

Greenhead College

Remediation Verification Report

Galliford Try Building – North East & Yorkshire

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Principal author	Checked by	Verified by
Signed by: Lazenby, Chris	Signed by: Allen, Jim	Signed by: Allen, Jim

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1.0

Introduction

1.0 Introduction

1.1 The Site

The Client, Galliford Try Building North East & Yorkshire (Galliford Try), is proposing to redevelop parts of the existing Greenhead College in Huddersfield. The wider site covers an area of approximately 2.5Ha and is located some 500m west of Huddersfield Town Centre, centred at NGR 413746E, 416747N. The site is currently an operational college and includes car parking and recreational space.

Figure 1-1 shows the site location and the extent of the wider development boundary.

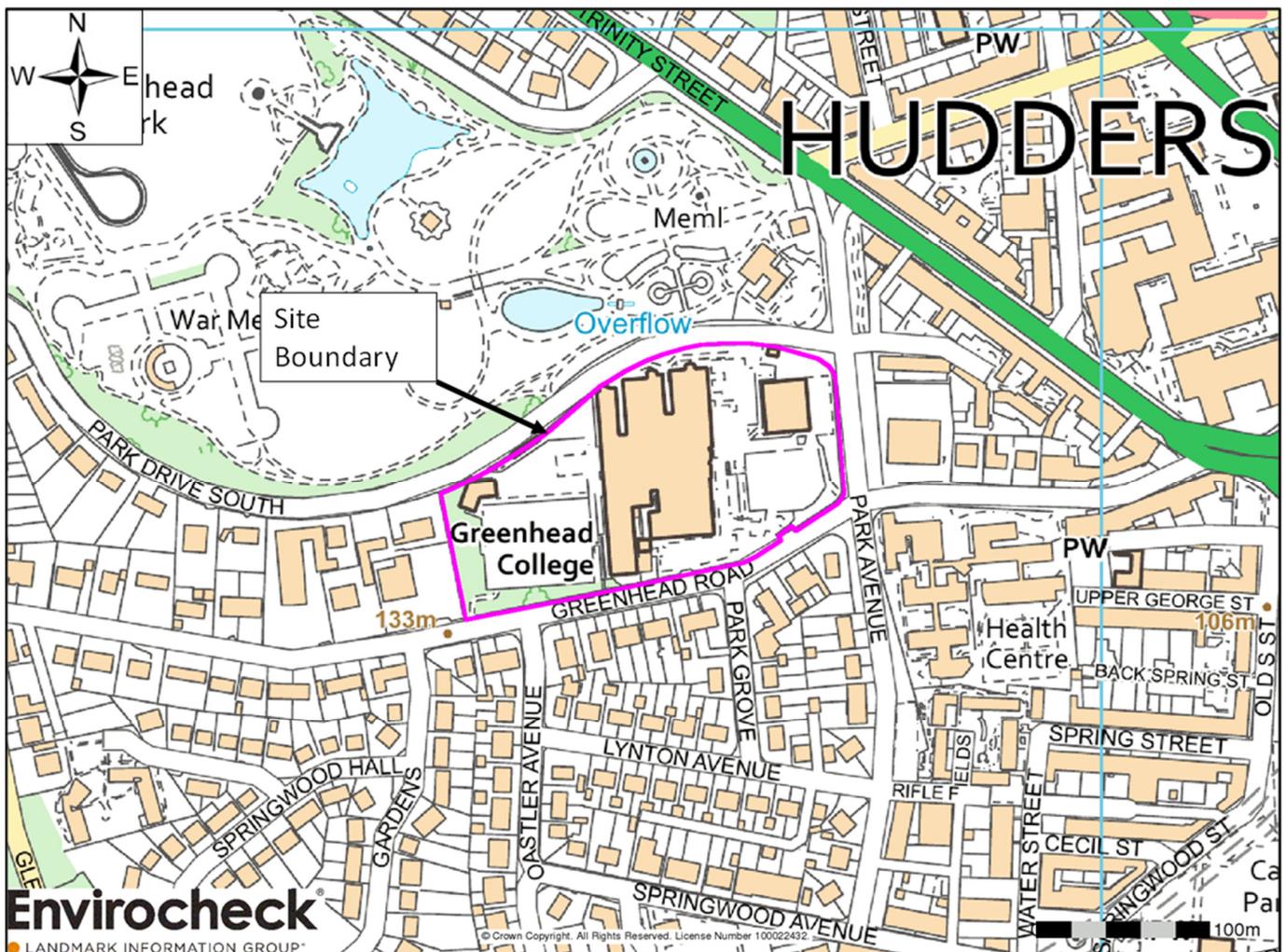


Figure 1-1: Site Location Plan

1.2 The Scheme

The scheme includes for the demolition of part of the existing Greenhead College and the construction of a new building within a similar footprint, referred to as the 'infill' building. A new, multi storey college building has been constructed within the former car park in the southeast of the site.

The development also includes for the replacement of the existing sports pitches in the west with new car parking and an artificial sports pitch. Most of the proposed development will be either building footprints, hardstanding or artificial sports pitches and less than approximately 5% of the development will comprise soft landscaping. The majority of the existing

soft landscaped areas will not be subject to any further significant development given the presence of semi mature and mature trees.

Given the scope of the development and the necessity to keep the existing college building open during construction, the works are being completed over the following phases:

- **Phase 1:** Construction of new car parking and soft landscaping in the west and the main college building in the south east, including areas of hardstanding, infrastructure and very small areas of new soft landscaping.
- **Phase 2:** Demolition of the existing college building, followed by the construction of the new 'infill' building. The artificial sports pitches, external infrastructure and hard and soft landscaping surrounding the existing college building will also be completed during this phase.

1.3 Context & Purpose

Cundall was commissioned by the Client to prepare a Remediation Verification Report to satisfy the relevant planning condition and to validate that the scheme was undertaken in accordance with Cundall's Detailed Remediation and Verification Strategy (ref 7, Section 1.4).

This Remediation Verification Report applies only to Phase 1 of the scheme as described above. Additional verification reporting is required on completion of Phase 2 of the development. The areas subject to Verification Reporting in this report is indicated in shaded orange on Figure 1-2 below.

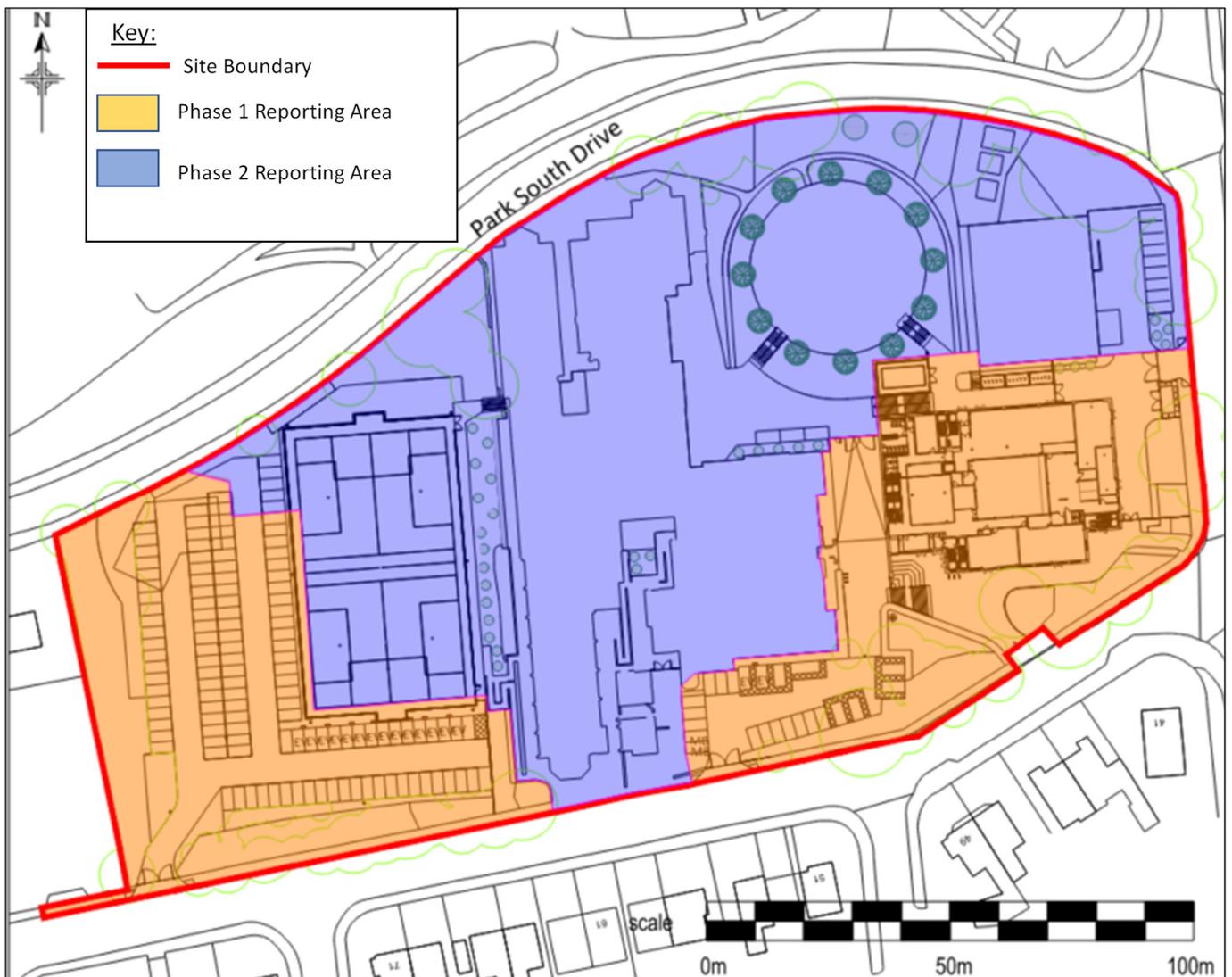


Figure 1-2: Phase 1 Remediation Verification Boundary

Note that the Phase 1 boundary includes the new building in the south east, which will be referred to as the 'Main Building' herein and the car parking in the west along with the areas of hard and soft landscaping. The areas outside this verification boundary (such as the infill building and sports pitches) will not be included within this report and will be verified under separate cover.

