congeners) in soils via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
WACTOCS	MS - CL - TOC Eltra (WAC)	Air dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soil as part of a WAC test
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
TPHS	MS - CL - TPH (GC-FID)	As received	Passing 10mm test sieve	Determination of Total Petroleum Hydrocarbons in soil using GC-FID
WACSKALAR	MS - CL - Phenols by Skalar (WAC)	As received	BSEN:12457 Leaching	Determination of Total Phenols within leachate as part of a WAC test using a Skalar Segmented flow analyser
WSBORONS	MS-CL- WS Boron	Air dried	Passing 10mm test sieve	Determination of Water soluble Boron in soils via ICP
SKALARCNS	MS - CL - Cyanide by Skalar	As received	Passing 10mm test sieve	Determination of cyanide (total / free / complex) in soil using a Skalar segmented flow analyser
WACDOC	MS - CL - DOC (WAC)	As received	BSEN:12457 Leaching	Determination of dissolved organic carbon in a leachate as part of a WAC test
SKALARHCS	MS - CL - Hexavalent Chromium by Skalar	As received	Passing 10mm test sieve	Determination of hexavalent chromium in soil using Skalar segmented flow analyser
WACMETALS	MS - CL - ICP -Metals in Waters (WAC)	As received	BSEN:12457 Leaching	Determination of metals in a leachate as part of a WAC test via ICP
ICPMETL	MS - CL - ICP -Metals in Waters	As received	BSEN:12457 Leaching	Determination of metals in leachates via ICP
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
WACPHS	MS - CL - pH in Soils (WAC)	As received	BSEN:12457 Leaching	Determination of pH in soils as part of a WAC test via pH probe
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
WACANIONS	MS - CL - Anions by Aquakem (WAC)	As received	BSEN:12457 Leaching	Determination of sulphate, chloride and fluoride in a leachate as part of a WAC test using a Aquakem analyser
SULPHIDES	MS - CL - Sulphide in Soils	As received	Passing 10mm test sieve	Determination of sulphide in soil via titration
TDSL	MS - CL - TDS (Leachate)	As received	BSEN:12457 Leaching	Determination of total dissolved solids in leachates
SKALARPHL	MS - CL - Phenols by Skalar	As received	BSEN:12457 Leaching	Determination of total phenols in leachates using Skalar segmented flow analyser
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
ASB	MS - AS - Asbestos	-	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"

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Project Reference - 21185 Upper Hoyland Road Rockingham

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ENLEACHP2	BS EN 12457-3	As Received	-	Leaching in accordance with BSEN 12457-3
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377LOI	BS1377 Lol	Oven dried	Passing 2mm test sieve	Testing was in accordance with BS 1377: Part 3: 2018 + A1 :2021 Clause 6. Determination of the mass loss on ignition. Some information required by BS1377: 2016: Part 1 has not been reported. This information is available on request.
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)
1377PH	BS1377 pH	Oven dried	Passing 2mm test sieve	pH testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 12

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Project Reference - 21185 Upper Hoyland Road Rockingham

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Date of sampling to receipt insufficient to allow analysis to be completed without deviation, Please note this is only a deviation if 'X' is also recorded against the sample

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
207814	DN2474/206	Phase 3 Mound 2	-	-		A

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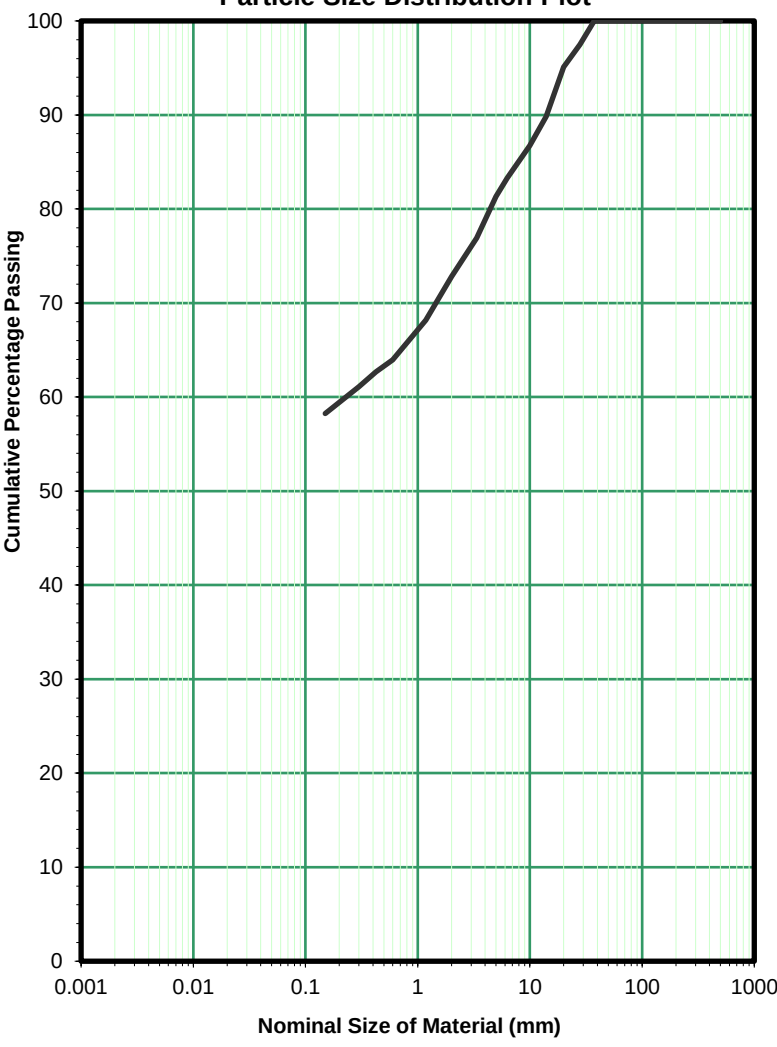
Project Reference - 21185 Upper Hoyland Road Rockingham

HWOL TPH Acronym Index

Acronym	Description
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics and Aromatics
AL	Aliphatics Only
AR	Aromatics Only
2D	GC-GC - Double Coil Gas Chromatography
#1	EH_Total but with humics mathmatically subtracted
#2	EH_Total but with fatty acids mathmatically subtracted
_	Operator - underscore to separate acronyms (except for +)
+	Operator to indicate cumlative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

Laboratory Report	DNR-92930	Contract Sample No	DN2474/207	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	17/01/2021	Clients Reference	DN2474/207		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay			
	Date Sampled	13/12/2021			
	Sampling Plan	Client Specification			
	Source	Ex-Site			
	Supplier	Ex-Site			
	Sampled By	CTS			
	Sampling Environment	Overcast/Moist			
	Sample Type	Bulk			
Date Received	13/12/2021				
Location in sample	N/A	Date Tests Completed	12/01/2022		
Sample Location	Phase 3-Mound 2	TEST REPORT			

Determination of moisture content	
Prepared and tested in Accordance with BS 1377: Part 2: 1990 Clause 3.2 - Oven drying	
Moisture Content	15 %

Particle size distribution (wet sieving method) - Tested in accordance with BS 1377: Part 2: 1990 Clause 9.2 Sample prepared in Accordance with BS 1377: Part 1: 2016 clause 8.3.4(a)		Specification MCHW SHW Vol 1 Series 600 Table 6/2 Class 2C																																																																																										
<table border="1"> <thead> <tr> <th>BS Sieve Size (mm)</th> <th>Passing BS Sieve (%)</th> </tr> </thead> <tbody> <tr><td>500</td><td>100</td></tr> <tr><td>300</td><td>100</td></tr> <tr><td>125</td><td>100</td></tr> <tr><td>100</td><td>100</td></tr> <tr><td>90</td><td>100</td></tr> <tr><td>75</td><td>100</td></tr> <tr><td>63</td><td>100</td></tr> <tr><td>50</td><td>100</td></tr> <tr><td>37.5</td><td>100</td></tr> <tr><td>28</td><td>97</td></tr> <tr><td>20</td><td>95</td></tr> <tr><td>14</td><td>90</td></tr> <tr><td>10</td><td>87</td></tr> <tr><td>6.3</td><td>83</td></tr> <tr><td>5</td><td>81</td></tr> <tr><td>3.35</td><td>77</td></tr> <tr><td>2</td><td>73</td></tr> <tr><td>1.18</td><td>68</td></tr> <tr><td>0.600</td><td>64</td></tr> <tr><td>0.425</td><td>63</td></tr> <tr><td>0.300</td><td>61</td></tr> <tr><td>0.150</td><td>58</td></tr> <tr><td>0.063</td><td>55</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>	BS Sieve Size (mm)	Passing BS Sieve (%)	500	100	300	100	125	100	100	100	90	100	75	100	63	100	50	100	37.5	100	28	97	20	95	14	90	10	87	6.3	83	5	81	3.35	77	2	73	1.18	68	0.600	64	0.425	63	0.300	61	0.150	58	0.063	55																			Particle Size Distribution Plot 	<table border="1"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>100</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>15 - 80</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>15 - 80</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>				100											15 - 80							15 - 80		
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Laboratory Report	DNR-92930	Contract Sample No	DN2474/207	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 	
Report Date	17/01/2021	Clients Reference	DN2474/207		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay	Tel: (01302) 352652 Web: www.constructiontesting.co.uk		
	Date Sampled	13/12/2021			Email: enquiries@constructiontesting.co.uk
	Sampling Plan	Client Specification	Date Received		
	Source	Ex-Site	Date Tests Completed		12/01/2022
	Supplier	Ex-Site	TEST REPORT		
	Sampled By	CTS			
	Sampling Environment	Overcast/Moist			
	Sample Type	Bulk			
Location in sample	N/A				
Sample Location	Phase 3-Mound 2				

Determination of Plastic Limit, Liquid Limit and Plasticity Index - Tested in Accordance with BS 1377: Part2: 1990 The sample was prepared from a natural soil specimen and in accordance with BS1377: Part 1: 2016: Clause 8.3.4(b)		% Passing Sieve taken from Particle Size Distribution test.
Liquid Limit (BS 1377: Part 2: 1990 Clause 4.4 - One Point)	38 %	
Plastic Limit (BS 1377: Part 2: 1990 Clause 5.3)	21 %	
Plasticity Index (BS 1377: Part 2: 1990 Clause 5.4)	17 %	
Material Passing 425 µm test sieve	63 %	
Material Retained on 425 µm test sieve	37 %	

Determination of Moisture Condition Value (MCV) at Natural Moisture Content Prepared and Tested on a Single Sample in Accordance with BS 1377: Part 4: 1990: Clause 5.4		
MCV - interpreted from the steepest straight line of the plot.	8.7	
Moisture Content in Accordance with BS 1377: Part 2: 1990: Clause 3.2	15 %	
Percentage of material retained on 20mm test sieve	5 %	

Determination of Particle Density Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)		Sample prepared in Accordance with BS 1377-1:2016, clause 8.4
Average Particle Density	2.58 Mg/m³	

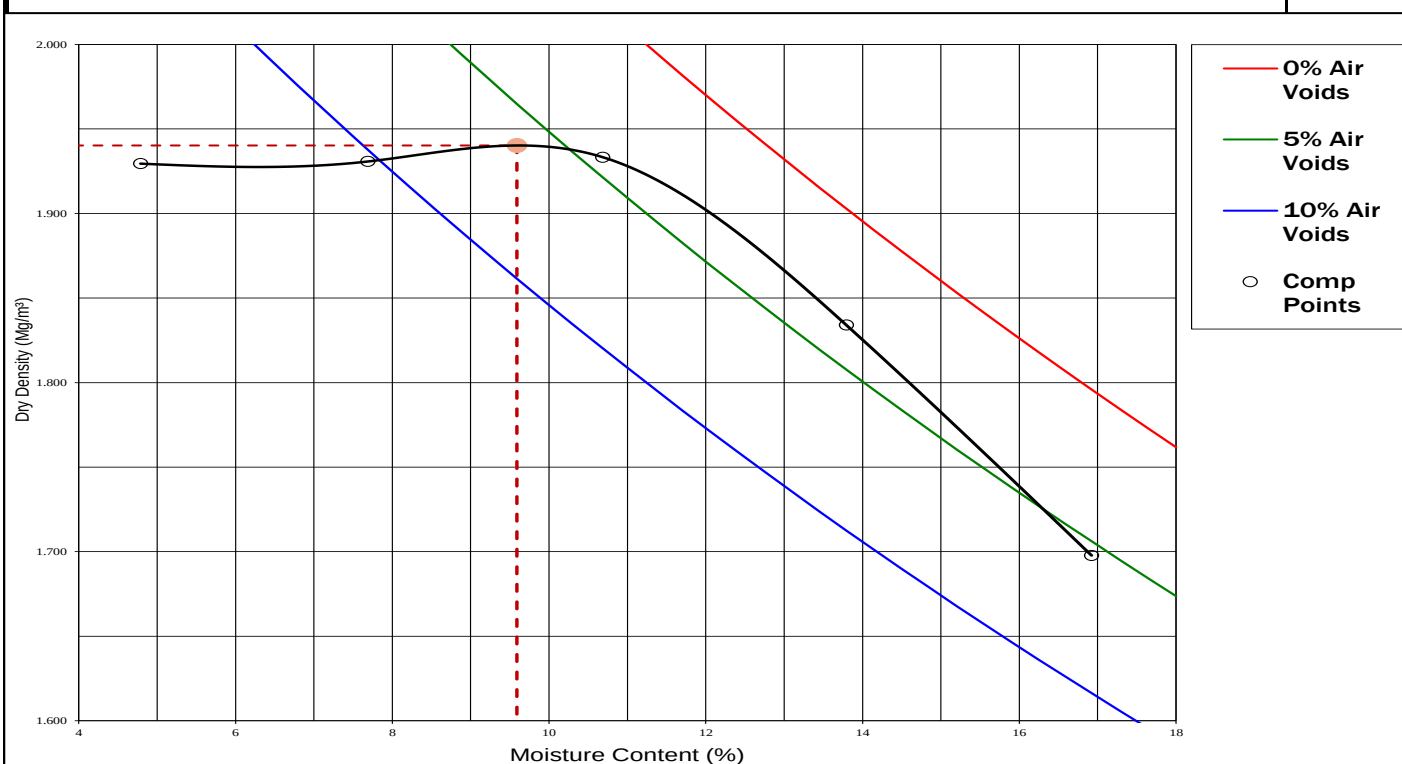
Laboratory Report	DNR-92930	Contract Sample No	DN2474/207	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 	
Report Date	17/01/2021	Clients Reference	DN2474/207		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay		
	Date Sampled		13/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site		
	Sampled By		CTS		
	Sampling Environment		Overcast/Moist		
	Sample Type		Bulk		
Location in sample		N/A	Date Received	13/12/2021	
Sample Location		Phase 3-Mound 2	Date Tests Completed	12/01/2022	
				TEST REPORT	

Determination of Dry Density / Moisture Content Relationship

Tested In Accordance with BS 1377: Part 4: 1990 Clause 3.6.4.2 (4.5kg Rammer, CBR mould)

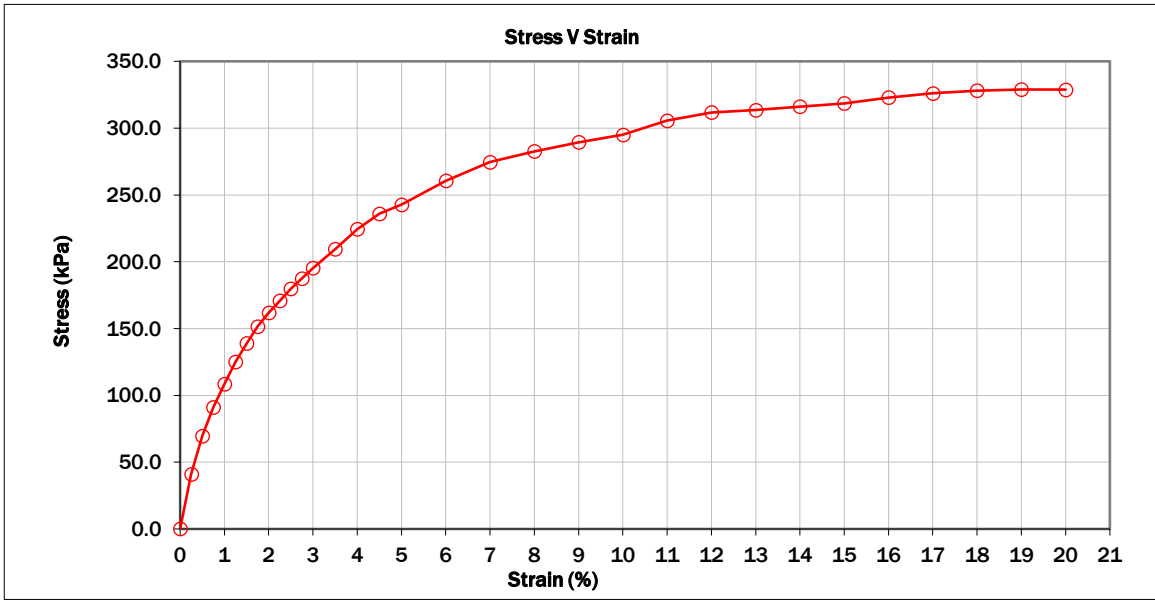
The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment: None



Optimum Moisture Content (%)	9.6 %
Maximum Dry Density	1.94 Mg/m³
Material Retained on 37.5mm test sieve	0 %
Material Retained on 20.0mm test sieve	5 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.58 Mg/m³

Laboratory Report	DNR-92930	Contract Sample No	DN2474/207	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	17/01/2021	Clients Reference	DN2474/207		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay			
	Date Sampled	13/12/2021			
	Sampling Plan	Client Specification			
	Source	Ex-Site			
	Supplier	Ex-Site			
	Sampled By	CTS			
	Sampling Environment	Overcast/Moist			
	Sample Type	Bulk			
Location in sample	N/A	Date Received	13/12/2021		
Sample Location	Phase 3-Mound 2	Date Tests Completed	12/01/2022		
TEST REPORT					

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement Tested in Accordance with BS 1377: Part 7: 1990 Clause 8 Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.			Laboratory Temperature 18-22 °C
Initial specimen height	200	mm	
Initial specimen diameter	99.07	mm	
Initial bulk density	2.01	Mg/m ³	
Initial moisture content	16	%	
Initial dry density	1.74	Mg/m ³	
Rate of strain applied	1.00	%/min	
Membrane thickness (latex)	0.33	mm	
Membrane correction	1.2	kPa	
Cell pressure	200	kPa	
Corrected maximum deviator stress at failure	328	kPa	
Strain at failure	19.0	%	
Time at Failure	19 Minutes, 0 Seconds		
Mode of failure	Plastic		
Stress V Strain 			Undrained Shear Strength, c_u 164 kPa
Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633 Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.			

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** END OF REPORT **

Construction Testing Solutions is a trading division of Construction Testing Solutions Ltd - Company No. 05998333

Laboratory Report	DNR-92931	Contract Sample No	DN2474/208	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 	
Report Date	17/01/2021	Clients Reference	DN2474/208		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay		
		Date Sampled	13/12/2021		
		Sampling Plan	Client Specification		
		Source	Ex-Site		
		Supplier	Ex-Site		
		Sampled By	CTS		
		Sampling Environment	Not Stated		
		Sample Type	Bulk		
	Location in sample	N/A	Date Received	13/12/2021	
	Sample Location	Phase 3-Mound 2	Date Tests Completed	12/01/2022	
				TEST REPORT	

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Laboratory Report	DNR-92931	Contract Sample No	DN2474/208	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 
Report Date	17/01/2021	Clients Reference	DN2474/208	
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay		
	Date Sampled	13/12/2021		
	Sampling Plan	Client Specification		
	Source	Ex-Site		
	Supplier	Ex-Site		
	Sampled By	CTS		
	Sampling Environment	Not Stated		
	Sample Type	Bulk		
Location in sample	N/A	Date Received	13/12/2021	
Sample Location	Phase 3-Mound 2	Date Tests Completed	12/01/2022	
TEST REPORT				
Determination of Plastic Limit, Liquid Limit and Plasticity Index - Tested in Accordance with BS 1377: Part2: 1990 The sample was prepared from a natural soil specimen and in accordance with BS1377: Part 1: 2016: Clause 8.3.4(b)				% Passing Sieve taken from Particle Size Distribution test.
Liquid Limit (BS 1377: Part 2: 1990 Clause 4.4 - One Point)			39 %	
Plastic Limit (BS 1377: Part 2: 1990 Clause 5.3)			19 %	
Plasticity Index (BS 1377: Part 2: 1990 Clause 5.4)			20 %	
Material Passing 425 µm test sieve			63 %	
Material Retained on 425 µm test sieve			37 %	
Determination of Moisture Condition Value (MCV) at Natural Moisture Content Prepared and Tested on a Single Sample in Accordance with BS 1377: Part 4: 1990: Clause 5.4				
MCV - interpreted from the steepest straight line of the plot.			9.0	
Moisture Content in Accordance with BS 1377: Part 2: 1990: Clause 3.2			14 %	
Percentage of material retained on 20mm test sieve			2 %	
Determination of Particle Density Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)				Sample prepared in Accordance with BS 1377-1:2016, clause 8.4
Average Particle Density			2.59 Mg/m³	

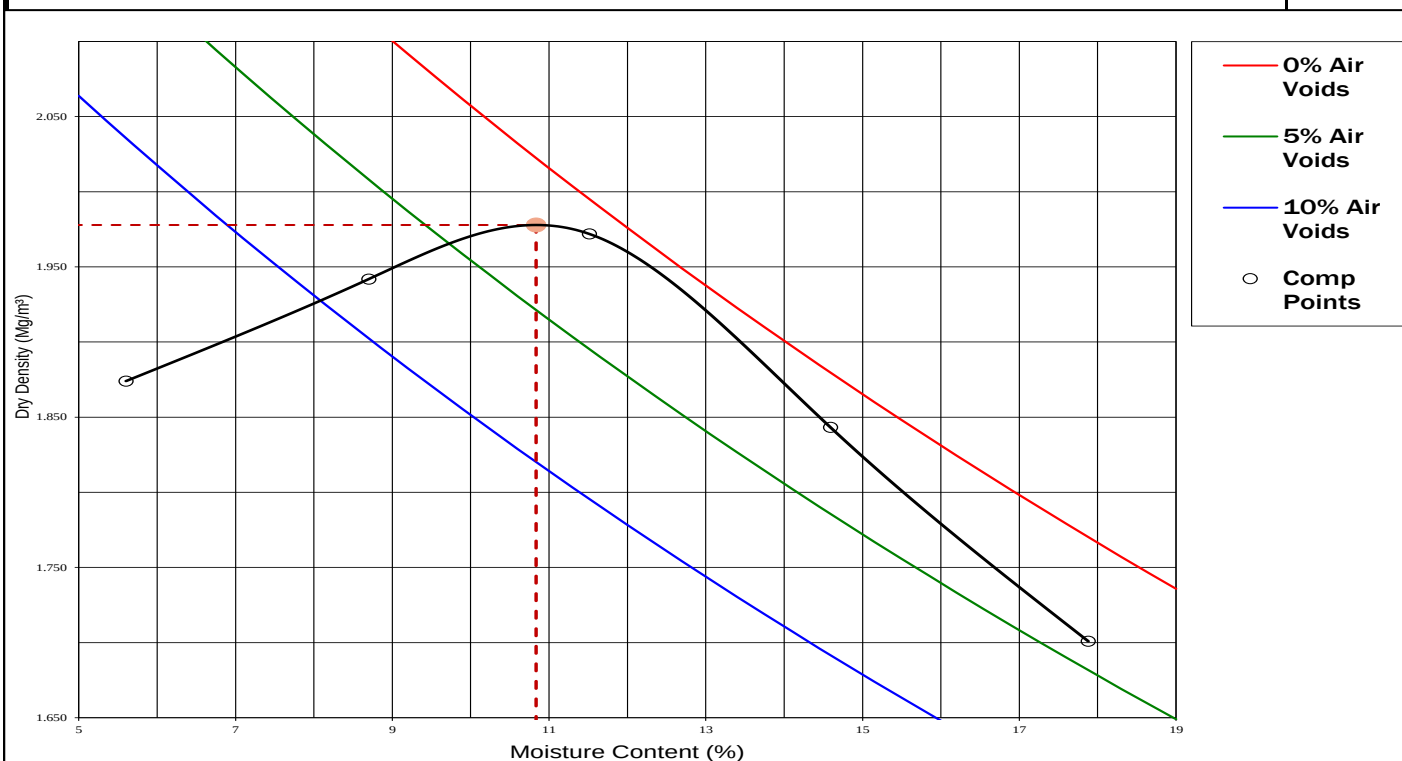
Laboratory Report	DNR-92931	Contract Sample No	DN2474/208	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 	
Report Date	17/01/2021	Clients Reference	DN2474/208		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay		
		Date Sampled	13/12/2021		
		Sampling Plan	Client Specification		
		Source	Ex-Site		
		Supplier	Ex-Site		
		Sampled By	CTS		
		Sampling Environment	Not Stated		
		Sample Type	Bulk		
	Location in sample	N/A	Date Received	13/12/2021	
	Sample Location	Phase 3-Mound 2	Date Tests Completed	12/01/2022	
				TEST REPORT	

Determination of Dry Density / Moisture Content Relationship

Tested In Accordance with BS 1377: Part 4: 1990 Clause 3.6.4.2 (4.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment: None



Optimum Moisture Content (%)	11 %
Maximum Dry Density	1.98 Mg/m³
Material Retained on 37.5mm test sieve	0 %
Material Retained on 20.0mm test sieve	2 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.59 Mg/m³

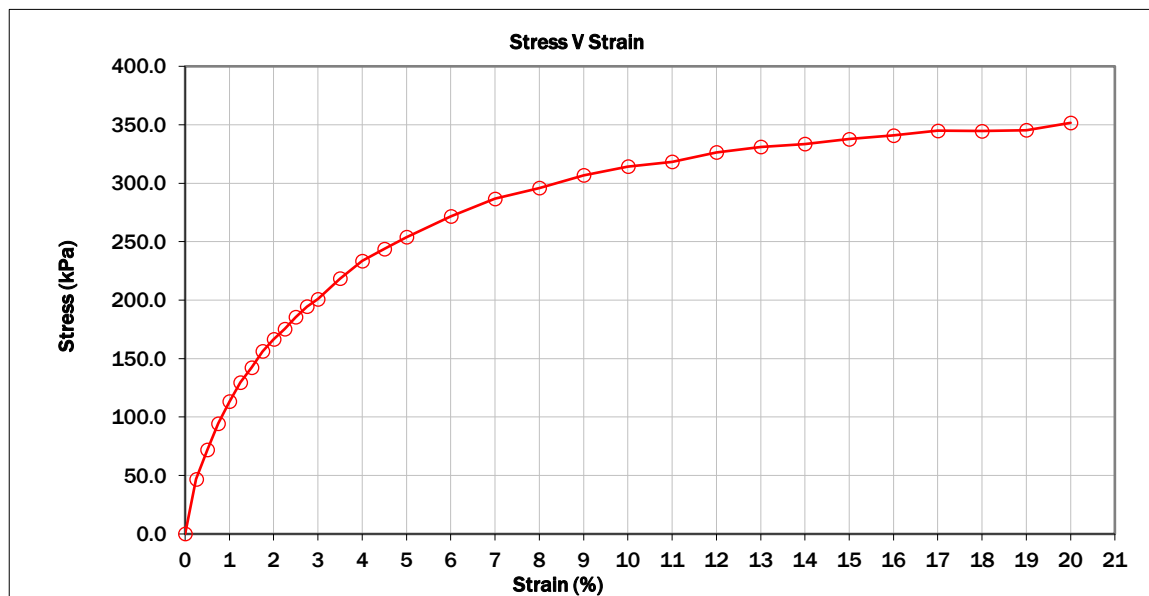
Laboratory Report	DNR-92931	Contract Sample No	DN2474/208	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	17/01/2021	Clients Reference	DN2474/208		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay		
	Date Sampled		13/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site		
	Sampled By		CTS	Date Received 13/12/2021 Date Tests Completed 12/01/2022	
	Sampling Environment		Not Stated		
	Sample Type		Bulk	TEST REPORT	
	Location in sample		N/A		
	Sample Location		Phase 3-Mound 2		

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement
Tested in Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	2.09	Mg/m ³
Initial moisture content	15	%
Initial dry density	1.82	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	1.3	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	350	kPa
Strain at failure	20.0	%
Time at Failure	20 Minutes, 0 Seconds	
Mode of failure	Plastic	

Laboratory Temperature
18-22 °C



Undrained Shear Strength, c_u
175 kPa

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.

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Laboratory Report	DNR-93242	Contract Sample No	DN2474/209	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 
Report Date	24/01/2022	Clients Reference	DN2474/209	
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF	Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay	
		Date Sampled	17/12/2021	
		Sampling Plan	Client Specification	
		Source	Ex-Site	
		Supplier	Ex-Site	
		Sampled By	CTS	
		Sampling Environment	Overcast	
		Sample Type	Bulk	
Location in sample	N/A	Date Received	17/12/2021	
Sample Location	Phase 3-Mound 2	Date Tests Completed	18/01/2022	
TEST REPORT				

Determination of moisture content

Particle size distribution (wet sieving method) - Tested In accordance with BS 1377: Part 2: 1990 Clause 9.2

[illegible]

Laboratory Report	DNR-93242	Contract Sample No	DN2474/209	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 	
Report Date	24/01/2022	Clients Reference	DN2474/209		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay	Tel: (01302) 352652 Web: www.constructiontesting.co.uk		
	Date Sampled	17/12/2021			Email: enquiries@constructiontesting.co.uk
	Sampling Plan	Client Specification	Date Received		
	Source	Ex-Site	Date Tests Completed		18/01/2022
	Supplier	Ex-Site	TEST REPORT		
	Sampled By	CTS			
	Sampling Environment	Overcast			
	Sample Type	Bulk			
Location in sample	N/A				
Sample Location	Phase 3-Mound 2				

Determination of Plastic Limit, Liquid Limit and Plasticity Index - Tested in Accordance with BS 1377: Part2: 1990 The sample was prepared from a natural soil specimen and in accordance with BS1377: Part 1: 2016: Clause 8.3.4(b)		% Passing Sieve taken from Particle Size Distribution test.
Liquid Limit (BS 1377: Part 2: 1990 Clause 4.4 - One Point)	38 %	
Plastic Limit (BS 1377: Part 2: 1990 Clause 5.3)	20 %	
Plasticity Index (BS 1377: Part 2: 1990 Clause 5.4)	18 %	
Material Passing 425 µm test sieve	65 %	
Material Retained on 425 µm test sieve	35 %	

Determination of Moisture Condition Value (MCV) at Natural Moisture Content Prepared and Tested on a Single Sample in Accordance with BS 1377: Part 4: 1990: Clause 5.4		
MCV - interpreted from the steepest straight line of the plot.	8.6	
Moisture Content in Accordance with BS 1377: Part 2: 1990: Clause 3.2	16 %	
Percentage of material retained on 20mm test sieve	8 %	

Determination of Particle Density Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)		Sample prepared in Accordance with BS 1377-1:2016, clause 8.4
Average Particle Density	2.66 Mg/m³	

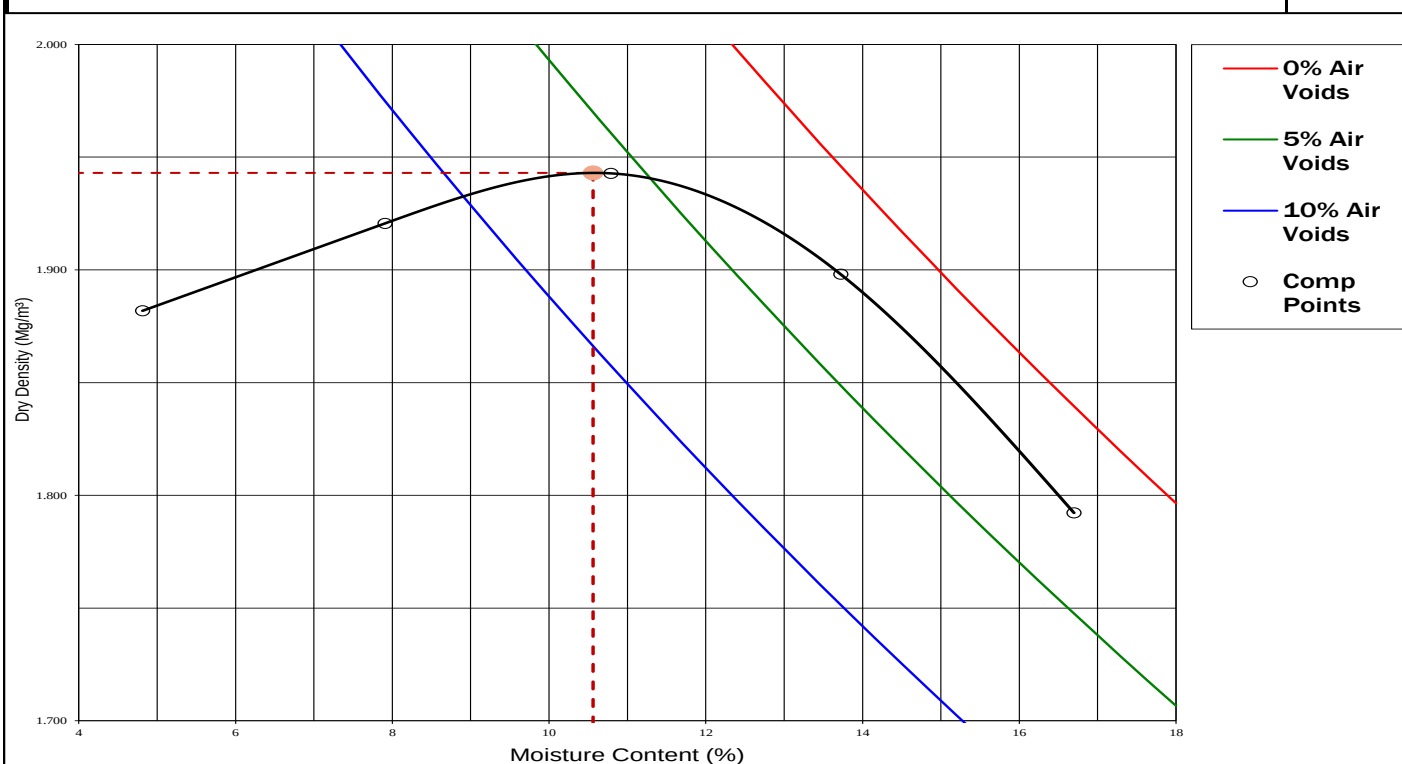
Laboratory Report	DNR-93242	Contract Sample No	DN2474/209	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	24/01/2022	Clients Reference	DN2474/209		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay		
	Date Sampled		17/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site		
	Sampled By		CTS		
	Sampling Environment		Overcast		
	Sample Type		Bulk	Date Received	17/12/2021
	Location in sample		N/A	Date Tests Completed	18/01/2022
	Sample Location		Phase 3-Mound 2	TEST REPORT	

Determination of Dry Density / Moisture Content Relationship

Tested In Accordance with BS 1377: Part 4: 1990 Clause 3.6.4.2 (4.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment: None



Optimum Moisture Content (%)	11 %
Maximum Dry Density	1.94 Mg/m³
Material Retained on 37.5mm test sieve	0 %
Material Retained on 20.0mm test sieve	8 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.66 Mg/m³

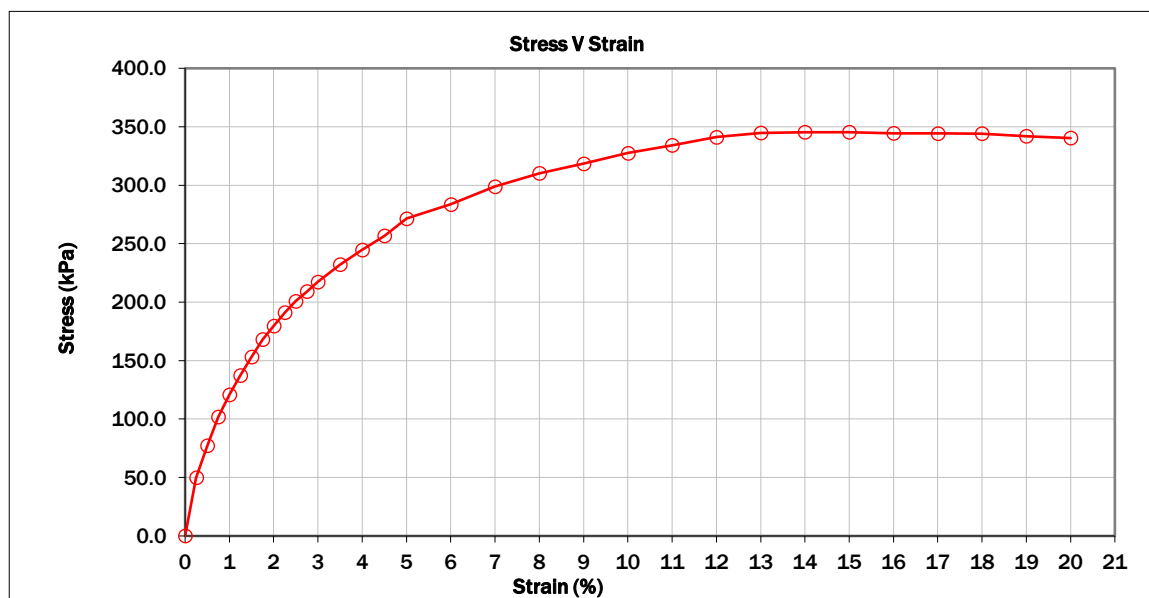
Laboratory Report	DNR-93242	Contract Sample No	DN2474/209	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	24/01/2022	Clients Reference	DN2474/209		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay		
	Date Sampled		17/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site		
	Sampled By		CTS	Date Received 17/12/2021 Date Tests Completed 18/01/2022	
	Sampling Environment		Overcast		
	Sample Type		Bulk	TEST REPORT	
	Location in sample		N/A		
	Sample Location		Phase 3-Mound 2		

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement
Tested in Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99	mm
Initial bulk density	2.14	Mg/m ³
Initial moisture content	15	%
Initial dry density	1.87	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	1.0	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	344	kPa
Strain at failure	15.0	%
Time at Failure	15 Minutes, 0 Seconds	
Mode of failure	Compound	

Laboratory Temperature
18-22 °C



Undrained Shear Strength, c_u
172 kPa

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

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Laboratory Report	DNR-93242-93244	Contract Sample No	DN2747/209-211
Report Date	20 January 2022	Clients Reference	DN2747/209-211
Howard Civil Engineering Unit 11, Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay
		Source	Ex Site
		Supplier	Ex Site
		Date Sampled	17/12/2021
		Date Received	17/12/2021
		Date Completed	18/01/2022
		Sample Location	Phase 3 Mound 2



Construction Testing Solutions

Bootham Lane Industrial Estate
Doncaster | Doncaster | DN7 4JU
T | (01302) 332652
E | enquiries@constructiontesting.co.uk
W | www.constructiontesting.co.uk

BS1377 PH, BS1377 LOI, 2 Stage WAC, ENV1, Asbestos & BRE Suite

Please find enclosed test certificate (L22/0108/CTS-22-23193) supplied by our approved Sub-contract Laboratory, Nicholls Colton

Authorised Signatory



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

Construction Testing Solutions
Bootham Lane Industrial Estate
Dunscroft
Doncaster
DN7 4JU

Analytical Test Report: L22/0108/CTS - 22-23193

Your Project Reference: **21267 Upper Hoyland Road Rockingham**

Your Order Number: 21267 Samples Received / Instructed: 10/01/2022 / 10/01/2022

Report Issue Number: 1 Sample Tested: 10/01 to 18/01/2022

Samples Analysed: 3 soil samples Report issued: 18/01/2022

Signed

James Gane
Data Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report with the exception of the asbestos test portion which is held for 6 months unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

Asbestos

Please note: Where further analysis is required samples identified as containing asbestos are screened and tested on an as received basis. No correction is made for moisture content and these results are not covered by our accreditation

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

WAC Testing

Samples were leached in accordance with BS EN 12457-3: 2002.