This report verifies that the identified land quality (geoenvironmental) risks in the development Phase 1 area were appropriately managed and mitigated.

It is not within the scope of this report to provide verification of the geotechnical aspects of the works (such as compliance with the Earthworks Specification), or of the stabilisation of mineworkings, which is also outside the scope of this report and has been reported separately by Sirius within the Drilling and Grouting Completion Report (ref 6, Section 1.4).

1.4 Sources of Information

This report is based upon a review of the following data:

1. EPS (September 2020) Greenhead College, Phase 1 Geo-Environmental Desk Study (Report ref. UK20.5113).
2. EPS (November 2020) Greenhead College, Phase II Geo-environmental Assessment. (Report ref. UK20.5113b) Issue 1.
3. Cundall (September 2021) Coal Mining Risk Assessment at Greenhead College, Kirklees (Report ref. 1029739.RPT.GL.001) RevA.
4. Cundall (November 2021) Phase II Geotechnical and Geoenvironmental Assessment (Report ref. NE8659-CDL-ZZ-XX-RP-GE-60200) Rev C.
5. Sirius (January 2022) Specification for the Stabilisation of Shallow Mine Workings, (Report ref. SDL4284)
6. Sirius (June 2022) Completion Report for the Drilling and Grouting of Mine Workings at Greenhead Sixth Form College, Huddersfield' Report ref SDL4284.
7. Cundall, August 2022 'Detailed Remediation and Verification Strategy' Ref. NE8659-CDL-ZZ-XX-RP-GE-60201 Rev B.
8. Oobe (November 2022) Urban Greening Factor, Drawing No. NE8659-OOB-ZZ-00-DR-L-0009.
9. Cundall (July 2023) Ground Floor Slab General Arrangement, Drawing No. NE8659-CCS-XX-00-DR-S-31002.

1.5 Limitations

The opinions provided and recommendations given in this report are based on the information contained within the sources referenced in Section 1.4, which have been based on visual site inspection, information provided by third parties, the results of the ground investigations and factual data provided by the Client and their Sub-contractor(s).

This report is based upon the data provided by the Client (or appointed sub-contractor) to Cundall, and site inspections undertaken by Cundall. Cundall cannot be held responsible for any data omissions, or any activities not agreed with the Local Planning Authority for which they had no prior knowledge.

2.0

Background Information

2.0 Background Information

2.1 Site Description

A detailed review of the site is included within Cundall's Geotechnical and Geoenvironmental assessment (ref 4, Section 1.4) and should be read in conjunction with this report.

The site is an irregular shape and occupies an area approximately 2.5Ha in size to the west of Huddersfield town centre. It sits south of Park Drive South and north of Greenhead Road. The area is predominantly residential with some commercial units to the east and Greenhead Park to the north.

The site is occupied by the existing Greenhead College and associated infrastructure. Prior to redevelopment, a sports pitch was present in the west and a car park was in the south east. The site boundary was generally occupied by soft landscaping including mature and semi mature trees.

The site is generally located on two levels and is split centrally by a gabion wall, with the higher elevation in the west at around 130.5mAOD and the lower level in the east at approximately 127.0mAOD.

2.2 Site History

The available mapping from 1851 shows Greenhead Hall School to be present in the centre of the site. The school building has developed with the addition of several buildings, sports pitches and car parking with the most recent development in the north east of the school, understood to have been constructed between 2003 and 2009.

2.3 Ground Conditions

Historical ground investigation by EPS in October 2020 and Dunelm in April 2021 generally recorded the following succession of strata:

- Tarmacadam hardstanding in areas of car parking and access road to a maximum depth of 0.20m bgl
- Topsoil in landscaped areas to a maximum depth of 0.40m bgl.
- Granular sub base below tarmacadam hardstanding to a maximum depth of 0.40m bgl.
- Cohesive and granular Made ground across the majority of the site to a maximum depth of 2.20m bgl.
 - Granular made ground was generally described as black gravelly sand with ash and clinker and was recorded across most of the site except the south west and south. The made ground was recorded to a maximum depth of 1.10m in the north west of the site.
 - Cohesive made ground was generally recorded below the granular made ground as soft to firm, light brown sandy gravelly clay. The cohesive made ground was recorded at a maximum depth of 2.20m bgl in the north west.
- Completely weathered Pennine Lower Coal Measures typically described as soft to firm sandy gravelly clay, was recorded below the made ground and was recorded at thicknesses of between 0.90m and 1.50m. The cohesive deposits became stiffer with depth and were recorded to a maximum depth of 116.90m AOD.
- Competent Pennine Lower Coal Measures were predominantly encountered as mudstone, described as dark grey extremely weak to medium strong thinly laminated mudstone. A thin band of sandstone was recorded in the far western part of the site.

Water was encountered within one exploratory hole in the south east at 3m bgl and was considered to be representative of perched water within the completely weathered mudstone.

Detailed descriptions of the ground conditions discussed above, including exploratory hole logs, are included within EPS Phase II Geo-Environmental Assessment (ref 2, Section 1.4) and Dunelm Factual Ground Investigation Report, included within Cundall's Geotechnical and Environmental Assessment (ref 4, Section 1.4).

2.4 Identified Areas of Contamination

2.4.1 Human Health

Elevated concentrations of PAH compounds were recorded within three exploratory holes, two of which were located in the south east below the proposed building footprint and one located within the north west, below the proposed sports pitches.

2.4.2 Gas Risk

The Cundall Geotechnical and Geoenvironmental Assessment (ref 4, Section 1.4) included six rounds of ground gas monitoring and a further three rounds were undertaken during and following the drilling and grouting of the underground mine workings. The results of the ground gas monitoring were assessed and characterised the site as a Characteristic Situation 2 (CS-2), under which scenario ground gas protection measures are required.

3.0

Remediation Strategy

3.0 Remediation Strategy

3.1 Summary of Approved Remediation Strategy

3.1.1 Objectives and Principles of Remediation

Prior to commencement of the works a Detailed Remediation and Verification Strategy (ref 7, Section 1.4) was prepared by Cundall. The purpose of the strategy was to outline remedial measures and implement controls in accordance with the current contaminated land and planning guidance, regulations and legislation. Additionally, the strategy served to:

- Satisfy the Local Planning Authority that upon completion of the works the identified risks have been adequately mitigated.
- Ensure construction workers are not put at an unacceptable short-term risk during the redevelopment works.
- Provide a Verification Strategy for the works. This is required to verify that the remedial works undertaken are implemented in accordance with the agreed Strategy.

The latest revision of the Remediation & Verification Strategy was issued to the Contaminated Land Officer (CLO) at Kirklees Council and no comments were received.

The remedial requirements relating to the Phase 2 development area (as described in Section 1.2) are not considered within this report.

For the Phase 1 development area only, the strategy stipulated that the following remedial measures were required to be implemented to comply with the agreed Remediation Strategy.

3.1.2 Base of Excavation and As Built Survey

Both as built and as dug (base of excavation) surveys were required to be completed.

3.1.3 Human Health Risks (Clean Cover System in Areas of New Soft Landscaping)

Elevated concentrations of Speciated Polycyclic Aromatic Hydrocarbons (PAHs) were identified during the ground investigation that requires mitigation measures to prevent future end users and maintenance workers coming into contact with contaminated soils.

The proposed mitigation measures include the placement of a clean cover system, comprising a minimum 300mm thickness of clean topsoil / subsoil overlying a geotextile separator in areas of new (not existing) soft landscaping only where made ground is present.

Where made ground is not present, and in areas of existing soft landscaping, the clean cover system is not required.

3.1.4 Ground Gas

The gassing situation across the site has been assessed as Characteristic Situation 2 (CS-2), under which scenario all new developments require ground gas protection measures.

Further information on the ground gas protection measures is detailed below.

3.1.4.1 Main Building

The proposed college building in the south east of the site is classified as a Type C Building (in accordance with BS8485) and therefore requires a gas protection score of 2.5 points. It is understood that this is to be achieved by the use of a ground bearing slab and the placement and verification of a suitable ground gas membrane by an independent specialist.

3.1.5 Water Supply Pipes

All new potable water supply pipes at the site were to conform with one of the following remedial options:

1. Place all new potable water supply pipes in either natural soils or directly into new buildings (i.e., no direct contact with existing made ground soils), thus preventing contact with made ground soils.
2. Upgrade the water supply pipes to a proprietary potable water supply pipe designed for contaminated sites such as 'Protect-line' together with the associated connections.

3.1.6 Material Control

3.1.6.1 Required validation of Imported / Site Won Aggregates

Site won and imported materials were to be tested in accordance with the frequencies detailed in Table 3 and meet the criteria of Table 4 in Cundall's Detailed Remediation and Verification Strategy (ref 7, Section 1.4).

The validation was to consist of a minimum of two chemical testing results (depending on the origin of the material) for each source of imported or site won aggregate.

3.1.7 Required Validation of Landscaping Material

Fill placed in soft landscaped areas were to be tested in accordance with the frequencies detailed in Table 3 and meet the criteria of Table 4 in Cundall's Detailed Remediation and Verification Strategy (ref 7, Section 1.4).

The validation was to consist of a minimum of two chemical testing results (depending on the origin of the material) for each source of imported or site won aggregate.

3.1.7.1 Soil Disposal

Any materials exported from site to landfill were to be hauled by a registered waste carrier and a Waste Transfer Note (WTN) shall be completed, signed and retained by all parties involved. The WTN shall state the volume of waste, the nature of the material and statement of its chemical composition. The WTN shall be kept by the Main Contractor and copies made available for inclusion in the Verification Report, where practicable.

Site records shall be kept detailing any previously unidentified contamination encountered during the construction works and any deviations from the agreed remediation strategy.

3.1.8 Areas of Unforeseen Ground Contamination

Where any previously unidentified contamination was encountered during the construction works then site records were needed to be kept including any deviations from the agreed Remediation Strategy. The records needed to include details of the works carried out, including a photographic record as works progresses, details of any unexpected contamination / buried structures and what action was taken laboratory analysis results, copies of the Waste Transfer Notes and 'day works' records for any materials taken off the site.

3.1.9 Variations to the Remediation Strategy

Any significant deviation from the agreed remediation strategy was to be agreed in writing with the LPA and their CLO prior to implementation.

4.0

Remediation and Verification Works Undertaken

4.0 Remediation and Verification Works Undertaken

4.1 Enabling Works Undertaken

The enabling works undertaken across Phase 1 predominantly consisted of the breaking out of concrete and macadam hardstanding and a reduced level dig to formation. Excavations within the western part of the site were typically shallow and in the south eastern part of the site extended to a maximum approximate depth of 4.00m bgl to accommodate the retaining wall and the building foundations.

Enabling works were restricted by large mature trees in the far south east where it was essential that the root zones of the trees remained undisturbed and no cutting or filling operations were undertaken within these areas.

4.2 Base of Excavation Survey / As Built Survey

The base of excavation survey is presented in Appendix A along with an 'as built' survey following the placement and compaction of fill (where applicable) and construction of soft and hard landscaping.

4.3 Provision of a Clean Cover System to New Soft Landscaped Area

In areas of new soft landscaping and where made ground soils remain in situ, a clean cover system was constructed and comprised a geotextile marker layer below a minimum of 300mm of topsoil / subsoil.

Where the earthworks consisted of a reduced level dig that exposed natural ground, a clean cover system was not required, and the finished development levels were achieved by placing a minimum of 150mm of topsoil merely to act as a growing medium. The locations where made ground soils were excavated and removed in their entirety in areas of new soft landscaping are shown in yellow within Figure 4-1. Confirmation of the removal of made ground and exposure of underlying natural clean soils is included within an email from GallifordTry, included in Appendix B.

In some areas, no remedial earthworks were possible to undertaken due to the presence of semi-mature, mature trees or dense vegetation (to be retained). A clean cover system was not installed within these areas.

Areas highlighted in green on Figure 4-1 are areas of pre-existing soft landscaping, no remedial earthworks were undertaken in these areas other than minor regarding and reseeded.

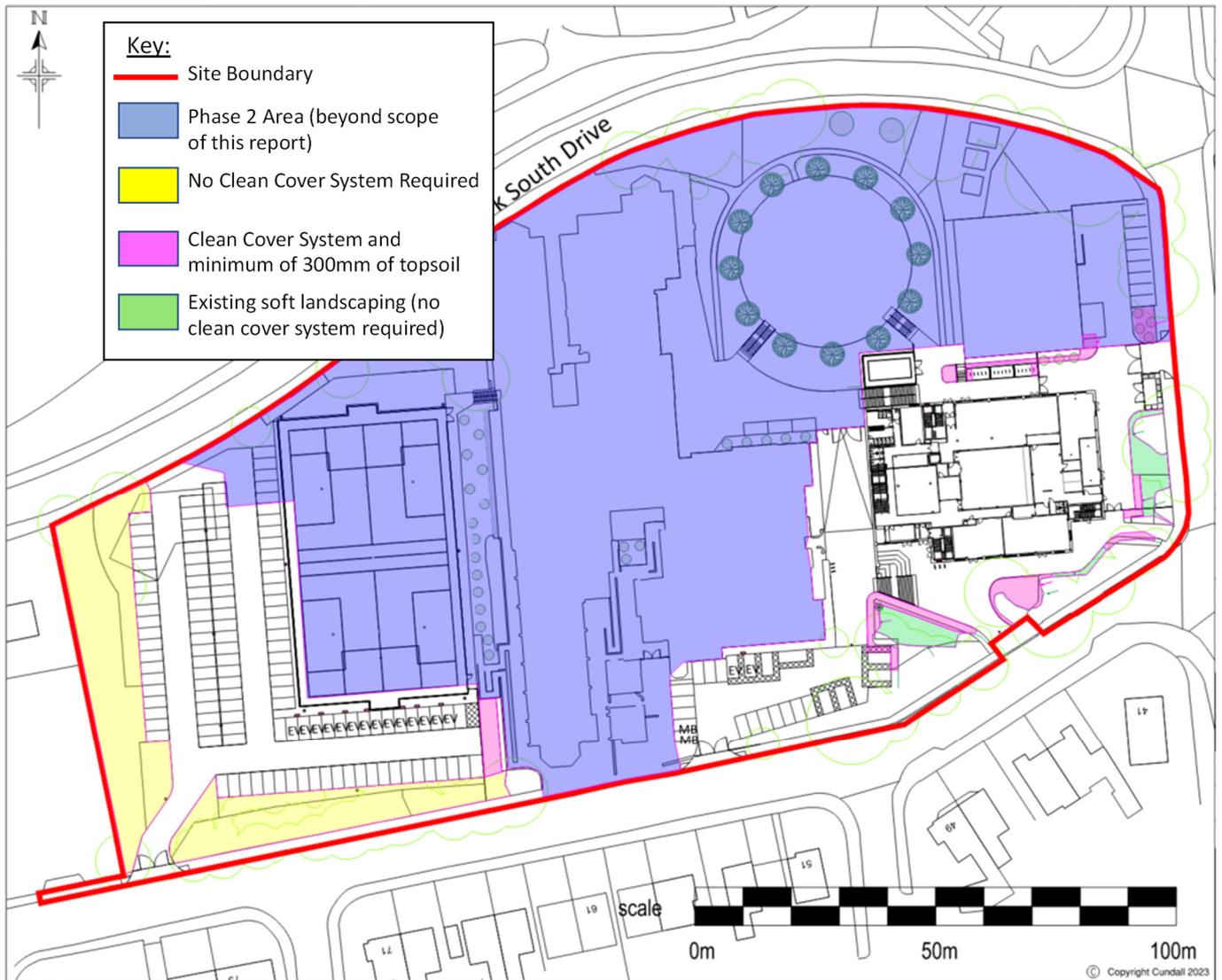


Figure 4-1: Location of Clean Cover System and where pre-existing soft landscaping is present

In areas where topsoil has been placed upon made ground soils, a geotextile separator has been used at the base of the clean cover system, followed by the placement of at least 300mm of topsoil. These areas are highlighted in pink in Figure 4-1 Further detail on the chemical suitability and testing of the imported topsoil is included in Section 4.6.

A specification data sheet of the geotextile used as a separator at the base of topsoil is included within Appendix D.

4.4 Ground Gas

4.4.1 Main Building

The required ground gas protection score of 2.5 has been achieved within the main building in the south east by adopting a ground bearing floor slab (0.5 points) and installing a suitable ground gas membrane (2 points), which was verified by an independent third party consultant.

Confirmation of the ground bearing floor slab is included on Drawing NE8659-CCS-XX-00-DR-S-31002.

Individual ground gas membrane verification reports produced by a third party (Geoshield Ltd) confirm that the ground gas membrane was installed and verified in accordance with BS8485. A verification certificate (Dated 20 January 2023) was produced following completion of the verification process and is included within Appendix F. The individual verification reports are available upon request from the Contractor.

4.5 Water Supply Pipes

The Contractor has confirmed that barrier pipe was used within the development and the relevant correspondence is presented in Appendix B. A photograph of the pipe used on site is included in Figure 4-2.



Figure 4-2: Barrier Pipe used for water supply pipes on site

4.6 Material Control

4.6.1 Imported Topsoil

Approximately 100m³ of topsoil was imported from FastSource in June 2022 and placed within the western part of the site and was subjected to chemical testing in accordance with Cundall's Remediation and Verification Strategy.