Eluate Results are reported as the cumulative release at L/S 10 from eluates of L/S 2 and L/S 8. These results have been calculated in accordance with BS EN 12457-3:2002.

Comparative values are taken from the Council Decision Annex - CRITERIA AND PROCEDURES FOR THE ACCEPTANCE OF WASTE AT LANDFILLS, (2003/33/EC).

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue 10/12/2020

Owned by Emily Blissett - Customer Services Supervisor

Authorised by James Gane - Commercial Manager

J:\Public\Projects\2022\L22\CTS - Construction Testing Solutions\L22-0108-CTS\L22-0108-CTS 22-23193.xml Cover Sheet



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Analytical Test Results - Soil

NC Reference			209963	209964	209965
Client Sample ID			DN2474/209	DN2474/210	DN2474/211
Client Sample Location			Phase 3 Mound 2	Phase 3 Mound 2	Phase 3 Mound 2
Client Sample Type			-	-	-
Client Sample Number			-	-	-
Depth - Top (m)			-	-	-
Depth - Bottom (m)			-	-	-
Date of Sampling			17/12/2021	17/12/2021	17/12/2021
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	Units	Accreditation			
Arsenic	(mg/kg)	MCERTS	< 10	< 10	< 10
Boron (w/s)	(mg/kg)	u	< 2.5	< 2.5	< 2.5
Cadmium	(mg/kg)	MCERTS	0.5	0.6	0.5
Chromium (Total)	(mg/kg)	UKAS	15	16	15
Copper	(mg/kg)	MCERTS	31	34	40
Lead	(mg/kg)	MCERTS	28	21	20
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	< 2.5
Nickel	(mg/kg)	MCERTS	30	30	30
Selenium	(mg/kg)	u	< 8.0	< 8.0	< 8.0
Zinc	(mg/kg)	MCERTS	81	90	88
Total Phenols	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0
Cyanide (Total)	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0
Cyanide (Free)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
Chromium (Hexavalent)	(mg/kg)	u	< 1.0	< 1.0	< 1.0
Acid Soluble Sulphate	(%)	u	0.10	0.10	0.07
pH	pH Units	MCERTS	7.6	7.7	7.8
Sulphate (Water soluble)	(mg/l)	u	330	350	240
Sulphide	(mg/kg)	u	< 15	< 15	< 15
Thiocyanate	(mg/kg)	u	< 5.0	< 5.0	< 5.0
Acenaphthene	(mg/kg)	MCERTS	0.02	0.11	0.05
Acenaphthylene	(mg/kg)	UKAS	< 0.02	< 0.02	< 0.02
Anthracene	(mg/kg)	UKAS	< 0.02	0.08	0.05
Benzo (a) anthracene	(mg/kg)	MCERTS	0.04	0.16	0.11
Benzo (a) pyrene	(mg/kg)	MCERTS	0.04	0.14	0.09
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.05	0.17	0.11
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.04	0.09	0.07
Benzo (k) fluoranthene	(mg/kg)	MCERTS	< 0.02	0.05	0.03
Chrysene	(mg/kg)	MCERTS	0.06	0.17	0.12
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02
Fluoranthene	(mg/kg)	MCERTS	0.07	0.41	0.23
Fluorene	(mg/kg)	MCERTS	< 0.02	0.07	0.05
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.02	0.08	0.05
Naphthalene	(mg/kg)	MCERTS	0.12	0.27	0.14
Phenanthrene	(mg/kg)	MCERTS	0.15	0.48	0.28
Pyrene	(mg/kg)	MCERTS	0.07	0.36	0.22
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	0.79	2.7	1.6
Gasoline Range Organics (>C ₈ to C ₁₀) [EH_1D_Total]	(mg/kg)	UKAS	< 5.0	< 5.0	6.1
Diesel Range Organics (>C ₁₀ to C ₂₁) [EH_1D_Total]	(mg/kg)	MCERTS	21	16	25
Mineral Range Organics (>C ₂₁ to C ₄₀) [EH_1D_Total]	(mg/kg)	MCERTS	55	64	67
Total TPH (>C ₈ to C ₄₀) [EH_1D_Total]	(mg/kg)	MCERTS	81	84	99
SOM (via TOC)	(%)	UKAS	2.4	2.2	2.8



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Analytical Test Results - Soil

NC Reference		209963	209964	209965
Client Sample ID		DN2474/209	DN2474/210	DN2474/211
Client Sample Location		Phase 3 Mound 2	Phase 3 Mound 2	Phase 3 Mound 2
Client Sample Type		-	-	-
Client Sample Number		-	-	-
Depth - Top (m)		-	-	-
Depth - Bottom (m)		-	-	-
Date of Sampling		17/12/2021	17/12/2021	17/12/2021
Time of Sampling		-	-	-
Sample Matrix		Clay	Clay	Clay
Determinant	Units	Accreditation		
Asbestos	-	UKAS	No asbestos detected	No asbestos detected

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Analytical Test Results - Chemical Analysis

NC Reference			209963	209964	209965
Client Sample ID			DN2474/209	DN2474/210	DN2474/211
Client Sample Location			Phase 3 Mound 2	Phase 3 Mound 2	Phase 3 Mound 2
Client Sample Type			-	-	-
Client Sample Number			-	-	-
Depth - Top (m)			-	-	-
Depth - Bottom (m)			-	-	-
Date of Sampling			17/12/2021	17/12/2021	17/12/2021
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	Units	Accreditation			
Water soluble sulphate	(mg/l)	u	330	350	240
Acid Soluble Sulphate	(%)	u	0.10	0.10	0.07
Total Sulphur	(%)	UKAS	0.14	0.08	0.06
pH Value	pH Units	MCERTS	7.6	7.7	7.8
pH Value (BS 1377)	(pH Units)	UKAS	7.6	7.7	7.3
Loss on Ignition (BS 1377)	(%)	UKAS	5.0	4.6	4.7

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	209963
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Client Sample ID	DN2474/209
Client Sample Location	Phase 3 Mound 2
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	17/12/2021
Time of Sampling	-
Sample Description	Grey slightly gravelly silty clay
Sample Matrix	Clay
Moisture Content (%)	15
Stone content (%)	3.7

	Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
--	-------------------	----------------------	---	--------------------------

Solid Analysis

Total Organic Carbon	%	MCERTS	1.4	3.0	5.0	6.0
Loss on Ignition	%	UKAS	5.0	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) (EH_1D_Total)	mg/kg	u	76	500	-	-
PAH	mg/kg	u	0.8	100	-	-
pH	units	MCERTS	7.6	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	15	800	15000	25000
Fluoride	mg/kg	u	3	10	150	500
Sulphate (as SO ₄)	mg/kg	u	250	1000	20000	50000
Total Dissolved Solids	mg/kg	u	480	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	21.0	500	800	1000

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	209964
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Client Sample ID	DN2474/210
Client Sample Location	Phase 3 Mound 2
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	17/12/2021
Time of Sampling	-
Sample Description	Grey slightly gravelly silty clay
Sample Matrix	Clay
Moisture Content (%)	16
Stone content (%)	8.7

	Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
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Solid Analysis

Total Organic Carbon	%	MCERTS	1.3	3.0	5.0	6.0
Loss on Ignition	%	UKAS	4.6	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) (EH_1D_Total)	mg/kg	u	80	500	-	-
PAH	mg/kg	u	< 0.34	100	-	-
pH	units	MCERTS	7.7	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	19	800	15000	25000
Fluoride	mg/kg	u	3	10	150	500
Sulphate (as SO ₄)	mg/kg	u	290	1000	20000	50000
Total Dissolved Solids	mg/kg	u	490	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	22.0	500	800	1000

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	209965
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Client Sample ID	DN2474/211
Client Sample Location	Phase 3 Mound 2
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	17/12/2021
Time of Sampling	-
Sample Description	Grey slightly gravelly silty clay with rare rootlets
Sample Matrix	Clay
Moisture Content (%)	15
Stone content (%)	21

	Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
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Solid Analysis

Total Organic Carbon	%	MCERTS	1.6	3.0	5.0	6.0
Loss on Ignition	%	UKAS	4.7	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) (EH_1D_Total)	mg/kg	u	93	500	-	-
PAH	mg/kg	u	< 0.34	100	-	-
pH	units	MCERTS	7.8	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	< 0.01	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	25	800	15000	25000
Fluoride	mg/kg	u	3	10	150	500
Sulphate (as SO ₄)	mg/kg	u	270	1000	20000	50000
Total Dissolved Solids	mg/kg	u	510	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
209963	DN2474/209	Phase 3 Mound 2	-	-	Grey slightly gravelly silty clay	15	3.7	29
209964	DN2474/210	Phase 3 Mound 2	-	-	Grey slightly gravelly silty clay	16	8.7	41
209965	DN2474/211	Phase 3 Mound 2	-	-	Grey slightly gravelly silty clay with rare rootlets	15	21	42

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Sample Comments

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
209963	DN2474/209	Phase 3 Mound 2	-	-	VOC/BTEX - Sample taken from container with headspace.
209964	DN2474/210	Phase 3 Mound 2	-	-	VOC/BTEX - Sample taken from container with headspace.
209965	DN2474/211	Phase 3 Mound 2	-	-	VOC/BTEX - Sample taken from container with headspace.

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
TOCL	MS - CL - DOC	As received	BSEN:12457 Leaching	Determination of Dissolved Organic Carbon in leachates
ANIONSL	MS - CL - Anions by Aquakem	As received	-	Determination of Anions (inc Sulphate, chloride etc.) in leachate samples by Aquakem
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
BTEXS	MS - CL - VOC and MBTEX	As received	Passing 10mm test sieve	Determination of BTEX in soils via Headspace-GC-MS
PCB7S	MS - CL - PCB Soils	As received	Passing 10mm test sieve	Determination of PCB's (7 congeners) in soils via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
WACTOCS	MS - CL - TOC Eltra (WAC)	Air dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soil as part of a WAC test
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
TPHS	MS - CL - TPH (GC-FID)	As received	Passing 10mm test sieve	Determination of Total Petroleum Hydrocarbons in soil using GC-FID
WACSKALAR	MS - CL - Phenols by Skalar (WAC)	As received	BSEN:12457 Leaching	Determination of Total Phenols within leachate as part of a WAC test using a Skalar Segmented flow analyser
WSBORONS	MS-CL- WS Boron	Air dried	Passing 10mm test sieve	Determination of Water soluble Boron in soils via ICP
SKALARCNS	MS - CL - Cyanide by Skalar	As received	Passing 10mm test sieve	Determination of cyanide (total / free / complex) in soil using a Skalar segmented flow analyser
WACDOC	MS - CL - DOC (WAC)	As received	BSEN:12457 Leaching	Determination of dissolved organic carbon in a leachate as part of a WAC test
SKALARHCS	MS - CL - Hexavalent Chromium by Skalar	As received	Passing 10mm test sieve	Determination of hexavalent chromium in soil using Skalar segmented flow analyser
WACMETALS	MS - CL - ICP -Metals in Waters (WAC)	As received	BSEN:12457 Leaching	Determination of metals in a leachate as part of a WAC test via ICP
ICPMETL	MS - CL - ICP -Metals in Waters	As received	BSEN:12457 Leaching	Determination of metals in leachates via ICP
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
WACPHS	MS - CL - pH in Soils (WAC)	As received	BSEN:12457 Leaching	Determination of pH in soils as part of a WAC test via pH probe
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
WACANIONS	MS - CL - Anions by Aquakem (WAC)	As received	BSEN:12457 Leaching	Determination of sulphate, chloride and fluoride in a leachate as part of a WAC test using a Aquakem analyser
SULPHIDES	MS - CL - Sulphide in Soils	As received	Passing 10mm test sieve	Determination of sulphide in soil via titration
TDSL	MS - CL - TDS (Leachate)	As received	BSEN:12457 Leaching	Determination of total dissolved solids in leachates
SKALARPHL	MS - CL - Phenols by Skalar	As received	BSEN:12457 Leaching	Determination of total phenols in leachates using Skalar segmented flow analyser
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
ASB	MS - AS - Asbestos	-	-	Fibre identification is in accordance with in house documented methods which are based on the procedure documented in the HSE Document HSG 248 "Asbestos: The analysts guide for sampling, analysis and clearance procedures"

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Project Reference - 21267 Upper Hoyland Road Rockingham

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
ENLEACHP2	BS EN 12457-3	As Received	-	Leaching in accordance with BSEN 12457-3
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377LOI	BS1377 Lol	Oven dried	Passing 2mm test sieve	Testing was in accordance with BS 1377: Part 3: 2018 + A1 :2021 Clause 6. Determination of the mass loss on ignition. Some information required by BS1377: 2016: Part 1 has not been reported. This information is available on request.
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)
1377PH	BS1377 pH	Oven dried	Passing 2mm test sieve	pH testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 12

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Date of sampling to receipt insufficient to allow analysis to be completed without deviation, Please note this is only a deviation if 'X' is also recorded against the sample

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
209963	DN2474/209	Phase 3 Mound 2	-	-	BS1377 LoI	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - Anions by Aquakem (2:1Extract)	R
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - Cyanide by Skalar	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - Hexavalent Chromium by Skalar	R
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - ICP Metals	R
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - PAH (As Received)	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - PCB Soils	R
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - Phenols by Skalar	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - TOC Eltra	R
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - TOC Eltra (WAC)	R
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - TPH (GC-FID)	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - VOC and MBTEX	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - pH in Soils	RX
209963	DN2474/209	Phase 3 Mound 2	-	-	MS - CL - pH in Soils (WAC)	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	BS1377 LoI	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - Anions by Aquakem (2:1Extract)	R
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - Cyanide by Skalar	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - Hexavalent Chromium by Skalar	R
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - ICP Metals	R
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - PAH (As Received)	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - PCB Soils	R
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - Phenols by Skalar	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - TOC Eltra	R
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - TOC Eltra (WAC)	R
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - TPH (GC-FID)	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - VOC and MBTEX	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - pH in Soils	RX
209964	DN2474/210	Phase 3 Mound 2	-	-	MS - CL - pH in Soils (WAC)	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	BS1377 LoI	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - Anions by Aquakem (2:1Extract)	R
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - Cyanide by Skalar	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - Hexavalent Chromium by Skalar	R
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - ICP Metals	R
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - PAH (As Received)	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - PCB Soils	R
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - Phenols by Skalar	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - TOC Eltra	R
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - TOC Eltra (WAC)	R

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

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Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - TPH (GC-FID)	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - VOC and MBTEX	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - pH in Soils	RX
209965	DN2474/211	Phase 3 Mound 2	-	-	MS - CL - pH in Soils (WAC)	RX

L22/0108/CTS - 22-23193

Project Reference - 21267 Upper Hoyland Road Rockingham

HWOL TPH Acronym Index

Acronym	Description
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics and Aromatics
AL	Aliphatics Only
AR	Aromatics Only
2D	GC-GC - Double Coil Gas Chromatography
#1	EH_Total but with humics mathmatically subtracted
#2	EH_Total but with fatty acids mathmatically subtracted
_	Operator - underscore to separate acronyms (except for +)
+	Operator to indicate cumlative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

Laboratory Report	DNR-93243	Contract Sample No	DN2474/210	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 
Report Date	24/01/2022	Clients Reference	DN2474/210	
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay	
		Date Sampled	17/12/2021	
		Sampling Plan	Client Specification	
		Source	Ex-Site	
		Supplier	Ex-Site	
		Sampled By	CTS	
		Sampling Environment	Overcast	
		Sample Type	Bulk	
Location in sample	N/A	Date Received	17/12/2021	
Sample Location	Phase 3-Mound 2	Date Tests Completed	18/01/2022	
TEST REPORT				

Determination of moisture content Prepared and tested in Accordance with BS 1377: Part 2: 1990 Clause 3.2 - Oven drying Moisture Content 15 %		
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Laboratory Report	DNR-93243	Contract Sample No	DN2474/210	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 	
Report Date	24/01/2022	Clients Reference	DN2474/210		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay	Tel: (01302) 352652 Web: www.constructiontesting.co.uk		
	Date Sampled	17/12/2021			Email: enquiries@constructiontesting.co.uk
	Sampling Plan	Client Specification	Date Received		
	Source	Ex-Site	Date Tests Completed		18/01/2022
	Supplier	Ex-Site	TEST REPORT		
	Sampled By	CTS			
	Sampling Environment	Overcast			
	Sample Type	Bulk			
Location in sample	N/A				
Sample Location	Phase 3-Mound 2				

Determination of Plastic Limit, Liquid Limit and Plasticity Index - Tested in Accordance with BS 1377: Part2: 1990 The sample was prepared from a natural soil specimen and in accordance with BS1377: Part 1: 2016: Clause 8.3.4(b)		% Passing Sieve taken from Particle Size Distribution test.
Liquid Limit (BS 1377: Part 2: 1990 Clause 4.4 - One Point)	40 %	
Plastic Limit (BS 1377: Part 2: 1990 Clause 5.3)	18 %	
Plasticity Index (BS 1377: Part 2: 1990 Clause 5.4)	22 %	
Material Passing 425 µm test sieve	51 %	
Material Retained on 425 µm test sieve	49 %	

Determination of Moisture Condition Value (MCV) at Natural Moisture Content Prepared and Tested on a Single Sample in Accordance with BS 1377: Part 4: 1990: Clause 5.4		
MCV - interpreted from the steepest straight line of the plot.	7.9	
Moisture Content in Accordance with BS 1377: Part 2: 1990: Clause 3.2	18 %	
Percentage of material retained on 20mm test sieve	26 %	

Determination of Particle Density Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)		Sample prepared in Accordance with BS 1377-1:2016, clause 8.4
Average Particle Density	2.67 Mg/m³	

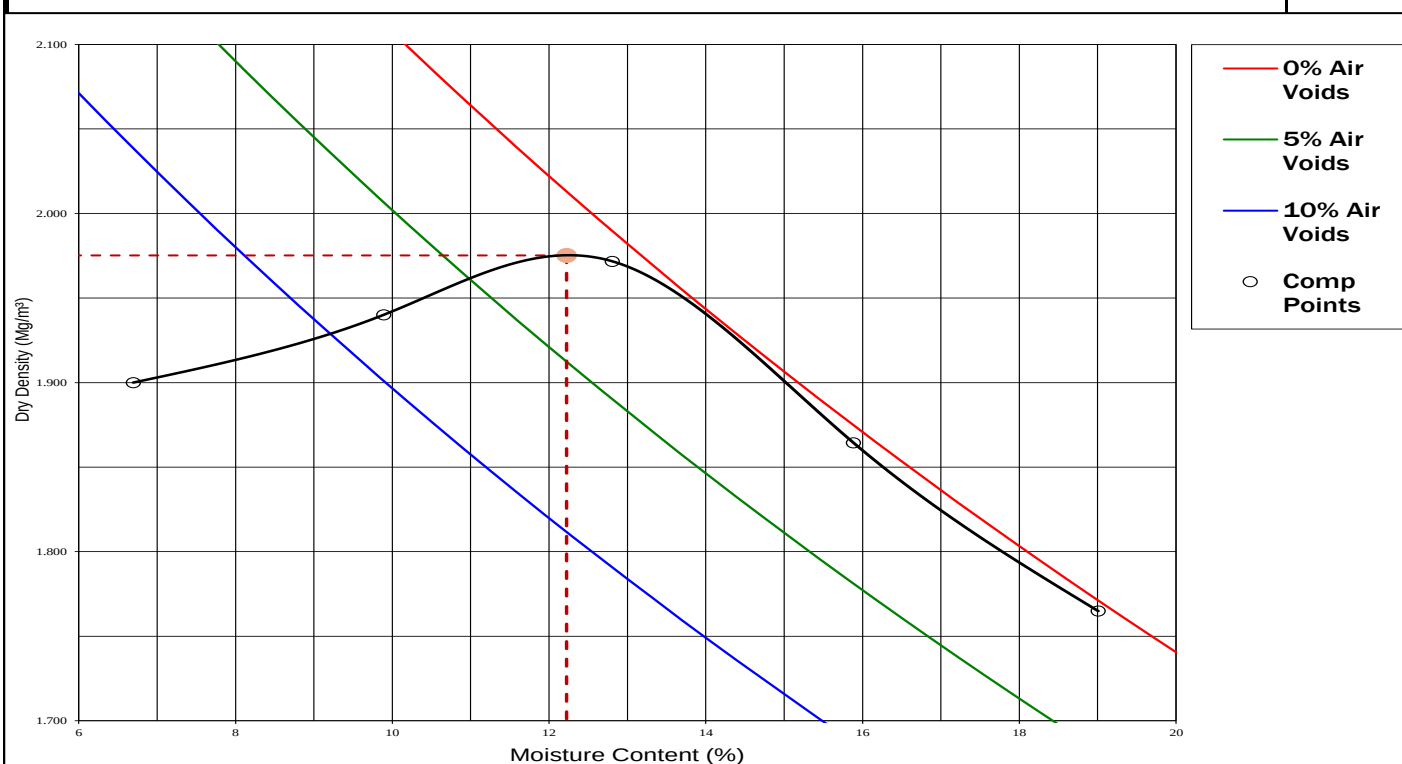
Laboratory Report	DNR-93243	Contract Sample No	DN2474/210	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 
Report Date	24/01/2022	Clients Reference	DN2474/210	
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay	
		Date Sampled	17/12/2021	
		Sampling Plan	Client Specification	
		Source	Ex-Site	
		Supplier	Ex-Site	
		Sampled By	CTS	
		Sampling Environment	Overcast	
		Sample Type	Bulk	
Location in sample	N/A	Date Received	17/12/2021	
Sample Location	Phase 3-Mound 2	Date Tests Completed	18/01/2022	
TEST REPORT				

Determination of Dry Density / Moisture Content Relationship

Tested In Accordance with BS 1377: Part 4: 1990 Clause 3.6.4.2 (4.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment: +37.5mm particles removed



Optimum Moisture Content (%)	12 %
Maximum Dry Density	1.98 Mg/m³
Material Retained on 37.5mm test sieve	12 %
Material Retained on 20.0mm test sieve	26 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.67 Mg/m³

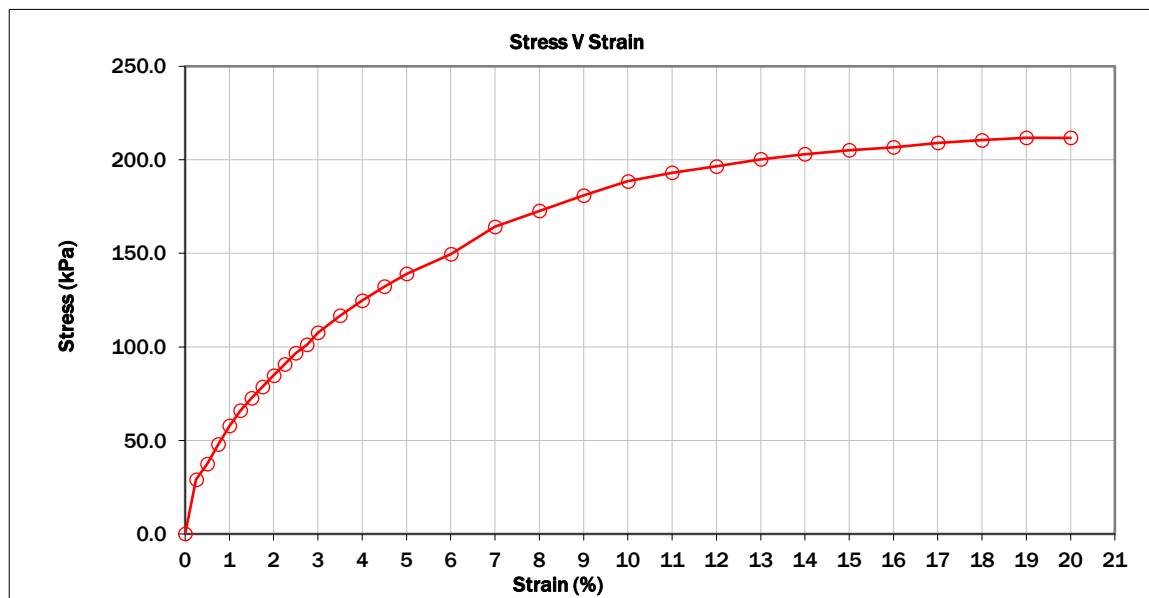
Laboratory Report	DNR-93243	Contract Sample No	DN2474/210	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	24/01/2022	Clients Reference	DN2474/210		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay		
	Date Sampled		17/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site		
	Sampled By		CTS	Date Received 17/12/2021 Date Tests Completed 18/01/2022	
	Sampling Environment		Overcast		
	Sample Type		Bulk	TEST REPORT	
	Location in sample		N/A		
	Sample Location		Phase 3-Mound 2		

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement
Tested in Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	2.17	Mg/m ³
Initial moisture content	9.9	%
Initial dry density	1.98	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	1.2	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	211	kPa
Strain at failure	19.0	%
Time at Failure	19 Minutes, 0 Seconds	
Mode of failure	Plastic	

Laboratory Temperature
18-22 °C



Undrained Shear Strength, c_u
105 kPa

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.

Template Version: 1.6

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Authorised Signatory

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**** END OF REPORT ****

Construction Testing Solutions is a trading division of Construction Testing Solutions Ltd - Company No. 05998333

Laboratory Report	DNR-93244	Contract Sample No	DN2474/211	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 	
Report Date	24/01/2022	Clients Reference	DN2474/211		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay		
		Date Sampled	17/12/2021		
		Sampling Plan	Client Specification		
		Source	Ex-Site		
		Supplier	Ex-Site		
		Sampled By	CTS		
		Sampling Environment	Overcast		
		Sample Type	Bulk		
	Location in sample	N/A	Date Received	17/12/2021	
	Sample Location	Phase 3-Mound 2	Date Tests Completed	18/01/2022	
				TEST REPORT	

Determination of moisture content

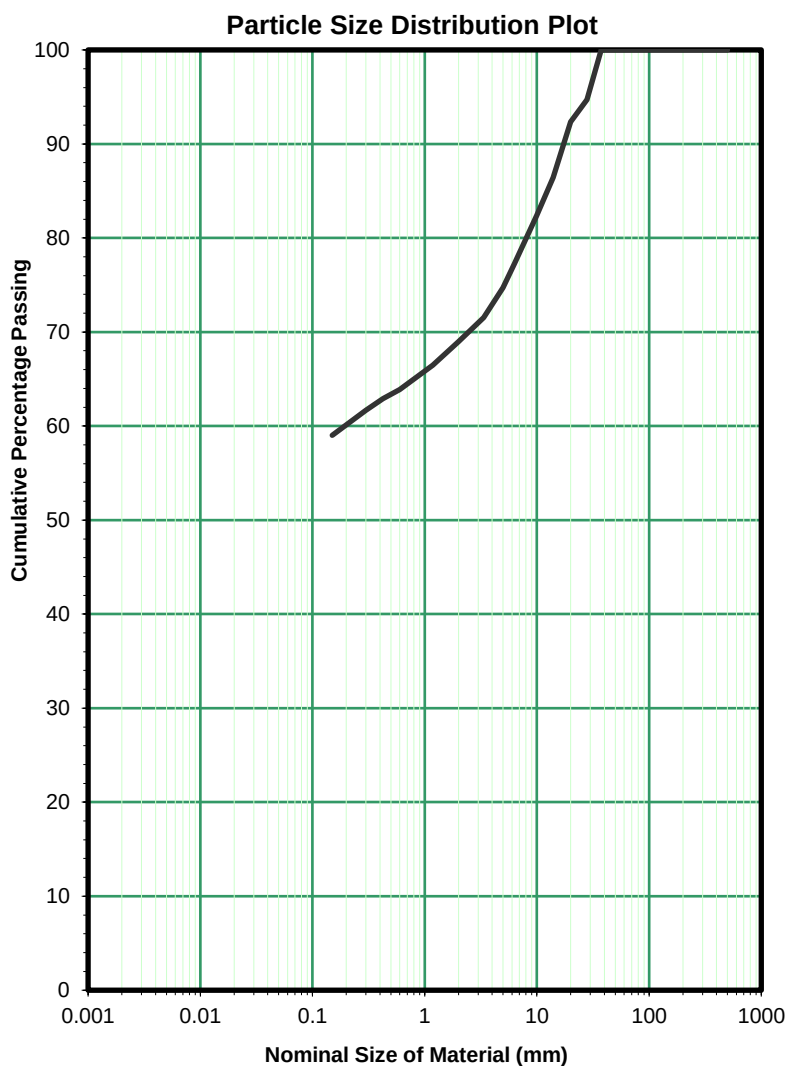
Prepared and tested in Accordance with BS 1377: Part 2: 1990 Clause 3.2 - Oven drying

Moisture Content

16 %

Particle size distribution (wet sieving method) - Tested In accordance with BS 1377: Part 2: 1990 Clause 9.2

Sample prepared in Accordance with BS 1377: Part 1: 2016 clause 8.3.4(a)

[illegible]

Specification
MCHW SHW Vol 1 Series 600 Table 6/2 Class 2C
100
15 - 80
15 - 80

Laboratory Report	DNR-93244	Contract Sample No	DN2474/211	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 
Report Date	24/01/2022	Clients Reference	DN2474/211	
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description	Gravelly Clay		
	Date Sampled	17/12/2021		
	Sampling Plan	Client Specification		
	Source	Ex-Site		
	Supplier	Ex-Site		
	Sampled By	CTS		
	Sampling Environment	Overcast		
	Sample Type	Bulk		
Location in sample	N/A	Date Received	17/12/2021	
Sample Location	Phase 3-Mound 2	Date Tests Completed	18/01/2022	
TEST REPORT				
Determination of Plastic Limit, Liquid Limit and Plasticity Index - Tested in Accordance with BS 1377: Part2: 1990 The sample was prepared from a natural soil specimen and in accordance with BS1377: Part 1: 2016: Clause 8.3.4(b)				% Passing Sieve taken from Particle Size Distribution test.
Liquid Limit (BS 1377: Part 2: 1990 Clause 4.4 - One Point)			39 %	
Plastic Limit (BS 1377: Part 2: 1990 Clause 5.3)			20 %	
Plasticity Index (BS 1377: Part 2: 1990 Clause 5.4)			19 %	
Material Passing 425 µm test sieve			63 %	
Material Retained on 425 µm test sieve			37 %	
Determination of Moisture Condition Value (MCV) at Natural Moisture Content Prepared and Tested on a Single Sample in Accordance with BS 1377: Part 4: 1990: Clause 5.4				
MCV - interpreted from the steepest straight line of the plot.			8.0	
Moisture Content in Accordance with BS 1377: Part 2: 1990: Clause 3.2			18 %	
Percentage of material retained on 20mm test sieve			8 %	
Determination of Particle Density Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)				Sample prepared in Accordance with BS 1377-1:2016, clause 8.4
Average Particle Density			2.68 Mg/m³	

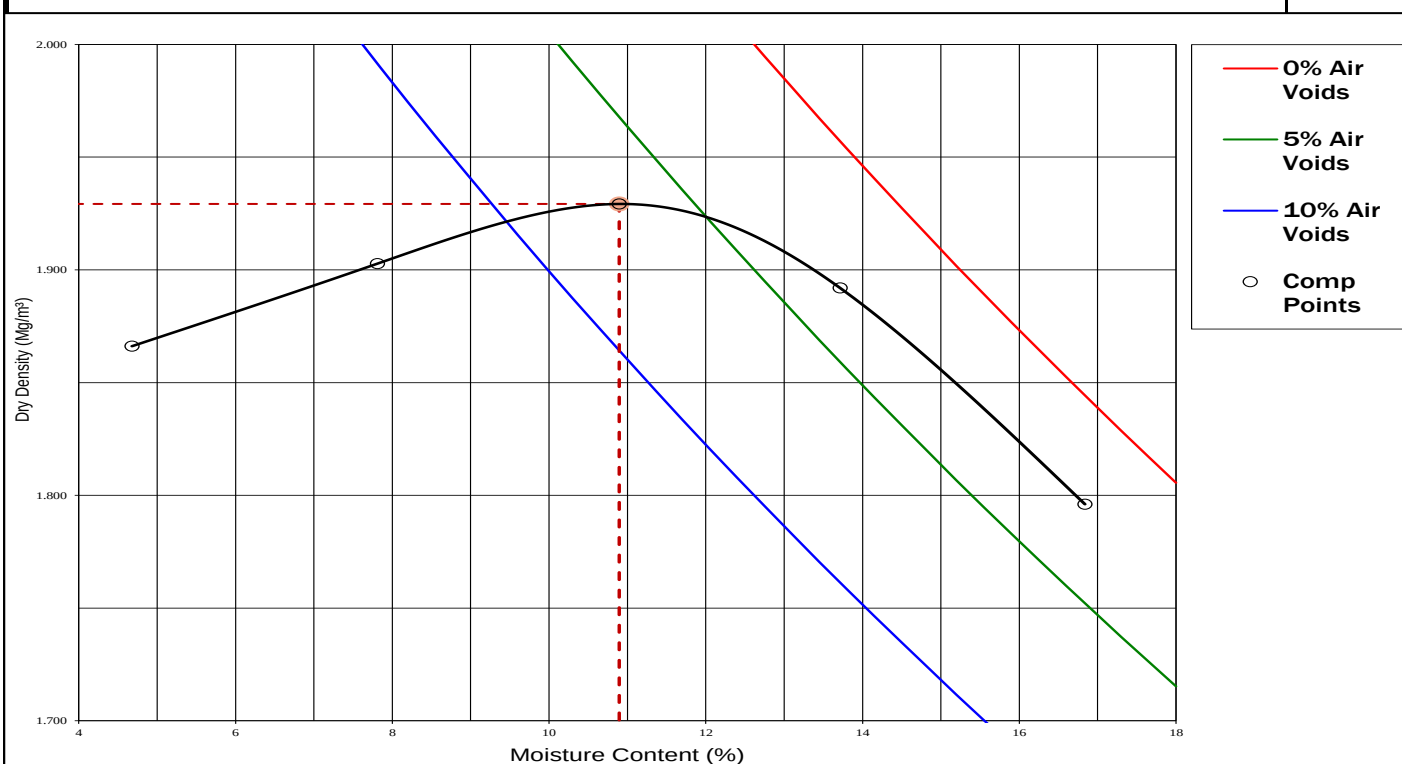
Laboratory Report	DNR-93244	Contract Sample No	DN2474/211	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 
Report Date	24/01/2022	Clients Reference	DN2474/211	
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Gravelly Clay	
		Date Sampled	17/12/2021	
		Sampling Plan	Client Specification	
		Source	Ex-Site	
		Supplier	Ex-Site	
		Sampled By	CTS	
		Sampling Environment	Overcast	
		Sample Type	Bulk	
Location in sample	N/A	Date Tests Completed	18/01/2022	
Sample Location	Phase 3-Mound 2	TEST REPORT		

Determination of Dry Density / Moisture Content Relationship

Tested In Accordance with BS 1377: Part 4: 1990 Clause 3.6.4.2 (4.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment: None



Optimum Moisture Content (%)	11 %
Maximum Dry Density	1.93 Mg/m³
Material Retained on 37.5mm test sieve	0 %
Material Retained on 20.0mm test sieve	8 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.68 Mg/m³

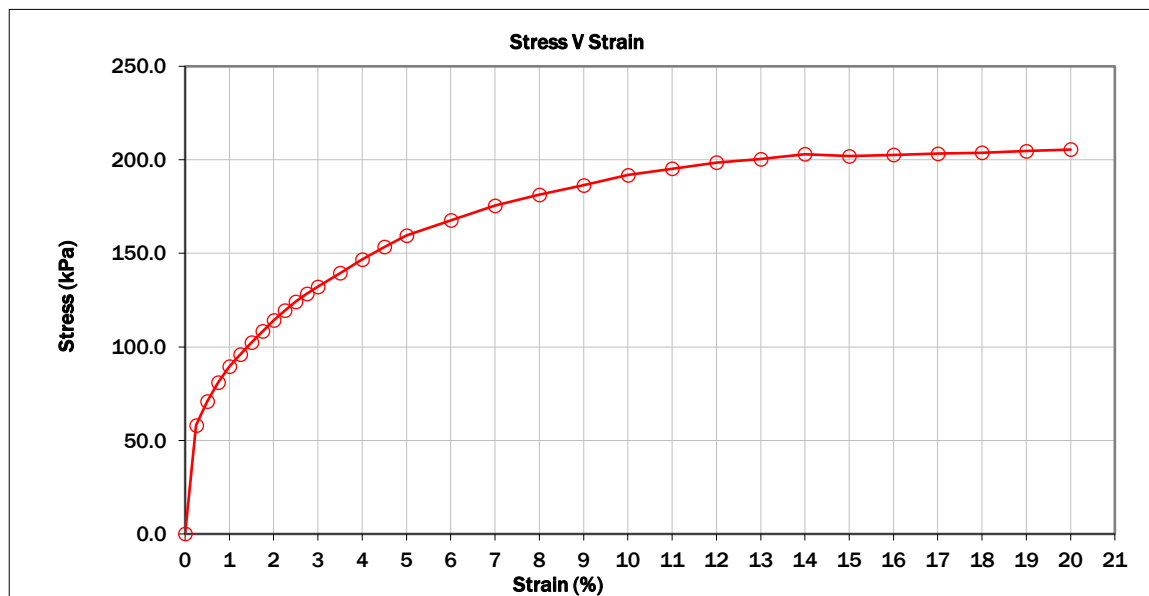
Laboratory Report	DNR-93244	Contract Sample No	DN2474/211	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	24/01/2022	Clients Reference	DN2474/211		
Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham	Material Description		Gravelly Clay		
	Date Sampled		17/12/2021		
	Sampling Plan		Client Specification		
	Source		Ex-Site		
	Supplier		Ex-Site		
	Sampled By		CTS	Date Received 17/12/2021 Date Tests Completed 18/01/2022	
	Sampling Environment		Overcast		
	Sample Type		Bulk	TEST REPORT	
	Location in sample		N/A		
	Sample Location		Phase 3-Mound 2		

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement
Tested in Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	2.16	Mg/m ³
Initial moisture content	16	%
Initial dry density	1.86	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	1.3	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	204	kPa
Strain at failure	20.0	%
Time at Failure	20 Minutes, 0 Seconds	
Mode of failure	Plastic	

Laboratory Temperature
18-22 °C



Undrained Shear Strength, c_u
102 kPa

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.

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 Results relate only to the sample(s) as received.

Authorised Signatory

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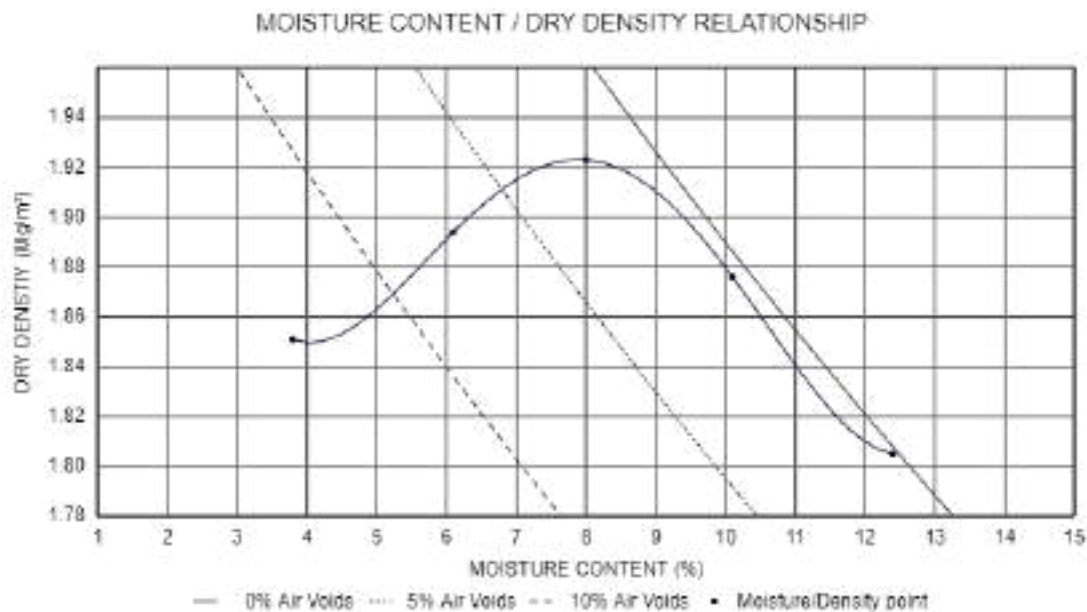
**** END OF REPORT ****

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TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:1990 clause 3.5 4.5kg Rammer method		
REPORT NUMBER:	C1054158 / 170797.4.1.1		
SAMPLE NUMBER:	265326	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/213	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	25/02/2022	LOCATION:	Surcharge
TESTED BY:	JS, CL	PREPARATION METHOD:	1 Ltr Mould (BS1377:Pt1:1990 Cl7.6.2) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Provided

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.92 Mg/m³
OPTIMUM MOISTURE CONTENT: 7.9 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 12 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 4 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.33 Mg/m³
 (measured in accordance with BS 1377: 1990:part 2)



Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
 This report shall not be reproduced except in full without approval of the Laboratory.