Six representative samples were recovered by a suitably experienced geoenvironmental engineer and submitted to a UKAS accredited laboratory. The results are included in laboratory certificate 22-13177 and are presented in Appendix E.

The chemical testing results comply with the requirements of Cundall's Remediation and Verification Strategy and are deemed acceptable.

A further 100m³ of topsoil was imported from 'Freeland Horticulture Limited' and placed in the eastern part of Phase 1. Three representative samples were recovered by a suitably experienced geoenvironmental engineer and submitted to a UKAS accredited laboratory. The results are included in laboratory certificate 23-17758 and are presented in Appendix E.

The chemical testing results comply with the requirements of Cundall's Remediation and Verification Strategy and are deemed acceptable.

4.6.2 Imported Aggregate

Approximately 1000m³ of virgin quarried aggregate was imported to site from Swindon Quarry, owned and operated by Tarmac Trading Limited, and placed behind the retaining wall. Four representative samples were recovered from site and scheduled for testing in accordance with the Cundall Remediation and Verification Strategy. The results of the chemical testing are included laboratory certificate 23-15427 and are presented in Appendix E).

The chemical testing results comply with the requirements of Cundall's Remediation and Verification Strategy and are deemed acceptable.

4.7 Unforeseen Contamination

During the course of the preparatory earthworks, no unforeseen ground conditions were encountered, and this was confirmed by the 'Client'. The relevant correspondence is included within Appendix B.

4.8 Variations to the Strategy

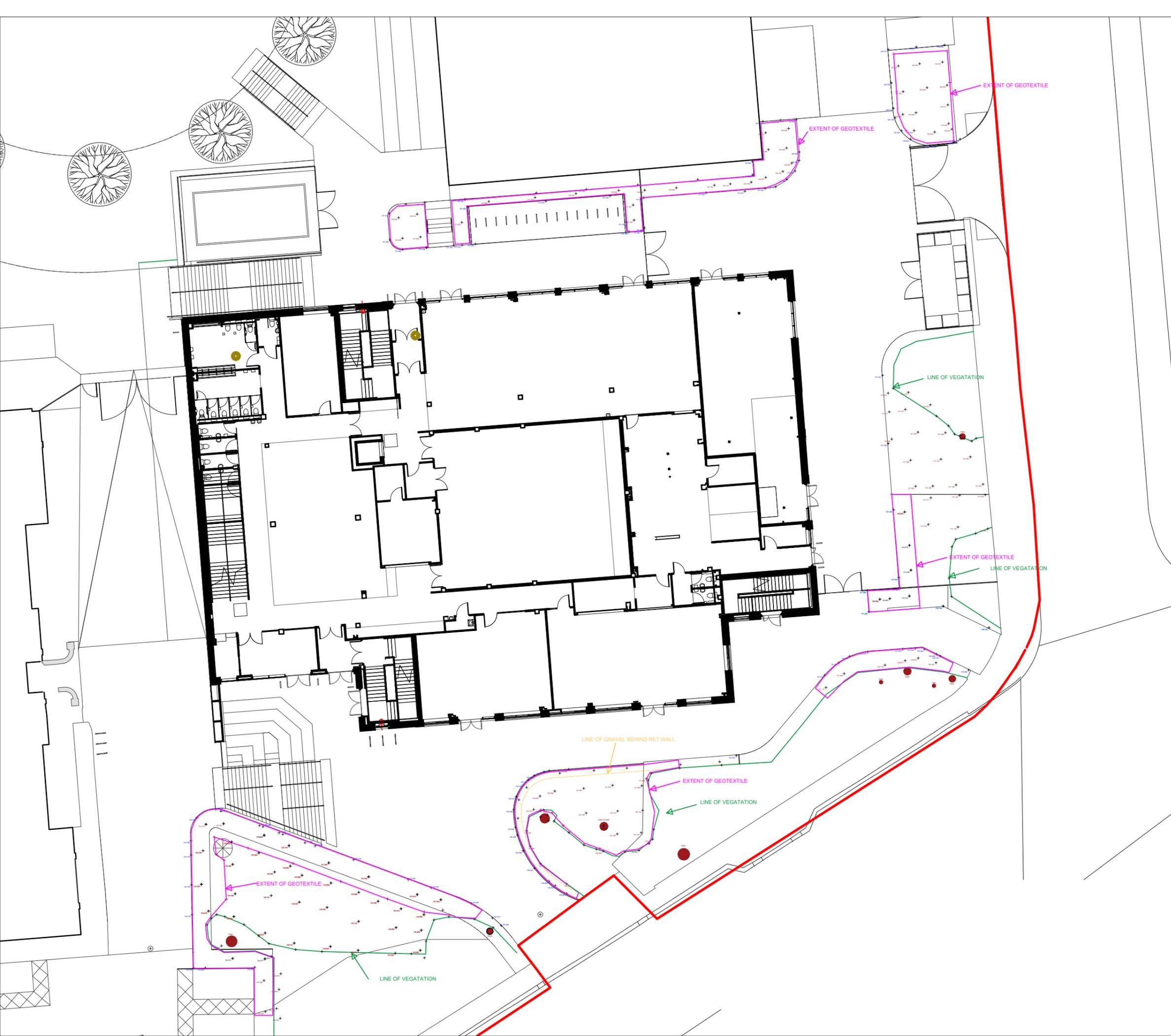
4.8.1 Future Verification Requirements

Areas outwith the Phase 1 boundary (specified in Figure 1-2) will be required to be remediated in accordance with Cundall Detailed Remediation and Verification Strategy (ref 7, Section 1.4). On completion of the works in Phase 2, a Verification Report will be required confirming that these works have been undertaken in accordance with the Remediation Strategy.

Appendices

Appendices

Appendix A Base of Excavation and As Built Survey



Notes

+0.000 Hard Landscaping Levels

+0.000 As-Dug Levels



Site Address

Galliford Try
Greenhead College
Greenhead Road
Huddersfield,
HD1 4ES

Drawing Title

Remediation As-Dug Survey

Surveyed By

JM

Date

28/08/23



- Notes**
- +0.000 Hard Landscaping Levels
 - +0.000 Topsoil Levels



Site Address

Galliford Try
 Greenhead College
 Greenhead Road
 Huddersfield,
 HD1 4ES

Drawing Title

Remediation As-Built Survey

Surveyed By	Date
JM	25/08/23

Appendix B Correspondence

Chris Lazenby

From: Aaron Stanaway (Galliford Try) <Aaron.Stanaway@gallifordtry.co.uk>
Sent: 12 July 2022 14:28
To: Chris Lazenby
Cc: Mark Dean (Galliford Try)
Subject: Greenhead - Topsoil Confirmation
Attachments: PHOTO-2022-06-29-12-25-48.jpg; PDS033_Standard_Geotextiles.pdf; Topsoil Mark-Up.pdf

Hi Chris,

Further to the call, please accept this email as confirmation from GT that the topsoil in the car park area was placed on top of natural ground.
In the area to the south-east (see attached photo), where made ground was present, a geotextile membrane was laid before the topsoil. For information on the membrane, please see the datasheet attached.

Thanks for your time,

Aaron Stanaway

Design Co-ordinator

Aaron.Stanaway@gallifordtry.co.uk

T: 07923 254 901

Galliford Try Building - North East & Yorkshire
Lumina, Park Approach
Thorpe Park, West Yorkshire LS15 8ZB
www.gallifordtry.co.uk



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Chris Lazenby

From: Mark Dean (Galliford Try) <Mark.Dean@gallifordtry.co.uk>
Sent: 08 June 2023 15:09
To: Chris Lazenby
Cc: Will McKaig (Galliford Try); Jack Broomhead (Galliford Try); Mark Wright (Galliford Try)
Subject: Greenhead College - Verification (013)

Chris,

GT confirm there were no unexpected ground conditions (i.e. areas of potential contamination) were identified during the excavation of made ground.

Kind Regards

Mark Dean

Senior Design Manager

Mark.Dean@gallifordtry.co.uk

T: 07706357412

Galliford Try Building - North East & Yorkshire
Galliford Try House, Pontefract Road
Normanton, West Yorkshire WF6 1RN
www.gallifordtry.co.uk



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Chris Lazenby

From: Aaron Stanaway (Galliford Try) <Aaron.Stanaway@gallifordtry.co.uk>
Sent: 12 July 2022 16:14
To: Chris Lazenby
Cc: Mark Dean (Galliford Try); Jack Broomhead (Galliford Try)
Subject: Greenhead - Ground Conditions

Hi Chris,

Please accept this email as confirmation from GT that no unexpected ground conditions were identified during the excavation of made ground. This should close out item 013 on the RFI schedule.

Thank you,

Aaron Stanaway

Design Co-ordinator

Aaron.Stanaway@gallifordtry.co.uk

T: 07923 254 901

Galliford Try Building - North East & Yorkshire
Lumina, Park Approach
Thorpe Park, West Yorkshire LS15 8ZB
www.gallifordtry.co.uk



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Chris Lazenby

From: Aaron Stanaway (Galliford Try) <Aaron.Stanaway@gallifordtry.co.uk>
Sent: 12 July 2022 16:10
To: Chris Lazenby
Cc: Mark Dean (Galliford Try); Jack Broomhead (Galliford Try)
Subject: Greenhead -

Hi Chris,

Please accept this email as confirmation that barrier pipe has been utilised for the water supply pipe. This should close off item 011 on the RFI schedule.

Thank you for your time,

Aaron Stanaway

Design Co-ordinator

Aaron.Stanaway@gallifordtry.co.uk

T: 07923 254 901

Galliford Try Building - North East & Yorkshire
Lumina, Park Approach
Thorpe Park, West Yorkshire LS15 8ZB
www.gallifordtry.co.uk



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Appendix C Clean Cover System

Appendix D Geotextile Specification

Product Data Sheet

Standard Geotextiles

PDS033 Issue 11—May 2022

DESCRIPTION:

Nonwoven geotextile manufactured from UV stabilised, high tenacity, virgin polypropylene fibres that have been both mechanically and thermally bonded to provide a highly permeable yet durable separation and filtration layer.

APPLICATIONS:

With over 50 years of unrivalled expertise and experience, Terram standard geotextiles are the original nonwoven geotextiles for separation and filtration applications.

Typical uses include the prevention of intermixing of sub-base and subgrade layers, drainage and bedding materials. Terram filters/separators are used extensively in the construction of:

- Paved and unpaved roads
- Railways
- Car parks and hardstandings
- Cycleways and footpaths
- Sustainable Drainage Systems (SuDS)

FEATURES & BENEFITS:

- Manufactured from inert high tenacity virgin polypropylene fibres giving excellent long term durability in all soil types.
- High static and dynamic puncture resistance ensures a low risk of damage during construction.
- Random orientated web with isotropic properties provide the same strength, permeability and filtration in all directions.
- High elongation at break maintains separation and filtration function under load particularly in soft and variable ground conditions.



APPROVAL:

Network Rail PADS certificate numbers; T1000 057/100703, T2000 57/100705, T3000 57/100706 (4.5m wide x 100m long rolls) and T4000 057/100709 (4.5m wide x 50m long rolls).



INTENDED USE/FUNCTION:



INTENDED APPLICATION:



PROPERTIES	Test Method	Unit	Mean Value								
			T700	T1000	T1000 Orange	T1300	T1500	T2000	T3000	T4000	T4500
MECHANICAL	BS8661 classification profile		1	1	1	2	3	3	3	3	
Tensile Strength	EN ISO 10319	kN/m	6	8	8	10	12.5	14.5	18	22	30
Tensile Elongation	EN ISO 10319	%	60	60	60	60	60	60	60	60	60
CBR Puncture Resistance	EN ISO 12236	N	1050	1500	1500	2000	2250	2750	3250	4300	5350
Cone Drop	EN ISO 13433	mm	42	38	38	34	32	26	24	22	14
HYDRAULIC											
Pore Size - Mean AOS	EN ISO 12956	µm	95	90	90	65	65	65	60	60	60
Permeability—(H50)	EN ISO 11058	l/m ² s	100	90	90	65	65	55	50	30	30
DURABILITY											
Weathering (UV Exposure)	EN 12224	Days	30	30	30	30	30	30	30	30	30
Combined ageing (Oxidation, temperature & moisture)	EN ISO 13438	Service Life (Years)	50	100	100	100	100	100	100	100	100
MATERIAL DIMENSIONS											
Standard Roll Length		m	150	100	100	100	100	100	100	50	50
Standard Roll Width		m	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Maximum Roll Width		m	6	6	6	6	6	6	6	6	6
Gross Roll Weight (Nominal)		kg	40	54	54	70	78	94	112	74	90

PACKAGING & IDENTIFICATION

Terram Standard Geotextiles are supplied on cardboard cores and wrapped in Polyethylene sheeting with identification labels in accordance with ISO 10320.

STORAGE

The rolls of geotextile shall be stored on stable/ level ground and stacked not more than five rolls high and no other materials shall be stacked on top. The rolls can be stored outdoors when packaged, but should be protected from exposure to UV. All materials should be stored in accordance with good health and safety practice and in accordance with local laws. For additional information please refer to Terram Geotextiles MSDS.

QUALITY

Terram Standard Geotextiles are supplied having met internal quality requirements in accordance with our Quality Management system which is certified to BS EN ISO 9001:2015.

NOTES

Reported values are arithmetic mean values unless otherwise stated. For further details on physical parameters please refer to the individual Declaration of Performance certificates available for download from www.terram.com

Reported values related to durability testing are generally based on the lowest grade product within a family.

A Nominal value indicates that the value is not part of the performance specification and is provided for guidance only.

Gross roll weight is based on standard roll dimensions and is provided is for lifting guidance only, it does not form part of quality control procedures.

ADDITIONAL INFORMATION

Refer to the Terram Jointing Methods (downloadable from www.terram.com) for when simple overlaps are required for subsequent and adjacent roll lengths. However, pegging, sewing, stapling or gluing can also be used depending upon the application, the sub-grade conditions, the loading, the convenience and the cost.

These figures relate to standard product weights and roll sizes. Other weights, sizes and colours may be available on request. For further information please contact Terram Technical Support.

How else can we help? Get in touch with us

+44 (0) 1621 874200 info@terram.com www.terram.com



Appendix E Chemical Testing Results



DETS

Certificate of Analysis

Certificate Number 22-13177

Issued: 19-Jul-22

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

Our Reference 22-13177

Client Reference D10377

Order No PO26739-D10377

Contract Title Greenhead College

Description 6 Soil samples.

Date Received 12-Jul-22

Date Started 12-Jul-22

Date Completed 19-Jul-22

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By



Kirk Bridgewood
General Manager



Summary of Chemical Analysis

Matrix Descriptions

Our Ref 22-13177

Client Ref D10377

Contract Title Greenhead College

Sample ID	Depth	Lab No	Completed	Matrix Description
Sample 1	0.1	2031259	19/07/2022	Brown gravelly, sandy CLAY including some rootlets
Sample 2	0.1	2031260	19/07/2022	Brown gravelly, sandy CLAY including some rootlets
Sample 3	0.1	2031261	19/07/2022	Brown gravelly, sandy CLAY including some rootlets
Sample 4	0.1	2031262	19/07/2022	Brown gravelly, sandy CLAY
Sample 5	0.1	2031263	19/07/2022	Brown gravelly, sandy CLAY
Sample 6	0.1	2031264	19/07/2022	Brown gravelly, sandy CLAY including some rootlets

Summary of Chemical Analysis

Soil Samples

Our Ref 22-13177
 Client Ref D10377
 Contract Title Greenhead College

Lab No	2031259	2031260	2031261	2031262	2031263	2031264
Sample ID	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Depth	0.10	0.10	0.10	0.10	0.10	0.10
Other ID						
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	07/07/2022	07/07/2022	07/07/2022	07/07/2022	07/07/2022	07/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units	2031259	2031260	2031261	2031262	2031263	2031264
Metals									
Arsenic	DETSC 2301#	0.2	mg/kg	13	9.1	6.0	13	13	11
Cadmium	DETSC 2301#	0.1	mg/kg	0.4	0.3	0.3	0.3	0.4	0.3
Chromium	DETSC 2301#	0.15	mg/kg	16	12	11	16	17	13
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	39	26	29	36	34	29
Lead	DETSC 2301#	0.3	mg/kg	53	56	41	79	91	63
Mercury	DETSC 2325#	0.05	mg/kg	0.13	0.12	0.10	0.16	0.23	0.12
Nickel	DETSC 2301#	1	mg/kg	14	9.7	7.8	12	12	10
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	0.8	0.6	< 0.5
Zinc	DETSC 2301#	1	mg/kg	95	58	67	68	69	50
Inorganics									
pH	DETSC 2008#		pH	7.1	7.3	7.7	7.2	6.9	7.6
Organic matter	DETSC 2002#	0.1	%	6.1	5.8	11	5.7	5.4	6.2
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l	96	79	170	42	39	51
Petroleum Hydrocarbons									
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2	< 1.2
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	15	< 3.4	< 3.4	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	15	< 10	< 10	< 10
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	1.0	1.7	0.5	1.4	< 0.5
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	4.6	12	< 0.6	4.1	< 0.6
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	7.0	1.6	< 1.4	14	< 1.4
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	13	16	< 10	20	< 10
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	13	31	< 10	20	< 10
PAHs									
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.27	0.07	0.46	0.15	0.08	0.34
Anthracene	DETSC 3303	0.03	mg/kg	0.05	< 0.03	0.08	< 0.03	< 0.03	0.07
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.37	0.13	1.3	0.26	0.16	0.82
Pyrene	DETSC 3303#	0.03	mg/kg	0.32	0.11	1.1	0.24	0.15	0.69



Summary of Chemical Analysis

Soil Samples

Our Ref 22-13177

Client Ref D10377

Contract Title Greenhead College

Lab No	2031259	2031260	2031261	2031262	2031263	2031264
Sample ID	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6
Depth	0.10	0.10	0.10	0.10	0.10	0.10
Other ID						
Sample Type	ES	ES	ES	ES	ES	ES
Sampling Date	07/07/2022	07/07/2022	07/07/2022	07/07/2022	07/07/2022	07/07/2022
Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s