For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



Approved Signatory
 Report date 07-Mar-22



4161

Report Format: L/Rep S11-S14a/Rev 9

Bootham Lane Industrial Estate,
 Dunscoft,
 Doncaster,
 South Yorkshire DN7 4JU

0343 227 8545
 enquiries@constructiontesting.co.uk
www.constructiontesting.co.uk
 END OF REPORT

Construction Testing Solutions Ltd.
 Registered in England No. 05998333

Report version 1

Page 1 of 1

Howard Civil Engineering Ltd Unit 11 Acorn Business Park Killingbeck Drive Leeds LS14 6UF Site : DN2474 - Upper Hoyland Road, Rockingham	Chemistry Report Reference : A8725 Report Date : 28/02/2022 Date Received : 16/02/2022 Test Date : 24/02/2022 Laboratory Report No : DNR/96002-96007 Tests Carried out at: Doncaster Laboratory	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU T (01302) 352652 E enquiries@constructiontesting.co.uk W www.constructiontesting.co.uk 	
	The test results included in this certificate relate only to the samples as tested. Every care should be taken to ensure samples are representative of the material to ensure test results are meaningful. Testing was performed in a temperature controlled laboratory at 20±5°C		

CERTIFICATE OF ANALYSIS

No. of Samples:	6	Sampling Plan Used:	Not Known	Samples prepared to methods stated in relevant test standards.
No. of Determinands	7	Sampling Environment:	Not Known	* - test not included in the UKAS schedule for this laboratory

Sample Reference	A8725-1	A8725-2	A8725-3	A8725-4	A8725-5	A8725-6				
Sample Type	Soil	Soil	Soil	Soil	Soil	Soil				
CTS Reference	DN2474/213	DN2474/214	DN2474/215	DN2474/216	DN2474/217	DN2474/218				
Lab Reference	DNR/96002	DNR/96003	DNR/96004	DNR/96005	DNR/96006	DNR/96007				
Sampling Location	Surcharge	Surcharge	Surcharge	Surcharge	Surcharge	Surcharge				
Material Description	Brown Clay/Soil	Brown Clay/Soil	Brown Clay/Soil	Brown Clay/Soil	Brown Clay/Soil	Brown Clay/Soil				
Date Sampled	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022				
Test	Units									
1. pH	pH Units	7.5	7.5	7.3	7.4	7.7	7.6			
2. Loss on Ignition	%	12	14	16	17	21	14			
3. Passing 2mm Sieve	%	56	64	78	75	91	88			
4. Water Soluble Sulphate	mg/l SO4	720	840	1490	850	900	1140			
5. Acid Soluble Sulphate	% SO4	0.16	0.18	0.28	0.17	0.18	0.24			
6. Total Sulphur	%	0.89	1.22	1.07	11.78**	1.21	1.28			
7. Total Potential Sulphate	% SO4	2.7	3.7	3.2	35.4**	3.6	3.8			
		-	-	-	-	-	-			
		-	-	-	-	-	-			
		-	-	-	-	-	-			
		-	-	-	-	-	-			
		-	-	-	-	-	-			

Test Methods : 1. pH - BS 1377 : Part 3 : 2018 + A1 2021, clause 12 2. Loss on Ignition - BS 1377 : Part 3 : 2018 + A1 2021, clause 6 3. Passing 2mm Sieve - BS 1377 : Part 3 : 2018 + A1 2021 4. Water Soluble Sulphate - BS 1377 : Part 3 : 2018 + A1 2021, clause 7.5 (ICP-OES) 5. Acid Soluble Sulphate - BS 1377 : Part 3 : 2018 + A1 2021, clause 7.5 (ICP-OES) 6. Total Sulphur - BS 1377 : Part 3 : 2018 + A1 2021, clause 7.10 by Eltra CS800 Sulphur Analyser	7. Total Potential Sulphate - BS 1377 : Part 3 : 2018 + A1 2021, clause 7.10
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Comments : ** Results above the allowable range of our UKAS accredited procedure.	Signature :
---	--------------------

Laboratory Report	DNR-96002-96007	Contract Sample No	DN2747/213-218	 Construction Testing Solutions Bootham Lane Industrial Estate Doncaster Doncaster DN7 4JU T (01302) 312652 E enquiries@constructiontesting.co.uk W www.constructiontesting.co.uk
Report Date	03 March 2022	Clients Reference	DN2747/213-218	
Howard Civil Engineering Unit 11, Acorn Business Park Killingbeck Drive Leeds LS14 6UF Upper Hoyland Road, Rockingham		Material Description	Brown Clay Soil	
		Source	Ex Site	
		Supplier	Ex Site	
		Date Sampled	02/02/2022	
		Date Received	02/02/2022	
		Date Completed	03/03/2022	
		Sample Location	Surcharge Won	

2 Stage WAC & ENV1

Please find enclosed test certificate (L22/00978/CTS-22-24332) supplied by our approved Sub-contract Laboratory, Nicholls Colton

Authorised Signatory



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

Construction Testing Solutions
Bootham Lane Industrial Estate
Dunscroft
Doncaster
DN7 4JU

Analytical Test Report: L22/00978/CTS - 22-24332

Your Project Reference: **21767 Upper Hoyland Road Rockingham**

Your Order Number: 21767 Samples Received / Instructed: 18/02/2022 / 18/02/2022

Report Issue Number: 1 Sample Tested: 18/02 to 03/03/2022

Samples Analysed: 6 soil samples Report issued: 03/03/2022

Signed

James Gane
Data Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Stone Content was determined in accordance with NC method statement MS - CL - Sample Prep and refers to the percentage of stones retained on a 10mm BS test sieve.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received.

WAC Testing

Samples were leached in accordance with BS EN 12457-3: 2002.

Eluate Results are reported as the cumulative release at L/S 10 from eluates of L/S 2 and L/S 8. These results have been calculated in accordance with BS EN 12457-3:2002.

Comparative values are taken from the Council Decision Annex - CRITERIA AND PROCEDURES FOR THE ACCEPTANCE OF WASTE AT LANDFILLS, (2003/33/EC).

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Date of Issue: 10/12/2020

Owned by Emily Blissett - Customer Services Supervisor

Authorised by James Gane - Commercial Manager

L:\DATA\REPORTS\CTS\777\122-00978-CTS - 22-24332.XLSM\TPH Codes

L22/00978/CTS - 22-24332

Project Reference - 21767 Upper Hoyland Road Rockingham

Analytical Test Results - Soil

NC Reference			218138	218139	218140	218141	218142	218143
Client Sample ID			DN2474/213	DN2474/214	DN2474/215	DN2474/216	DN2474/217	DN2474/218
Client Sample Location			Surcharge	Surcharge	Surcharge	Surcharge	Surcharge	Surcharge
Client Sample Type			-	-	-	-	-	-
Client Sample Number			-	-	-	-	-	-
Depth - Top (m)			-	-	-	-	-	-
Depth - Bottom (m)			-	-	-	-	-	-
Date of Sampling			02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022	02/02/2022
Time of Sampling			-	-	-	-	-	-
Sample Matrix			Sand	Sand	Sand	Sand	Sand	Sand
Determinant	Units	Accreditation						
Arsenic	(mg/kg)	MCERTS	12	12	12	11	13	13
Boron (w/s)	(mg/kg)	u	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Cadmium	(mg/kg)	MCERTS	0.7	0.7	0.7	0.8	0.6	0.7
Chromium (Total)	(mg/kg)	UKAS	8.4	8.5	9.2	8.9	7.4	7.7
Copper	(mg/kg)	MCERTS	43	42	41	50	41	39
Lead	(mg/kg)	MCERTS	26	25	25	32	26	25
Mercury	(mg/kg)	UKAS	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5	< 2.5
Nickel	(mg/kg)	MCERTS	29	29	30	33	26	28
Selenium	(mg/kg)	u	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0	< 8.0
Zinc	(mg/kg)	MCERTS	52	51	57	63	44	48
Total Phenols	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cyanide (Total)	(mg/kg)	MCERTS	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Cyanide (Free)	(mg/kg)	u	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Chromium (Hexavalent)	(mg/kg)	u	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Acid Soluble Sulphate	(%)	u	0.54	0.71	0.52	0.48	0.56	0.50
pH	pH Units	MCERTS	7.3	7.4	7.3	7.4	7.7	7.7
Sulphate (Water soluble)	(mg/l)	u	2200	2500	2100	2000	2300	2000
Sulphide	(mg/kg)	u	26	97	36	31	28	33
Thiocyanate	(mg/kg)	u	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Acenaphthene	(mg/kg)	MCERTS	0.14	0.13	0.11	0.12	0.13	0.07
Acenaphthylene	(mg/kg)	UKAS	< 0.02	0.03	0.03	0.03	0.03	< 0.02
Anthracene	(mg/kg)	UKAS	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Benzo (a) anthracene	(mg/kg)	MCERTS	0.07	0.06	0.07	0.07	0.07	0.05
Benzo (a) pyrene	(mg/kg)	MCERTS	0.06	0.05	0.05	0.05	0.05	0.04
Benzo (b) fluoranthene	(mg/kg)	MCERTS	0.07	0.06	0.07	0.07	0.07	0.04
Benzo (g, h, i) perylene	(mg/kg)	MCERTS	0.09	0.09	0.09	0.09	0.10	0.07
Benzo (k) fluoranthene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Chrysene	(mg/kg)	MCERTS	0.12	0.11	0.11	0.12	0.13	0.07
Dibenzo (a,h) anthracene	(mg/kg)	MCERTS	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Fluoranthene	(mg/kg)	MCERTS	0.12	0.13	0.11	0.12	0.12	0.07
Fluorene	(mg/kg)	MCERTS	0.14	0.12	0.13	0.14	0.15	0.08
Indeno (1, 2, 3,-cd) pyrene	(mg/kg)	MCERTS	0.02	< 0.02	< 0.02	< 0.02	0.02	< 0.02
Naphthalene	(mg/kg)	MCERTS	1.1	1.0	0.92	1.1	1.2	0.70
Phenanthrene	(mg/kg)	MCERTS	0.71	0.67	0.66	0.69	0.76	0.47
Pyrene	(mg/kg)	MCERTS	0.12	0.12	0.12	0.12	0.12	0.08
Total PAH (Sum of USEPA 16)	(mg/kg)	UKAS	2.8	2.7	2.5	2.8	3.1	1.9
Gasoline Range Organics (>C ₈ to C ₁₀) [EH_1D_Total]	(mg/kg)	UKAS	14	14	17	15	16	15
Diesel Range Organics (>C ₁₀ to C ₂₁) [EH_1D_Total]	(mg/kg)	MCERTS	66	66	78	65	69	64
Mineral Range Organics (>C ₂₁ to C ₄₀) [EH_1D_Total]	(mg/kg)	MCERTS	72	78	89	79	80	80
Total TPH (>C ₈ to C ₄₀) [EH_1D_Total]	(mg/kg)	MCERTS	150	160	180	160	170	160
SOM (via TOC)	(%)	UKAS	13	13	12	15	14	13

L22/00978/CTS - 22-24332

Project Reference - 21767 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	218138
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Client Sample ID	DN2474/213
Client Sample Location	Surcharge
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	02/02/2022
Time of Sampling	-
Sample Description	Grey clayey sandy silt
Sample Matrix	Sand
Moisture Content (%)	5.3
Stone content (%)	< 0.1

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	7.3	3.0	5.0	6.0
Loss on Ignition	%	UKAS	17	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) [EH ₁₀ _Total]	mg/kg	u	137	500	-	-
PAH	mg/kg	u	2.9	100	-	-
pH	units	MCERTS	7.3	-	> 6	-

Eluate Analysis						
Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	0.07	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	0.02	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	11	800	15000	25000
Fluoride	mg/kg	u	1	10	150	500
Sulphate (as SO ₄)	mg/kg	u	2100	1000	20000	50000
Total Dissolved Solids	mg/kg	u	1900	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

L22/00978/CTS - 22-24332

Project Reference - 21767 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	218139
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Client Sample ID	DN2474/214
Client Sample Location	Surcharge
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	02/02/2022
Time of Sampling	-
Sample Description	Grey clayey sandy silt
Sample Matrix	Sand
Moisture Content (%)	6.3
Stone content (%)	< 0.1

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
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Solid Analysis

Total Organic Carbon	%	MCERTS	7.5	3.0	5.0	6.0
Loss on Ignition	%	UKAS	14	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) [EH ₁₀ _Total]	mg/kg	u	138	500	-	-
PAH	mg/kg	u	2.7	100	-	-
pH	units	MCERTS	7.4	-	> 6	-

Eluate Analysis

Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	0.11	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	0.04	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	6	800	15000	25000
Fluoride	mg/kg	u	1	10	150	500
Sulphate (as SO ₄)	mg/kg	u	1900	1000	20000	50000
Total Dissolved Solids	mg/kg	u	2000	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

L22/00978/CTS - 22-24332

Project Reference - 21767 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	218140
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Client Sample ID	DN2474/215
Client Sample Location	Surcharge
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	02/02/2022
Time of Sampling	-
Sample Description	Grey clayey sandy silt
Sample Matrix	Sand
Moisture Content (%)	6.2
Stone content (%)	< 0.1

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	7.2	3.0	5.0	6.0
Loss on Ignition	%	UKAS	14	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) [EH ₁₀ _Total]	mg/kg	u	170	500	-	-
PAH	mg/kg	u	2.6	100	-	-
pH	units	MCERTS	7.3	-	> 6	-

Eluate Analysis						
Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	0.09	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	0.02	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	6	800	15000	25000
Fluoride	mg/kg	u	1	10	150	500
Sulphate (as SO ₄)	mg/kg	u	1900	1000	20000	50000
Total Dissolved Solids	mg/kg	u	1900	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

L22/00978/CTS - 22-24332

Project Reference - 21767 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference			218141			
Client Sample ID			DN2474/216			
Client Sample Location			Surcharge			
Client Sample Type			-			
Client Sample Number			-			
Depth - Top (m)			-			
Depth - Bottom (m)			-			
Date of Sampling			02/02/2022			
Time of Sampling			-			
Sample Description			Grey clayey sandy silt			
Sample Matrix			Sand			
Moisture Content (%)			7.1			
Stone content (%)			< 0.1			
			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	8.7	3.0	5.0	6.0
Loss on Ignition	%	UKAS	14	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) [EH_10_Total]	mg/kg	u	139	500	-	-
PAH	mg/kg	u	2.8	100	-	-
pH	units	MCERTS	7.4	-	> 6	-
Eluate Analysis						
Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	0.03	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	9	800	15000	25000
Fluoride	mg/kg	u	1	10	150	500
Sulphate (as SO ₄)	mg/kg	u	1400	1000	20000	50000
Total Dissolved Solids	mg/kg	u	1600	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

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Project Reference - 21767 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	218142
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Client Sample ID	DN2474/217
Client Sample Location	Surcharge
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	02/02/2022
Time of Sampling	-
Sample Description	Grey clayey sandy silt
Sample Matrix	Sand
Moisture Content (%)	5.4
Stone content (%)	< 0.1

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	8.3	3.0	5.0	6.0
Loss on Ignition	%	UKAS	14	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) [EH ₁₀ _Total]	mg/kg	u	148	500	-	-
PAH	mg/kg	u	3.1	100	-	-
pH	units	MCERTS	7.7	-	> 6	-

Eluate Analysis						
Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	< 0.05	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	0.03	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	11	800	15000	25000
Fluoride	mg/kg	u	2	10	150	500
Sulphate (as SO ₄)	mg/kg	u	1600	1000	20000	50000
Total Dissolved Solids	mg/kg	u	1700	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	20.0	500	800	1000

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Project Reference - 21767 Upper Hoyland Road Rockingham

Certificate Of Analysis - WAC Suite

NC Reference	218143
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Client Sample ID	DN2474/218
Client Sample Location	Surcharge
Client Sample Type	-
Client Sample Number	-
Depth - Top (m)	-
Depth - Bottom (m)	-
Date of Sampling	02/02/2022
Time of Sampling	-
Sample Description	Grey clayey sandy silt
Sample Matrix	Sand
Moisture Content (%)	5.1
Stone content (%)	< 0.1

			Determined Result	Inert Waste Landfill	Stable non reactive hazardous waste in a non hazardous landfill	Hazardous Waste Landfill
Solid Analysis						
Total Organic Carbon	%	MCERTS	7.8	3.0	5.0	6.0
Loss on Ignition	%	UKAS	14	-	-	10.0
BTEX	mg/kg	MCERTS	< 0.30	6.00	-	-
PCB's (7 Congeners)	mg/kg	u	< 0.028	1.00	-	-
Mineral Oil (>C ₁₀ to C ₄₀) [EH ₁₀ _Total]	mg/kg	u	147	500	-	-
PAH	mg/kg	u	1.9	100	-	-
pH	units	MCERTS	7.7	-	> 6	-

Eluate Analysis						
Arsenic	mg/kg	u	< 0.03	0.50	2	25
Barium	mg/kg	u	0.06	20	100	300
Cadmium	mg/kg	u	< 0.03	0.04	1	5
Chromium (total)	mg/kg	u	< 0.03	0.5	10	70
Copper	mg/kg	u	< 0.10	2.0	50	100
Mercury	mg/kg	u	< 0.01	0.01	0.2	2
Molybdenum	mg/kg	u	< 0.03	0.5	10.0	30
Nickel	mg/kg	u	< 0.03	0.4	10.0	40
Lead	mg/kg	u	< 0.10	0.5	10.0	50
Antimony	mg/kg	u	< 0.03	0.06	0.7	5
Selenium	mg/kg	u	0.03	0.1	0.5	7
Zinc	mg/kg	u	< 0.10	4	50	200
Chloride	mg/kg	u	7	800	15000	25000
Fluoride	mg/kg	u	1	10	150	500
Sulphate (as SO ₄)	mg/kg	u	2100	1000	20000	50000
Total Dissolved Solids	mg/kg	u	2100	4000	60000	100000
Phenol Index	mg/kg	u	< 1.0	1	-	-
Dissolved Organic Carbon	mg/kg	u	< 20	500	800	1000

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Project Reference - 21767 Upper Hoyland Road Rockingham

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
218138	DN2474/213	Surcharge	-	-	Grey clayey sandy silt	5.3	< 0.1	100
218139	DN2474/214	Surcharge	-	-	Grey clayey sandy silt	6.3	< 0.1	100
218140	DN2474/215	Surcharge	-	-	Grey clayey sandy silt	6.2	< 0.1	100
218141	DN2474/216	Surcharge	-	-	Grey clayey sandy silt	7.1	< 0.1	100
218142	DN2474/217	Surcharge	-	-	Grey clayey sandy silt	5.4	< 0.1	100
218143	DN2474/218	Surcharge	-	-	Grey clayey sandy silt	5.1	< 0.1	100

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Project Reference - 21767 Upper Hoyland Road Rockingham

Sample Comments

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Comments
218138	DN2474/213	Surcharge	-	-	VOC/BTEX - Sample taken from container with head space.
218139	DN2474/214	Surcharge	-	-	VOC/BTEX - Sample taken from container with head space.
218140	DN2474/215	Surcharge	-	-	VOC/BTEX - Sample taken from container with head space.
218141	DN2474/216	Surcharge	-	-	VOC/BTEX - Sample taken from container with head space.
218142	DN2474/217	Surcharge	-	-	VOC/BTEX - Sample taken from container with head space.
218143	DN2474/218	Surcharge	-	-	VOC/BTEX - Sample taken from container with head space.

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Project Reference - 21767 Upper Hoyland Road Rockingham

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
TOCL	MS - CL - DOC	As received	BSEN:12457 Leaching	Determination of Dissolved Organic Carbon in leachates
ANIONSL	MS - CL - Anions by Aquakem	As received	-	Determination of Anions (inc Sulphate, chloride etc.) in leachate samples by Aquakem
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
BTEXS	MS - CL - VOC and MBTEX	As received	Passing 10mm test sieve	Determination of BTEX in soils via Headspace-GC-MS
PCB7S	MS - CL - PCB Soils	As received	Passing 10mm test sieve	Determination of PCB's (7 congeners) in soils via GC-MS
PAHASRDS	MS - CL - PAH (As Received)	As received	Passing 10mm test sieve	Determination of Polyaromatic hydrocarbons in soil via GC-MS
WACTOCS	MS - CL - TOC Eltra (WAC)	Air dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soil as part of a WAC test
TOCS	MS - CL - TOC Eltra	Air Dried	Passing 10mm test sieve	Determination of Total Organic Carbon in soils
TPHS	MS - CL - TPH (GC-FID)	As received	Passing 10mm test sieve	Determination of Total Petroleum Hydrocarbons in soil using GC-FID
WACSKALAR	MS - CL - Phenols by Skalar (WAC)	As received	BSEN:12457 Leaching	Determination of Total Phenols within leachate as part of a WAC test using a Skalar Segmented flow analyser
WSBORONS	MS - CL - WS Boron	Air dried	Passing 10mm test sieve	Determination of Water soluble Boron in soils via ICP
SKALARCNS	MS - CL - Cyanide by Skalar	As received	Passing 10mm test sieve	Determination of cyanide (total / free / complex) in soil using a Skalar segmented flow analyser
WACDOC	MS - CL - DOC (WAC)	As received	BSEN:12457 Leaching	Determination of dissolved organic carbon in a leachate as part of a WAC test
SKALARHCS	MS - CL - Hexavalent Chromium by Skalar	As received	Passing 10mm test sieve	Determination of hexavalent chromium in soil using Skalar segmented flow analyser
WACMETALS	MS - CL - ICP - Metals in Waters (WAC)	As received	BSEN:12457 Leaching	Determination of metals in a leachate as part of a WAC test via ICP
ICPMETS	MS - CL - ICP Metals	Air dried	Passing 10mm test sieve	Determination of metals in soils via ICP
WACPHS	MS - CL - pH in Soils (WAC)	As received	BSEN:12457 Leaching	Determination of pH in soils as part of a WAC test via pH probe
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
WACANIONS	MS - CL - Anions by Aquakem (WAC)	As received	BSEN:12457 Leaching	Determination of sulphate, chloride and fluoride in a leachate as part of a WAC test using a Aquakem analyser
SULPHIDES	MS - CL - Sulphide in Soils	As received	Passing 10mm test sieve	Determination of sulphide in soil via titration
TDSL	MS - CL - TDS (Leachate)	As received	BSEN:12457 Leaching	Determination of total dissolved solids in leachates
SKALARPHL	MS - CL - Phenols by Skalar	As received	BSEN:12457 Leaching	Determination of total phenols in leachates using Skalar segmented flow analyser
SKALARPHS	MS - CL - Phenols by Skalar	As received	Passing 10mm test sieve	Determination of total phenols in soil using Skalar segmented flow analyser
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
ENLEACHP2	BS EN 12457-3	As Received	-	Leaching in accordance with BSEN 12457-3
SAMPLEPREP	MS - CL - Sample Preparation	-	-	Preparation of samples (including determination of moisture content) to allow for subsequent analysis
1377LOI	BS1377 LoI	Oven dried	Passing 2mm test sieve	Testing was in accordance with BS 1377: Part 3: 2018 + A1 :2021 Clause 6. Determination of the mass loss on ignition. Some information required by BS1377: 2016: Part 1 has not been reported. This information is available on request.



Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L22/00978/CTS - 22-24332

Project Reference - 21767 Upper Hoyland Road Rockingham

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preparation	Test Details
1377TS-ELT	BS1377 Total Sulphur Content by HTC	Oven dried	BS1377 : Part 1 : 2016	Total Sulphur Content testing of Soil in accordance with BS 1377 : Part 3 : 2018 + A1 : 2021 Clause 7.10 (using Eltra CS-800 Analyser)

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Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Date of sampling to receipt insufficient to allow analysis to be completed without deviation, Please note this is only a deviation if 'X' is also recorded against the sample

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
218138	DN2474/213	Surcharge	-	-	BS1377 Lol	X
218138	DN2474/213	Surcharge	-	-	MS - CL - Cyanide by Skalar	RX
218138	DN2474/213	Surcharge	-	-	MS - CL - PAH (As Received)	RX
218138	DN2474/213	Surcharge	-	-	MS - CL - Phenols by Skalar	RX
218138	DN2474/213	Surcharge	-	-	MS - CL - TPH (GC-FID)	RX
218138	DN2474/213	Surcharge	-	-	MS - CL - VOC and MBTEX	RX
218138	DN2474/213	Surcharge	-	-	MS - CL - pH in Soils	RX
218138	DN2474/213	Surcharge	-	-	MS - CL - pH in Soils (WAC)	RX
218139	DN2474/214	Surcharge	-	-	BS1377 Lol	X
218139	DN2474/214	Surcharge	-	-	MS - CL - Cyanide by Skalar	RX
218139	DN2474/214	Surcharge	-	-	MS - CL - PAH (As Received)	RX
218139	DN2474/214	Surcharge	-	-	MS - CL - Phenols by Skalar	RX
218139	DN2474/214	Surcharge	-	-	MS - CL - TPH (GC-FID)	RX
218139	DN2474/214	Surcharge	-	-	MS - CL - VOC and MBTEX	RX
218139	DN2474/214	Surcharge	-	-	MS - CL - pH in Soils	RX
218139	DN2474/214	Surcharge	-	-	MS - CL - pH in Soils (WAC)	RX
218140	DN2474/215	Surcharge	-	-	BS1377 Lol	X
218140	DN2474/215	Surcharge	-	-	MS - CL - Cyanide by Skalar	RX
218140	DN2474/215	Surcharge	-	-	MS - CL - PAH (As Received)	RX
218140	DN2474/215	Surcharge	-	-	MS - CL - Phenols by Skalar	RX
218140	DN2474/215	Surcharge	-	-	MS - CL - TPH (GC-FID)	RX
218140	DN2474/215	Surcharge	-	-	MS - CL - VOC and MBTEX	RX
218140	DN2474/215	Surcharge	-	-	MS - CL - pH in Soils	RX
218140	DN2474/215	Surcharge	-	-	MS - CL - pH in Soils (WAC)	RX
218141	DN2474/216	Surcharge	-	-	BS1377 Lol	X
218141	DN2474/216	Surcharge	-	-	MS - CL - Cyanide by Skalar	RX
218141	DN2474/216	Surcharge	-	-	MS - CL - PAH (As Received)	RX
218141	DN2474/216	Surcharge	-	-	MS - CL - Phenols by Skalar	RX
218141	DN2474/216	Surcharge	-	-	MS - CL - TPH (GC-FID)	RX
218141	DN2474/216	Surcharge	-	-	MS - CL - VOC and MBTEX	RX
218141	DN2474/216	Surcharge	-	-	MS - CL - pH in Soils	RX
218141	DN2474/216	Surcharge	-	-	MS - CL - pH in Soils (WAC)	RX
218142	DN2474/217	Surcharge	-	-	BS1377 Lol	X
218142	DN2474/217	Surcharge	-	-	MS - CL - Cyanide by Skalar	RX
218142	DN2474/217	Surcharge	-	-	MS - CL - PAH (As Received)	RX
218142	DN2474/217	Surcharge	-	-	MS - CL - Phenols by Skalar	RX
218142	DN2474/217	Surcharge	-	-	MS - CL - TPH (GC-FID)	RX
218142	DN2474/217	Surcharge	-	-	MS - CL - VOC and MBTEX	RX
218142	DN2474/217	Surcharge	-	-	MS - CL - pH in Soils	RX
218142	DN2474/217	Surcharge	-	-	MS - CL - pH in Soils (WAC)	RX

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Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

Observations on receipt

A - No date of sampling provided

C - Received in inappropriate container

H - Contains headspace

T - Temperature on receipt exceeds storage temperature

R - Date of sampling to receipt insufficient to allow analysis to be completed without deviation, Please note this is only a deviation if 'X' is also recorded against the sample

Observations whilst in laboratory

X - Exceeds sampling to extraction or analysis timescales

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
218143	DN2474/218	Surcharge	-	-	BS1377 LoI	X
218143	DN2474/218	Surcharge	-	-	MS - CL - Cyanide by Skalar	RX
218143	DN2474/218	Surcharge	-	-	MS - CL - PAH (As Received)	RX
218143	DN2474/218	Surcharge	-	-	MS - CL - Phenols by Skalar	RX
218143	DN2474/218	Surcharge	-	-	MS - CL - TPH (GC-FID)	RX
218143	DN2474/218	Surcharge	-	-	MS - CL - VOC and MBTEX	RX
218143	DN2474/218	Surcharge	-	-	MS - CL - pH in Soils	RX
218143	DN2474/218	Surcharge	-	-	MS - CL - pH in Soils (WAC)	RX

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Project Reference - 21767 Upper Hoyland Road Rockingham

HWOL TPH Acronym Index

Acronym	Description
HS	Headspace Analysis
EH	Extractable Hydrocarbons - i.e. everything extracted by the solvent
CU	Clean-up e.g. by florisil, silica gel
1D	GC - Single coil gas chromatography
Total	Aliphatics and Aromatics
AL	Aliphatics Only
AR	Aromatics Only
2D	GC-GC - Double Coil Gas Chromatography
#1	EH_Total but with humics mathmatically subtracted
#2	EH_Total but with fatty acids mathmatically subtracted
_	Operator - underscore to separate acronyms (except for +)
+	Operator to indicate cumlative e.g. EH+HS_Total or EH_CU+HS_Total
MS	Mass Spectrometry

TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 2 : 1990, Method 3.2

REPORT NUMBER:

C1054158 / 170797.5.1.1

SAMPLE NUMBER:

265326

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/213

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Client

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

04/03/2022

CLASSIFICATION:

Class 2C

TESTED BY:

JW, CL, RF, BH

LOCATION:

Surcharge

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

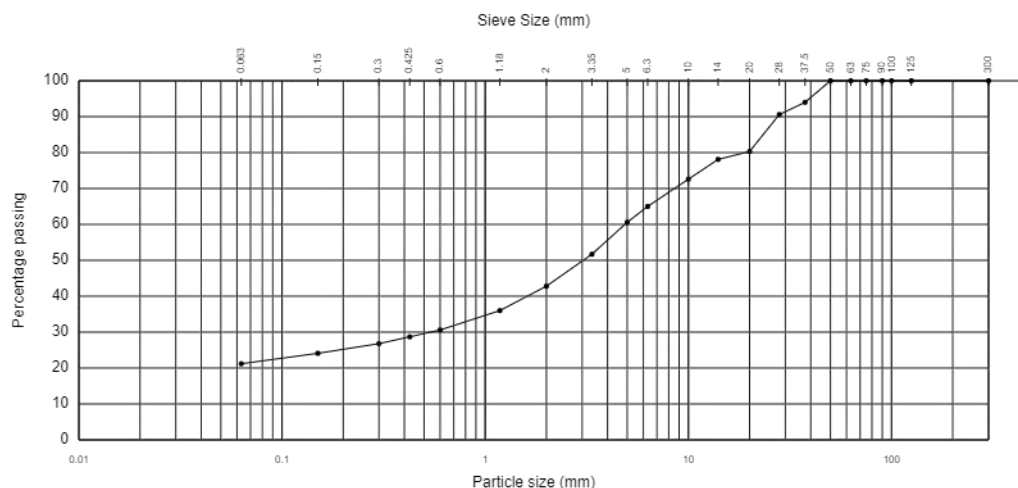
BS 1377:Part 1:1990 clause 7.3 & 7.4.5

VARIATIONS:

No variations

SAMPLING PLAN:

Client Provided

RESULT Test Location: CTS Doncaster
SIEVE ANALYSIS


Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	94	
28	91	
20	80	
14	78	
10	73	
6.3	65	
5	61	
3.35	52	
2	43	15 - 80
1.18	36	
0.6	31	
0.425	29	
0.3	27	
0.15	24	
0.063	21	15 - 80

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Sample complies with the grading specification

Moisture content: 7.5%

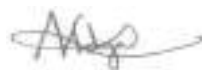
Remarks:

Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.

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For and on behalf of CTS

Alex Edgar - Senior Laboratory Technician



Approved Signatory

Report date 07-Mar-22



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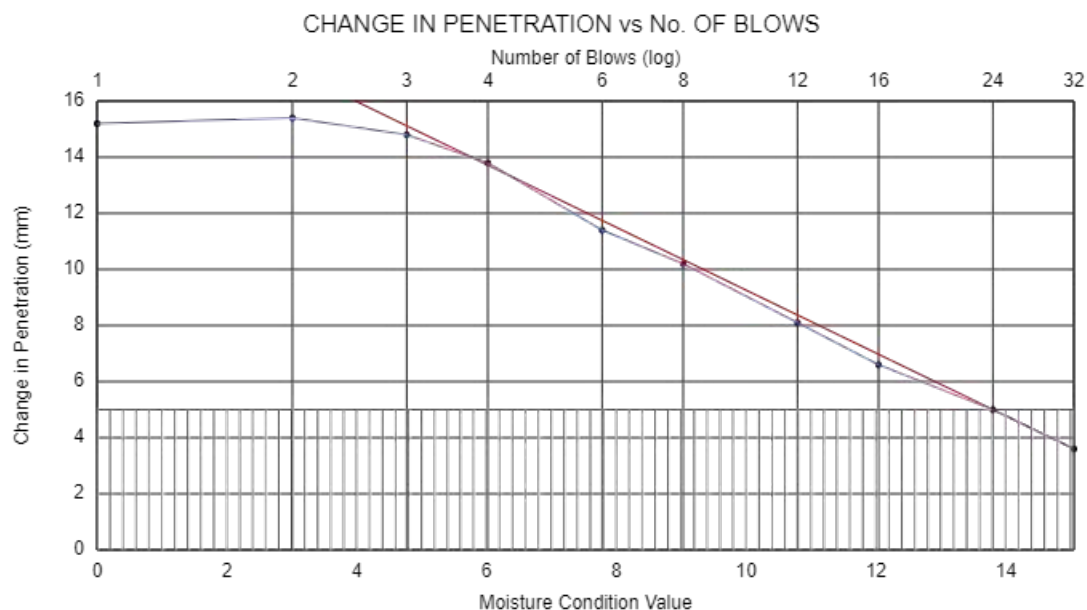
Report version 1

Page 1 of 1

TEST REPORT:	DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)		
	BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)		
REPORT NUMBER:	C1054158 / 170797.2.1.1		
SAMPLE NUMBER:	265326	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/213	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	24/02/2022	FILL LOCATION:	Surcharge
TESTED BY:	Ryan Firth	CERTIFICATE OF SAMPLING:	No
TYPE OF SAMPLE:	Disturbed	SAMPLING PLAN:	Client Provided

RESULTS Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	13.8
NATURAL MOISTURE CONTENT (%)	8.4
PERCENTAGE RETAINED 20mm (%)	145.6
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



Remarks:
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 Amended report. This test report supersedes test report version 1 -

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 Alex Edgar - Senior Laboratory Technician



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 Report date 24-Feb-22

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Report version 2



4161

TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1054158 / 170797.1.1.1		
SAMPLE NUMBER:	265326	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/213	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	28/02/2022	LOCATION:	Surcharge,
TESTED BY:	Bethany Higgins	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	36%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	27%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	9%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	71%		
Sample History:	The material was tested after washing through a 425µm test sieve		

Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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 Alex Edgar - Senior Laboratory Technician



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 Report date 07-Mar-22

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Report version 1



4161

TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:

C1054158 / 170797.3.1.1

SAMPLE NUMBER:

See Below

CLIENT:

Howard Civil Engineering

CLIENT REF:

See Below

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

25/02/2022

LOCATION:

Surcharge

TESTED BY:

CL, MD

SAMPLING PLAN:

Client Provided

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS1377:Part1:1990 clauses 7.3 and 7.4.2

 ORIENTATION OF TEST SPECIMEN
WITHIN ORIGINAL SAMPLE:

N/A

VARIATIONS:

None

METHOD OF PREPARATION:

None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
265326	DN2474/213	Brown Clay/Soil	2.33

Remarks:

Test results reported relate only to the items tested.

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Alex Edgar - Senior Laboratory Technician



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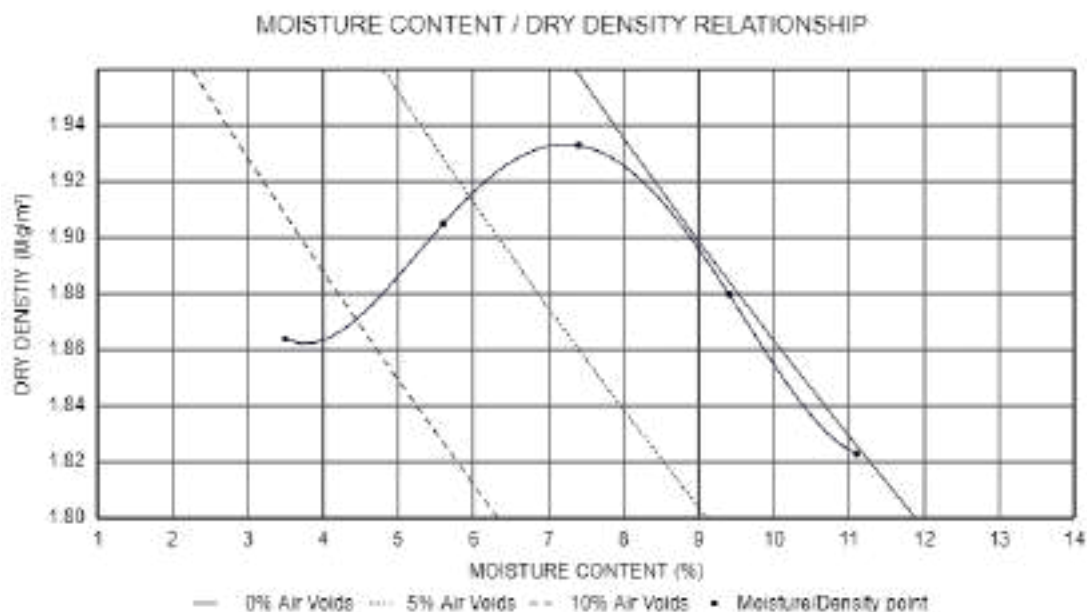
Report version 1

Page 1 of 1

TEST REPORT:		DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP	
		BS 1377:Part 4:1990 clause 3.5 4.5kg Rammer method	
REPORT NUMBER:	C1054158 / 170797.10.1.1		
SAMPLE NUMBER:	265328	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/214	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	25/02/2022	LOCATION:	Surcharge
TESTED BY:	JS, CL	PREPARATION METHOD:	1 Ltr Mould (BS1377:Pt1:1990 Cl7.6.2) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	
VARIATIONS:	None	SAMPLING PLAN:	Client Provided

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.93 Mg/m³
OPTIMUM MOISTURE CONTENT: 7.3 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 14 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 8 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.29 Mg/m³
 (measured in accordance with BS 1377: 1990:part 2)



Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



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 Report date 07-Mar-22



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Report version 1

Page 1 of 1

TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 2 : 1990, Method 3.2

REPORT NUMBER:

C1054158 / 170797.11.1.1

SAMPLE NUMBER:

265328

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/214

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Client

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

10/03/2022

CLASSIFICATION:

Class 2C

TESTED BY:

JW, CL, BH

LOCATION:

N/A

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

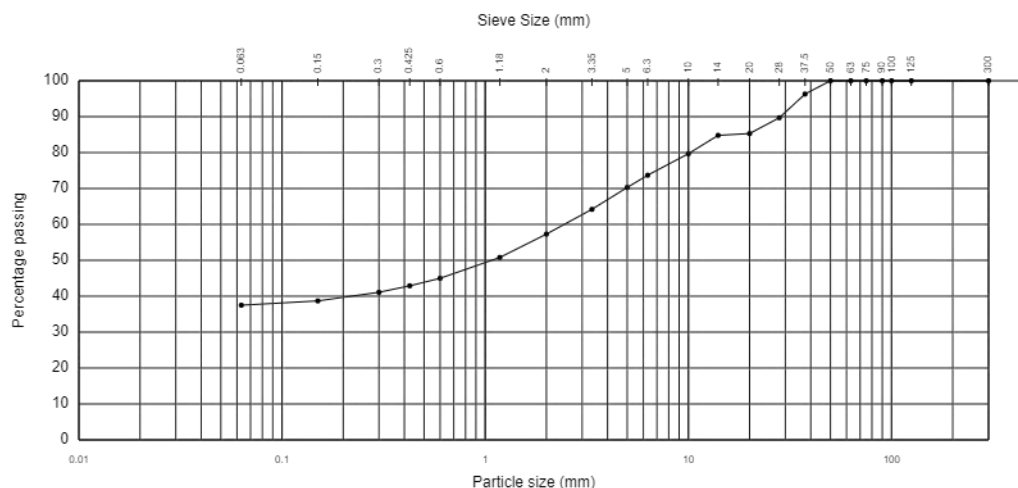
BS 1377:Part 1:1990 clause 7.3 & 7.4.5

VARIATIONS:

No variations

SAMPLING PLAN:

Client Provided

RESULT Test Location: CTS Doncaster
SIEVE ANALYSIS


Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	96	
28	90	
20	85	
14	85	
10	80	
6.3	74	
5	70	
3.35	64	
2	57	15 - 80
1.18	51	
0.6	45	
0.425	43	
0.3	41	
0.15	39	
0.063	38	15 - 80

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Sample complies with the grading specification

Moisture content: 8.5%

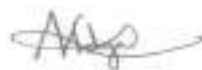
Remarks:

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For and on behalf of CTS

Alex Edgar - Senior Laboratory Technician



Approved Signatory

Report date 17-Mar-22



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Report version 1

Page 1 of 1

TEST REPORT:
DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)

BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER:

C1054158 / 170797.8.1.1

SAMPLE NUMBER:

265328

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/214

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

24/02/2022

FILL LOCATION:

Surcharge

TESTED BY:

Ryan Firth

CERTIFICATE OF SAMPLING:

No

TYPE OF SAMPLE:

Disturbed

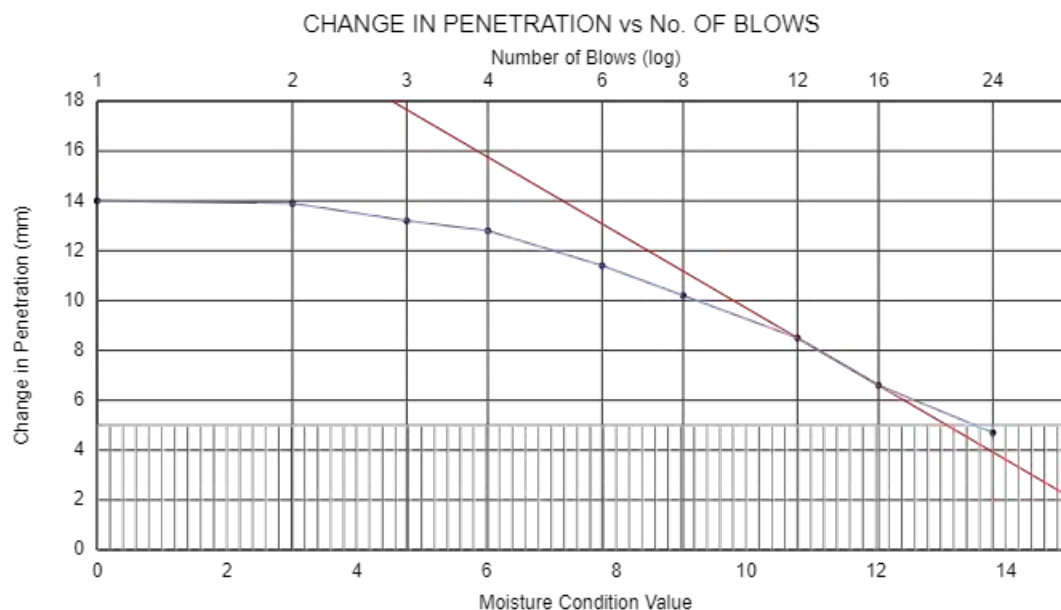
SAMPLING PLAN:

Client Provided

RESULTS

Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	13.1
NATURAL MOISTURE CONTENT (%)	8.4
PERCENTAGE RETAINED 20mm (%)	144.2
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)

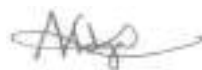

Remarks:

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Alex Edgar - Senior Laboratory Technician



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Report date 24-Feb-22



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Report version 1

Page 1 of 1

TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1054158 / 170797.7.1.1		
SAMPLE NUMBER:	265328	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/214	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	28/02/2022	LOCATION:	Surcharge,
TESTED BY:	Bethany Higgins	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	37%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	20%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	17%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	82%		
Sample History:	The material was tested after washing through a 425µm test sieve		

Remarks:
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 Alex Edgar - Senior Laboratory Technician



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 Report date 07-Mar-22

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Report version 1



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TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:

C1054158 / 170797.9.1.1

SAMPLE NUMBER:

See Below

CLIENT:

Howard Civil Engineering

CLIENT REF:

See Below

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

25/02/2022

LOCATION:

Surcharge

TESTED BY:

CL, MD

SAMPLING PLAN:

Client Provided

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS1377:Part1:1990 clauses 7.3 and 7.4.2

 ORIENTATION OF TEST SPECIMEN
WITHIN ORIGINAL SAMPLE:

N/A

VARIATIONS:

None

METHOD OF PREPARATION:

None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
265328	DN2474/214	Brown Clay/Soil	2.29

Remarks:

Test results reported relate only to the items tested.

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For and on behalf of CTS

Alex Edgar - Senior Laboratory Technician



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Report date 07-Mar-22



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Report version 1

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TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 2 : 1990, Method 3.2

REPORT NUMBER:

C1054158 / 170797.17.1.1

SAMPLE NUMBER:

265330

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/215

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham - SITE

SAMPLED BY:

Client

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

10/03/2022

CLASSIFICATION:

Class 2C

TESTED BY:

JW, CL, BH

LOCATION:

Surcharge

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

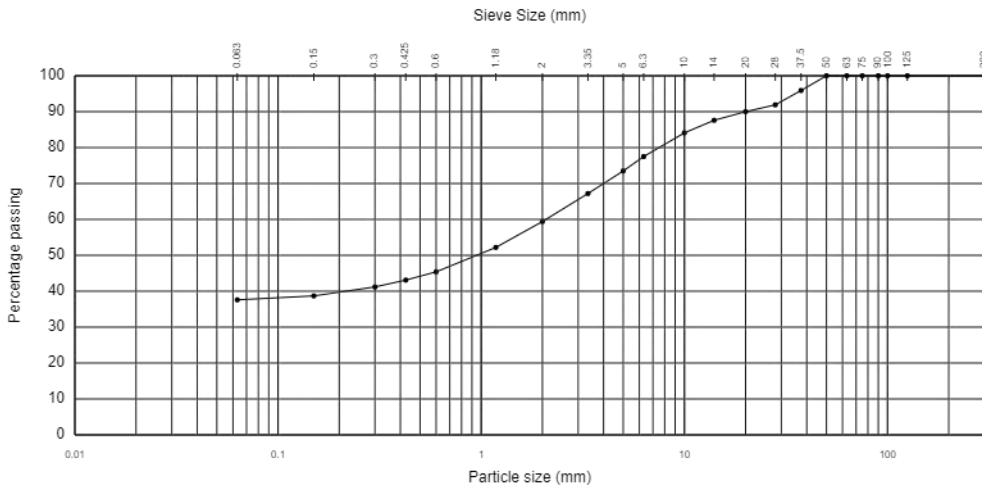
BS 1377:Part 1:1990 clause 7.3 & 7.4.5

VARIATIONS:

No variations

SAMPLING PLAN:

Client Provided

RESULT Test Location: CTS Doncaster

SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	96	
28	92	
20	90	
14	88	
10	84	
6.3	78	
5	74	
3.35	67	
2	59	15 - 80
1.18	52	
0.6	45	
0.425	43	
0.3	41	
0.15	39	
0.063	38	15 - 80

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Sample complies with the grading specification

Moisture content: 8.7%

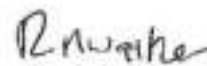
Remarks:

Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.

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For and on behalf of CTS

Reece Walker - Senior Technician



Approved Signatory

Report date 25-Mar-22



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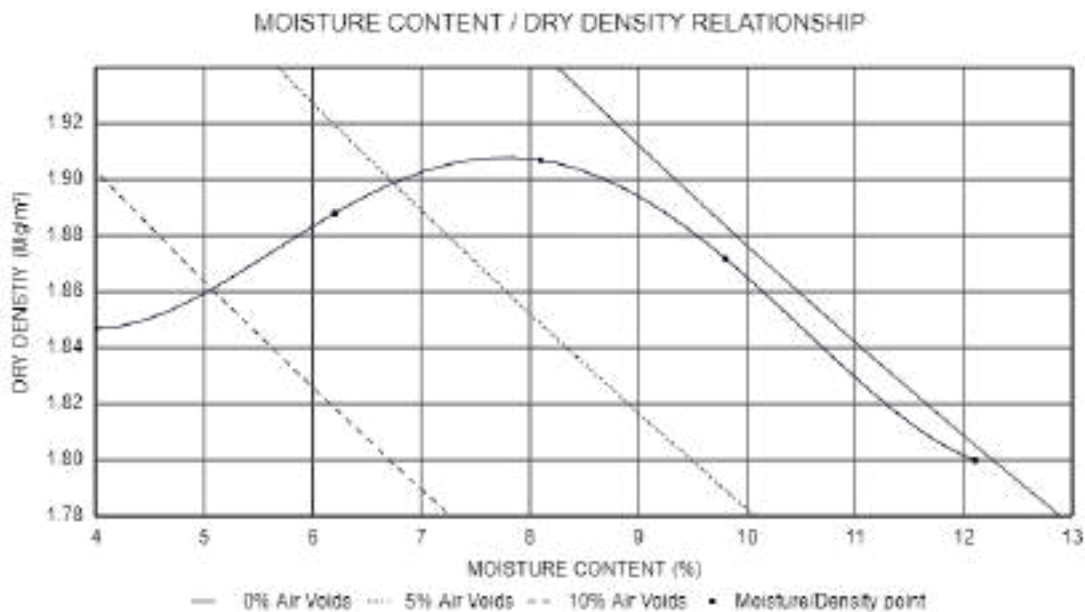
Report version 1

Page 1 of 1

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:1990 clause 3.5 4.5kg Rammer method		
REPORT NUMBER:	C1054158 / 170797.16.1.1		
SAMPLE NUMBER:	265330	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/215	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	25/02/2022	LOCATION:	Surcharge
TESTED BY:	JS, CL	PREPARATION METHOD:	1 Ltr Mould (BS1377:Pt1:1990 Cl7.6.2) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Provided

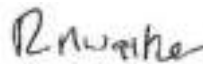
RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.91 Mg/m³
OPTIMUM MOISTURE CONTENT: 7.8 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 13 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 6 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.31 Mg/m³
 (measured in accordance with BS 1377: 1990:part 2)



Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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For and on behalf of CTS
 Reece Walker - Senior Technician



Approved Signatory
 Report date 01-Mar-22



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Report Format: L/Rep S11-S14a/Rev 9

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TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1054158 / 170797.13.1.1		
SAMPLE NUMBER:	265330	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/215	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	28/02/2022	LOCATION:	Surcharge,
TESTED BY:	Bethany Higgins	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	36%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	22%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	14%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	77%		
Sample History:	The material was tested after washing through a 425µm test sieve		

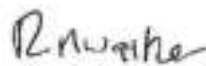
Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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For and on behalf of CTS
 Reece Walker - Senior Technician



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TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:

C1054158 / 170797.15.1.1

SAMPLE NUMBER:

See Below

CLIENT:

Howard Civil Engineering

CLIENT REF:

See Below

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

24/02/2022

LOCATION:

Surcharge

TESTED BY:

CL, MD

SAMPLING PLAN:

Client Provided

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS1377:Part1:1990 clauses 7.3 and 7.4.2

 ORIENTATION OF TEST SPECIMEN
WITHIN ORIGINAL SAMPLE:

N/A

VARIATIONS:

None

METHOD OF PREPARATION:

None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
265330	DN2474/215	Brown Clay/Soil	2.31

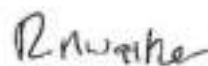
Remarks:

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TEST REPORT:
DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)

BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER:

C1054158 / 170797.14.1.1

SAMPLE NUMBER:

265330

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/215

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

24/02/2022

FILL LOCATION:

Surcharge

TESTED BY:

Ryan Firth

CERTIFICATE OF SAMPLING:

No

TYPE OF SAMPLE:

Disturbed

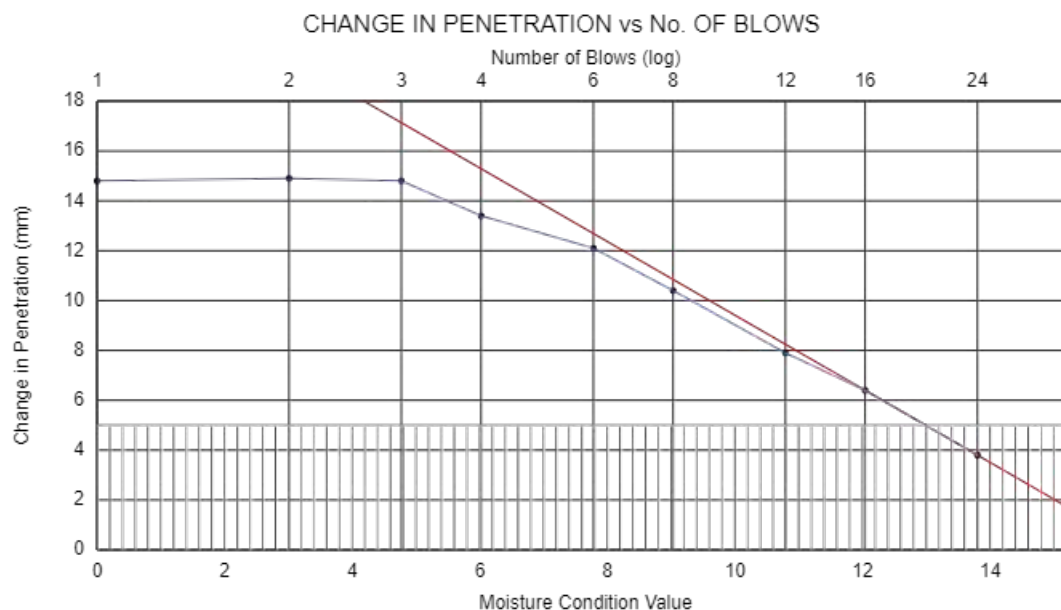
SAMPLING PLAN:

Client Provided

RESULTS

Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	13.0
NATURAL MOISTURE CONTENT (%)	8.9
PERCENTAGE RETAINED 20mm (%)	94.1
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)

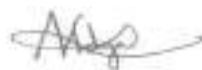

Remarks:

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Alex Edgar - Senior Laboratory Technician



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Report date 24-Feb-22



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TEST REPORT:

TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 2 : 1990, Method 3.2

REPORT NUMBER:

C1054158 / 170797.23.1.1

SAMPLE NUMBER:

265333

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/216

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham - SITE

SAMPLED BY:

Client

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

10/03/2022

CLASSIFICATION:

Class 2C

TESTED BY:

JW, CL, BH

LOCATION:

Surcharge

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS 1377:Part 1:1990 clause 7.3 & 7.4.5

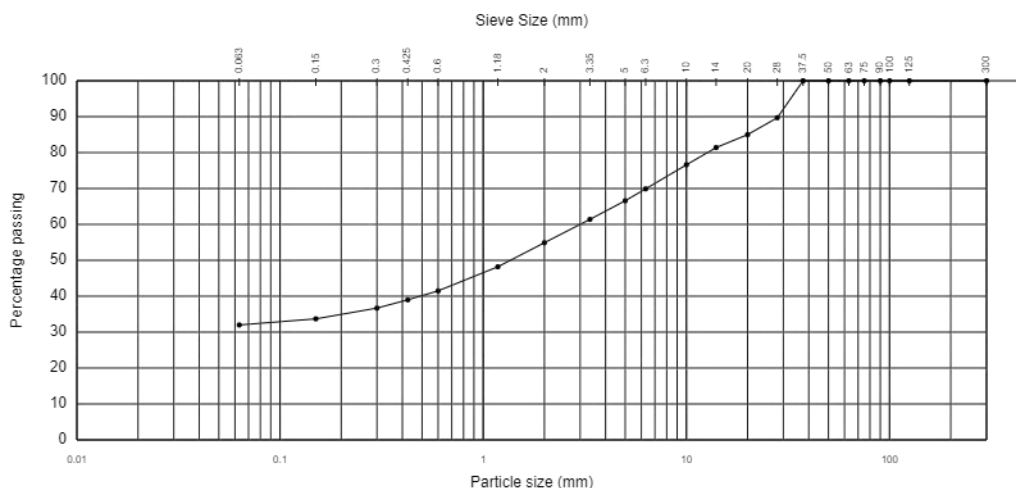
VARIATIONS:

No variations

SAMPLING PLAN:

Client Provided

RESULT Test Location: CTS Doncaster



SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	100	
28	90	
20	85	
14	81	
10	77	
6.3	70	
5	67	
3.35	61	
2	55	15 - 80
1.18	48	
0.6	42	
0.425	39	
0.3	37	
0.15	34	
0.063	32	15 - 80

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Sample complies with the grading specification

Moisture content: 8.0%

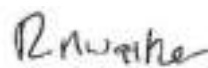
Remarks:

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For and on behalf of CTS

Reece Walker - Senior Technician



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Report date 25-Mar-22



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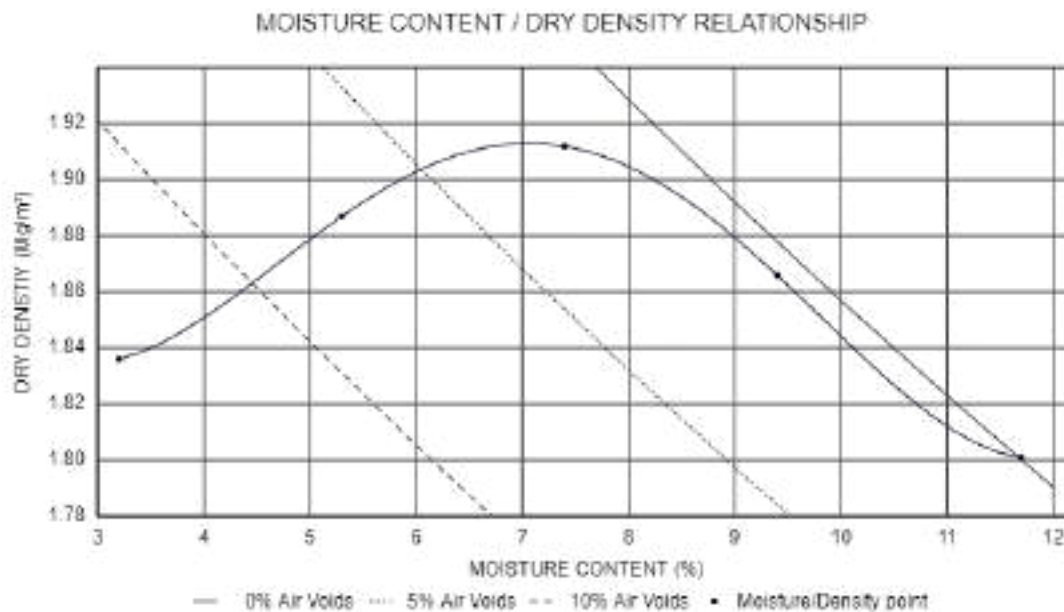
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TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:1990 clause 3.5 4.5kg Rammer method		
REPORT NUMBER:	C1054158 / 170797.22.1.1		
SAMPLE NUMBER:	265333	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/216	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	25/02/2022	LOCATION:	Surcharge
TESTED BY:	JS, CL	PREPARATION METHOD:	1 Ltr Mould (BS1377:Pt1:1990 Cl7.6.2) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Provided

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.91 Mg/m³
OPTIMUM MOISTURE CONTENT: 6.9 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 11 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 5 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.27 Mg/m³
 (measured in accordance with BS 1377: 1990:part 2)



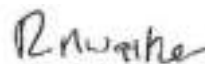
Remarks:
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TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1054158 / 170797.19.1.1		
SAMPLE NUMBER:	265333	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/216	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	28/02/2022	LOCATION:	Surcharge,
TESTED BY:	Bethany Higgins	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	38%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	23%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	15%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	77%		
Sample History:	The material was tested after washing through a 425µm test sieve		

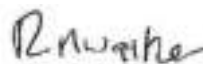
Remarks:
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TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:

C1054158 / 170797.21.1.1

SAMPLE NUMBER:

See Below

CLIENT:

Howard Civil Engineering

CLIENT REF:

See Below

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

25/02/2022

LOCATION:

Surcharge

TESTED BY:

CL, MD

SAMPLING PLAN:

Client Provided

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS1377:Part1:1990 clauses 7.3 and 7.4.2

 ORIENTATION OF TEST SPECIMEN
WITHIN ORIGINAL SAMPLE:

N/A

VARIATIONS:

None

METHOD OF PREPARATION:

None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
265333	DN2474/216	Brown Clay/Soil	2.27

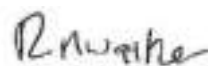
Remarks:

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TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
 BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1054158 / 170797.20.1.1

SAMPLE NUMBER: 265333 **CLIENT:** Howard Civil Engineering

CLIENT REF: DN2474/216 **ADDRESS:** Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED: 02/02/2022 **SITE:** Upper Hoyland Road, Rockingham

SAMPLED BY: Unknown **SUPPLIER:** Site Won, Site Won

DATE RECEIVED: 08/02/2022 **MATERIAL:** Brown Clay/Soil

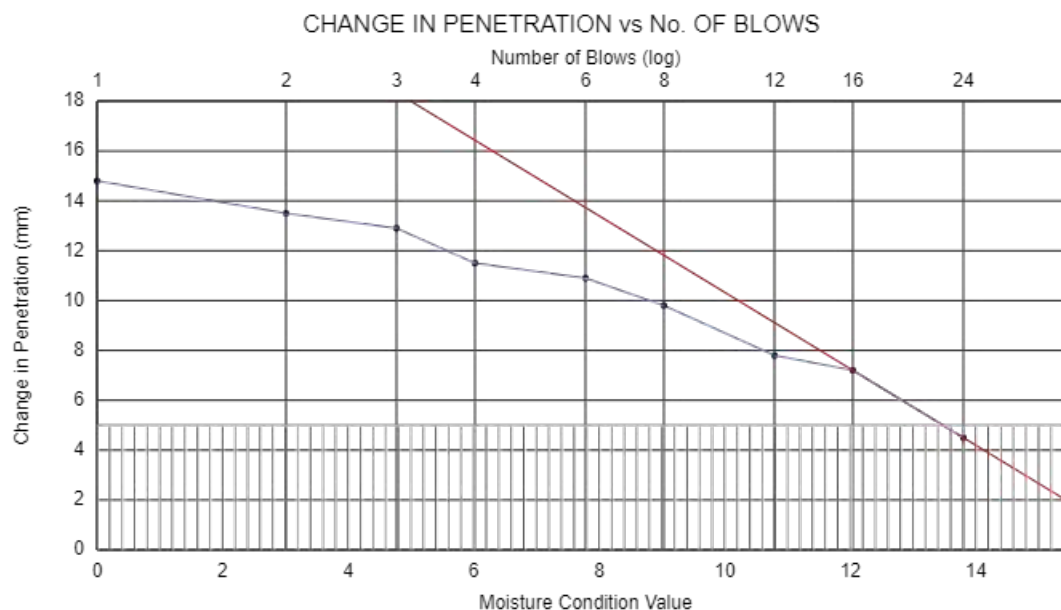
DATE COMPLETED: 24/02/2022 **FILL LOCATION:** Surcharge

TESTED BY: Ryan Firth **CERTIFICATE OF SAMPLING:** No

TYPE OF SAMPLE: Disturbed **SAMPLING PLAN:** Client Provided

RESULTS Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	13.5
NATURAL MOISTURE CONTENT (%)	8.2
PERCENTAGE RETAINED 20mm (%)	45.2
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



Remarks:
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For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



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 Report date 24-Feb-22



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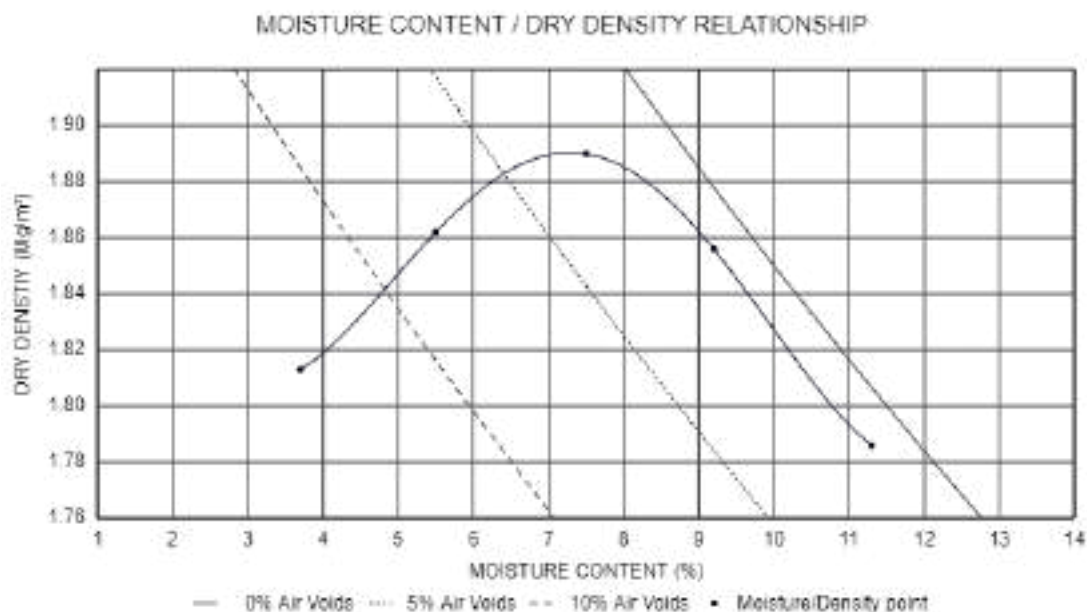
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TEST REPORT:		DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP	
		BS 1377:Part 4:1990 clause 3.5 4.5kg Rammer method	
REPORT NUMBER:	C1054158 / 170797.28.1.1		
SAMPLE NUMBER:	265335	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/217	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	24/02/2022	LOCATION:	Surcharge
TESTED BY:	JS, CL	PREPARATION METHOD:	1 Ltr Mould (BS1377:Pt1:1990 Cl7.6.2) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Provided

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.93 Mg/m³
OPTIMUM MOISTURE CONTENT: 7.3 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 10 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 3 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.27 Mg/m³
 (measured in accordance with BS 1377: 1990:part 2)



Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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Approved Signatory
 Report date 07-Mar-22



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TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 2 : 1990, Method 3.2

REPORT NUMBER:

C1054158 / 170797.29.1.1

SAMPLE NUMBER:

265335

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/217

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Client

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

04/03/2022

CLASSIFICATION:

Class 2C

TESTED BY:

JW, CL, RF, BH

LOCATION:

Surcharge

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

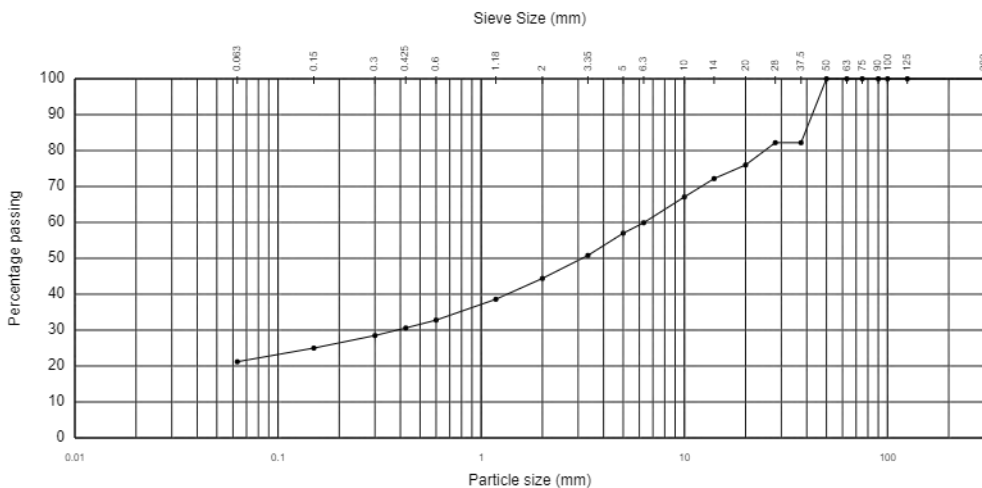
BS 1377:Part 1:1990 clause 7.3 & 7.4.5

VARIATIONS:

No variations

SAMPLING PLAN:

Client Provided

RESULT Test Location: CTS Doncaster

SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	82	
28	82	
20	76	
14	72	
10	67	
6.3	60	
5	57	
3.35	51	
2	44	15 - 80
1.18	39	
0.6	33	
0.425	31	
0.3	29	
0.15	25	
0.063	21	15 - 80

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Sample complies with the grading specification

Moisture content: 6.3%

Remarks:

Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.

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For and on behalf of CTS

Alex Edgar - Senior Laboratory Technician



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Report date 07-Mar-22



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TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
 BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1054158 / 170797.26.1.1

SAMPLE NUMBER: 265335 **CLIENT:** Howard Civil Engineering

CLIENT REF: DN2474/217 **ADDRESS:** Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED: 02/02/2022 **SITE:** Upper Hoyland Road, Rockingham

SAMPLED BY: Unknown **SUPPLIER:** Site Won, Site Won

DATE RECEIVED: 08/02/2022 **MATERIAL:** Brown Clay/Soil

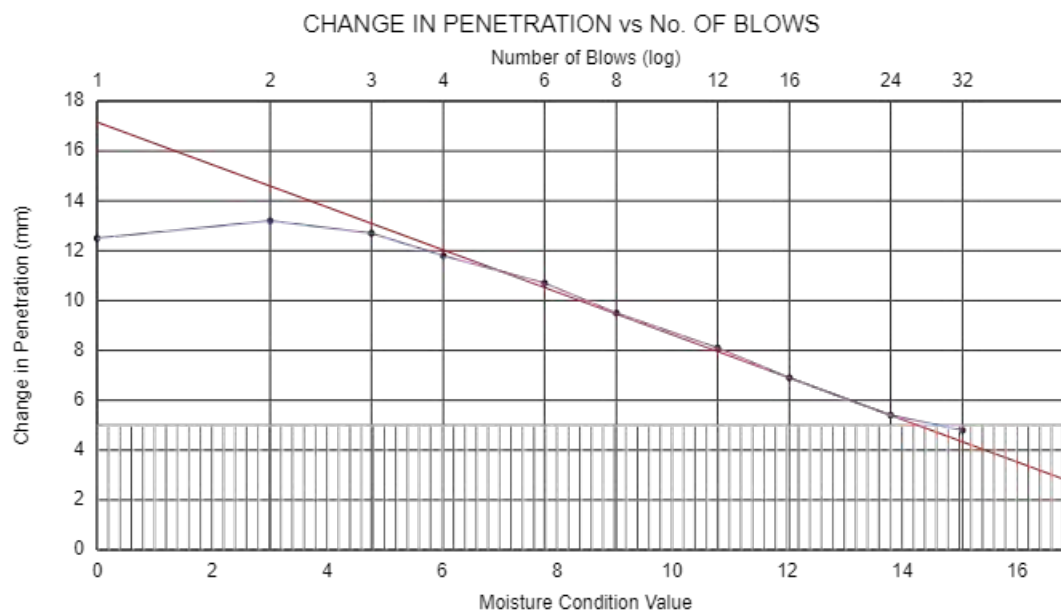
DATE COMPLETED: 24/02/2022 **FILL LOCATION:** Surcharge

TESTED BY: Ryan Firth **CERTIFICATE OF SAMPLING:** No

TYPE OF SAMPLE: Disturbed **SAMPLING PLAN:** Client Provided

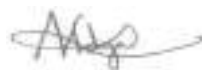
RESULTS Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	14.3
NATURAL MOISTURE CONTENT (%)	6.8
PERCENTAGE RETAINED 20mm (%)	52.0
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



Remarks:
 Test results reported relate only to the items tested.
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For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



Approved Signatory
 Report date 24-Feb-22



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Page 1 of 1

TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1054158 / 170797.25.1.1		
SAMPLE NUMBER:	265335	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/217	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	Unknown	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	01/03/2022	LOCATION:	Surcharge,
TESTED BY:	Diane Weighell	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	36%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	17%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	19%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	32%		
Sample History:	The material was tested after washing through a 425µm test sieve		

Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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 For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



 Approved Signatory
 Report date 07-Mar-22

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Report version 1



4161

TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:

C1054158 / 170797.27.1.1

SAMPLE NUMBER:

See Below

CLIENT:

Howard Civil Engineering

CLIENT REF:

See Below

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

Unknown

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

28/02/2022

LOCATION:

Surcharge

TESTED BY:

CL, MD

SAMPLING PLAN:

Client Provided

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS1377:Part1:1990 clauses 7.3 and 7.4.2

 ORIENTATION OF TEST SPECIMEN
WITHIN ORIGINAL SAMPLE:

N/A

VARIATIONS:

None

METHOD OF PREPARATION:

None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
265335	DN2474/217	Brown Clay/Soil	2.27

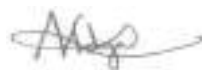
Remarks:

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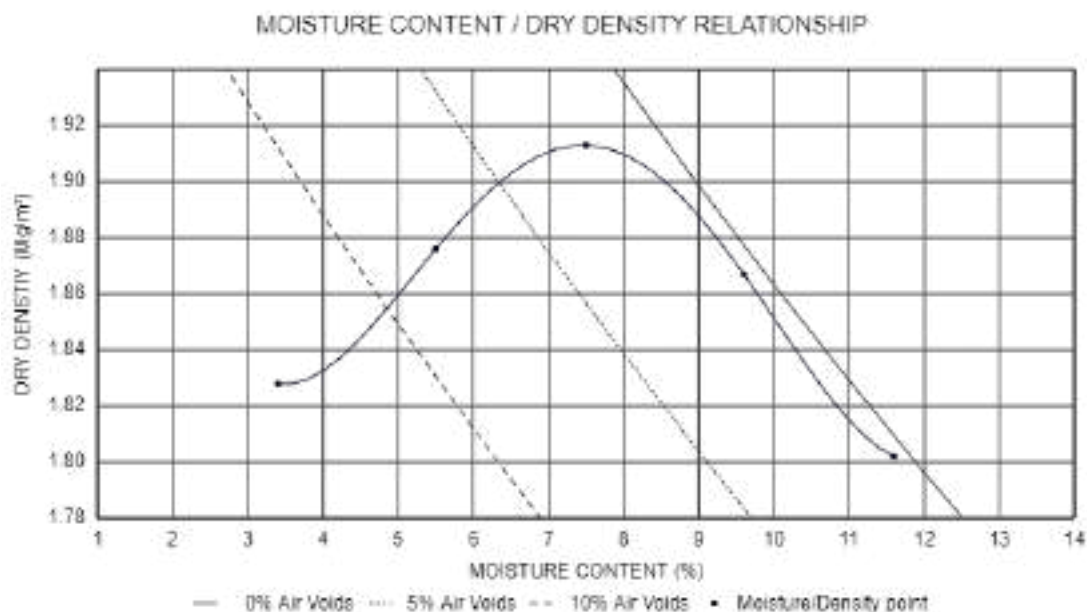
Report version 1

Page 1 of 1

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.6 4.5kg Rammer method		
REPORT NUMBER:	C1054158 / 170797.34.1.1		
SAMPLE NUMBER:	265338	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/218	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	CTS	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	24/02/2022	LOCATION:	Q21 Layer 13
TESTED BY:	JS, CL	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.91 Mg/m³
OPTIMUM MOISTURE CONTENT: 7.5 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 10 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 3 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.29 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



Remarks:
 Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.
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TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 2 : 1990, Method 3.2

REPORT NUMBER:

C1054158 / 170797.35.1.1

SAMPLE NUMBER:

265338

CLIENT:

Howard Civil Engineering

CLIENT REF:

DN2474/218

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

CTS

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

04/03/2022

CLASSIFICATION:

Class 2C

TESTED BY:

JW, CL, RF, BH

LOCATION:

Surcharge

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

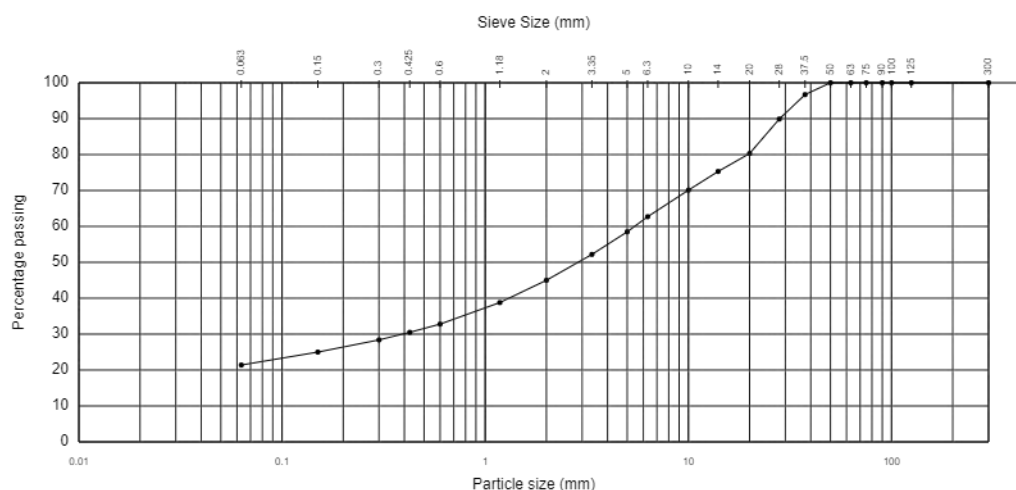
BS 1377:Part 1:1990 clause 7.3 & 7.4.5

VARIATIONS:

No variations

SAMPLING PLAN:

Client Specification

RESULT Test Location: CTS Doncaster
SIEVE ANALYSIS


Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	97	
28	90	
20	80	
14	75	
10	70	
6.3	63	
5	59	
3.35	52	
2	45	15 - 80
1.18	39	
0.6	33	
0.425	31	
0.3	28	
0.15	25	
0.063	21	15 - 80

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Sample complies with the grading specification

Moisture content: 7.0%

Remarks:

Remaining sample will be retained for a minimum of 28 days from date of report. Test results reported relate only to the items tested.