Test	Method	LOD	Units						
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.12	0.04	0.49	0.10	0.06	0.28
Chrysene	DETSC 3303	0.03	mg/kg	0.21	0.09	0.78	0.16	0.12	0.40
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.21	0.09	0.68	0.15	0.13	0.38
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.06	< 0.03	0.37	0.06	0.04	0.17
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.13	0.05	0.52	0.08	0.07	0.28
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.07	0.04	0.28	0.06	0.05	0.16
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	0.10	< 0.03	< 0.03	0.07
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.08	0.04	0.35	0.07	0.05	0.22
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 1.60	< 0.57	< 5.64	< 1.07	< 0.75	< 3.27

Summary of Asbestos Analysis

Soil Samples

Our Ref 22-13177

Client Ref D10377

Contract Title Greenhead College

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2031259	Sample 1 0.10	SOIL	NAD	none	Darryl Fletcher
2031260	Sample 2 0.10	SOIL	NAD	none	Darryl Fletcher
2031261	Sample 3 0.10	SOIL	NAD	none	Darryl Fletcher
2031262	Sample 4 0.10	SOIL	NAD	none	Darryl Fletcher
2031263	Sample 5 0.10	SOIL	NAD	none	Darryl Fletcher
2031264	Sample 6 0.10	SOIL	NAD	none	Darryl Fletcher

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

Information in Support of the Analytical Results

Our Ref 22-13177
 Client Ref D10377
 Contract Greenhead College

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2031259	Sample 1 0.10 SOIL	07/07/22	GJ 250ml, GJ 60ml, PT 1L		
2031260	Sample 2 0.10 SOIL	07/07/22	GJ 250ml, GJ 60ml, PT 1L		
2031261	Sample 3 0.10 SOIL	07/07/22	GJ 250ml, GJ 60ml, PT 1L		
2031262	Sample 4 0.10 SOIL	07/07/22	GJ 250ml, GJ 60ml, PT 1L		
2031263	Sample 5 0.10 SOIL	07/07/22	GJ 250ml, GJ 60ml, PT 1L		
2031264	Sample 6 0.10 SOIL	07/07/22	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2024	Sulphide	mg/kg	10	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO4	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO4	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	Air Dried	No	Yes	Yes
DETSC2123	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETS 062	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETS 062	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report



DETS

Certificate of Analysis

Certificate Number 23-17758

Issued: 17-Aug-23

Client SOCOTEC UK Ltd
29 Rufford Court
Hardwick Grange
Warrington
WA1 4RF

Our Reference 23-17758

Client Reference 51070871

Order No 204709WAR

Contract Title Shanco Contracts Ltd Greenhead College Huddersfield

Description 3 Soil samples.

Date Received 25-Jul-23

Date Started 25-Jul-23

Date Completed 17-Aug-23

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By



Kirk Bridgewood
General Manager



2139

Summary of Chemical Analysis Soil Samples

Our Ref 23-17758

Client Ref 51070871

Contract Title Shanco Contracts Ltd Greenhead College Huddersfield

Lab No	2208582	2208583	2208584
Sample ID	55118125	55118126	55118127
Depth			
Other ID	TS1	TS2	TS3
Sample Type	SOIL	SOIL	SOIL
Sampling Date	21/07/2023	21/07/2023	21/07/2023
Sampling Time	n/s	n/s	n/s

Test	Method	LOD	Units			
Metals						
Arsenic	DETSC 2301#	0.2	mg/kg	8.1	7.1	8.4
Boron, Water Soluble (2.5:1)	DETSC 2311#	0.2	mg/kg	1.3	1.3	1.4
Cadmium	DETSC 2301#	0.1	mg/kg	1.0	0.1	0.2
Chromium	DETSC 2301#	0.15	mg/kg	9.4	10	9.8
Copper	DETSC 2301#	0.2	mg/kg	20	15	17
Lead	DETSC 2301#	0.3	mg/kg	39	29	34
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	< 0.05
Nickel	DETSC 2301#	1	mg/kg	10	9.5	11
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	66	55	64
Inorganics						
pH	DETSC 2008#		pH	8.0	8.0	7.9
Organic matter	DETSC 2002#	0.1	%	4.9	3.4	3.1
PAHs						
Naphthalene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Acenaphthylene	DETSC 3301	0.1	mg/kg	0.1	0.1	< 0.1
Acenaphthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	< 0.1
Fluorene	DETSC 3301	0.1	mg/kg	0.1	0.1	< 0.1
Phenanthrene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	0.1
Anthracene	DETSC 3301	0.1	mg/kg	< 0.1	0.2	< 0.1
Fluoranthene	DETSC 3301	0.1	mg/kg	0.3	0.1	0.6
Pyrene	DETSC 3301	0.1	mg/kg	0.4	0.3	0.6
Benzo(a)anthracene	DETSC 3301	0.1	mg/kg	0.1	< 0.1	0.2
Chrysene	DETSC 3301	0.1	mg/kg	0.2	< 0.1	0.4
Benzo(b)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4
Benzo(k)fluoranthene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.5
Benzo(a)pyrene	DETSC 3301	0.1	mg/kg	< 0.1	< 0.1	0.4
Indeno(1,2,3-c,d)pyrene	DETSC 3301	0.1	mg/kg	0.8	0.7	0.4
Dibenzo(a,h)anthracene	DETSC 3301	0.1	mg/kg	0.2	0.2	0.1
Benzo(g,h,i)perylene	DETSC 3301	0.1	mg/kg	0.6	0.4	0.5
PAH 16 Total	DETSC 3301	1.6	mg/kg	3.1	2.1	4.3

Summary of Asbestos Analysis

Soil Samples

Our Ref 23-17758

Client Ref 51070871

Contract Title Shanco Contracts Ltd Greenhead College Huddersfield

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2208582	55118125 TS1	SOIL	NAD	none	Robertas Ciparis
2208583	55118126 TS2	SOIL	NAD	none	Robertas Ciparis
2208584	55118127 TS3	SOIL	NAD	none	Robertas Ciparis

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

Information in Support of the Analytical Results

Our Ref 23-17758
 Client Ref 51070871
 Contract Shanco Contracts Ltd Greenhead College Huddersfield

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2208582	55118125 SOIL	21/07/23	GJ 250ml, GJ 60ml, PT 1L x2		
2208583	55118126 SOIL	21/07/23	GJ 250ml, GJ 60ml, PT 1L x2		
2208584	55118127 SOIL	21/07/23	GJ 250ml, GJ 60ml, PT 1L x2		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

End of Report



DETS

Certificate of Analysis

Certificate Number 23-15427

Issued: 07-Jul-23

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

Our Reference 23-15427

Client Reference D30047

Order No PO0476

Contract Title Greenhead College

Description 4 Soil samples.

Date Received 29-Jun-23

Date Started 29-Jun-23

Date Completed 07-Jul-23

Test Procedures Identified by prefix DETSn (details on request).

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

Approved By



Kirk Bridgewood
General Manager



Summary of Chemical Analysis

Matrix Descriptions

Our Ref 23-15427

Client Ref D30047

Contract Title Greenhead College

Sample ID	Lab No	Completed	Matrix Description
GT1	2194540	07/07/2023	Brown very gravelly SAND
GT2	2194541	07/07/2023	Brown very gravelly SAND
GT3	2194542	07/07/2023	Brown very gravelly SAND
GT4	2194543	07/07/2023	Brown very gravelly SAND

Summary of Chemical Analysis

Soil Samples

Our Ref 23-15427

Client Ref D30047

Contract Title Greenhead College

Lab No	2194540	2194541	2194542	2194543
Sample ID	GT1	GT2	GT3	GT4
Depth				
Other ID				
Sample Type	ES	ES	ES	ES
Sampling Date	27/06/2023	27/06/2023	27/06/2023	27/06/2023
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Metals							
Arsenic	DETSC 2301#	0.2	mg/kg	1.6	5.9	2.6	2.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.3	0.3	0.3	0.4
Chromium	DETSC 2301#	0.15	mg/kg	1.0	4.0	1.9	1.0
Chromium, Hexavalent	DETSC 2204*	1	mg/kg	< 1.0	< 1.0	< 1.0	< 1.0
Copper	DETSC 2301#	0.2	mg/kg	3.8	7.3	3.7	5.8
Lead	DETSC 2301#	0.3	mg/kg	1.6	2.7	2.4	2.9
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05	< 0.05	0.06	< 0.05
Nickel	DETSC 2301#	1	mg/kg	1.7	5.0	2.2	1.8
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5	< 0.5	< 0.5	< 0.5
Zinc	DETSC 2301#	1	mg/kg	11	25	28	23
Inorganics							
pH	DETSC 2008#		pH	9.2	9.8	9.3	10.1
Organic matter	DETSC 2002#	0.1	%	1.2	4.0	0.5	0.6
Sulphate Aqueous Extract as SO4 (2:1)	DETSC 2076#	10	mg/l	57	340	100	96
Petroleum Hydrocarbons							
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	< 1.5	< 1.5
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg	< 1.2	< 1.2	< 1.2	1.9
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg	< 1.5	< 1.5	3.4	8.7
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg	< 3.4	< 3.4	45	< 3.4
Aliphatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	48	11
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg	< 0.9	< 0.9	3.1	< 0.9
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg	< 0.5	< 0.5	5.3	2.2
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg	< 0.6	< 0.6	16	14
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg	< 1.4	< 1.4	35	6.9
Aromatic C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	59	23
TPH Ali/Aro Total C5-C35	DETSC 3072*	10	mg/kg	< 10	< 10	110	34
Benzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Ethylbenzene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Toluene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
Xylene	DETSC 3321#	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
MTBE	DETSC 3321	0.01	mg/kg	< 0.01	< 0.01	< 0.01	< 0.01
PAHs							
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03