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Alex Edgar - Senior Laboratory Technician



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Report date 17-Mar-22



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Report version 1

Page 1 of 1

TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
 BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1054158 / 170797.32.1.1

SAMPLE NUMBER: 265338 **CLIENT:** Howard Civil Engineering

CLIENT REF: DN2474/218 **ADDRESS:** Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED: 02/02/2022 **SITE:** Upper Hoyland Road, Rockingham

SAMPLED BY: Unknown **SUPPLIER:** Site Won, Site Won

DATE RECEIVED: 08/02/2022 **MATERIAL:** Brown Clay/Soil

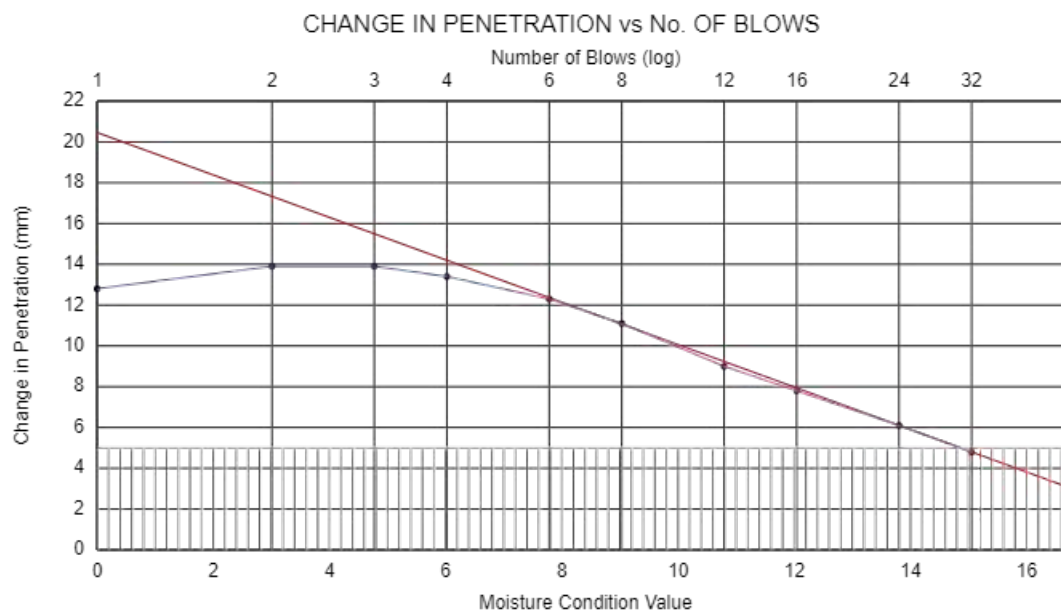
DATE COMPLETED: 24/02/2022 **FILL LOCATION:** Surcharge

TESTED BY: Ryan Firth **CERTIFICATE OF SAMPLING:** No

TYPE OF SAMPLE: Disturbed **SAMPLING PLAN:** Client Provided

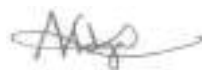
RESULTS Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	14.9
NATURAL MOISTURE CONTENT (%)	7.9
PERCENTAGE RETAINED 20mm (%)	120.7
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



Remarks:
 Test results reported relate only to the items tested.
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 Report date 24-Feb-22



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Page 1 of 1

TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1054158 / 170797.31.1.1		
SAMPLE NUMBER:	265338	CLIENT:	Howard Civil Engineering
CLIENT REF:	DN2474/218	ADDRESS:	Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF
DATE SAMPLED:	02/02/2022	SITE:	Upper Hoyland Road, Rockingham
SAMPLED BY:	CTS	SUPPLIER:	Site Won, Site Won
DATE RECEIVED:	08/02/2022	MATERIAL:	Brown Clay/Soil
DATE COMPLETED:	17/03/2022	LOCATION:	Q21 Layer 13 ,
TESTED BY:	AE, DW	PREPARATION METHOD:	BS 1377:Part 1:1990 cl 7.3 & 7.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A		

RESULTS:

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE:	39%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE:	20%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	19%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	50%		
Sample History:	The material was tested after washing through a 425µm test sieve		

Remarks:
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 Alex Edgar - Senior Laboratory Technician



 Approved Signatory
 Report date 17-Mar-22

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Report version 1



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TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:

C1054158 / 170797.33.1.1

SAMPLE NUMBER:

See Below

CLIENT:

Howard Civil Engineering

CLIENT REF:

See Below

ADDRESS:

Unit 11 Acorn Business Park, Killingbeck Drive , Leeds, LS14 6UF

DATE SAMPLED:

02/02/2022

SITE:

Upper Hoyland Road, Rockingham

SAMPLED BY:

CTS

SUPPLIER:

Site Won, Site Won

DATE RECEIVED:

08/02/2022

MATERIAL:

Brown Clay/Soil

DATE COMPLETED:

25/02/2022

LOCATION:

Q21 Layer 13

TESTED BY:

CL, MD

SAMPLING PLAN:

Client Specification

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS1377:Part1:2016 clauses 8.3 and 8.4.2

 ORIENTATION OF TEST SPECIMEN
WITHIN ORIGINAL SAMPLE:

N/A

VARIATIONS:

None

METHOD OF PREPARATION:

None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
265338	DN2474/218	Brown Clay/Soil	2.29

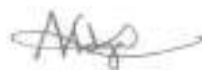
Remarks:

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APPENDIX D

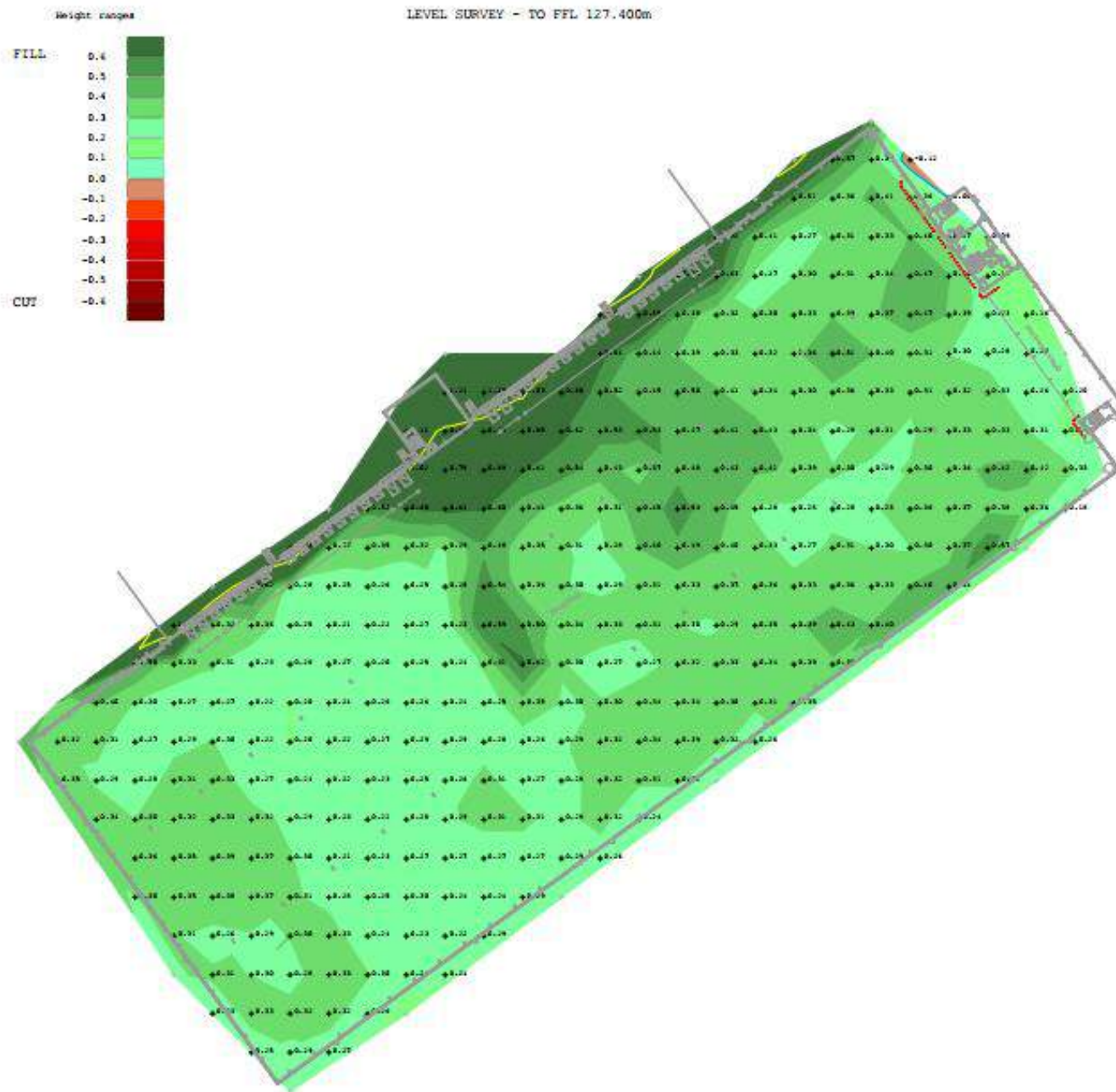
SCHEDULE OF TESTING

The Contractor shall note that further testing may be required at the discretion of the Supervisor. Additionally, and in accordance with the specification, the requirements for the testing and validation of lime / lime-cement stabilised fill (should this be considered necessary) is to be submitted by the Contractor to the Supervisor for review.

Test	Frequency	Comment
Classification* of general fill materials	1 per 2,500m ³	Scheduling to include (but not limited to): - natural moisture content determination - loss on ignition - particle size distribution - liquid limit/plastic limit/plasticity index - moisture condition value - compaction tests (dry density/moisture content relationship) using the 4.5kg rammer method - any other testing necessary to permit a classification in accordance with SHW
In-situ nuclear density gauge	No fewer than 1 test per 100m ² or a minimum of a half-day testing (whichever is greater)	Reasonable and adequate calibration testing must be provided by the Contractor as part of their Sum, and this will include (but not limited to) for nuclear density gauge calibration purposes: - sand replacement tests - cores - natural moisture content
Chemical testing	As required by the Supervisor - Principal Contractor to allow 1 per 2,500m ³ .	Broad suite of chemical determinands including: - pH - loss on ignition - metals - speciated TPH (CWG) - speciated PAH - BRE sulphate suite (pyritic ground)
CBR	Testing on 20m grid (1 per 400m ²)	To be undertaken at final formation level using a 450mm diameter plate.
Note: * Testing of materials that are to be used as fill materials are to allow classification of materials in accordance with Series 600 Earthworks' of the Specification for Highway Works published by the Stationary Office in November 2009 as Volume 1 of the Manual of Contract Documents for Highway Works including all subsequent published amendments		

APPENDIX C

CORE SP ASSESSMENT OF WEDGE AREA



BARNSELEY36 ISOS FFL TO LEVEL SURVEY

The level survey has been taken of the site when bulk fill ceased, and the dips are from the FFL of 127.400. (i.e. a reading of 0.41 is a level of FFL – 410mm)

Our ground works strategy inside the footprint is a 330mm floor slab build zone, with 300mm cement stabilised ground beneath. The GCL process therefore treats the ground to FFL – 630mm or a dip reading of 0.63.

All areas where the filled and validated levels have readings of 0.63 or less will be stabilised and levelled by GCL, and our stabilisation team will provide testing data for validation.

Where areas are slightly high / low, the GCL team will complete a cut/fill process to balance the levels prior to stabilisation.

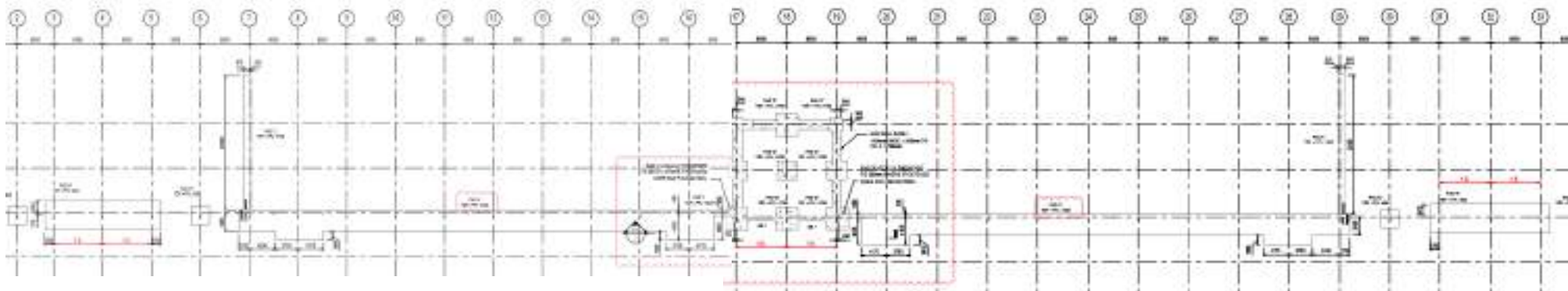
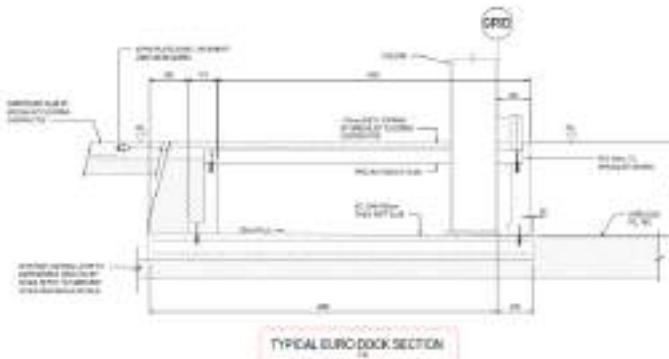
The areas of concern are the dips with readings with values above 0.63, as the ground level is lower than the stabilisation process requires.

These areas are predominantly in the positions of the deepest foundation excavations.

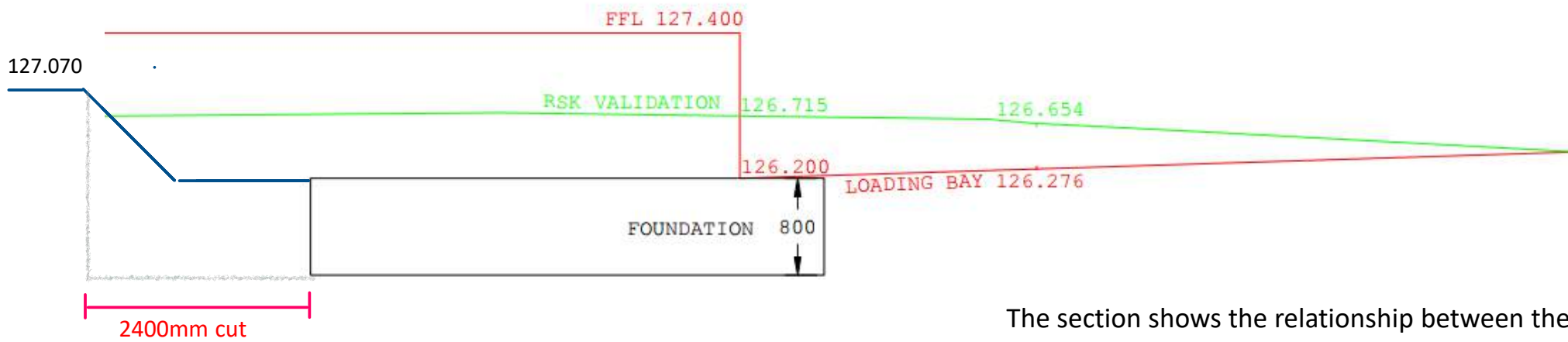
G1144-FRH-XX-FN-DR-S-03012_FOUNDATION SECTION AND DETAILS

The dock door slab foundation has TOC at FFL -1200mm, and the hub office foundations are lower still, at FFL -1700mm.

All foundations have been rationalised to 800mm deep, meaning a dig level of FFL-2000mm to the docks and FFL-2500mm for the hub office.



Section through current ground at grid line 23



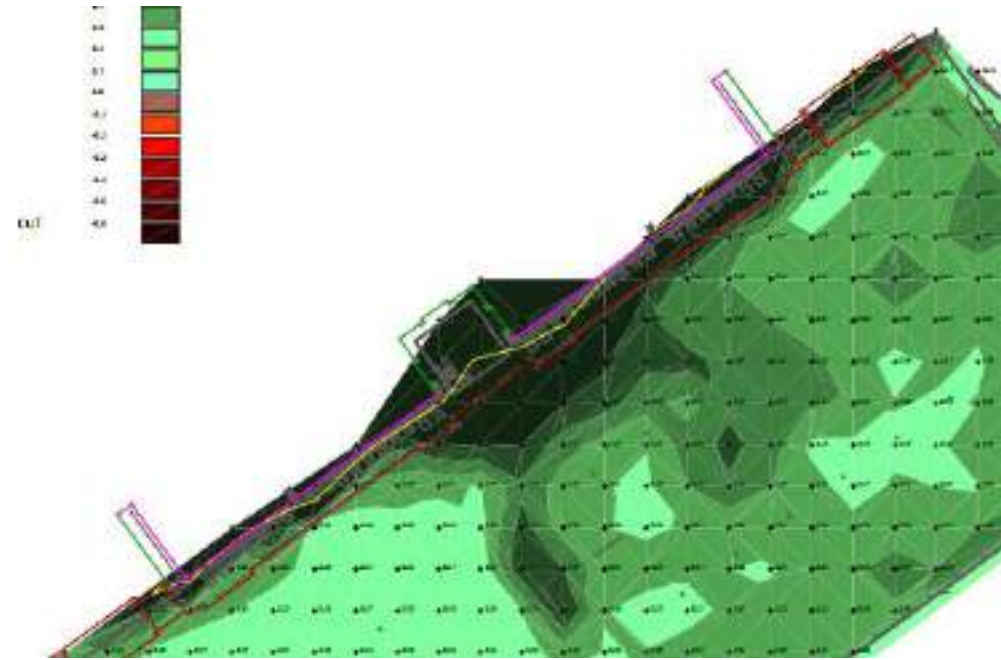
The section shows the relationship between the current level, and the proposed dig levels across the loading dock foundation line at grid line 23.

As can be seen, to excavate the foundation and build safely, we will need to excavate a 1200mm flat zone for safe working around the base, and a batter of 1200mm due to the ground being unsuitable for vertical excavation.

Once the concrete works are complete, and the dock walls installed, the ground infill will be completed in line with Fairhurst's specification

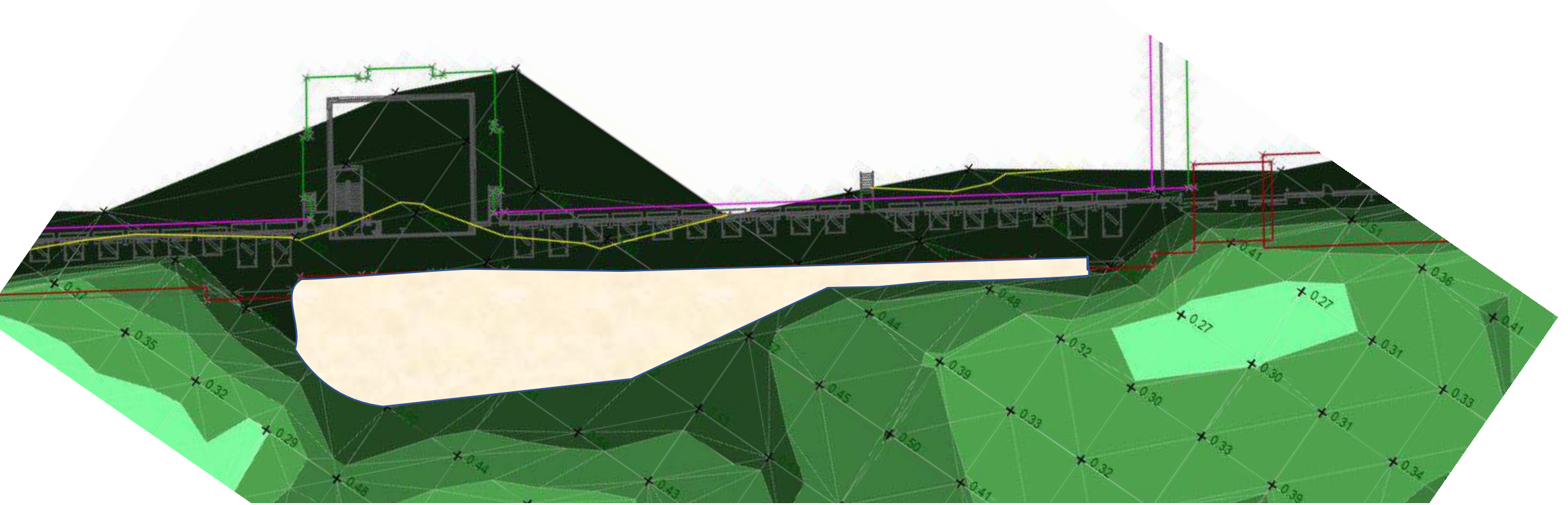
Working
Batter
1200m

Working
zone,
1200mm



Foundation dig extremities C01
foundation dig extremities on Barnslet36 ISOS to level survey

Using the excavation proposal, the Foundation dig extremities can then be plotted on the Fairhurst drawing, and then plotted onto the ISOS level survey. This shows the extent of the dig, in relation to the current validated ground levels.



The area highlighted above, overlaid onto the ISOS grid, indicates the area where the compacted and validated ground level is lower than that which is required for the cement stabilisation process.

The area is low and varies to a maximum dip of 0.89 which is 260mm below where it should be, and to an average of 100mm.

GCL proposal is to lime stabilise the surface of the area, then compact it to achieve the appropriate validation. Then to make up the material shortfall with site won material before completing the cement stabilisation process.

APPENDIX D

PHOTOGRAPHIC LOG

Photograph no 1:

Taken on 3 October 2022 – Photograph looking west with wedge material on central right of image.



Photograph no 2:

Taken on 3 October 2022 – Image of wedge material showing layer 3 (500-750mm) being taken off and Layer 2 rerolled (250-500mm).



Photograph no 3:

Photograph taken on 3 October 2022 – Rerolling of Layer 2 (right side) and material from layer 3 in the middle of wedge area.



Photograph no 4:

Photograph taken on 14 October 2022– Rolled Layer 3 (500mm-750mm).



Photograph no 5:

Photograph taken on 14 October 2022 – Location marked for testing.



Photograph no 6:

Photograph taken on 17 October 2022 – Layer 4 placed over weekend and rolled.



Photograph no 7:

Photograph taken on 18 October 2022 – Placement, rolling and testing of layer 5. Moisture content too high so scarified.



Photograph no 8:

Photograph taken on 19 October 2022 – Layer 5 (1000-1250mm) material placed, rolled and tested.



Photograph no 9:

Photograph taken on 7 February 2023 – Addition of lime to final layer.



Photograph no 10:

Photograph taken on 9 February 2023 – Completed area.



APPENDIX E

IN-SITU GEOTECHNICAL TEST RESULTS

Gateway 36 Phase 3, Barnsley

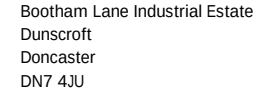


Plate Loading Test to determine equivalent CBR Value

Contract Test Reference:

Clients Reference:

REPORT NO:

Report Date:

10/02/2023

Material Description:	Brown Gravelly Clay	Date Tested:	09/02/2023
Test Location:	CBR 1	Supplier/Source:	Not Stated
Weather	Sunny/Dry		

The graph illustrates the relationship between bearing pressure and settlement for two different test cycles. The top x-axis represents bearing pressure in kN/m², ranging from 0.00 to 350.00. The y-axis represents settlement in millimeters, ranging from 0.000 to 3.000. The top red line, representing the first test cycle, shows a non-linear relationship where settlement increases rapidly as bearing pressure increases beyond 100 kN/m². The bottom red line, representing the second test cycle, shows a more linear relationship between bearing pressure and settlement.

Bearing Pressure (kN/m²)	Settlement (mm) - Test Cycle 1	Settlement (mm) - Test Cycle 2
0.00	0.000	1.250
62.5	0.250	1.500
125.0	0.500	1.750
187.5	1.000	2.000
250.0	1.700	2.250
312.5	2.500	2.500

Template Version: 2.11

Plate Diameter	450mm	Authorised Signatory  M O'Hara - Operations Manager
Moisture Content*	Not Taken	
Carried out in accordance with BS1377: Part 2: 1990.		
Equivalent CBR Value (%) 29.0		

results relate only to the sample(s) as tested.

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The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

Testing carried out at client's site location.

Gateway 36 Phase 3, Barnsley

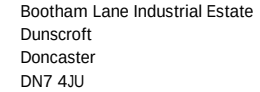


Plate Loading Test to determine equivalent CBR Value

Contract Test Reference:

DN4710/59B

REPORT NO:

Report Date:

10/02/2023

Material Description:	Brown Gravelly Clay	Date Tested:	09/02/2023
Test Location:	CBR 2	Supplier/Source:	Not Stated
Weather	Sunny/Dry		

Load Vs Settlement Data

Bearing Pressure (kN/m²)	Settlement (mm) - Test Cycle	Settlement (mm) - Design Cycle
0.00	0.000	0.000
60.00	0.200	0.100
120.00	0.600	0.300
156.4	-	0.500
180.00	1.800	0.800
250.00	3.500	1.500
320.00	5.400	2.500

Template Version: 2.11

Equivalent CBR Value (%)

18.3

Authorised Signatory

M. O'Hare – Operations Manager

** End of report **

Gateway 36 Phase 3, Barnsley

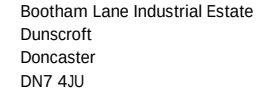


Plate Loading Test to determine equivalent CBR Value

Contract Test Reference:

Clients Reference:

REPORT NO:

DNR/125119C

Report Date:

10/02/2023

Material Description:	Brown Gravelly Clay	Date Tested:	09/02/2023
Test Location:	CBR 3	Supplier/Source:	Not Stated
Weather	Sunny / Dry		

Load Vs Settlement Data

Settlement (mm)	Bearing Pressure (kN/m²) - Cycle 1 (Upper)	Bearing Pressure (kN/m²) - Cycle 2 (Lower)
0.00	0.00	0.00
0.15	60.00	30.00
0.50	120.00	60.00
1.00	180.00	100.00
1.25	210.00	120.00
1.60	250.00	150.00
2.35	320.00	210.00

Template Version: 2.11

Equivalent CBR Value (%)
100
90
80
70
60
50
40
30
20
10
0

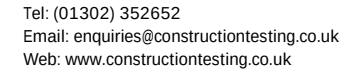
30.5

Authorised Signatory

M O'Hara - Operations Manager

** End of report **

Gateway 36 Phase 3, Barnsley



TEST REPORT

The graph displays the relationship between Bearing Pressure (kN/m²) and Settlement (mm) for a Test Cycle. The Y-axis represents Settlement (mm) from 0.000 to 8.000, and the X-axis represents Bearing Pressure (kN/m²) from 0.00 to 350.00. Two curves are plotted: a top curve (red line with diamond markers) and a bottom curve (black line with diamond markers). The top curve starts at (0, 0) and ends at (315, 7.000). The bottom curve starts at (0, 4.000) and ends at (315, 7.000). A label '124' is placed near the top curve at approximately (124, 1.2).

Bearing Pressure (kN/m²)	Settlement (mm) - Top Curve	Settlement (mm) - Bottom Curve
0.00	0.000	4.000
50.00	0.500	4.500
124.00	1.200	5.000
180.00	2.800	5.500
250.00	4.500	6.000
315.00	7.000	7.000

Template Version: 2.11

Construction Testing Solutions Ltd - Company No. 05998333
** End of report **

Report No.	DNR/118121-120095	 Construction Testing Solutions	
Report Date	10/11/2022		
Core SP 2175 Century Way Thorpe Park Leeds LS15 8ZB Site: Gateway 36, Phase 3, Barnsley	Sample No(s)	DN4710/32-46	Doncaster Laboratory Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk
	Client Reference	See Below	
	Material Description	Colliery Spoil/ Clay	
	Area Tested	See Below	
	Date Sampled/Tested	See Below	
	Sample Plan	Client Specification	
	Weather Conditions	Overcast	
	Source	Not Stated	
	Supplier	Not Stated	
	Date Samples Received	See Below	
Operator	MS		



TEST REPORT

Insitu Density & Moisture Content - Nuclear Density Gauge. Tested in Accordance with BS 1377: 1990: Part 9: 1990

Ground Investigation Absolute Tests

Density Gauge Data		Material Data		Gauge Corrections Applied			
Gauge model	InstroTek Xplorer 3500	Maximum Dry Density (MDD)	1.86 Mg/m³	Bulk Density		Moisture Density	
Gauge S/N	3249	Optimum Moisture Content	N/A %	Gradient (b)	0.517	Gradient (d)	0.390887529
Mode	Direct Transmission	Particle Density (Assumed)	2.49 Mg/m³	Intercept (a)	0.972	Intercept (c)	0.149
		Source sample reference	Client Supplied	D=(BD x b)+a		M=(MD x d)+c	

Test Location	Probe Depth mm	Bulk Density Mg/m³	Moisture Density Mg/m³	Gauge Moisture %	Dry Density Mg/m³	Compaction %	Air Voids %
Wedge L1 NDT 1 - 27/09/22	200	2.04	0.27	15	1.77	94.1	2.2
Wedge L1 NDT 2 - 27/09/22	200	2.01	0.26	15	1.75	94.3	3.5
Wedge L1 NDT 3 - 27/09/22	200	2.05	0.27	15	1.77	92.4	1.3
Wedge L1 NDT 4 - 27/09/22	200	2.05	0.27	15	1.78	94.6	1.3
Wedge L1 NDT 5 - 27/09/22	200	2.01	0.26	15	1.75	94.6	3.3
Wedge L1 NDT 6 - 27/09/22	200	2.05	0.24	13	1.81	94.4	3.2
Wedge L1 NDT 7 - 27/09/22	200	2.06	0.27	15	1.79	93.1	1.1
Wedge L1 NDT 8 - 27/09/22	200	2.01	0.27	15	1.74	94.8	3.2
Wedge L1 NDT 9 - 27/09/22	200	2.07	0.27	15	1.80	93.8	0.9
Wedge L1 RT -1 - 06/10/22	200	2.04	0.29	17	1.75	95.0	0.9
Wedge L1 RT -2 - 06/10/22	200	2.03	0.27	15	1.77	95.3	2.5
Wedge L1 RT -3 - 06/10/22	200	2.03	0.28	16	1.75	95.3	1.7
Wedge L1 RT -4 - 06/10/22	200	2.02	0.28	16	1.73	95.2	2.1
Wedge L1 RT -5 - 06/10/22	200	2.01	0.24	14	1.77	95.2	4.9
Wedge L1 RT -6 - 06/10/22	200	2.03	0.29	17	1.74	97.5	1.3
Wedge L1 RT -7 - 06/10/22	200	2.02	0.29	17	1.73	95.2	1.6
Wedge L1 RT -8 - 06/10/22	200	2.03	0.27	15	1.77	95.1	2.3
Wedge L1 RT -9 - 06/10/22	200	2.03	0.27	15	1.76	96.7	2.2
Wedge L2 NDT 1 - 14/10/22	200	2.12	0.29	16	1.83	98.2	-2.6
Wedge L2 NDT 2 - 14/10/22	200	2.06	0.28	16	1.78	96.0	0.5
Wedge L2 NDT 3 - 14/10/22	200	2.08	0.28	15	1.81	97.1	-0.3
Wedge L2 NDT 4 - 14/10/22	200	2.07	0.28	16	1.79	96.3	0.2
Wedge L2 NDT 5 - 14/10/22	200	2.06	0.27	15	1.79	96.3	0.9
Wedge L2 NDT 6 - 14/10/22	200	2.05	0.27	15	1.78	95.7	1.7
Wedge L2 NDT 7 - 14/10/22	200	2.06	0.28	16	1.78	95.7	0.1
Wedge L2 NDT 8 - 14/10/22	200	2.05	0.27	15	1.78	95.5	1.7
Wedge L2 NDT 9 - 14/10/22	200	2.05	0.27	15	1.78	95.8	1.5
Wedge L3 NDT 1 - 14/10/22	200	2.06	0.28	16	1.78	95.6	0.2
Wedge L3 NDT 2 - 14/10/22	200	2.08	0.29	16	1.79	96.4	-1.1
Wedge L3 NDT 3 - 14/10/22	200	2.06	0.28	16	1.78	95.8	0.4

Template Version: 2.0

Comments:

Authorised Signatory


M. O'Hara - Operations Manager

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 Results relate only to the samples tested. Tests carried out at site. Where reported, oven dried moisture carried out to BS 1377: Part 2

Construction Testing Solutions Ltd. - Company No. 05998333

Report No.	DNR/118121-120095	 Construction Testing Solutions	
Report Date	10/11/2022		
Core SP 2175 Century Way Thorpe Park Leeds LS15 8ZB Site: Gateway 36, Phase 3, Barnsley	Sample No(s)	DN4710/32-46	Doncaster Laboratory Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk
	Client Reference	See Below	
	Material Description	Colliery Spoil/ Clay	
	Area Tested	See Below	
	Date Sampled/Tested	See Below	
	Sample Plan	Client Specification	
	Weather Conditions	Overcast	
	Source	Not Stated	
	Supplier	Not Stated	
	Date Completed	See Below	
Operator	MS		



TEST REPORT

Insitu Density & Moisture Content - Nuclear Density Gauge. Tested in Accordance with BS 1377: 1990: Part 9: 1990

Ground Investigation Absolute Tests

Density Gauge Data		Material Data		Gauge Corrections Applied			
Gauge model	InstroTek Xplorer 3500	Maximum Dry Density (MDD)	1.86 Mg/m³	Bulk Density		Moisture Density	
Gauge S/N	3249	Optimum Moisture Content	N/A %	Gradient (b)	0.520	Gradient (d)	0.390887529
Mode	Direct Transmission	Particle Density (Assumed)	2.49 Mg/m³	Intercept (a)	0.972	Intercept (c)	0.150
		Source sample reference	Client Supplied	D=(BD x b)+a		M=(MD x d)+c	

Test Location	Probe Depth mm	Bulk Density Mg/m³	Moisture Density Mg/m³	Gauge Moisture %	Dry Density Mg/m³	Compaction %	Air Voids %
Wedge L3 NDT 4 - 14/10/22	200	2.06	0.26	15	1.80	96.9	1.4
Wedge L3 NDT 5 14/10/22	200	2.05	0.25	14	1.80	96.8	2.5
Wedge L3 NDT 6 -14/10/22	200	2.06	0.26	14	1.81	97.2	1.7
Wedge L3 NDT 7 - 14/10/22	200	2.08	0.26	14	1.82	97.7	1.2
Wedge L3 NDT 8 - 14/10/22	200	2.05	0.26	14	1.79	96.4	2.2
Wedge L3 NDT 9 - 14/10/22	200	2.06	0.26	14	1.81	97.1	1.8
Wedge L4 NDT 1 - 19/10/22	200	2.10	0.26	14	1.83	98.5	0.1
Wedge L4 NDT 2 - 19/10/22	200	2.09	0.27	15	1.82	98.0	0.0
Wedge L4 NDT 3 - 19/10/22	200	2.07	0.29	16	1.77	95.4	-0.3
Wedge L4 NDT 4 - 19/10/22	200	2.07	0.28	16	1.79	96.2	0.0
Wedge L4 NDT 5 - 19/10/22	200	2.08	0.26	14	1.82	98.0	1.0
Wedge L4 NDT 6 - 19/10/22	200	2.06	0.27	15	1.80	96.5	1.3
Wedge L4 NDT 7 - 19/10/22	200	2.08	0.27	15	1.81	97.3	0.1
Wedge L4 NDT 8 - 19/10/22	200	2.09	0.28	15	1.81	97.4	-0.6
Wedge L4 NDT 9 - 19/10/22	200	2.09	0.27	15	1.81	97.6	0.0
Wedge L5 NDT 1 - 19/10/22	200	2.08	0.28	16	1.79	96.4	-0.3
Wedge L5 NDT 2 - 19/10/22	200	2.08	0.27	15	1.81	97.3	0.4
Wedge L5 NDT 3 - 19/10/22	200	2.03	0.26	15	1.77	95.2	2.5
Wedge L5 NDT 4 - 19/10/22	200	2.08	0.27	15	1.81	97.1	0.4
Wedge L5 NDT 5 - 19/10/22	200	2.05	0.26	15	1.79	96.0	2.2
Wedge L5 NDT 6 - 19/10/22	200	2.04	0.25	14	1.79	96.2	2.7
Wedge L5 NDT 7 - 19/10/22	200	2.06	0.27	15	1.78	95.8	0.9
Wedge L5 NDT 8 - 19/10/22	200	2.06	0.27	15	1.78	95.9	1.0
Wedge L5 NDT 9 - 19/10/22	200	2.05	0.26	15	1.79	96.1	2.2
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-

Template Version: 2.0

Comments:

Authorised Signatory


M. O'Hara - Operations Manager

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Construction Testing Solutions Ltd. - Company No. 05998333

** END OF REPORT **

TEST REPORT:
In-Situ Dry Density, Relative Compaction And Air Voids

BS 1377-9: 1990 Nuclear Density Method Compliance tests for compacted material (Direct transmission)

REPORT NUMBER:

C1061682 / 235892.2.1.1

CLIENT REF:

1061682

CLIENT:

Core Special Projects Ltd

DATE COMPLETED:

08/02/2023

ADDRESS:

2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

TESTED BY:

Kieran Perkins

SITE:

Gateway 36, Barnsley - SITE

 ENVIRONMENTAL
CONDITIONS:

Clear

SAMPLING PLAN:

Client Specification

GAUGE MODEL No:

T7

SUPPLIER / SOURCE:

Ex site Ex site

GAUGE SERIAL No:

Gauge

MATERIAL:

Colliery Spoil Grey

CORRECTION FACTORS:

 Bulk $\gamma = 0.517x + 0.972$
Moisture $b = 0.391x + 0.149$

LOCATION:

SPECIFIC GRAVITY:

 2.490 Mg/m³

MAX DRY DENSITY:

 1.860 Mg/m³

DEPTH OF TEST

200

TEST RESULTS

Activity Location: On-Site

Test No.	Gauge Bulk Density (Mg/m ³)	Gauge Moisture Density (Mg/m ³)	Corrected Bulk Density (Mg/m ³)	Corrected Moisture Content (%)	Mean Dry Density (Mg/m ³)	Mean Moisture Content (%)	Mean Air Voids (%)	Mean Relative Compaction (%)
Layer 1 (SOFT SPOT)	2.152	0.360	2.08	16				
	2.136	0.350	2.08	16	1.79	16	-0.8	96
NDM 1	2.094	0.314	2.05	15				
	2.103	0.326	2.06	16	1.78	15	1.0	96
Layer 2	2.129	0.338	2.07	16				
	2.116	0.330	2.07	16	1.79	16	0.2	96
NDM 4	2.096	0.314	2.06	15				
	2.111	0.303	2.06	15	1.79	15	1.2	96
NDM 2	2.131	0.349	2.07	16				
	2.144	0.355	2.08	16	1.79	16	-0.6	96

Remarks:

Test results reported relate only to the items tested.