Summary of Chemical Analysis Soil Samples

Our Ref 23-15427

Client Ref D30047

Contract Title Greenhead College

Lab No	2194540	2194541	2194542	2194543
Sample ID	GT1	GT2	GT3	GT4
Depth				
Other ID				
Sample Type	ES	ES	ES	ES
Sampling Date	27/06/2023	27/06/2023	27/06/2023	27/06/2023
Sampling Time	n/s	n/s	n/s	n/s

Test	Method	LOD	Units				
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	0.15
Anthracene	DETSC 3303	0.03	mg/kg	0.04	< 0.03	< 0.03	< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	0.30	0.04	< 0.03	0.11
Pyrene	DETSC 3303#	0.03	mg/kg	0.44	0.04	< 0.03	0.09
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	0.19	< 0.03	< 0.03	0.05
Chrysene	DETSC 3303	0.03	mg/kg	0.21	< 0.03	< 0.03	0.04
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	0.26	0.03	< 0.03	0.04
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	0.10	< 0.03	< 0.03	< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	0.21	< 0.03	< 0.03	< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	< 0.03	< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03	< 0.03	< 0.03	< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	0.11	< 0.03	< 0.03	< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	2.1	0.11	< 0.10	0.48

Summary of Asbestos Analysis

Soil Samples

Our Ref 23-15427

Client Ref D30047

Contract Title Greenhead College

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
2194540	GT1	SOIL	NAD	none	Robertas Ciparis
2194541	GT2	SOIL	NAD	none	Robertas Ciparis
2194542	GT3	SOIL	NAD	none	Robertas Ciparis
2194543	GT4	SOIL	NAD	none	Robertas Ciparis

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

Information in Support of the Analytical Results

Our Ref 23-15427
 Client Ref D30047
 Contract Greenhead College

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
2194540	GT1 SOIL	27/06/23	GJ 250ml, GJ 60ml, PT 1L		
2194541	GT2 SOIL	27/06/23	GJ 250ml, GJ 60ml, PT 1L		
2194542	GT3 SOIL	27/06/23	GJ 250ml, GJ 60ml, PT 1L		
2194543	GT4 SOIL	27/06/23	GJ 250ml, GJ 60ml, PT 1L		

Key: G-Glass P-Plastic J-Jar T-Tub

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

Soil Analysis Notes

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

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

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

Disposal

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

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

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 2002	Organic matter	%	0.1	Air Dried	No	Yes	Yes
DETSC 2003	Loss on ignition	%	0.01	Air Dried	No	Yes	Yes
DETSC 2008	pH	pH Units	1	Air Dried	No	Yes	Yes
DETSC 2076	Sulphate Aqueous Extract as SO ₄	mg/l	10	Air Dried	No	Yes	Yes
DETSC 2084	Total Organic Carbon	%	0.5	Air Dried	No	Yes	Yes
DETSC 2119	Ammoniacal Nitrogen as N	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide free	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Cyanide total	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2130	Phenol - Monohydric	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2130	Thiocyanate	mg/kg	0.6	Air Dried	No	Yes	Yes
DETSC 2301	Arsenic	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Barium	mg/kg	1.5	Air Dried	No	Yes	Yes
DETSC 2301	Beryllium	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Cadmium Available	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2301	Cadmium	mg/kg	0.1	Air Dried	No	Yes	Yes
DETSC 2301	Cobalt	mg/kg	0.7	Air Dried	No	Yes	Yes
DETSC 2301	Chromium	mg/kg	0.15	Air Dried	No	Yes	Yes
DETSC 2301	Copper	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2301	Manganese	mg/kg	20	Air Dried	No	Yes	Yes
DETSC 2301	Molybdenum	mg/kg	0.4	Air Dried	No	Yes	Yes
DETSC 2301	Nickel	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 2301	Lead	mg/kg	0.3	Air Dried	No	Yes	Yes
DETSC 2301	Selenium	mg/kg	0.5	Air Dried	No	Yes	Yes
DETSC 2301	Zinc	mg/kg	1	Air Dried	No	Yes	Yes
DETSC 2311	Boron (water soluble)	mg/kg	0.2	Air Dried	No	Yes	Yes
DETSC 2321	Total Sulphate as SO ₄	%	0.01	Air Dried	No	Yes	Yes
DETSC 2325	Mercury	mg/kg	0.05	Air Dried	No	Yes	Yes
DETSC 3049	Sulphur (free)	mg/kg	0.75	As Received	No	Yes	Yes
DETSC 3072	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3072	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3072	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3072	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3072	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3072	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes
DETSC 3303	Acenaphthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Acenaphthylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(a)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(b)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(k)fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Benzo(g,h,i)perylene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Dibenzo(a,h)anthracene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Fluoranthene	mg/kg	0.03	As Received	No	Yes	Yes

Appendix A - Details of Analysis

Method	Parameter	Units	Limit of Detection	Sample Preparation	Sub-Contracted	UKAS	MCERTS
DETSC 3303	Indeno(1,2,3-c,d)pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Naphthalene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Phenanthrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3303	Pyrene	mg/kg	0.03	As Received	No	Yes	Yes
DETSC 3311	C10-C24 Diesel Range Organics (DRO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	C24-C40 Lube Oil Range Organics (LORO)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3311	EPH (C10-C40)	mg/kg	10	As Received	No	Yes	Yes
DETSC 3321	Benzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Ethylbenzene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Toluene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	m+p Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3321	o Xylene	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 28 + PCB 31	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 52	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 101	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 118	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 153	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 138	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB 180	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3401	PCB Total	mg/kg	0.01	As Received	No	Yes	Yes
DETSC 3521	Ali/Aro C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C12	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C12-C16	mg/kg	1.2	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C16-C21	mg/kg	1.5	As Received	No	Yes	Yes
DETSC 3521	Aliphatic C21-C35	mg/kg	3.4	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C12	mg/kg	0.9	As Received	No	Yes	Yes
DETSC 3521	Aromatic C10-C35	mg/kg	10	As Received	No	Yes	Yes
DETSC 3521	Aromatic C12-C16	mg/kg	0.5	As Received	No	Yes	Yes
DETSC 3521	Aromatic C16-C21	mg/kg	0.6	As Received	No	Yes	Yes
DETSC 3521	Aromatic C21-C35	mg/kg	1.4	As Received	No	Yes	Yes

Method details are shown only for those determinands listed in Annex A of the MCERTS standard. Anything not included on this list falls outside the scope of MCERTS. No Recovery Factors are used in the determination of results. Results reported assume 100% recovery. Full method statements are available on request.

End of Report

Appendix F Gas Verification Records

Visqueen Gas Barrier

Features and benefits

- BBA certified - third party accreditation
- Complies with BS 8485:2015 + A1:2019 - industry standard for methane and carbon dioxide protection
- Flexible - easy to detail and install on site
- Multi functional - also acts as a radon and damp proof membrane
- Dual jointing methods - lap joints can be taped or heat welded

Product description

Visqueen Gas Barrier is a multi-layer reinforced polyethylene gas barrier with a 20 micron aluminium foil. The barrier is coloured blue on the upper surface and silver on the reverse. The product is supplied in single wound rolls (not folded), 2m x 50m.

Approvals and standards

- Third party accreditation (BBA 13/5069)
- Conforms to the specification requirements of BS 8485:2015 + A1:2019
- Suitable for all Characteristic Gas Situation (CS) ground gas regimes
- Conforms to the specification requirements of NHBC Amber 1 and Amber 2 applications
- Conforms to the specification requirements of BR 211:2015
- CE Mark EN 13967:2017
- Quality Management System ISO 9001:2015
- Occupational Health and Safety System ISO 45001:2018
- Environmental Management System ISO 14001:2015

Usage

Visqueen Gas Barrier is suitable for use in all types of buildings to prevent the ingress of harmful levels of ground gases e.g. methane, carbon dioxide and radon.

The barrier can be positioned above or below a solid concrete ground floor slab or above a precast suspended segmental ground floor system, e.g. beam and block floor.

The barrier can also be used as a high performance radon membrane and/or damp proof membrane.

The product is not intended for use where there is a risk of hydrostatic pressure.

System components

- VisqueenPro Double Sided Jointing Tape, 50mm x 10m
- Visqueen Gas Resistant Foil Lap Tape, 75mm x 50m
- Visqueen GR Lap Tape, 150mm x 10m
- Visqueen Ultimate Top Hat Units
- Visqueen Preformed Units
- VisqueenPro Detailing Strip, 300mm x 10m, 500mm x 10m
- Visqueen TreadGUARD 300, 2m x 75m
- Visqueen TreadGUARD 1500, 1m x 2m

Find your local stockist



- Visqueen Class B FR Vapour Check is a fire resistant AVCL (air and vapour control layer)
- Surpasses all national Building Regulations and Standards for air and vapour control layers
- Fire classification B - s1, d0
- Competitive, efficient and fully tested system (including tapes) for fire resistance

NEW

ANOTHER FIRE PROTECTION PRODUCT FROM VISQUEEN

To discover the Visqueen difference visit www.visqueen.com or call us on +44 (0) 333 202 6800

Visqueen Gas Barrier

Storage and handling

Visqueen Gas Barrier should be stored horizontally, under cover in its original packaging.