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Amended report. This test report supersedes test report version 1 - re-reported

Report Format: S/Rep STP NDM-S (voids) Rev 4

 Bootham Lane Industrial Estate
Dunscroft,
Doncaster,
South Yorkshire
DN7 4JU

 0343 227 8545
enquiries@constructiontesting.co.uk
www.constructiontesting.co.uk

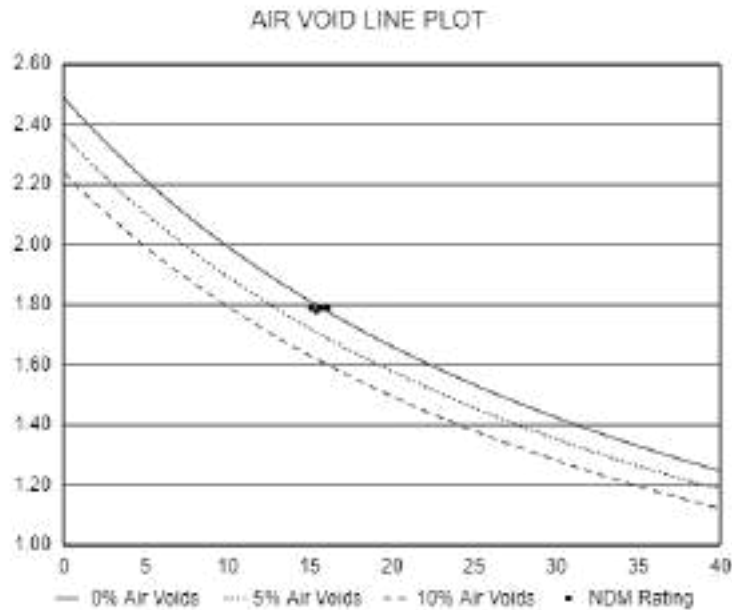
 Construction Testing Solutions Ltd.
Registered in England No. 05998333

Report version 2

Page 1 of 2

TEST REPORT: In-Situ Dry Density, Relative Compaction And Air Voids
 BS 1377-9: 1990 Nuclear Density Method Compliance tests for compacted material (Direct transmission)

REPORT NUMBER: C1061682 / 235892.2.1.1



Remarks:
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 Amended report. This test report supersedes test report version 1 - re-reported

Report Format: S/Rep STP NDM-S (voids) Rev 4

Bootham Lane Industrial Estate
 Dunscroft,
 Doncaster,
 South Yorkshire
 DN7 4JU

0343 227 8545
 enquiries@constructiontesting.co.uk
www.constructiontesting.co.uk
 END OF REPORT

For and on behalf of CTS
 Matty O'Hara - Operations Manager



Approved Signatory
 Report date 10-Mar-23

Construction Testing Solutions Ltd.
 Registered in England No. 05998333

Report version 2



4161

APPENDIX F

LABORATORY GEOTECHNICAL TEST RESULTS

TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 - 2 : 1990, Method 3.2

REPORT NUMBER: C1061321 / 194472.6.1.1

SAMPLE NUMBER: 301576

CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/1

ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022

SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS

SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022

MATERIAL: Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)

DATE COMPLETED: 26/07/2022

CLASSIFICATION: Class 2C

TESTED BY: IS, BH, MD, BM

LOCATION: Surcharge Stockpile

TYPE OF SAMPLE: Disturbed

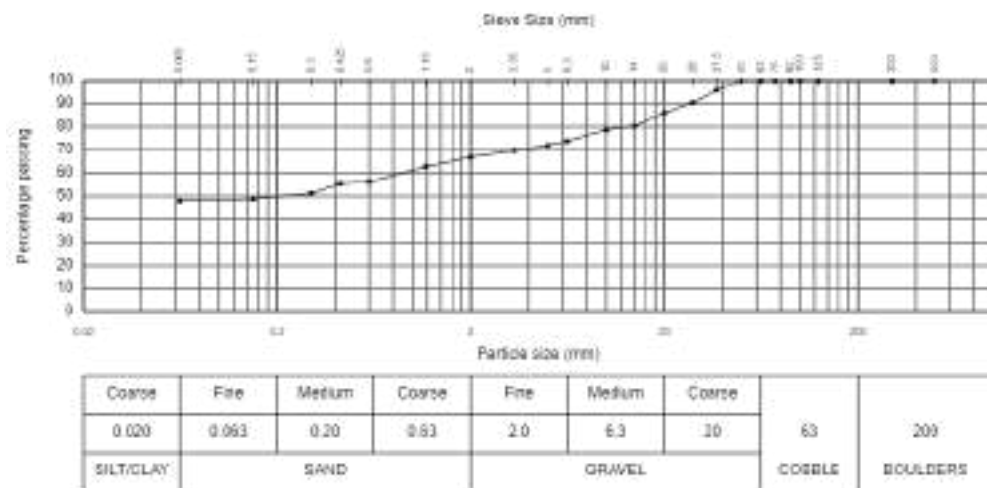
PREPARATION METHOD: BS 1377:Part 1:2016 clause 8.3 & 8.4.5

VARIATIONS: No variations

SAMPLING PLAN: Client Specification

METHOD OF SAMPLING: Unknown

WITHIN ORIGINAL SAMPLE:

RESULT Test Location: CTS Doncaster


Percentage BOULDERS: 0.0%

Percentage COBBLES: 0.0%

Percentage GRAVEL: 33.1%

Percentage SAND: 18.9%

Percentage SILT/CLAY: 48.0%

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Moisture content: 15%

SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	96	
28	90	
20	86	
14	80	
10	79	
6.3	74	
5	72	
3.35	70	
2	67	15 - 80
1.18	63	
0.6	56	
0.425	55	
0.3	51	
0.15	49	
0.063	48	15 - 80

Remarks:

Test results reported relate only to the items tested.

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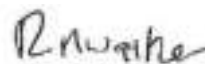
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Report Format: PSDsoil/TP02/Rep Issue 1 Rev 0 05/17

For and on behalf of CTS

Reece Walker - Senior Technician



 Approved Signatory
Report date 27-Jul-22

TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1061321 / 194472.2.1.1

SAMPLE NUMBER: 301576 CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/1 ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022 SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022 MATERIAL: Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)

DATE COMPLETED: 21/07/2022 FILL LOCATION: Surcharge Stockpile

TESTED BY: HB, RF CERTIFICATE OF SAMPLING: No

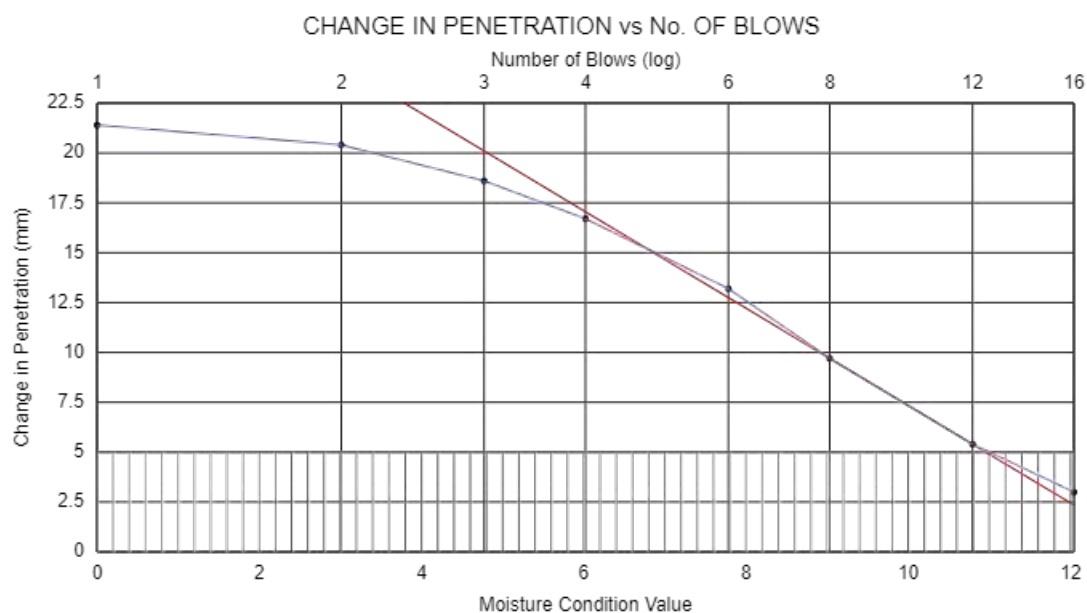
TYPE OF SAMPLE: Unknown SAMPLING PLAN: Client Specification

ENVIRONMENTAL CONDITIONS: Unknown METHOD OF SAMPLING: Unknown

WITHIN ORIGINAL SAMPLE:

RESULTS Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	11.0
NATURAL MOISTURE CONTENT (%)	16
PERCENTAGE RETAINED 20mm (%)	5.3
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



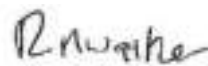
Remarks:
Test results reported relate only to the items tested.
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Report Format: MCV/TP08/Rep Issue 1 Rev 1 06/22

Bootham Lane Industrial Estate,
Dunscroft,
Doncaster,
South Yorkshire DN7 4JU

0343 227 8545
enquiries@constructiontesting.co.uk
www.constructiontesting.co.uk
END OF REPORT

For and on behalf of CTS
Reece Walker - Senior Technician



Approved Signatory
Report date 27-Jul-22

Construction Testing Solutions Ltd.
Registered in England No. 05998333

Report version 1

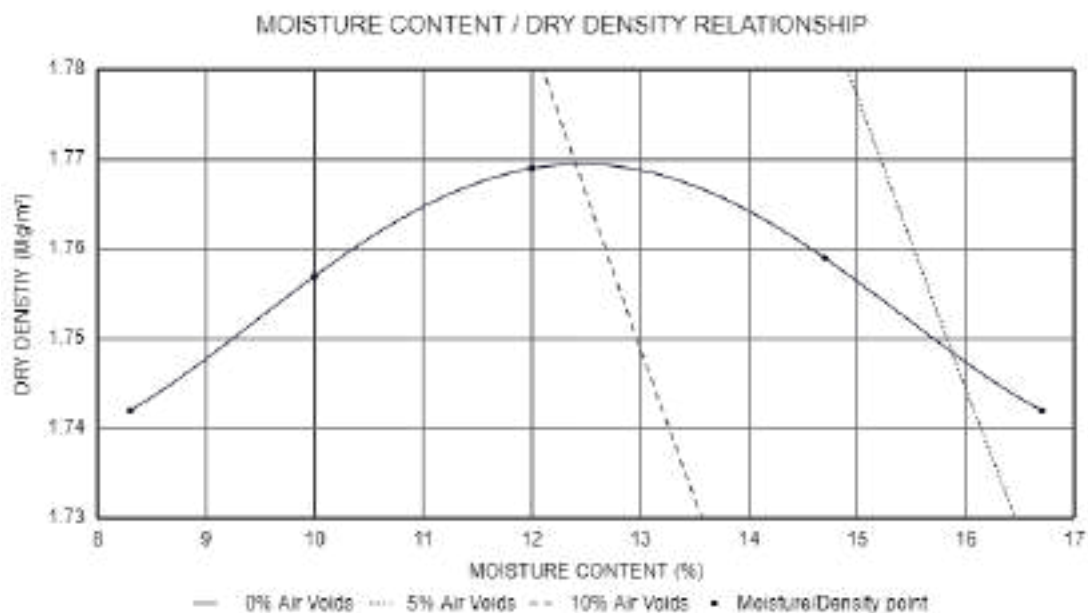


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.4 2.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.5.1.1		
SAMPLE NUMBER:	301576	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/1	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	27/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	RW, IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.77 Mg/m³
OPTIMUM MOISTURE CONTENT: 12 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 7 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 2 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.6 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



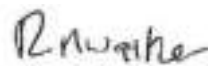
Remarks:
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Report Format: OMC2.5/TP06/Rep Issue 1 Rev 1 06/22

Bootham Lane Industrial Estate,
 Dunscoft,
 Doncaster,
 South Yorkshire DN7 4JU

0343 227 8545
 enquiries@constructiontesting.co.uk
www.constructiontesting.co.uk
 END OF REPORT

For and on behalf of CTS
 Reece Walker - Senior Technician



Approved Signatory
 Report date 27-Jul-22

Construction Testing Solutions Ltd.
 Registered in England No. 05998333

Report version 1



4161

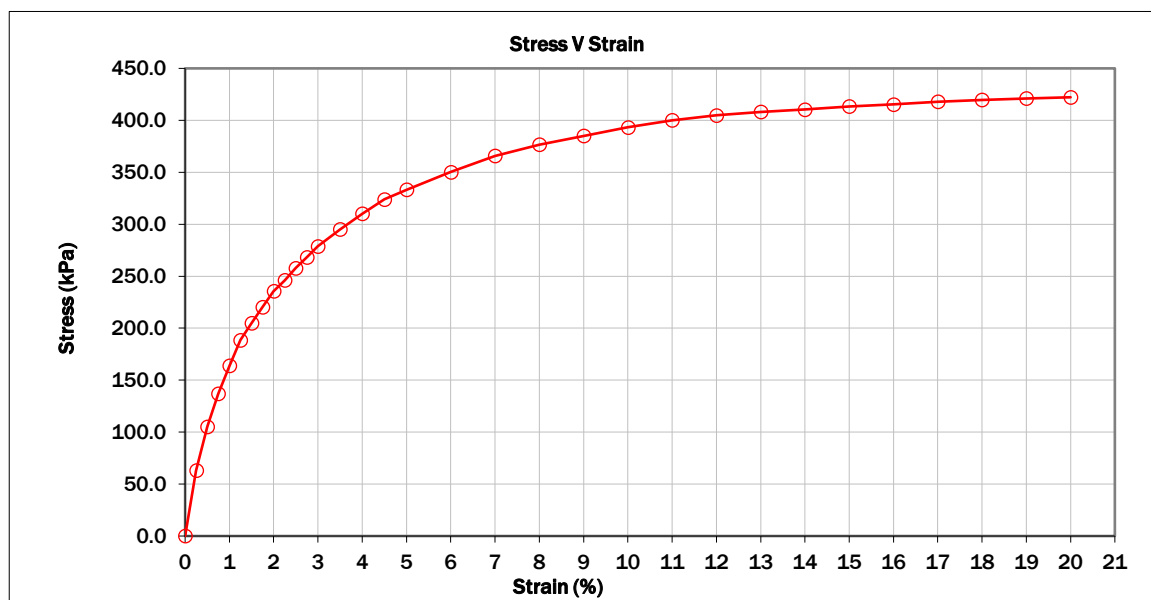
Laboratory Report	DNR/112632	Contract Sample No	DN4710/1	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk 	
Report Date	29/07/2022	Clients Reference	DN4710/1		
Core SP 2175 Century Way Thorpe Park Leeds LS15 8ZB		Material Description	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)		
		Date Sampled	01/07/2022		
		Sampling Plan	Client Specification		
		Source	Site Won		
		Supplier	Site Won		
		Sampled By	CTS		
		Sampling Environment	Not Stated		
		Sample Type	Bulk		
Gateway 36 Phase 3, Barnsley		Location in sample	N/A	Date Received	01/07/2022
		Sample Location	Surcharge Stockpile	Date Tests Completed	28/07/2022
				TEST REPORT	

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement
Tested in Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompactd using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	2.10	Mg/m ³
Initial moisture content	16	%
Initial dry density	1.81	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	1.3	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	421	kPa
Strain at failure	20.0	%
Time at Failure	20 Minutes, 0 Seconds	
Mode of failure	Plastic	

Laboratory Temperature
18-22 °C



**Undrained Shear
Strength, c_u
210 kPa**

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.

Template Version: 1.61

Authorized Signatory

R Walker
R Walker - Senior Lab Technician

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** END OF REPORT **

Construction Testing Solutions Ltd - Company No. 05998333

TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:	C1061321 / 194472.3.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	Core Special Projects Ltd
CLIENT REF:	See Below	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	19/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, DW, SV	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD: :	BS1377:Part1:2016 clauses 8.3 and 8.4.2
ORIENTATION OF TEST SPECIMEN WITHIN ORIGINAL SAMPLE:	N/A	VARIATIONS:	None
		METHOD OF PREPARATION:	None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
301576	DN4710/1	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)	2.60

Remarks:

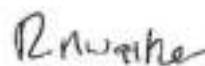
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 END OF REPORT

 For and on behalf of CTS
 Reece Walker - Senior Technician



 Approved Signatory
 Report date 27-Jul-22

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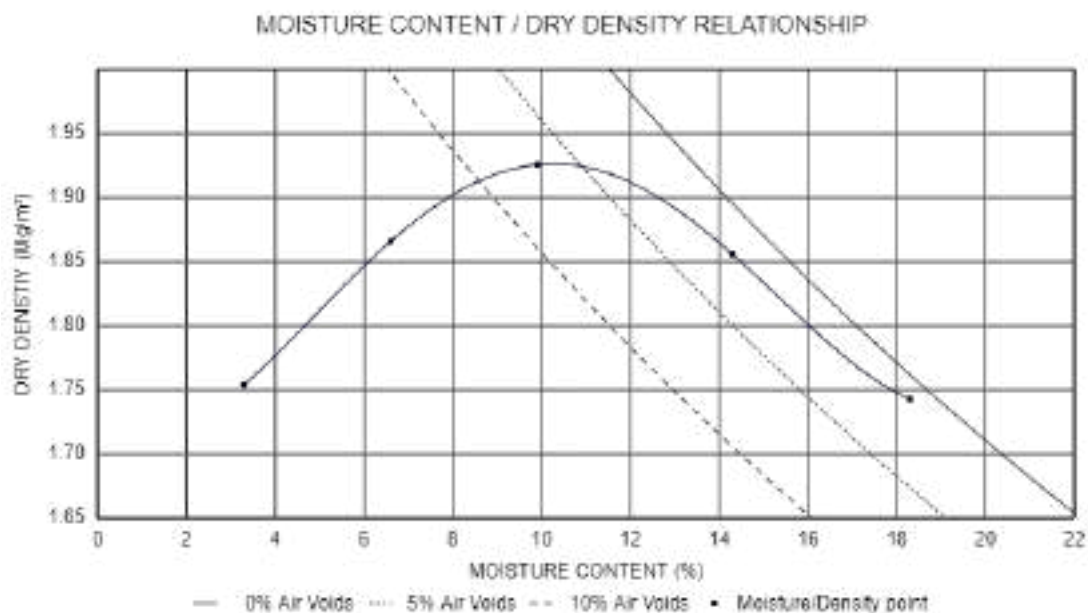


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.6 4.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.4.1.1		
SAMPLE NUMBER:	301576	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/1	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	03/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.93 Mg/m³
OPTIMUM MOISTURE CONTENT: 10 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 7 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 2 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.6 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



Remarks:
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For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



Approved Signatory
 Report date 04-Aug-22

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Report version 1



4161

TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1061321 / 194472.7.1.1		
SAMPLE NUMBER:	301576	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/1	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	11/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	Danielle Wilkinson	PREPARATION METHOD:	BS 1377:Part 1:2016 cl 8.3 & 8.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A	SAMPLING PLAN:	Client Specification

RESULTS: **Test Location: CTS Doncaster**

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	37%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	20%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	17%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	64%		
Sample History:	The material was tested after washing through a 425µm test sieve		

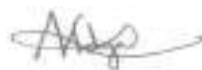
Remarks:
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For and on behalf of CTS
Alex Edgar - Senior Laboratory Technician



Approved Signatory
Report date 16-Aug-22

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4161

TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 - 2 : 1990, Method 3.2

REPORT NUMBER:

C1061321 / 194472.13.1.1

SAMPLE NUMBER:

301578

CLIENT:

Core Special Projects Ltd

CLIENT REF:

DN4710/2

ADDRESS:

2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED:

01/07/2022

SITE:

Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY:

CTS

SUPPLIER:

Ex-Site, Ex-Site

DATE RECEIVED:

01/07/2022

MATERIAL:

Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)

DATE COMPLETED:

26/07/2022

CLASSIFICATION:

Class 2C

TESTED BY:

IS, BH, MD, BM

LOCATION:

Surcharge Stockpile

TYPE OF SAMPLE:

Disturbed

PREPARATION METHOD:

BS 1377:Part 1:2016 clause 8.3 & 8.4.5

VARIATIONS:

No variations

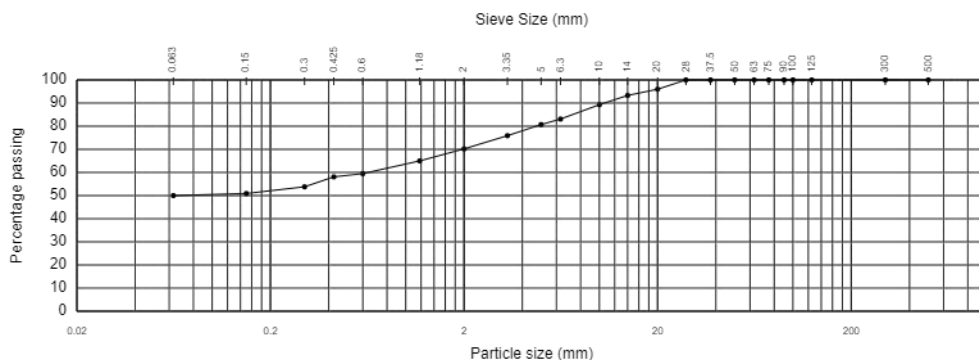
SAMPLING PLAN:

Client Specification

METHOD OF SAMPLING:

Unknown

 WITHIN ORIGINAL
SAMPLE:

RESULT Test Location: CTS Doncaster


Coarse	Fine	Medium	Coarse	Fine	Medium	Coarse	63	200
0.020	0.063	0.20	0.63	2.0	6.3	20		
SILT/CLAY	SAND			GRAVEL				

Percentage BOULDERS: 0.0%
 Percentage COBBLES: 0.0%
 Percentage GRAVEL: 29.8%
 Percentage SAND: 20.2%
 Percentage SILT/CLAY: 50.0%

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Moisture content: 14%

SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	100	
28	100	
20	96	
14	93	
10	89	
6.3	83	
5	81	
3.35	76	
2	70	15 - 80
1.18	65	
0.6	60	
0.425	58	
0.3	54	
0.15	51	
0.063	50	15 - 80

Remarks:

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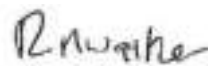
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For and on behalf of CTS

Reece Walker - Senior Technician



Approved Signatory
 Report date 27-Jul-22

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Report version 1



4161

TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1061321 / 194472.9.1.1

SAMPLE NUMBER: 301578 **CLIENT:** Core Special Projects Ltd

CLIENT REF: DN4710/2 **ADDRESS:** 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022 **SITE:** Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS **SUPPLIER:** Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022 **MATERIAL:** Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)

DATE COMPLETED: 21/07/2022 **FILL LOCATION:** Surcharge Stockpile

TESTED BY: HB, RF **CERTIFICATE OF SAMPLING:** No

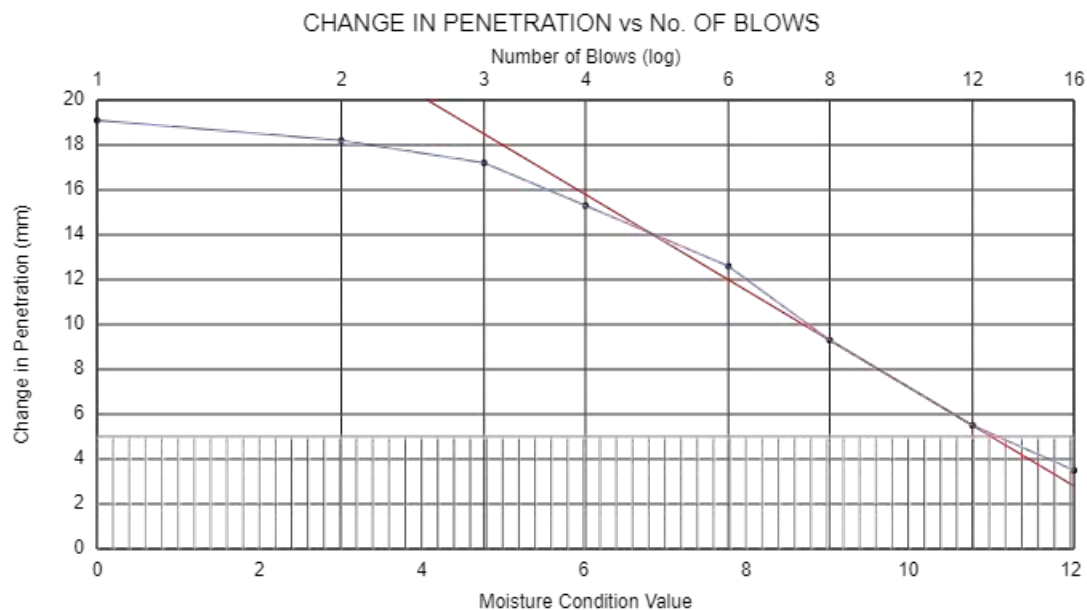
TYPE OF SAMPLE: Unknown **SAMPLING PLAN:** Client Specification

ENVIRONMENTAL CONDITIONS: Unknown **METHOD OF SAMPLING:** Unknown

WITHIN ORIGINAL SAMPLE:

RESULTS **Test Location: CTS Doncaster**

MOISTURE CONDITION VALUE	11.0
NATURAL MOISTURE CONTENT (%)	14
PERCENTAGE RETAINED 20mm (%)	5.7
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



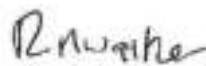
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Reece Walker - Senior Technician



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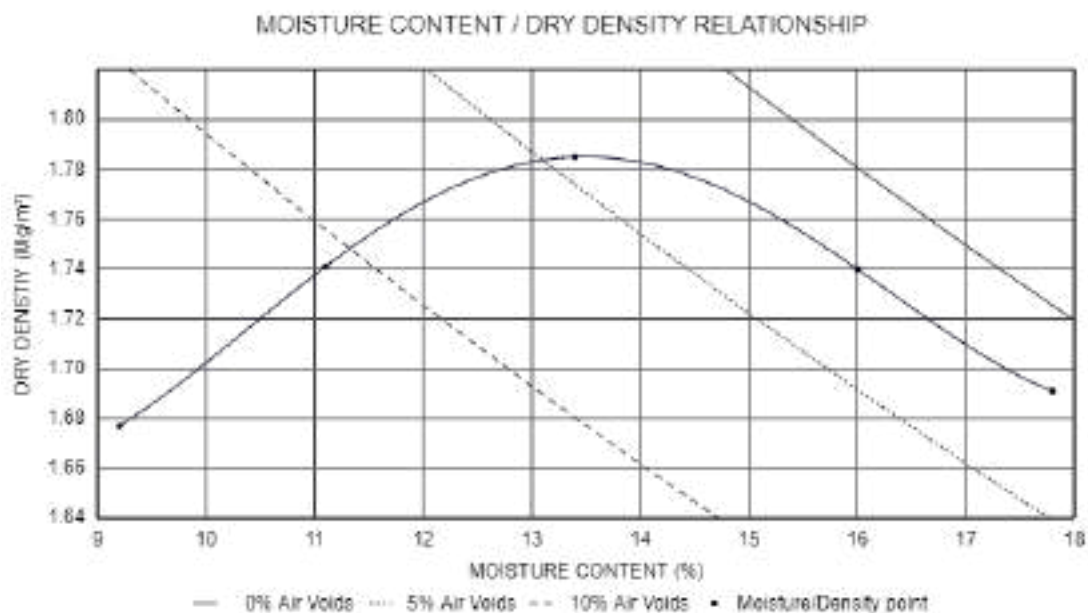


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.4 2.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.12.1.1		
SAMPLE NUMBER:	301578	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/2	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	27/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	RW, IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.79 Mg/m³
OPTIMUM MOISTURE CONTENT: 13 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 8 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 3 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.49 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



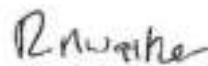
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 Reece Walker - Senior Technician



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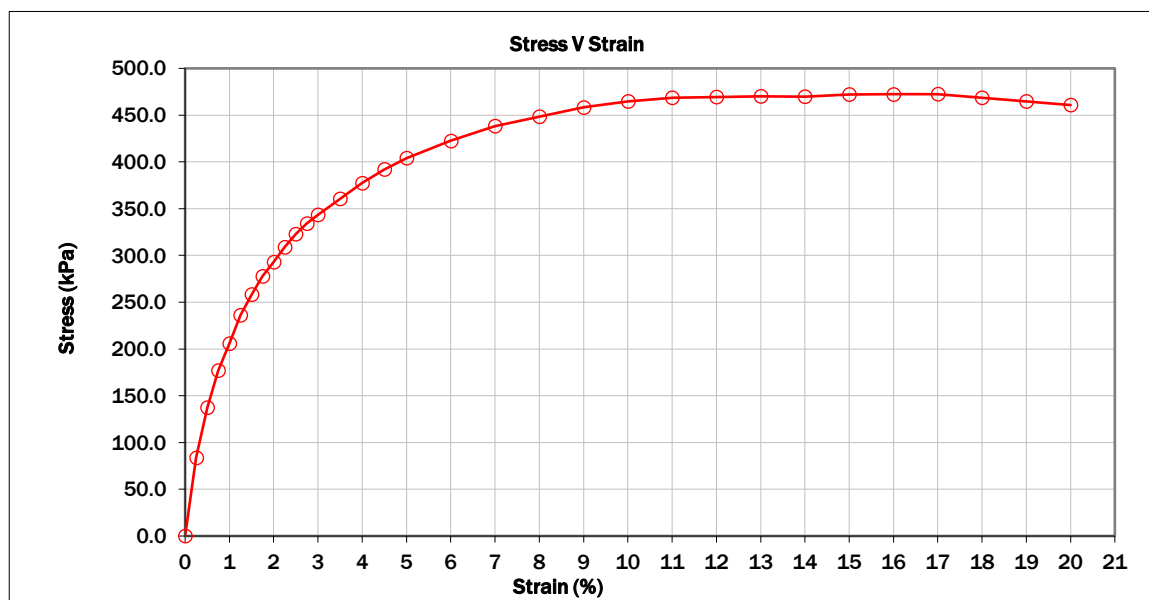
Laboratory Report	DNR/112633	Contract Sample No	DN4710/2	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	29/07/2022	Clients Reference	DN4710/2		
Core SP 2175 Century Way Thorpe Park Leeds LS15 8ZB		Material Description	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)		
		Date Sampled	01/07/2022		
		Sampling Plan	Client Specification		
		Source	Site Won		
		Supplier	Site Won		
		Sampled By	CTS		
		Sampling Environment	Not Stated		
		Sample Type	Bulk		
Gateway 36 Phase 3, Barnsley		Location in sample	N/A	Date Received	01/07/2022
		Sample Location	Surcharge Stockpile	Date Tests Completed	28/07/2022
				TEST REPORT	

Determination of Undrained Shear Strength in Triaxial Compression Without Pore Pressure Measurement
Tested in Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompactd using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	2.08	Mg/m ³
Initial moisture content	15	%
Initial dry density	1.80	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	1.1	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	471	kPa
Strain at failure	17.0	%
Time at Failure	17 Minutes, 0 Seconds	
Mode of failure	Compound	

Laboratory Temperature
18-22 °C



**Undrained Shear
Strength, c_u
236 kPa**

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Time to failure was outside the BS1377, 5 to 15 minute requirement for this test when carried out at the SHW required rate of 1%/minute.

Template Version: 1.61

Authorized Signatory

R Walker
R Walker – Senior Lab Technician

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TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:	C1061321 / 194472.10.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	Core Special Projects Ltd
CLIENT REF:	See Below	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	19/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, DW, SV	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD: :	BS1377:Part1:2016 clauses 8.3 and 8.4.2
ORIENTATION OF TEST SPECIMEN WITHIN ORIGINAL SAMPLE:	N/A	VARIATIONS:	None
		METHOD OF PREPARATION:	None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
301578	DN4710/2	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)	2.49

Remarks:

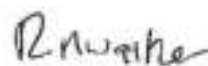
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 Reece Walker - Senior Technician



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 Report date 27-Jul-22

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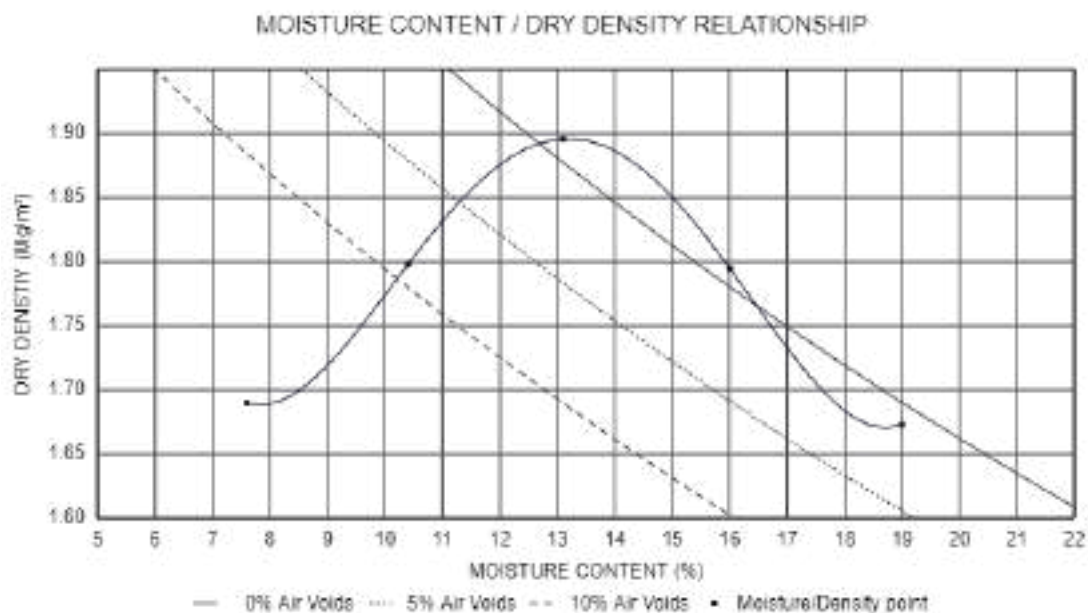


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.6 4.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.11.1.1		
SAMPLE NUMBER:	301578	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/2	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	05/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.86 Mg/m³
OPTIMUM MOISTURE CONTENT: 13 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 8 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 3 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.49 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



Remarks:
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For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



Approved Signatory
 Report date 09-Aug-22

Construction Testing Solutions Ltd.
 Registered in England No. 05998333

Report version 1



4161

TEST REPORT:	DETERMINATION OF THE PLASTICITY INDEX OF SOIL		
	BS 1377:Part 2:1990 clause 5.4		
REPORT NUMBER:	C1061321 / 194472.14.1.1		
SAMPLE NUMBER:	301578	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/2	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Slightly Gravelly Slightly Sandy CLAY (Colliery Spoil)
DATE COMPLETED:	11/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	Danielle Wilkinson	PREPARATION METHOD:	BS 1377:Part 1:2016 cl 8.3 & 8.4.3
TYPE OF SAMPLE:	Disturbed	VARIATIONS:	None
WITHIN ORIGINAL SAMPLE:	N/A	SAMPLING PLAN:	Client Specification

RESULTS: **Test Location: CTS Doncaster**

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	36%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	20%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	16%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	62%		
Sample History:	The material was tested after washing through a 425µm test sieve		

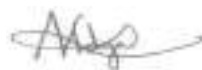
Remarks:
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END OF REPORT

For and on behalf of CTS
Alex Edgar - Senior Laboratory Technician



Approved Signatory
Report date 16-Aug-22

Construction Testing Solutions Ltd.
Registered in England No. 05998333



4161

TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 - 2 : 1990, Method 3.2

REPORT NUMBER: C1061321 / 194472.20.1.1

SAMPLE NUMBER: 301579

CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/3

ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022

SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS

SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022

MATERIAL: Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)

DATE COMPLETED: 26/07/2022

CLASSIFICATION: Class 2C

TESTED BY: IS, BH, MD, BM

LOCATION: Surcharge Stockpile

TYPE OF SAMPLE: Disturbed

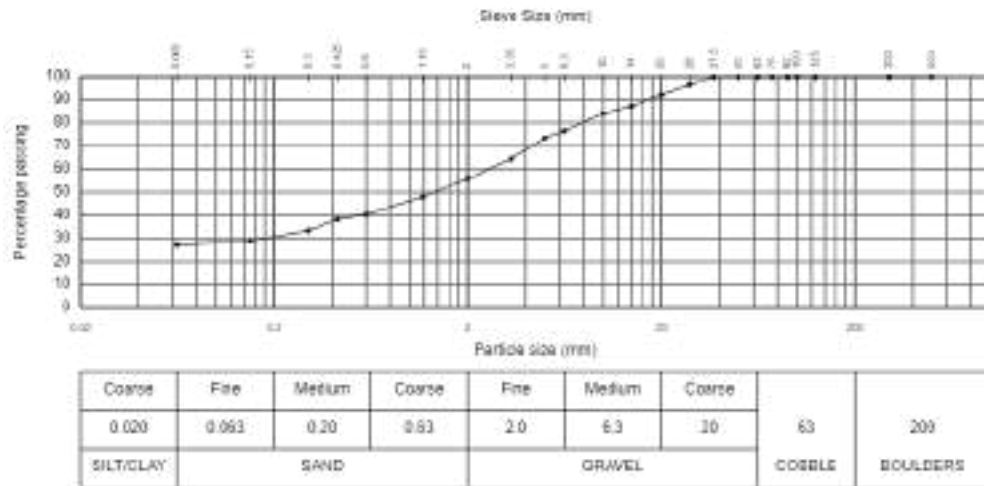
PREPARATION METHOD: BS 1377:Part 1:2016 clause 8.3 & 8.4.5

VARIATIONS: No variations

SAMPLING PLAN: Client Specification

METHOD OF SAMPLING: Unknown

WITHIN ORIGINAL SAMPLE:

RESULT Test Location: CTS Doncaster


Percentage BOULDERS: 0.0%
 Percentage COBBLES: 0.0%
 Percentage GRAVEL: 44.2%
 Percentage SAND: 28.6%
 Percentage SILT/CLAY: 27.2%

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Moisture content: 8.7%

SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	100	
28	96	
20	92	
14	87	
10	84	
6.3	76	
5	73	
3.35	64	
2	56	15 - 80
1.18	48	
0.6	40	
0.425	38	
0.3	33	
0.15	29	
0.063	27	15 - 80

Remarks:

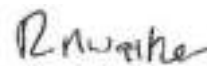
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For and on behalf of CTS
 Reece Walker - Senior Technician



Approved Signatory
 Report date 27-Jul-22

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Report version 1



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TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1061321 / 194472.16.1.1

SAMPLE NUMBER: 301579 **CLIENT:** Core Special Projects Ltd

CLIENT REF: DN4710/3 **ADDRESS:** 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022 **SITE:** Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS **SUPPLIER:** Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022 **MATERIAL:** Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)

DATE COMPLETED: 21/07/2022 **FILL LOCATION:** Surcharge Stockpile

TESTED BY: HB, RF **CERTIFICATE OF SAMPLING:** No

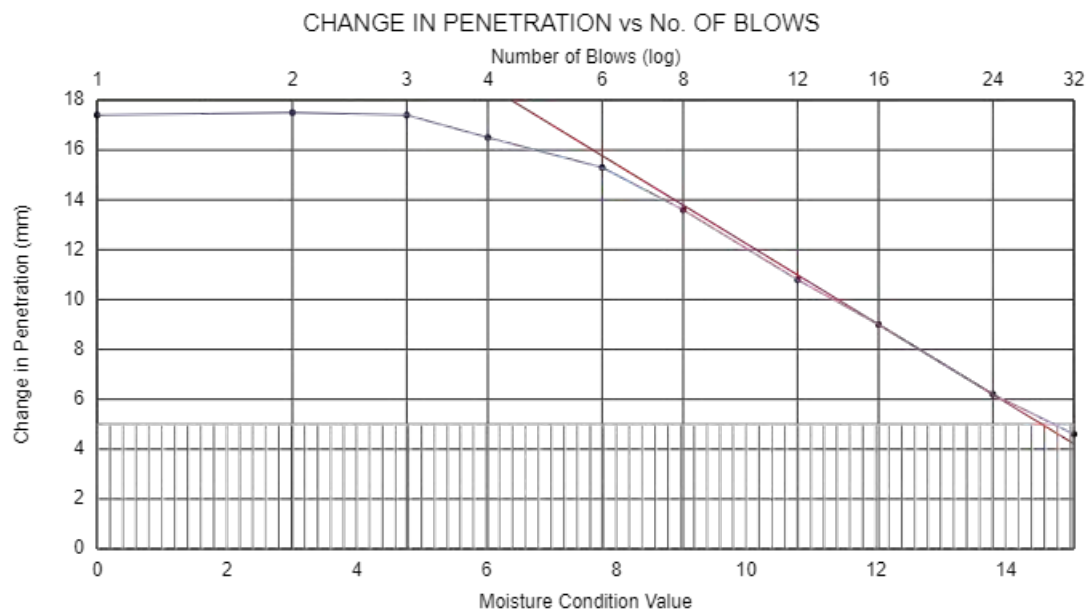
TYPE OF SAMPLE: Unknown **SAMPLING PLAN:** Client Specification

ENVIRONMENTAL CONDITIONS: Unknown **METHOD OF SAMPLING:** Unknown

WITHIN ORIGINAL SAMPLE:

RESULTS **Test Location: CTS Doncaster**

MOISTURE CONDITION VALUE	14.6
NATURAL MOISTURE CONTENT (%)	8.7
PERCENTAGE RETAINED 20mm (%)	6.7
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



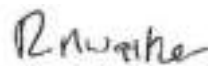
Remarks:
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Reece Walker - Senior Technician



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Report version 1



4161

TEST REPORT: **DETERMINATION OF THE PLASTICITY INDEX OF SOIL**
 BS 1377:Part 2:1990 clause 5.4

REPORT NUMBER: C1061321 / 194472.21.1.1

SAMPLE NUMBER: 301579 CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/3 ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022 SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022 MATERIAL: Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)

DATE COMPLETED: 25/08/2022 LOCATION: Surcharge Stockpile

TESTED BY: Danielle Wilkinson PREPARATION METHOD: BS 1377:Part 1:2016 cl 8.3 & 8.4.3

TYPE OF SAMPLE: Disturbed VARIATIONS: None

WITHIN ORIGINAL SAMPLE: N/A SAMPLING PLAN: Client Specification

RESULTS: Test Location: CTS Doncaster

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	31%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	15%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	16%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	36%		
Sample History:	The material was tested after washing through a 425µm test sieve		

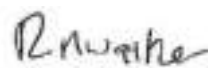
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 Reece Walker - Senior Technician



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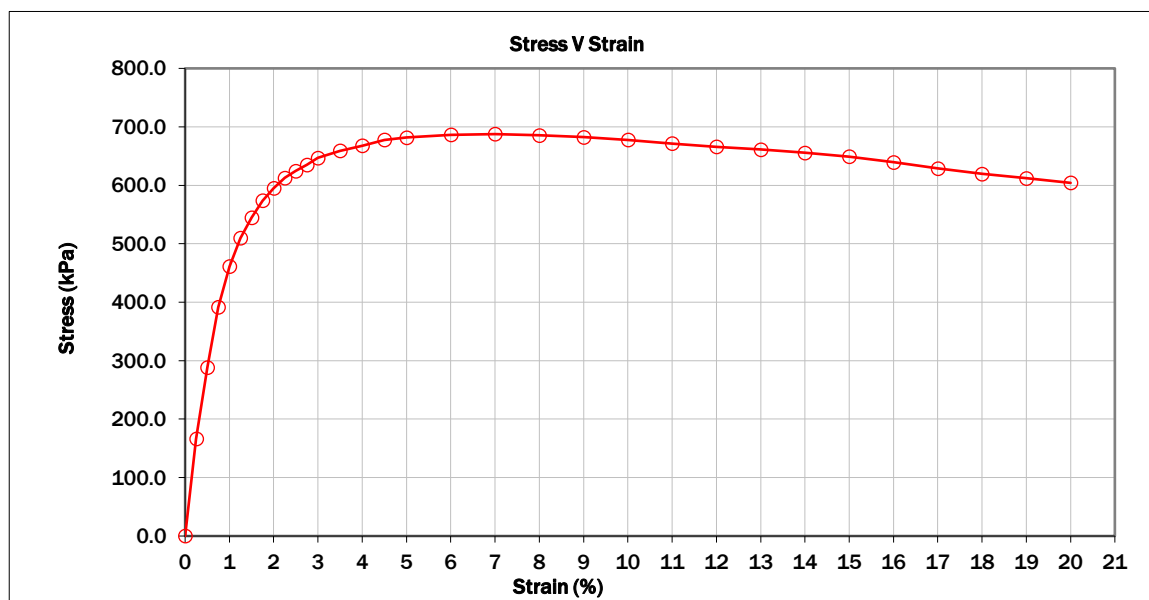
Laboratory Report	DNR/112634	Contract Sample No	DN4710/3	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU 
Report Date	02/08/2022	Clients Reference	DN4710/3	
Core SP 2175 Century Way Thorpe Park Leeds LS15 8ZB Gateway 36 Phase 3, Barnsley	Material Description		Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)	
	Date Sampled		01/07/2022	
	Sampling Plan		Client Specification	
	Source		Site Won	
	Supplier		Site Won	
	Sampled By		CTS	
	Sampling Environment		Not Stated	
	Sample Type		Bulk	
Location in sample		N/A	Date Received	01/07/2022
Sample Location		Surcharge Stockpile	Date Tests Completed	01/08/2022
TEST REPORT				

Determination of Undrained Shear Strength In Triaxial Compression Without Pore Pressure Measurement
Tested In Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	1.88	Mg/m ³
Initial moisture content	8.5	%
Initial dry density	1.73	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	0.6	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	687	kPa
Strain at failure	7.0	%
Time at Failure	7 Minutes, 0 Seconds	
Mode of failure	Compound	

Laboratory Temperature
18-22 °C



Undrained Shear Strength, c_u
344 kPa

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Template Version: 1.61

Authorised Signatory

R Walker
R Walker – Senior Lab Technician

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Results relate only to the sample(s) as received.