Care should be taken when handling the product in line with current manual handling regulations.

Preparation

Visqueen Gas Barrier should be installed on a smooth continuous surface e.g. grouted beam and block floor, a compacted blinding layer e.g. 50mm thick sand blinding, or smooth concrete blinding. The substrate should be free from irregularities such as voids or protrusions.

The barrier can be cut with a sharp retractable safety knife or robust scissors.

When installing the membrane in demanding site conditions, use Visqueen GR Lap Tape in place of Visqueen Gas Resistant Foil Lap Tape.

Installation

Visqueen Gas Barrier should be loose laid on the substrate with the blue side up so as to avoid sunlight glare.

The barrier should be clean and dry at the time of jointing. It should be overlapped by at least 150mm, bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape.

Alternatively lap joints can be heat welded to achieve an effective seal. Welded lap joints can be less than 150mm provided the joint integrity is not compromised.

Airtight seals should be formed around all service entry points. Visqueen Preformed Top Hat Units should be used for sealing service entry pipes. The base of the top hat and the upstand should be bonded using Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape. The upstand should be secured with the supplied jubilee clip.

Forming an effective barrier to gases may give rise to complex three-dimensional detailing where, it is recommended Visqueen Preformed Units are used e.g. corners. Alternatively Visqueen Pro Detailing Strip can be used to seal awkward junctions.

If the barrier is punctured or perforated a patch of the same material should be lapped at least 150mm beyond the limits of the puncture and bonded with Visqueen Pro Double Sided Jointing Tape and sealed with Visqueen Gas Resistant Foil Lap Tape. Alternatively a patch can be formed using Visqueen Pro Detailing Strip and lapped at least 150mm beyond the extents of the puncture.

Long periods of exposure to ultraviolet light will reduce the effectiveness of the membrane. The membrane should be covered by a protective layer immediately after installation to prevent damage from following trades, ultraviolet light, etc. Care should be taken to ensure that the membrane is not punctured, stretched or displaced when applying a screed or final floor covering. A minimum thickness of 50mm screed is recommended. When reinforced concrete is to be laid over the barrier the wire reinforcements and spacers must be prevented from puncturing the barrier. Where there is a high risk of potential damage, the barrier should be covered with Visqueen TreadGuard protection, screed, or other approved protection material before positioning the reinforcement.

Usable temperature range

It is recommended that Visqueen Gas Barrier and all associated system components should not be installed below 5°C.

Additional information

When used in accordance BS8485:2015 + A1:2019 a subfloor ventilation system or pressure relief maybe required

Where hydrocarbon or VOC contamination is present use Visqueen Ultimate VOC or HC Blok gas protection systems

To assist build sequencing, Visqueen GR DPC is available for gas protection through the wall constructions

For suspended beam and block floor detailing see GB-01

Visqueen Preformed Top Hat Units should be used at service pipe penetrations see GB-51

For internal and external corners Visqueen Ultimate Preformed Units should be used see PFU-553

To seal around steel columns use Visqueen Pro Detailing Strip see GB-52

For additional detailing information, contact Visqueen Technical Services +44 (0) 333 202 6800

The information in this datasheet was correct at the time of publication. It is the user's responsibility to obtain the latest version of the datasheet as it is updated on a regular basis. The information contained in the latest datasheet supersedes all previously published editions.

Visqueen Gas Barrier

Property	Test method	Units	Compliance criteria	Result
Dimensions	EN 1848-2	m		2 x 50
Overall thickness including scrim mesh	EN 1849-2	mm	+/-10%	0.52
Mass	EN 1849-2	g/m ²	-0%/+5%	400
Tensile strength - MD	EN 12311	N	MLV	350
Tensile strength - CD	EN 12311	N	MLV	350
Tensile elongation - MD	EN 12311	%	MLV	20
Tensile elongation - CD	EN 12311	%	MLV	21
Joint strength	EN 12317-2	N	MLV	332
Watertightness 2kPa	EN 1928	-	Pass/Fail	Pass
Resistance to impact	EN 12691	mm	MDV	150
Dart impact	BS 2782	g	MDV	731
Low temperature flexibility	EN 495-5	°C	MDV	-40
Durability against ageing	EN 1296 and EN 1928	-	Pass/Fail	Pass
Durability chemical resistance	EN 1847	-	Pass/Fail	Pass
Resistance to tearing (nail shank) CD	EN 12310-1	N	MDV	358
Resistance to tearing (nail shank) MD	EN 12310-1	N	MDV	368
Resistance to static loading	EN 12730	kg	MLV	20
Water vapour transmission - resistance	EN 1931	MNs/g	MDV	7000
Water vapour transmission - permeability	EN 1931	g/m ² /d	MDV	0.03
Visible defects	EN 1850 -2	-	Pass/Fail	Pass
Reaction to fire	EN 13501-1	Class	MDV	F
BS 8485:2015 + A1:2019 testing requirements				
Mass	EN 1849-2	g/m ²	Average >370	400
Methane permeability	ISO 15105-1	mls/m ² /d/atm	Pass/Fail	<0.15
Puncture CBR	BS EN ISO 12236	N	MDV	1114
Tensiles yield strength MD	ASTM D4885-01	kN/m	MDV	12.5
Tensiles yield strength CD	ASTM D4885-02	kN/m	MDV	7.3
Resistance to static loading	EN 12730	kg	>MLV	20
Yield elongation CD	ASTM D4885-04	%	MDV	19
Tear resistance - trouser method A - MD	BS ISO 34-1	kN/m	MDV	48.2
Tear resistance - trouser method A - CD	BS ISO 34-1	kN/m	MDV	44.8
Tear resistance - angle method B - MD	BS ISO 34-1	N	MDV	53.5
Tear resistance - angle method B - CD	BS ISO 34-1	N	MDV	60.6

Health and safety information

Refer to the Visqueen Gas Barrier material safety datasheet (MSDS).

Visqueen Gas Barrier

About Visqueen

The Visqueen name has long been recognised as one of the leading manufacturers of high quality advanced membrane technologies and design based solutions by specifiers, distributors, builders merchants and contractors throughout the UK and Europe.

For further guidance on the Visqueen services shown below, please refer to the relevant section of the Visqueen website (www.visqueen.com) or contact Visqueen Technical Services on +44 (0) 333 202 6800 or enquiries@visqueen.com

Complete Range, Complete Solution



Structural Waterproofing



Gas Protection



Damp Proof Membrane



Tapes



Damp Proof Course



Stormwater



Vapour Control

Visqueen Technical Support

Visqueen combine an extensive product portfolio with industry leading levels of service and support which includes guidance over the phone, bespoke CAD drawings to help with complex detailing, electronic NBS specifications and access to a dedicated team of highly knowledgeable and experienced field based Technical Support Managers.

Visqueen Technical Support is available to all our customers including architects, specifiers, distributors, builders merchants, contractors and end users. All of our technical team have been awarded the industry recognised qualification Certificated Surveyor in Structural Waterproofing (CSSW).

Visqueen CPD Seminars

The Visqueen Continuing Professional Development (CPD) Seminars provide up-to-date information on changes within Building Regulations/Building Standards and nationally recognised industry guidance affecting damp proofing, water vapour control, hazardous ground gas protection and below ground structural waterproofing.

The one hour seminars have been produced for design specialists within the construction sector and are delivered by our team of Technical Support Managers.

Visqueen PI designs and special projects

From initial design to the completed project, Visqueen are with you every step of the way. Whether it be hazardous ground gas protection and/or below ground waterproofing protection employing barrier, structurally integral or drained systems, Visqueen can offer professional indemnity (PI) insurance for bespoke Visqueen design solutions.

Visqueen Technical Support Managers work with all stakeholders to provide cost effective Visqueen solutions offering complete peace of mind throughout the construction phase and beyond.

Visqueen Training Academy

Based at our manufacturing facility in Derbyshire, the Visqueen Training Academy is available to support Visqueen customers throughout the UK by providing a wide range of both theory and practical skills related training.

Courses include one day product awareness training for our distributors and builders merchants to help them in their day-to-day jobs, through to intensive three day courses giving detailed hands-on training in the practical skills required for safe and robust product installation.



Verification Certificate

Date: 20 January 2023

Galliford Try Building North & East Yorkshire

Greenhead Sixth Form College
Huddersfield
HD1 4ES

The documentation in this handover package shows that the installation of the Gas Membrane and ancillaries was installed to specification.

Verified in accordance with BS 8485:2015+A1:2019 and CIRIA 735.

All areas were verified, and remediation issues corrected.

Paul Colbeck
Director of Site Services



Cundall Johnston & Partners LLP

4th Floor Partnership House Regent Farm Road
Gosforth Newcastle upon Tyne NE3 3AF
Tel: +44 (0)191 213 1515

Asia Australia Europe MENA UK and Ireland
www.cundall.com