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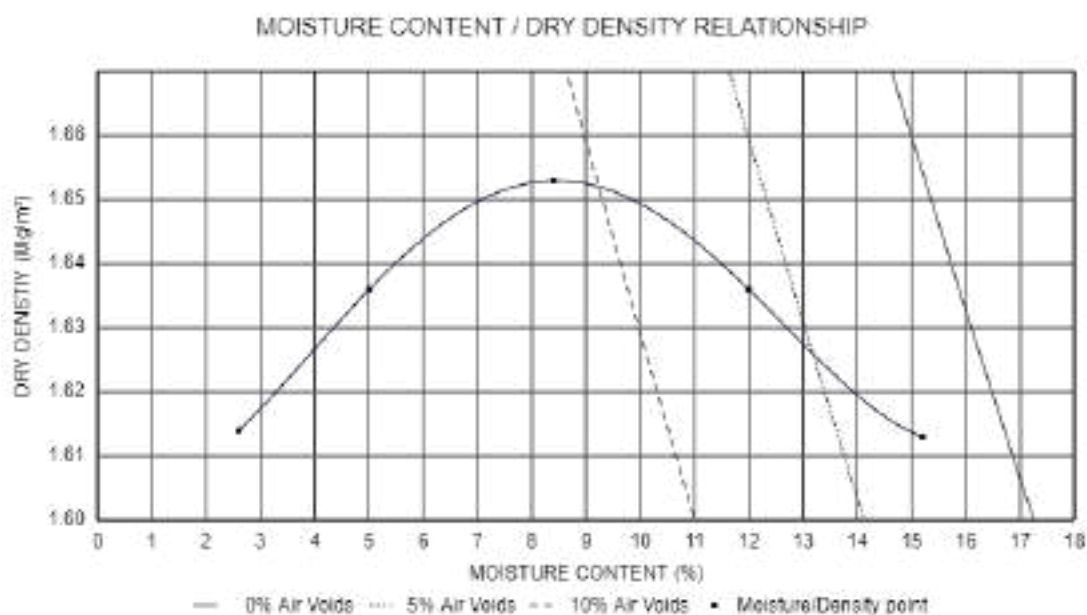
**** END OF REPORT ****

Construction Testing Solutions Ltd - Company No. 05998333

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.4 2.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.19.1.1		
SAMPLE NUMBER:	301579	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/3	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)
DATE COMPLETED:	04/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	AE, IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.65 Mg/m³
OPTIMUM MOISTURE CONTENT: 8.5 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 11 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 4 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.21 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



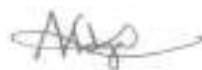
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 For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



 Approved Signatory
 Report date 04-Aug-22

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Report version 1

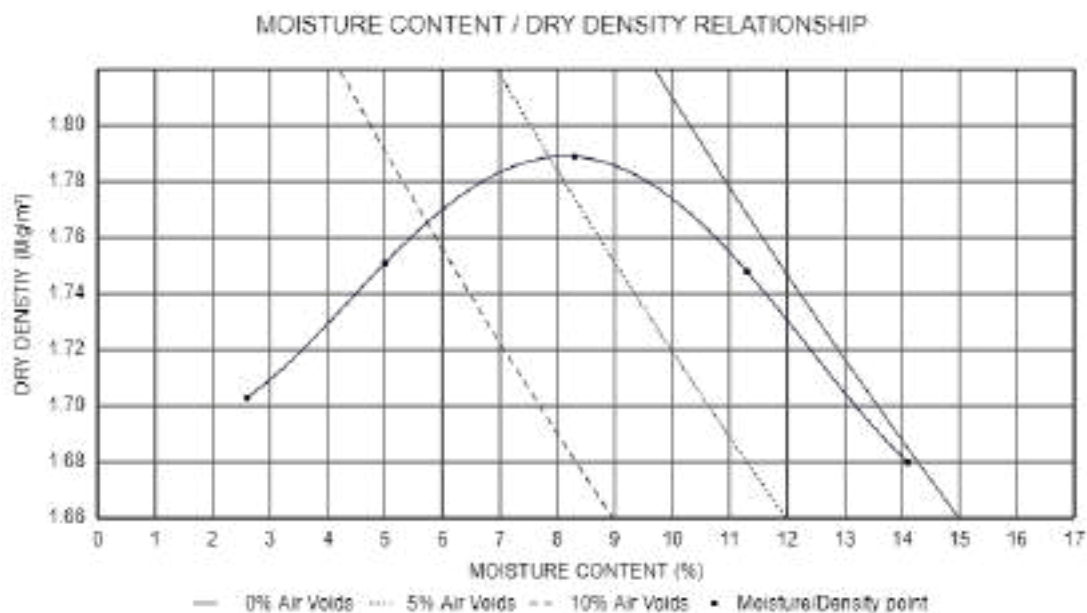


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.6 4.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.18.1.1		
SAMPLE NUMBER:	301579	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/3	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)
DATE COMPLETED:	04/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	AE, IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.79 Mg/m³
OPTIMUM MOISTURE CONTENT: 8.1 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 11 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 4 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.21 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



Remarks:
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 Alex Edgar - Senior Laboratory Technician



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Report version 1



4161

TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:	C1061321 / 194472.17.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	Core Special Projects Ltd
CLIENT REF:	See Below	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)
DATE COMPLETED:	26/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, DW	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD:	BS1377:Part1:2016 clauses 8.3 and 8.4.2
ORIENTATION OF TEST SPECIMEN WITHIN ORIGINAL SAMPLE:	N/A	VARIATIONS:	None
		METHOD OF PREPARATION:	None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
301579	DN4710/3	Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)	2.21

Remarks:

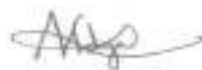
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 Alex Edgar - Senior Laboratory Technician



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 Report date 04-Aug-22

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Report version 1



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TEST REPORT:
TEST REPORT: DETERMINATION OF PARTICLE SIZE DISTRIBUTION & MOISTURE CONTENT

BS 1377 - 2 : 1990, Method 9.2 Washing & Dry Sieving and BS 1377 - 2 : 1990, Method 3.2

REPORT NUMBER: C1061321 / 194472.27.1.1

SAMPLE NUMBER: 301580

CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/4

ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022

SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS

SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022

MATERIAL: Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)

DATE COMPLETED: 26/07/2022

CLASSIFICATION: Class 2C

TESTED BY: BO, IS, MD, BM

LOCATION: Surcharge Stockpile

TYPE OF SAMPLE: Disturbed

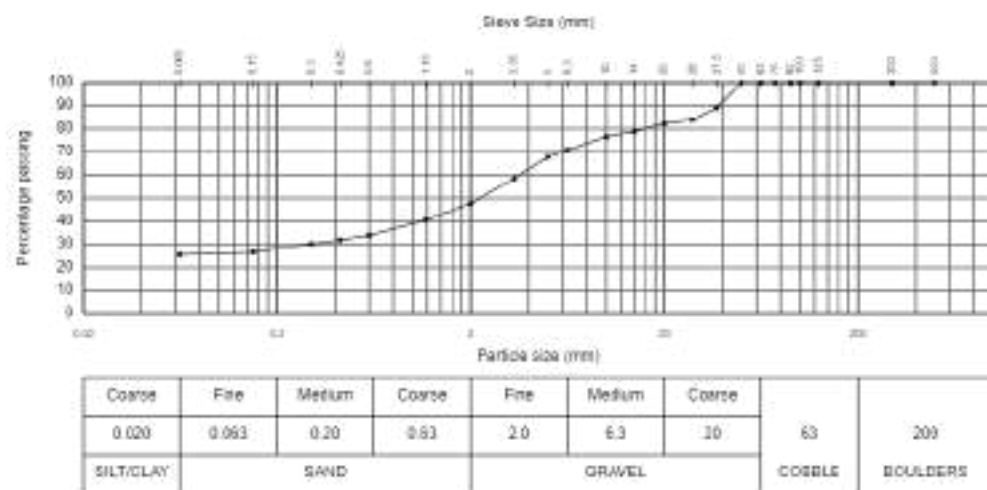
PREPARATION METHOD: BS 1377:Part 1:2016 clause 8.3 & 8.4.5

VARIATIONS: No variations

SAMPLING PLAN: Client Specification

METHOD OF SAMPLING: Unknown

WITHIN ORIGINAL SAMPLE:

RESULT Test Location: CTS Doncaster


Percentage BOULDERS: 0.0%

Percentage COBBLES: 0.0%

Percentage GRAVEL: 52.3%

Percentage SAND: 22.1%

Percentage SILT/CLAY: 25.6%

Class 2C - Specification for Highway Works (2016) Table 6/2 Earthworks Materials - Class 2C

Uniformity Coefficient (D60/D10) N/A

Percentage passing 63µm > 10% therefore uniformity coefficient is estimated minimum.

Moisture content: 7.5%

SIEVE ANALYSIS

Particle Diameter mm	Passing %	Specification Limits
500	100	
300	100	
125	100	100 - 100
100	100	
90	100	
75	100	
63	100	
50	100	
37.5	89	
28	84	
20	82	
14	79	
10	77	
6.3	71	
5	68	
3.35	59	
2	48	15 - 80
1.18	41	
0.6	34	
0.425	32	
0.3	30	
0.15	27	
0.063	26	15 - 80

Remarks:

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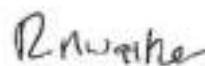
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For and on behalf of CTS

Reece Walker - Senior Technician



 Approved Signatory
Report date 27-Jul-22

 Construction Testing Solutions Ltd.
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Report version 1



4161

TEST REPORT: **DETERMINATION OF MOISTURE CONDITION VALUE (M.C.V.)**
BS 1377 Part 4 : 1990 Clause 5.4 - Natural Moisture Content (Lab Test)

REPORT NUMBER: C1061321 / 194472.23.1.1

SAMPLE NUMBER: 301580 CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/4 ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022 SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022 MATERIAL: Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)

DATE COMPLETED: 21/07/2022 FILL LOCATION: Surcharge Stockpile

TESTED BY: HB, RF CERTIFICATE OF SAMPLING: No

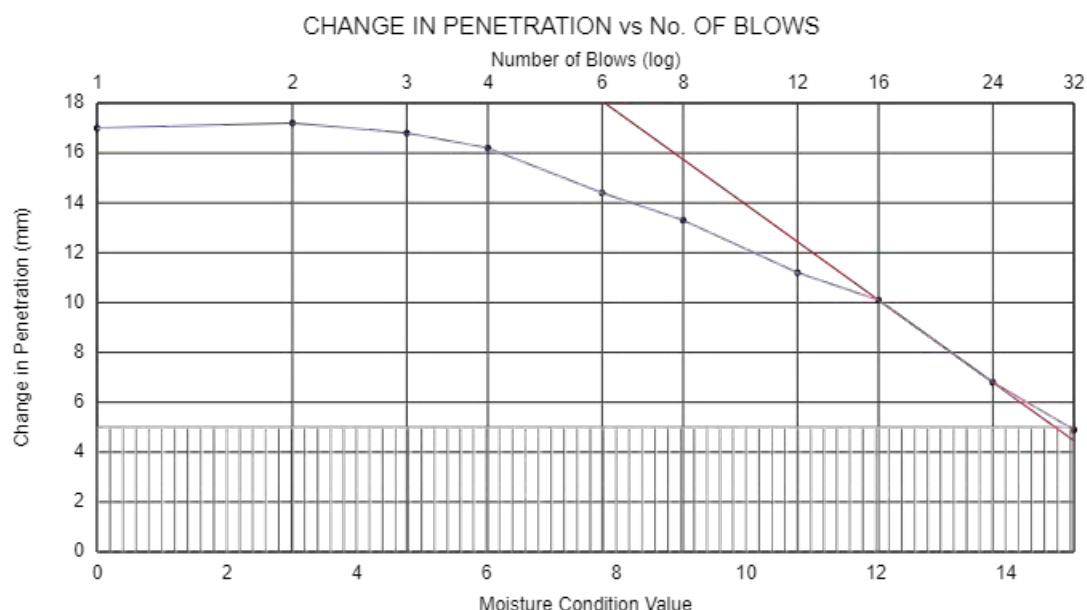
TYPE OF SAMPLE: Unknown SAMPLING PLAN: Client Specification

ENVIRONMENTAL CONDITIONS: Unknown METHOD OF SAMPLING: Unknown

WITHIN ORIGINAL SAMPLE:

RESULTS Test Location: CTS Doncaster

MOISTURE CONDITION VALUE	14.8
NATURAL MOISTURE CONTENT (%)	8.4
PERCENTAGE RETAINED 20mm (%)	6.0
INTERPRETATION OF CURVE	Steepest straight line
PREPARATION METHOD	BS 1377: Part 4: 1990 clause 5.4 (Natural and sieved through 20mm test sieve)



Remarks:

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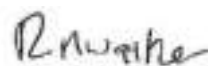
Amended report. This test report supersedes test report version 1 -

Report Format: MCV/TP08/Rep Issue 1 Rev 1 06/22

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For and on behalf of CTS
Reece Walker - Senior Technician



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Report date 27-Jul-22

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Report version 2

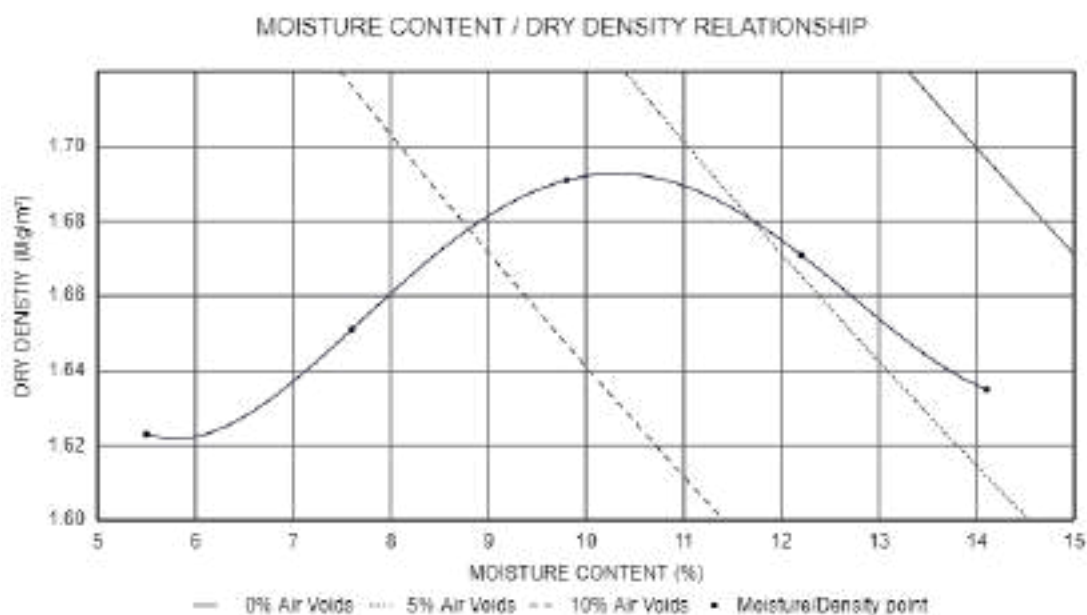


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.4 2.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.26.1.1		
SAMPLE NUMBER:	301580	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/4	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)
DATE COMPLETED:	27/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	RW, IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.69 Mg/m³
OPTIMUM MOISTURE CONTENT: 10 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 10 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 4 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.23 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



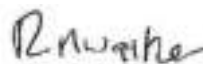
Remarks:
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 South Yorkshire DN7 4JU

0343 227 8545
 enquiries@constructiontesting.co.uk
www.constructiontesting.co.uk
 END OF REPORT

For and on behalf of CTS
 Reece Walker - Senior Technician



Approved Signatory
 Report date 27-Jul-22

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Report version 1



4161

TEST REPORT: **DETERMINATION OF THE PLASTICITY INDEX OF SOIL**
 BS 1377:Part 2:1990 clause 5.4

REPORT NUMBER: C1061321 / 194472.28.1.1

SAMPLE NUMBER: 301580 CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/4 ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: 01/07/2022 SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 01/07/2022 MATERIAL: Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)

DATE COMPLETED: 25/08/2022 LOCATION: Surcharge Stockpile

TESTED BY: Danielle Wilkinson PREPARATION METHOD: BS 1377:Part 1:2016 cl 8.3 & 8.4.3

TYPE OF SAMPLE: Disturbed VARIATIONS: None

WITHIN ORIGINAL SAMPLE: N/A SAMPLING PLAN: Client Specification

RESULTS: Test Location: CTS Doncaster

TEST DETAILS	TEST RESULT	SPECIFICATION LIMITS	
		Lower Limit	Upper Limit
THE LIQUID LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 4.4 one point)	29%	N/A	N/A
THE PLASTIC LIMIT OF THE SAMPLE: (BS 1377: Part 2:2016 clause 5.4)	15%	N/A	N/A
THE PLASTICITY INDEX OF THE SAMPLE:	14%		
THE PERCENTAGE PASSING 425µm TEST SIEVE:	Not available		
Sample History:	The material was tested after washing through a 425µm test sieve		

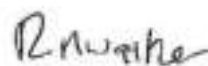
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 Reece Walker - Senior Technician



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 Report date 25-Aug-22

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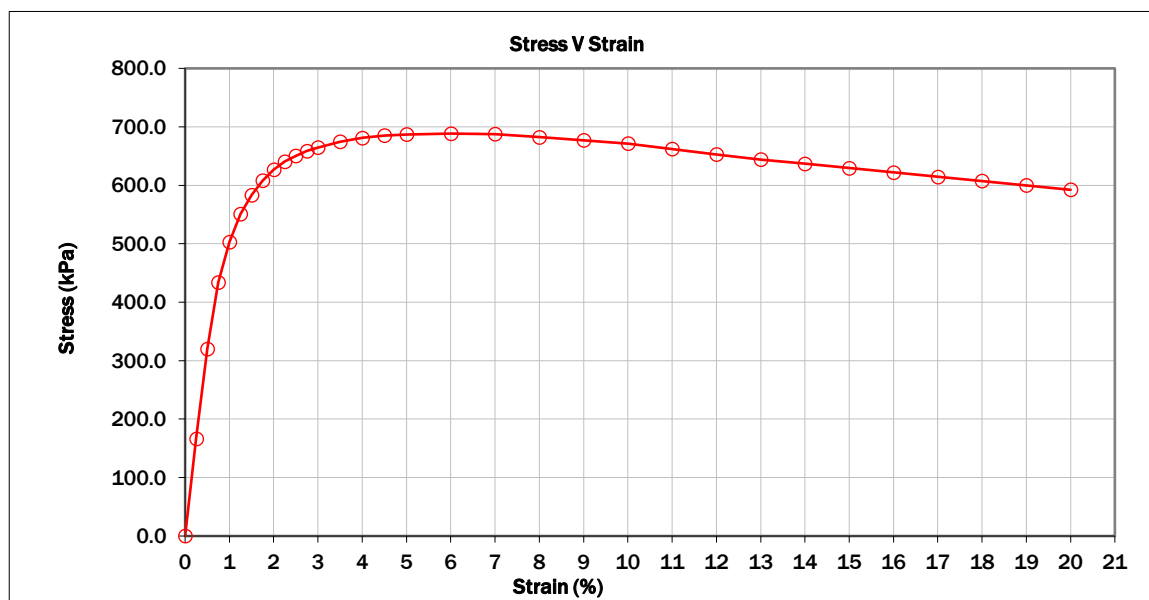
Laboratory Report	DNR/112635	Contract Sample No	DN4710/4	 Construction Testing Solutions Bootham Lane Industrial Estate Dunscroft Doncaster DN7 4JU Tel: (01302) 352652 Web: www.constructiontesting.co.uk Email: enquiries@constructiontesting.co.uk	
Report Date	02/08/2022	Clients Reference	DN4710/4		
Core SP 2175 Century Way Thorpe Park Leeds LS15 8ZB Gateway 36 Phase 3, Barnsley	Material Description	Colliery Spoil (Grey)			
	Date Sampled	01/07/2022			
	Sampling Plan	Client Specification			
	Source	Site Won			
	Supplier	Site Won			
	Sampled By	CTS			
	Sampling Environment	Not Stated			
	Sample Type	Bulk			
Location in sample	N/A	Date Received	01/07/2022		
Sample Location	Not Stated	Date Tests Completed	01/08/2022		
TEST REPORT					

Determination of Undrained Shear Strength In Triaxial Compression Without Pore Pressure Measurement
Tested In Accordance with BS 1377: Part 7: 1990 Clause 8

Tests were conducted on a disturbed sample, recompacted using a 2.5kg rammer at as received moisture content.

Initial specimen height	200	mm
Initial specimen diameter	99.07	mm
Initial bulk density	1.88	Mg/m ³
Initial moisture content	7.6	%
Initial dry density	1.74	Mg/m ³
Rate of strain applied	1.00	%/min
Membrane thickness (latex)	0.33	mm
Membrane correction	0.5	kPa
Cell pressure	200	kPa
Corrected maximum deviator stress at failure	688	kPa
Strain at failure	6.0	%
Time at Failure	6 Minutes, 0 Seconds	
Mode of failure	Compound	

Laboratory Temperature
18-22 °C

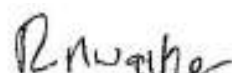


Undrained Shear Strength, c_u
344 kPa

Tested at rate of strain of 1%/minute as required by Specification for Highway Works Series 600, clause 633

Template Version: 1.61

Authorised Signatory


 R Walker – Senior Lab Technician

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Results relate only to the sample(s) as received.

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**** END OF REPORT ****

Construction Testing Solutions Ltd - Company No. 05998333

TEST REPORT:
DETERMINATION OF PARTICLE DENSITY

BS 1377:Part 2:1990 Gas Jar Method

REPORT NUMBER:	C1061321 / 194472.24.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	Core Special Projects Ltd
CLIENT REF:	See Below	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey black gravelly CLAY
DATE COMPLETED:	26/07/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, DW	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD: :	BS1377:Part1:2016 clauses 8.3 and 8.4.2
ORIENTATION OF TEST SPECIMEN WITHIN ORIGINAL SAMPLE:	N/A	VARIATIONS:	None
		METHOD OF PREPARATION:	None

RESULT Test Location: CTS Doncaster

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg.m ³
301580	DN4710/4	Grey black gravelly CLAY	2.23

Remarks:

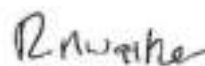
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 For and on behalf of CTS
 Reece Walker - Senior Technician



 Approved Signatory
 Report date 27-Jul-22

 Construction Testing Solutions Ltd.
 Registered in England No. 05998333

Report version 1

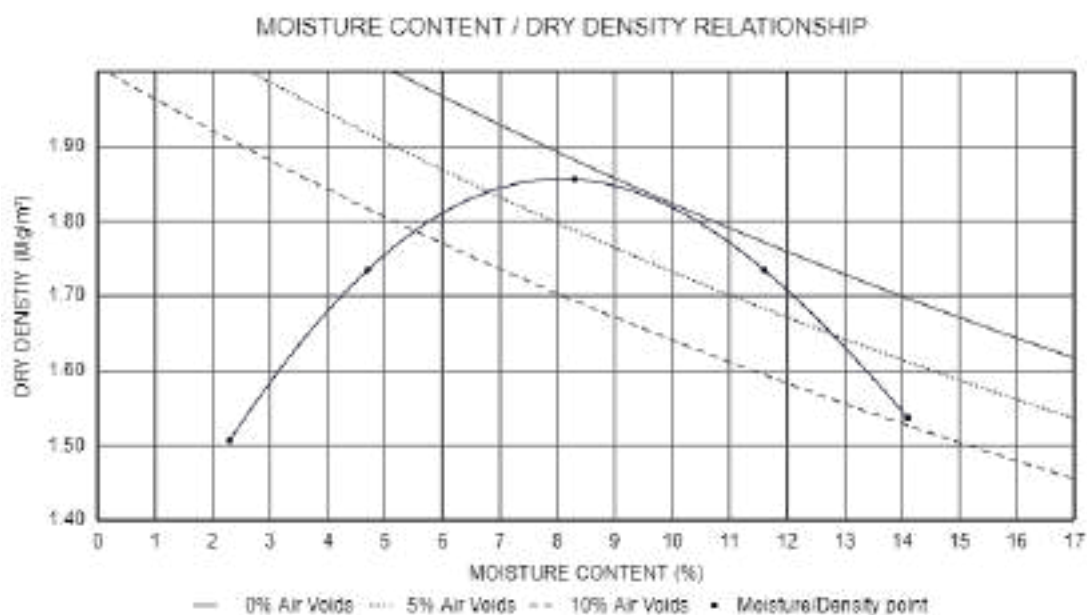


4161

TEST REPORT:	DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP		
	BS 1377:Part 4:2016 clause 3.6 4.5kg Rammer method		
REPORT NUMBER:	C1061321 / 194472.25.1.1		
SAMPLE NUMBER:	301580	CLIENT:	Core Special Projects Ltd
CLIENT REF:	DN4710/4	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	01/07/2022	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	01/07/2022	MATERIAL:	Grey Very Clayey Very Sandy GRAVEL (Colliery Spoil)
DATE COMPLETED:	03/08/2022	LOCATION:	Surcharge Stockpile
TESTED BY:	IS, EH	PREPARATION METHOD:	CBR Mould (BS1377:Pt1:2016 Cl7.6.3) : Material chopped to <20mm, for cohesive soil.
TYPE OF SAMPLE:	Disturbed	COMPACTION SAMPLE:	Separate samples
VARIATIONS:	None	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown

RESULT Test Location: CTS Doncaster

MAXIMUM DRY DENSITY: 1.86 Mg/m³
OPTIMUM MOISTURE CONTENT: 8.1 %
AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 10 %
AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 4 %
MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.23 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)



Remarks:
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For and on behalf of CTS
 Alex Edgar - Senior Laboratory Technician



Approved Signatory
 Report date 04-Aug-22

Construction Testing Solutions Ltd.
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Report version 1



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TEST REPORT:
DETERMINATION OF DRY DENSITY/MOISTURE CONTENT RELATIONSHIP

BS 1377:Part 4:2016 clause 3.3 2.5kg Rammer method

REPORT NUMBER: C1061321 / 197324.2.1.1

SAMPLE NUMBER: 306440

CLIENT: Core Special Projects Ltd

CLIENT REF: DN4710/7

ADDRESS: 2175 Century Way, Thorpe Park, Leeds, LS15 8ZB

DATE SAMPLED: Unknown

SITE: Gateway 36, Phase 3, Barnsley - LAB

SAMPLED BY: CTS

SUPPLIER: Ex-Site, Ex-Site

DATE RECEIVED: 16/07/2022

MATERIAL: Dark Grey Silty Clay Occasional Gravel, Mudstone & Coal

DATE COMPLETED: 16/09/2022

LOCATION: Not Stated

TESTED BY: Liam Brown

 PREPARATION METHOD: 1 Ltr Mould (BS1377:Pt1:2016 Cl7.6.2)
: Material chopped to <20mm, for cohesive soil.

TYPE OF SAMPLE: Disturbed

COMPACTION SAMPLE: Separate samples

VARIATIONS: None

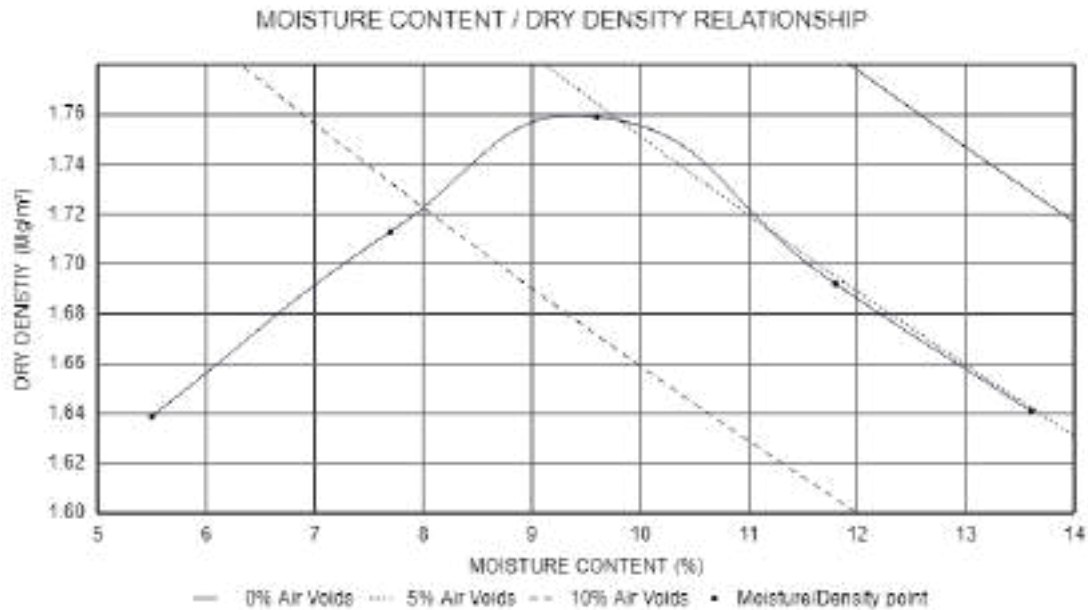
SAMPLING PLAN: Client Specification

ENVIRONMENTAL CONDITIONS: Unknown

METHOD OF SAMPLING: Unknown

RESULT Test Location: CTS Leicester

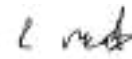
MAXIMUM DRY DENSITY: 1.76 Mg/m³
 OPTIMUM MOISTURE CONTENT: 9.5 %
 AMOUNT (By Dry Mass) RETAINED ON >20mm TEST SIEVE: 4 %
 AMOUNT (By Dry Mass) RETAINED ON >37.5mm TEST SIEVE: 0 %
 MEASURED PARTICLE DENSITY USED TO PLOT AIR VOIDS: 2.26 Mg/m³
 (measured in accordance with BS 1377: 2016:part 2)


Remarks:

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For and on behalf of CTS

Robert McGoff - GCM Technical supervisor



 Approved Signatory
 Report date 16-Sep-22


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Report version 1

Page 1 of 1

TEST REPORT:**DETERMINATION OF PARTICLE DENSITY**

BS 1377:Part 2:1990 clause 8.2 Gas Jar

REPORT NUMBER:	C1061321 / 197324.1.1.1		
SAMPLE NUMBER:	See Below	CLIENT:	Core Special Projects Ltd
CLIENT REF:	See Below	ADDRESS:	2175 Century Way, Thorpe Park, Leeds, LS15 8ZB
DATE SAMPLED:	Unknown	SITE:	Gateway 36, Phase 3, Barnsley - LAB
SAMPLED BY:	CTS	SUPPLIER:	Ex-Site, Ex-Site
DATE RECEIVED:	16/07/2022	MATERIAL:	Dark Grey Silty Clay Occasional Gravel, Mudstone & Coal
DATE COMPLETED:	16/09/2022	LOCATION:	Not Stated
TESTED BY:	CN, LB	SAMPLING PLAN:	Client Specification
ENVIRONMENTAL CONDITIONS:	Unknown	METHOD OF SAMPLING:	Unknown
TYPE OF SAMPLE:	Disturbed	PREPARATION METHOD: :	BS1377:Part1:2016 clauses 8.3 and 8.4.2
ORIENTATION OF TEST SPECIMEN WITHIN ORIGINAL SAMPLE:	N/A	VARIATIONS:	None
		METHOD OF PREPARATION:	None

RESULT **Test Location: CTS Leicester**

SAMPLE NO	CLIENT SAMPLE REF	MATERIAL	PARTICLE DENSITY Mg/m ³
306440	DN4710/7	Dark Grey Silty Clay Occasional Gravel, Mudstone & Coal	2.26

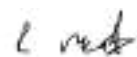
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For and on behalf of CTS
Robert McGoff - GCM Technical supervisor



Approved Signatory
Report date 16-Sep-22

Construction Testing Solutions Ltd.
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4161

APPENDIX G

LABORATORY CHEMICAL TEST RESULTS



Final Report

Report No.:	23-05898-1		
Initial Date of Issue:	06-Mar-2023		
Client	Core Special Projects Limited		
Client Address:	2175 Century Way Thorpe Park Leeds LS15 8ZB		
Contact(s):	Liam Miller		
Project	G36 Dearne Valley Parkway		
Quotation No.:	Q22-29268	Date Received:	21-Feb-2023
Order No.:		Date Instructed:	21-Feb-2023
No. of Samples:	6		
Turnaround (Wkdays):	10	Results Due:	06-Mar-2023
Date Approved:	06-Mar-2023		
Approved By:			
Details:	Stuart Henderson, Technical Manager		

Results - Soil

Project: G36 Dearne Valley Parkway

Client: Core Special Projects Limited	Chemtest Job No.:					23-05898	23-05898	23-05898	23-05898	23-05898	23-05898
Quotation No.: Q22-29268	Chemtest Sample ID.:					1594211	1594212	1594213	1594214	1594215	1594216
	Client Sample ID.:					1	2	3	4	5	6
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Determinand	Accred.	SOP	Units	LOD							
Moisture	N	2030	%	0.020	14	13	14	17	13	14	
pH	U	2010		4.0	[A] 8.6	[A] 8.4	[A] 8.5	[A] 8.3	[A] 8.3	[A] 8.6	
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010	[A] 0.030	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.014	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] 0.22	[A] 0.88	[A] 0.17	[A] 0.12	[A] 0.087	[A] 0.58	
Total Sulphur	U	2175	%	0.010	[A] 0.28	[A] 0.48	[A] 0.89	[A] 0.37	[A] 0.43	[A] 0.54	
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010	[A] 0.12	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] 0.015	
Nitrate (Water Soluble)	N	2220	g/l	0.010	< 0.010	0.011	< 0.010	< 0.010	< 0.010	< 0.010	
Ammonium (Water Soluble)	U	2220	g/l	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.069	[A] 0.19	[A] 0.082	[A] 0.13	[A] 0.028	[A] 0.15	
Arsenic	U	2455	mg/kg	0.5	12	13	10	11	20	16	
Cadmium	U	2455	mg/kg	0.10	< 0.10	0.15	0.10	< 0.10	< 0.10	0.17	
Chromium	U	2455	mg/kg	0.5	9.7	15	14	10	9.7	14	
Copper	U	2455	mg/kg	0.50	28	37	30	26	27	42	
Mercury	U	2455	mg/kg	0.05	0.08	0.08	0.06	0.05	0.07	0.09	
Nickel	U	2455	mg/kg	0.50	21	31	28	21	22	31	
Lead	U	2455	mg/kg	0.50	14	22	17	17	19	32	
Selenium	U	2455	mg/kg	0.25	0.67	1.0	0.80	0.71	0.60	0.97	
Zinc	U	2455	mg/kg	0.50	40	61	59	49	44	66	
LOI	U	2610	%	0.10	14	14	12	13	13	14	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C8-C10	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C10-C12	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C12-C16	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C16-C21	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C21-C35	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C8-C10	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C10-C12	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C12-C16	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C16-C21	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C21-C35	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10	
Naphthalene	U	2800	mg/kg	0.10	3.3	1.9	2.3	2.6	3.9	2.5	
Acenaphthylene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Acenaphthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	0.38	< 0.10	0.39	
Fluorene	U	2800	mg/kg	0.10	< 0.10	0.24	< 0.10	0.48	< 0.10	0.47	

Results - Soil

Project: G36 Dearne Valley Parkway

Client: Core Special Projects Limited	Chemtest Job No.:					23-05898	23-05898	23-05898	23-05898	23-05898	23-05898
Quotation No.: Q22-29268	Chemtest Sample ID.:					1594211	1594212	1594213	1594214	1594215	1594216
	Client Sample ID.:					1	2	3	4	5	6
	Sample Type:					SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
Determinand	Accred.	SOP	Units	LOD							
Phenanthrene	U	2800	mg/kg	0.10	< 0.10	0.85	< 0.10	1.2	< 0.10	1.2	
Anthracene	U	2800	mg/kg	0.10	< 0.10	0.11	< 0.10	< 0.10	< 0.10	0.14	
Fluoranthene	U	2800	mg/kg	0.10	< 0.10	0.19	< 0.10	0.20	< 0.10	0.30	
Pyrene	U	2800	mg/kg	0.10	< 0.10	0.13	< 0.10	0.24	< 0.10	0.22	
Benzo[a]anthracene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Chrysene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[b]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[k]fluoranthene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[a]pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Indeno(1,2,3-c,d)Pyrene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Benzo[g,h,i]perylene	U	2800	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	
Total Of 16 PAH's	N	2800	mg/kg	2.0	3.3	3.4	2.3	5.1	3.9	5.2	

Deviations

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

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1594211		1			A	Amber Glass 250ml
1594211		1			A	Plastic Tub 500g
1594212		2			A	Amber Glass 250ml
1594212		2			A	Plastic Tub 500g
1594213		3			A	Amber Glass 250ml
1594213		3			A	Plastic Tub 500g
1594214		4			A	Amber Glass 250ml
1594214		4			A	Plastic Tub 500g
1594215		5			A	Amber Glass 250ml
1594215		5			A	Plastic Tub 500g
1594216		6			A	Amber Glass 250ml
1594216		6			A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measurement by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2455	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	Acenaphthene*; Acenaphthylene; Anthracene*; Benzo[a]Anthracene*; Benzo[a]Pyrene*; Benzo[b]Fluoranthene*; Benzo[ghi]Perylene*; Benzo[k]Fluoranthene; Chrysene*; Dibenzo[ah]Anthracene; Fluoranthene*; Fluorene*; Indeno[123cd]Pyrene*; Naphthalene*; Phenanthrene*; Pyrene*	Dichloromethane extraction / GC-MS

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation

The results relate only to the items tested

Uncertainty of measurement for the determinands tested are available upon request

None of the results in this report have been recovery corrected

All results are expressed on a dry weight basis

The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols

For all other tests the samples were dried at < 37°C prior to analysis

All Asbestos testing is performed at the indicated laboratory

Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

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

Sample Retention and Disposal

All soil samples will be retained for a period of 30 days from the date of receipt

All water samples will be retained for 14 days from the date of receipt

Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:

customerservices@chemtest.com

APPENDIX H

GENERIC ASSESSMENT CRITERIA – COMMERCIAL END USE

Generic assessment criteria for human health: commercial scenario

Background

RSK's generic assessment criteria (GAC) were initially prepared following the publication by the Environment Agency (EA) of soil guideline value (SGV) and toxicological (TOX) reports, and associated publications in 2009⁽¹⁾. RSK GAC were updated following the publication of GAC by LQM/CIEH in 2009⁽²⁾. RSK GAC are periodically revised when updated information on toxicological, land use or receptor parameters is published.

Updates to the RSK GAC

In 2014, the publication of Category 4 Screening Levels (C4SL)^(3,4), as part of the Defra-funded research project SP1010, included modifications to certain exposure assumptions documented within EA Science Report SC050221/SR3 (herein after referred to as SR3)⁽⁵⁾ used in the generation of SGVs.

C4SL were initially published for six substances (cadmium, arsenic, benzene, benzo(a)pyrene, chromium VI and lead) for a sandy loam soil type with 6% soil organic matter, based on a low level of toxicological concern (LLTC; see Section 2.3 of research project report SP1010⁽³⁾). Further C4SL were published in 2021 for vinyl chloride, tetrachloroethene (PCE) and trichloroethene (TCE). Where a C4SL has been published, the RSK GAC duplicates the C4SL using all input parameters within the SP1010 final project report⁽³⁾ and associated chemical specific reports⁽⁶⁾, and adopts them as GAC for these substances. Due to the use of decimal places rather than significant figures applied to the Contaminated Land Exposure Assessment (CLEA) tool outputs, the GAC presented may be marginally differently to the C4SL values, however any differences between the values are minimal and would not equate to an unacceptable risk.

For all other substances the only C4SL exposure modification relevant to a commercial end use are daily inhalation rates.

The RSK GAC have also been revised with updated toxicology published by LQM/CIEH in 2015⁽⁷⁾ or by the USEPA⁽¹⁴⁾, where a C4SL has not been published.

RSK GAC derivation for metals and organic compounds

Model selection

Soil assessment criteria (SAC) were calculated using the CLEA tool v1.071, supporting EA guidance^(5,8,9) and revised exposure scenarios published for the C4SL⁽³⁾. The SAC are also termed GAC.

Pathway selection

In accordance with SR3⁽⁵⁾ the commercial scenario considers risks to a female worker who works from the age of 16 to 65 years. It should be noted that this end use is not suitable for a workplace nursery but may be appropriate for a sports centre or shopping centre where children are present. In accordance with Box 3.5, SR3⁽⁵⁾ the pathways considered for production of the SAC in the commercial scenario are

- direct soil and dust ingestion

- dermal contact with soil both indoors and outdoors
- indoor air inhalation from soil and vapour and outdoor inhalation of soil and vapour.

With respect to volatilisation, the CLEA model assumes a simple linear partitioning of a chemical in the soil between the sorbed, dissolved and vapour phase⁽⁹⁾. The upper boundaries of this partitioning are represented by the maximum aqueous solubility and pure saturated vapour concentration of the chemical. The CLEA model estimates saturated soil concentrations where these limits are reached⁽⁹⁾. The CLEA software uses a traffic light system to identify when individual and/or combined assessment criteria exceed the lower of either the aqueous- or vapour-based soil saturation limits. Model output cells are flagged red where the saturated soil concentration has been exceeded and the contribution of the indoor and outdoor vapour pathway to total exposure is greater than 10%. In this case, further consideration of the following is required⁽⁹⁾:

- Free phase contamination may be present.
- Exposure from the vapour pathways will be over-predicted by the model, as in reality the vapour phase concentration will not increase at concentrations above saturation limits
- Where the vapour pathway contribution is greater than 90%, it is unlikely the relevant health criteria value (HCV) will be exceeded at soil concentrations at least a factor of ten higher than the relevant HCV.

Where the vapour pathway is the predominant pathway (contributes greater than 90% of exposure) or the only exposure route considered and the cell is highlighted red (SAC exceeds saturation limit), the risk based on the assumed conceptual model is likely to be negligible as the vapour risk is assumed to be tolerable at maximum possible soil concentrations. In such circumstances, the vapour pathway exposure should be considered based on the presence of free phase or non-aqueous phase liquid sources and the measured concentrations of volatile organic compounds (VOC) in the vapour phase. Screening could be considered based on setting the SAC as the modelled soil saturation limits. However, as stated within the CLEA handbook⁽⁹⁾, this is likely to not be practical in many cases because of the very low saturation limits and, in any case, is highly conservative.

It should also be noted that for mixtures of compounds, free phase may be present where soil (or groundwater) concentrations are well below saturation limits for individual compounds.

Where the vapour pathway is only one of the exposure pathways considered, an additional approach can then be utilised as detailed within Section 4.12 of the CLEA model handbook⁽⁹⁾, which explains how to calculate an effective assessment criterion manually.

SR3⁽⁵⁾ states that, as a general rule of thumb, it is recognised that estimating vapour phase concentrations from dissolved and sorbed phase contamination by petroleum hydrocarbons are at least a factor of ten higher than those likely to be measured on-site. RSK has therefore applied an empirical subsurface to indoor air correction factor of 10 into the CLEA model chemical database for all petroleum hydrocarbon fractions (including BTEX, trimethylbenzenes and the polycyclic aromatic hydrocarbons (PAH) naphthalene, acenaphthene and acenaphthylene) to reduce this conservatism.

Input selection

The most up-to-date published chemical and toxicological data was obtained from EA Report SC050021/SR7⁽¹⁰⁾, the EA TOX⁽¹⁾ reports, the C4SL SP1010 project report and associated chemical specific reports^(3,6), the 2015 LQM/CIEH report⁽⁷⁾ or the USEPA IRIS database⁽¹⁴⁾. Where a LLTC^(3,6) has been published for a substance, RSK has used these input parameters to derive the RSK GAC. Toxicological and specific chemical parameters for 1,2,4-trimethylbenzene, barium, methyl tertiary-butyl ether (MTBE), 1,1,2-trichloroethane, 1,1-dichloroethene, 1,2-dichloropropane, 2-chloronaphthalene, chloroethane, chloromethane, cis 1,2-dichloroethene, dichloromethane, hexachloroethane and trans 1,2-dichloroethene were obtained from the CL:AIRE Soil Generic Assessment Criteria report⁽¹¹⁾.

For TPH, aromatic hydrocarbons C₅–C₈ were not modelled, as this range comprises benzene (>EC5-EC7) and toluene (>EC7-EC8), which are modelled separately.

Physical parameters

For the commercial end use, the CLEA default pre-1970s three-storey office building was used. SR3⁽⁵⁾ notes this commercial building type to be the most conservative in terms of protection from vapour intrusion. The default input building parameters presented in Table 3.10 of SR3⁽⁵⁾ have been used.

The parameters for a sandy loam soil type were used in line with Table 4.4 of SR3⁽⁵⁾. This includes a value of 6% for the percentage of soil organic matter (SOM) within the soil. In RSK's experience, this is rather high for many sites. To avoid undertaking site-specific risk assessments for this SOM, RSK has produced an additional set of GAC for SOM of 1% and 2.5% for all substances using the CLEA tool.

Summary of modifications to the default CLEA SR3⁽⁵⁾ input parameters for a commercial land use

In summary, the RSK commercial GAC were produced using the default input parameters for soil properties, the air dispersion model, building properties and the vapour model detailed in SR3⁽⁵⁾. Modifications to the default SR3⁽⁵⁾ exposure scenarios based on the C4SL exposure scenarios⁽³⁾ are presented in Table 2 below. The sole modification to the default commercial input parameters is the updated inhalation rate.

The final selected GAC are presented by pathway in Table 3 with the combined GAC in Table 4.

Figure 1: Conceptual model for CLEA commercial scenario

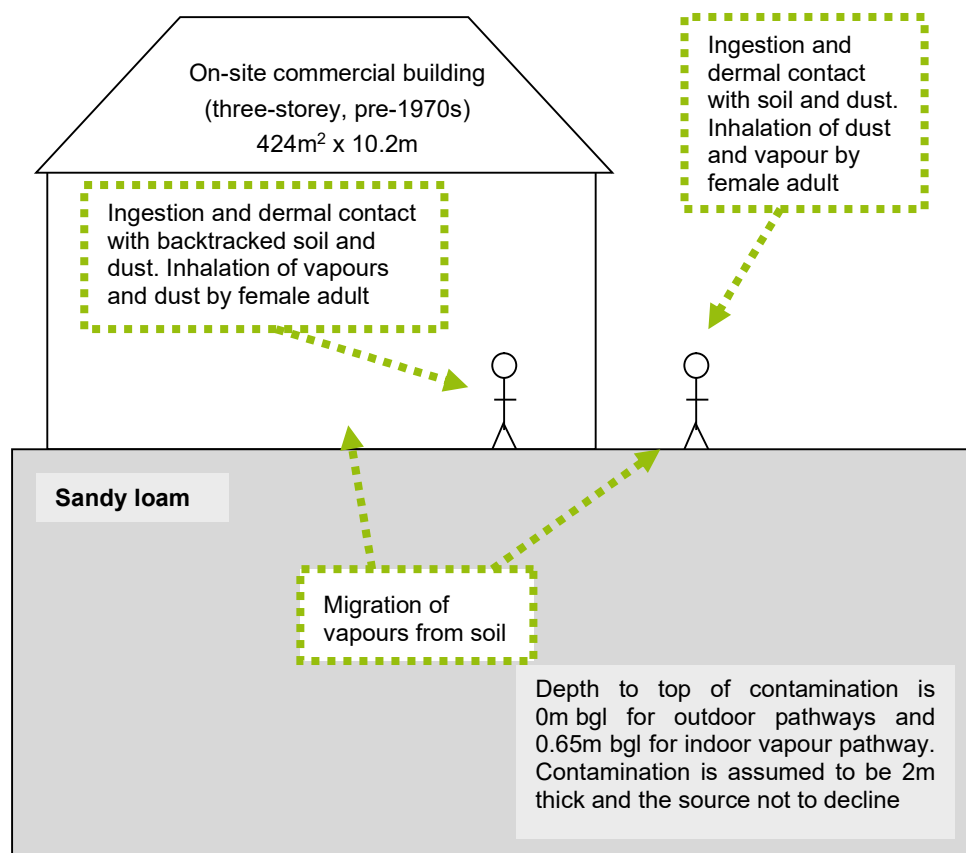


Table 1: Exposure assessment parameters for commercial scenario – inputs for CLEA model

Parameter	Value	Justification
Land use	Commercial	Chosen land use
Receptor	Female worker	Taken as female adult exposed over 49 years from age 16 to 65 years, Box 3.5, SR3 ⁽⁵⁾
Building	Office (pre-1970)	Key generic assumption given in Box 3.5, SR3 ⁽⁵⁾ . Pre-1970s three-storey office building chosen as it is the most conservative in terms of protection from vapour intrusion (Section 3.4.6, SR3 ⁽⁵⁾)
Soil type	Sandy loam	Most common UK soil type (Section 4.3.1, Table 4.4, SR3 ⁽⁵⁾)
Start age class (AC)	17	AC corresponding to key generic assumption that the critical receptor is a working female adult exposed over a 49-year period from age 16 to 65 years. Assumption given in Box 3.5, SR3 ⁽⁵⁾
End AC	17	
SOM (%)	6	Representative of sandy loam according to EA guidance note dated January 2009 entitled 'Changes We Have Made to the CLEA Framework Documents' ⁽¹³⁾
	1	To provide SAC for sites where SOM < 6% as often observed by RSK
	2.5	
pH	7	Model default



Table 2: Commercial – modified receptor inputs

Parameter	Unit	Value	Justification
Inhalation rate (AC17)	m ³ day ⁻¹	15.7	Mean value USEPA, 2011 ⁽¹²⁾ ; Table 3.2, SP1010 ⁽³⁾

References

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8. Environment Agency (2009), *Human health toxicological assessment of contaminants in soil. Science Report – Final SC050021/SR2* (Bristol: Environment Agency).
9. Environment Agency (2009), *Science Report – SC050021/SR4 CLEA Software (version 1.05) Handbook* (Bristol: Environment Agency).
10. Environment Agency (2008), *Science Report SC050021/SR7. Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values* (Bristol: Environment Agency).
11. CL:AIRE (2010), *Soil Generic Assessment Criteria for Human Health Risk Assessment* (London: CL:AIRE).
12. USEPA (2011), *Exposure factors handbook*, EPA/600/R-090/052F (Washington, DC: Office of Research and Development).
13. Environment Agency (2009), 'Changes made to the CLEA framework documents after the three-month evaluation period in 2008', released January 2009.



14. USEPA (2010). Hydrogen cyanide and cyanide salts. Integrated Risk Information Systems (IRIS) Chemical Assessment Summary. September 2010. <https://www.epa.gov/iris> (accessed 9 December 2015)

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Metals													
Arsenic	(a,b)	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR	6.35E+02	1.25E+03	NR	NR
Barium	(b)	2.21E+04	NR	NR	NR	2.21E+04	NR	NR	NR	2.21E+04	NR	NR	NR
Beryllium		3.97E+03	1.17E+01	NR	NR	3.97E+03	1.17E+01	NR	NR	3.97E+03	1.17E+01	NR	NR
Boron		2.38E+05	2.82E+07	NR	NR	2.38E+05	2.82E+07	NR	NR	2.38E+05	2.82E+07	NR	NR
Cadmium	(a)	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR	7.73E+02	8.57E+02	4.10E+02	NR
Chromium (III) - trivalent	(c)	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR	3.31E+05	8.57E+03	NR	NR
Chromium (VI) - hexavalent	(a,d)	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR	9.62E+02	4.91E+01	NR	NR
Copper		1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR	1.89E+05	8.96E+04	6.83E+04	NR
Lead	(a)	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR	2.32E+03	NR	NR	NR
Elemental Mercury (Hg ⁰)	(d)	NR	1.54E+01	NR	4.31E+00	NR	3.26E+01	NR	1.07E+01	NR	5.80E+01	NR	2.58E+01
Inorganic Mercury (Hg ²⁺)		1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR	1.18E+03	1.97E+04	1.12E+03	NR
Methyl Mercury (Hg ⁴⁺)		3.38E+02	2.13E+03	2.92E+02	7.33E+01	3.38E+02	3.87E+03	3.11E+02	1.42E+02	3.38E+02	7.33E+03	3.23E+02	3.04E+02
Nickel	(d)	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR	3.06E+03	9.83E+02	NR	NR
Selenium	(b)	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR	1.23E+04	NR	NR	NR
Vanadium		2.15E+04	9.03E+03	NR	NR	2.15E+04	9.03E+03	NR	NR	2.15E+04	9.03E+03	NR	NR
Zinc	(b)	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR	7.35E+05	1.97E+08	NR	NR
Cyanide (free)		6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR	6.56E+02	7.51E+04	6.53E+02	NR
Volatile Organic Compounds													
Benzene	(a)	1.09E+03	2.79E+01	2.72E+01	1.22E+03	1.09E+03	5.19E+01	4.96E+01	2.26E+03	1.09E+03	1.08E+02	9.80E+01	4.71E+03
Toluene		4.24E+05	6.49E+04	5.63E+04	8.69E+02	4.24E+05	1.43E+05	1.07E+05	1.92E+03	4.24E+05	3.24E+05	1.84E+05	4.36E+03
Ethylbenzene		1.91E+05	5.89E+03	5.71E+03	5.18E+02	1.91E+05	1.38E+04	1.28E+04	1.22E+03	1.91E+05	3.21E+04	2.75E+04	2.84E+03
Xylene - m		3.43E+05	6.26E+03	6.15E+03	6.25E+02	3.43E+05	1.47E+04	1.41E+04	1.47E+03	3.43E+05	3.44E+04	3.12E+04	3.46E+03
Xylene - o		3.43E+05	6.73E+03	6.60E+03	4.78E+02	3.43E+05	1.57E+04	1.50E+04	1.12E+03	3.43E+05	3.65E+04	3.30E+04	2.62E+03
Xylene - p		3.43E+05	6.03E+03	5.92E+03	5.76E+02	3.43E+05	1.41E+04	1.36E+04	1.35E+03	3.43E+05	3.28E+04	3.00E+04	3.17E+03
Total xylene		3.43E+05	6.03E+03	5.92E+03	6.25E+02	3.43E+05	1.41E+04	1.36E+04	1.47E+03	3.43E+05	3.28E+04	3.00E+04	3.46E+03
Methyl tertiary-Butyl ether (MTBE)		5.72E+05	7.58E+03	7.48E+03	2.04E+04	5.72E+05	1.23E+04	1.21E+04	3.31E+04	5.72E+05	2.34E+04	2.24E+04	6.27E+04
1,1,1,2-Tetrachloroethane		1.10E+04	1.09E+02	1.08E+02	2.60E+03	1.10E+04	2.53E+02	2.47E+02	6.02E+03	1.10E+04	5.88E+02	5.59E+02	1.40E+04
1,1,2,2-Tetrachloroethane		1.10E+04	2.81E+02	2.74E+02	2.67E+03	1.10E+04	5.75E+02	5.46E+02	5.46E+03	1.10E+04	1.26E+03	1.13E+03	1.20E+04
1,1,1-Trichloroethane		1.14E+06	6.60E+02	6.60E+02	1.43E+03	1.14E+06	1.35E+03	1.35E+03	2.92E+03	1.14E+06	2.96E+03	2.95E+03	6.39E+03
1,1,2 Trichloroethane		7.62E+03	9.02E+01	8.91E+01	4.03E+03	7.62E+03	1.84E+02	1.80E+02	8.21E+03	7.62E+03	4.02E+02	3.82E+02	1.80E+04
1,1-Dichloroethene		8.76E+04	2.43E+01	2.43E+01	2.23E+03	8.76E+04	4.30E+01	4.30E+01	3.94E+03	8.76E+04	8.68E+01	8.67E+01	7.94E+03
1,2-Dichloroethane		2.29E+02	6.73E-01	6.71E-01	3.41E+03	2.29E+02	9.71E-01	9.67E-01	4.91E+03	2.29E+02	1.67E+00	1.65E+00	8.43E+03
1,2,4-Trimethylbenzene		NR	3.29E+02	NR	4.74E+02	NR	6.41E+02	NR	1.16E+03	NR	1.04E+03	NR	2.76E+03
1,3,5-Trimethylbenzene	(e)	NR	NR	NR	2.30E+02	NR	NR	NR	5.52E+02	NR	NR	NR	1.30E+03
1,2-Dichloropropane		2.57E+04	3.14E+00	3.13E+00	1.19E+03	2.57E+04	5.54E+00	5.54E+00	2.11E+03	2.57E+04	1.11E+01	1.11E+01	4.24E+03
Carbon Tetrachloride (tetrachloromethane)		7.62E+03	2.87E+00	2.87E+00	1.52E+03	7.62E+03	6.29E+00	6.28E+00	3.32E+03	7.62E+03	1.43E+01	1.42E+01	7.54E+03
Chloroethane		NR	9.01E+02	NR	2.61E+03	NR	1.22E+03	NR	3.54E+03	NR	1.97E+03	NR	5.71E+03
Chloromethane		NR	9.54E-01	NR	1.91E+03	NR	1.11E+00	NR	2.24E+03	NR	1.49E+00	NR	2.99E+03
Cis 1,2 Dichloroethene		1.36E+01	NR	NR	3.94E+03	2.29E+01	NR	NR	6.61E+03	4.44E+01	NR	NR	1.29E+04
Dichloromethane		9.04E+03	2.63E+02	2.57E+02	7.27E+03	9.04E+03	3.50E+02	3.39E+02	9.68E+03	9.04E+03	5.53E+02	5.26E+02	1.53E+04
Tetrachloroethene (PCE)		2.67E+04	2.45E+01	2.45E+01	4.24E+02	2.67E+04	5.49E+01	5.48E+01	9.51E+02	2.67E+04	1.26E+02	1.25E+02	2.18E+03
Trans 1,2 Dichloroethene		3.23E+04	2.07E+01	NR	3.42E+03	3.23E+04	3.74E+01	NR	6.17E+03	3.23E+04	7.63E+01	NR	1.26E+04
Trichloroethene (TCE)		7.30E-01	2.59E+00	NR	1.54E+03	1.53E+00	5.43E+00	NR	3.22E+03	3.38E+00	1.20E+01	NR	7.14E+03
Vinyl Chloride (chloroethene)		1.19E+02	1.13E+00	1.12E+00	1.36E+03	1.19E+02	1.46E+00	1.45E+00	1.76E+03	1.19E+02	2.24E+00	2.20E+00	2.69E+03
Semi-Volatile Organic Compounds													
2-Chloronaphthalene		1.53E+05	3.71E+02	3.70E+02	1.14E+02	1.53E+05	9.07E+02	9.02E+02	2.80E+02	1.53E+05	2.13E+03	2.10E+03	6.69E+02
Acenaphthene		1.10E+05	2.75E+06	1.06E+05	5.70E+01	1.10E+05	5.38E+06	1.08E+05	1.41E+02	1.10E+05	8.83E+06	1.08E+05	3.36E+02

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 3

Human health generic assessment criteria by pathway for commercial scenario

Compound	Notes	SAC appropriate to pathway SOM 1% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 2.5% (mg/kg)			Soil saturation limit (mg/kg)	SAC appropriate to pathway SOM 6% (mg/kg)			Soil saturation limit (mg/kg)
		Oral	Inhalation	Combined		Oral	Inhalation	Combined		Oral	Inhalation	Combined	
Acenaphthylene		1.10E+05	2.68E+06	1.05E+05	8.61E+01	1.10E+05	5.23E+06	1.07E+05	2.12E+02	1.10E+05	8.65E+06	1.08E+05	5.06E+02
Anthracene		5.49E+05	1.13E+07	5.23E+05	1.17E+00	5.49E+05	2.35E+07	5.36E+05	2.91E+00	5.49E+05	4.13E+07	5.42E+05	6.96E+00
Benzo(a)anthracene		2.84E+02	4.08E+02	1.67E+02	1.71E+00	2.84E+02	4.47E+02	1.74E+02	4.28E+00	2.84E+02	4.67E+02	1.76E+02	1.03E+01
Benzo(a)pyrene	(a)	7.68E+01	2.04E+02	5.58E+01	9.11E-01	7.68E+01	2.09E+02	5.61E+01	2.28E+00	7.68E+01	2.11E+02	5.63E+01	5.46E+00
Benzo(b)fluoranthene		7.13E+01	1.17E+02	4.43E+01	1.22E+00	7.13E+01	1.20E+02	4.47E+01	3.04E+00	7.13E+01	1.21E+02	4.49E+01	7.29E+00
Benzo(g,h,i)perylene		6.29E+03	1.05E+04	3.93E+03	1.54E-02	6.29E+03	1.06E+04	3.95E+03	3.85E-02	6.29E+03	1.07E+04	3.96E+03	9.23E-02
Benzo(k)fluoranthene		1.88E+03	3.11E+03	1.17E+03	6.87E-01	1.88E+03	3.17E+03	1.18E+03	1.72E+00	1.88E+03	3.21E+03	1.19E+03	4.12E+00
Chrysene		5.67E+02	8.89E+02	3.46E+02	4.40E-01	5.67E+02	9.25E+02	3.52E+02	1.10E+00	5.67E+02	9.47E+02	3.55E+02	2.64E+00
Dibenzo(a,h)anthracene		5.67E+00	9.32E+00	3.53E+00	3.93E-03	5.67E+00	9.52E+00	3.55E+00	9.82E-03	5.67E+00	9.64E+00	3.57E+00	2.36E-02
Fluoranthene		2.29E+04	1.89E+06	2.26E+04	1.89E+01	2.29E+04	2.72E+06	2.27E+04	4.73E+01	2.29E+04	3.32E+06	2.27E+04	1.13E+02
Fluorene		7.31E+04	4.55E+05	6.30E+04	3.09E+01	7.31E+04	1.06E+06	6.84E+04	7.65E+01	7.31E+04	2.24E+06	7.08E+04	1.83E+02
Hexachloroethane		2.09E+01	NR	NR	8.17E+00	4.98E+01	NR	NR	2.01E+01	1.11E+02	NR	NR	4.81E+01
Indeno(1,2,3-cd)pyrene		8.10E+02	1.31E+03	5.01E+02	6.13E-02	8.10E+02	1.35E+03	5.06E+02	1.53E-01	8.10E+02	1.37E+03	5.09E+02	3.68E-01
Naphthalene		3.64E+04	1.87E+03	1.78E+03	7.64E+01	3.64E+04	4.39E+03	3.92E+03	1.83E+02	3.64E+04	9.94E+03	7.81E+03	4.32E+02
Phenanthrene		2.28E+04	5.35E+05	2.19E+04	3.60E+01	2.28E+04	1.09E+06	2.24E+04	8.96E+01	2.28E+04	1.86E+06	2.25E+04	2.14E+02
Pyrene		5.49E+04	4.47E+06	5.42E+04	2.20E+00	5.49E+04	6.46E+06	5.44E+04	5.49E+00	5.49E+04	7.91E+06	5.45E+04	1.32E+01
Phenol		1.10E+06	2.65E+04	2.59E+04	2.42E+04	1.10E+06	3.04E+04	2.96E+04	3.81E+04	1.10E+06	3.46E+04	3.35E+04	7.03E+04

Total petroleum hydrocarbons

Aliphatic hydrocarbons EC5-EC6		4.77E+06	3.19E+03	3.19E+03	3.04E+02	4.77E+06	5.86E+03	5.86E+03	5.58E+02	4.77E+06	1.21E+04	1.21E+04	1.15E+03
Aliphatic hydrocarbons >EC6-EC8		4.77E+06	7.79E+03	7.78E+03	1.44E+02	4.77E+06	1.74E+04	1.74E+04	3.22E+02	4.77E+06	3.97E+04	3.96E+04	7.36E+02
Aliphatic hydrocarbons >EC8-EC10		9.53E+04	2.02E+03	2.00E+03	7.77E+01	9.53E+04	4.91E+03	4.85E+03	1.90E+02	9.53E+04	1.17E+04	1.13E+04	4.51E+02
Aliphatic hydrocarbons >EC10-EC12		9.53E+04	9.97E+03	9.69E+03	4.75E+01	9.53E+04	2.47E+04	2.29E+04	1.18E+02	9.53E+04	5.89E+04	4.73E+04	2.83E+02
Aliphatic hydrocarbons >EC12-EC16		9.53E+04	8.26E+04	5.88E+04	2.37E+01	9.53E+04	2.04E+05	8.17E+04	5.91E+01	9.53E+04	4.81E+05	9.02E+04	1.42E+02
Aliphatic hydrocarbons >EC16-EC35	(b)	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aliphatic hydrocarbons >EC35-EC44	(b)	1.58E+06	NR	NR	8.48E+00	1.75E+06	NR	NR	2.12E+01	1.83E+06	NR	NR	5.09E+01
Aromatic hydrocarbons >EC8-EC10		3.81E+04	3.55E+03	3.46E+03	6.13E+02	3.81E+04	8.66E+03	8.11E+03	1.50E+03	3.81E+04	2.05E+04	1.70E+04	3.58E+03
Aromatic hydrocarbons >EC10-EC12		3.81E+04	1.92E+04	1.62E+04	3.64E+02	3.81E+04	4.69E+04	2.79E+04	8.99E+02	3.81E+04	1.10E+05	3.42E+04	2.15E+03
Aromatic hydrocarbons >EC12-EC16		3.81E+04	2.02E+05	3.62E+04	1.69E+02	3.81E+04	4.76E+05	3.73E+04	4.19E+02	3.81E+04	1.03E+06	3.78E+04	1.00E+03
Aromatic hydrocarbons >EC16-EC21	(b)	2.82E+04	NR	NR	5.37E+01	2.83E+04	NR	NR	1.34E+02	2.84E+04	NR	NR	3.21E+02
Aromatic hydrocarbons >EC21-EC35	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01
Aromatic hydrocarbons >EC35-EC44	(b)	2.84E+04	NR	NR	4.83E+00	2.84E+04	NR	NR	1.21E+01	2.84E+04	NR	NR	2.90E+01

Notes:

EC - equivalent carbon. GrAC - groundwater screening value. SAC - soil screening value.

The CLEA model output is colour coded depending upon whether the soil saturation limit has been exceeded.

	Calculated SAC exceeds soil saturation limit and may significantly affect the interpretation of any exceedances as the contribution of the indoor and outdoor vapour pathway to total exposure is >10%.
	Calculated SAC exceeds soil saturation limit but the exceedance will not affect the SAC significantly as the contribution of the indoor and outdoor vapour pathway to total exposure is <10%.
	Calculated SAC does not exceed the soil saturation limit.

The SAC for organic compounds are dependant upon soil organic matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58. 1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.

SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway (Section 10.1.1, SR3)

(a) SAC for arsenic, benzene, benzo(a)pyrene, cadmium, chromium VI and lead are derived using the C4SL toxicology data.

(b) SAC for barium and selenium should not include the inhalation pathway as no expert group HCV has been derived; aliphatic and aromatic hydrocarbons >EC16 should not include inhalation pathway due to their non-volatile nature and inhalation exposure being minimal (oral, dermal and inhalation exposure is compared to the oral HCV); arsenic should only be based on oral contribution (rather than combined) owing to the relative small contribution from inhalation in accordance with the SGV report. The Oral SAC should be adopted for zinc and benzo(a)pyrene.

(c) SAC for CrIII should be based on the lower of the oral and inhalation SAC (see LQM/CIEH 2015 Section 6.8)

(d) SAC for elemental mercury, chromium VI and nickel should be based on the inhalation pathway only.

(e) SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used.

GENERIC ASSESSMENT CRITERIA FOR HUMAN HEALTH - COMMERCIAL



Table 4
Human Health Generic Assessment Criteria for Commercial Scenario

Compound	SAC for Soil SOM 1% (mg/kg)	SAC for Soil SOM 2.5% (mg/kg)	SAC for Soil SOM 6% (mg/kg)
Metals			
Arsenic	640	640	640
Barium	22,000	22,000	22,000
Beryllium	12	12	12
Boron	240,000	240,000	240,000
Cadmium	410	410	410
Chromium (III) - trivalent	8,600	8,600	8,600
Chromium (VI) - hexavalent	49	49	49
Copper	68,000	68,000	68,000
Lead	2,300	2,300	2,300
Elemental Mercury (Hg ⁰)	15 (4)	33 (11)	58 (26)
Inorganic Mercury (Hg ²⁺)	1,120	1,120	1,120
Methyl Mercury (Hg ⁴⁺)	290 (73)	310 (142)	320
Nickel	980	980	980
Selenium	12,000	12,000	12,000
Vanadium	9,000	9,000	9,000
Zinc	740,000	740,000	740,000
Cyanide (free)	650	650	650
Volatile Organic Compounds			
Benzene	27	50	98
Toluene	56,000 (869)	107,000 (1,916)	184,000 (4,357)
Ethylbenzene	6,000 (518)	13,000 (1,216)	27,000 (2,844)
Xylene - m	6,200 (625)	14,100 (1,474)	31,200 (3,457)
Xylene - o	6,600 (478)	15,000 (1,120)	33,000 (2,618)
Xylene - p	5,900 (576)	13,600 (1,353)	30,000 (3,167)
Total xylene	5,900 (625)	13,600 (1,474)	30,000 (3,457)
Methyl tertiary-Butyl ether (MTBE)	7,500	12,100	22,400
1,1,1,2 Tetrachloroethane	110	250	560
1,1,2,2-Tetrachloroethane	270	550	1,130
1,1,1-Trichloroethane	700	1,300	3,000
1,1,2 Trichloroethane	89	180	382
1,1-Dichloroethene	24	43	87
1,2-Dichloroethane	0.67	0.97	1.65
1,2,4-Trimethylbenzene	330	640	1,040
1,3,5-Trimethylbenzene	NR	NR	NR
1,2-Dichloropropane	3	6	11
Carbon Tetrachloride (tetrachloromethane)	2.9	6.3	14.2
Chloroethane	901	1,223	1,972
Chloromethane	1.0	1.1	1.5
Cis 1,2 Dichloroethene	14	23	44
Dichloromethane	257	339	526
Tetrachloroethene (PCE)	24	55	125
Trichloroethene (TCE)	0.7	1.5	3.4
Trans 1,2 Dichloroethene	21	37	76
Vinyl Chloride (chloroethene)	1.1	1.4	2.2
Semi-Volatile Organic Compounds			
2-Chloronaphthalene	370 (114)	902 (280)	2,098 (669)
Acenaphthene	110,000	110,000	110,000
Acenaphthylene	110,000	110,000	110,000
Anthracene	520,000	540,000	540,000
Benzo(a)anthracene	170	170	180
Benzo(a)pyrene	77	77	77
Benzo(b)fluoranthene	44	45	45
Benzo(g,h,i)perylene	3,900	3,900	4,000
Benzo(k)fluoranthene	1,200	1,200	1,200
Chrysene	350	350	350
Dibenzo(a,h)anthracene	3.5	3.6	3.6
Fluoranthene	23,000	23,000	23,000
Fluorene	63,000 (31)	68,000	71,000
Hexachloroethane	21 (8)	50 (20)	111 (48)
Indeno(1,2,3-cd)pyrene	500	510	510
Naphthalene	1,800 (76)	3,900 (183)	7,800 (432)
Phenanthrene	22,000	22,000	23,000
Pyrene	54,000	54,000	54,000
Phenol	440*	690*	1,300*
Total Petroleum Hydrocarbons			
Aliphatic hydrocarbons EC ₅ -EC ₆	3,200 (304)	5,900 (558)	12,100 (1,150)
Aliphatic hydrocarbons >EC ₅ -EC ₈	7,800 (144)	17,400 (322)	39,600 (736)
Aliphatic hydrocarbons >EC ₈ -EC ₁₀	2,000 (78)	4,800 (190)	11,300 (451)
Aliphatic hydrocarbons >EC ₁₀ -EC ₁₂	9,700 (48)	22,900 (118)	47,300 (283)
Aliphatic hydrocarbons >EC ₁₂ -EC ₁₆	59,000 (24)	82,000 (59)	90,000 (142)
Aliphatic hydrocarbons >EC ₁₆ -EC ₃₅	1,000,000**	1,000,000**	1,000,000**
Aliphatic hydrocarbons >EC ₃₅ -EC ₄₄	1,000,000**	1,000,000**	1,000,000**
Aromatic hydrocarbons >EC ₅ -EC ₁₀	3,500 (613)	8,100 (1,503)	17,000 (3,580)
Aromatic hydrocarbons >EC ₁₀ -EC ₁₂	16,000 (364)	28,000 (899)	34,000 (2,150)
Aromatic hydrocarbons >EC ₁₂ -EC ₁₆	36,000 (169)	37,000	38,000
Aromatic hydrocarbons >EC ₁₆ -EC ₂₁	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₂₁ -EC ₃₅	28,000	28,000	28,000
Aromatic hydrocarbons >EC ₃₅ -EC ₄₄	28,000	28,000	28,000
Minerals			
Asbestos	Stage 1 test – No asbestos detected with ID; Stage 2 test - <0.001% dry weight (exceedance of either equates to an exceedance of the GAC) ¹		
Notes:			
*: Generic assessment criteria not calculated owing to low volatility of substance and therefore no pathway, or an absence of toxicological data.			
NR - SAC for 1,3,5-trimethylbenzene is not recorded owing to the lack of toxicological data, SAC for 1,2,4 trimethylbenzene may be used			
EC - equivalent carbon. GRAC - groundwater assessment criteria. SAC - soil assessment criteria.			
* The GAC for Phenol is based on a threshold which is protective of direct contact (SC050021/Phenol SGV report)			
** Denoted SAC calculated exceeds 100% contaminant, hence 100% (1,000,000mg/kg) has been taken as SAC			
The SAC for organic compounds are dependent on Soil Organic Matter (SOM) (%) content. To obtain SOM from total organic carbon (TOC) (%) divide by 0.58.			
1% SOM is 0.58% TOC. DL Rowell Soil Science: Methods and Applications, Longmans, 1994.			
SAC for TPH fractions, PAHs naphthalene, acenaphthene and acenaphthylene, BTEX and trimethylbenzene compounds were produced using an attenuation factor for the indoor air inhalation pathway of 10 to reduce conservatism associated with the vapour inhalation pathway, section 10.1.1, SR3.			
(VALUE IN BRACKETS)			
RSK has adopted an approach for petroleum hydrocarbons in accordance with LQM/CIEH whereby the concentration modelled for each petroleum hydrocarbon fraction has been tabulated as the SAC with the corresponding solubility or vapour saturation limits given in brackets.			