



Ysgol y Graig

Remediation Validation Report



September 2021

Version 1

Remediation Verification Report

A111030-2

September 2021

PRESENTED TO

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September

2021

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September

2021

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1.0 INTRODUCTION

1.1 INSTRUCTION

Tetra Tech Environment Planning Transport Ltd ('Tetra Tech') was commissioned by Kier Construction Limited ('the client') to prepare a Validation Report to discharge Condition 13 of full planning permission (ref. p/18/0311/b) for the construction of a new primary school, known as Ysgol y Graig (known hereafter as "the site").

The location of the site is shown on Figure 1.

1.2 PLANNING CONTEXT

The full planning permission (ref. p/18/0311/b) was granted by Merthyr Tydfil County Borough Council on the 1st October 2018 for the construction of a new primary school on the former school site and provision of internal access road, car park and games area on part of the Godre'r Coed playing field site, known hereafter as 'Ysgol y Graig'.

Condition 13 of the planning consent states that:

"If the site investigation indicates that the site is contaminated, the school hereby approved shall not be occupied until a third party report which verifies that the submitted scheme of remediation works have been implemented in full, has been submitted to and approved in writing by the Local Planning Authority. This report should also provide evidence that any material imported to the site as part of any remediation strategy is free from contamination."

The site has been subject to several assessment reports and ground investigation works since 2015, the reports relevant to this report are considered to be:

- *Ground Conditions Desk Study Report. Ysgol y Graig. WYG. December 2015;*
- *Ground Investigation Report. Ysgol y Graig. WYG. December 2015;*
- *Ysgol Y Graig Phase 2. Ground Conditions Desk Study Report. WYG. Report Ref. A111030. Dated April 2019;*
- *Ysgol Y Graig Phase 2. Ground Investigation Report. Report Ref. A111030. Dated April 2019;*
- *Remediation Options Appraisal and Remediation Method Statement. Ysgol y Graig, Cefn-Coed-y-Cymmer, Merthyr Tydfil. UK Remediation Ltd. Report Ref. 2428KR-1. Dated April 2019;*
- *Ysgol y Graig – Reactive Strategy and Asbestos Management Plan. WYG. Report Ref A111030-2. June 2019.*

A Materials Management Plan (MMP) also has been prepared for the development and is presented in the following report.

- *"Ysgol Y Graig Materials Management Plan (MMP). A111030-2. July 2019."*

1.3 REPORT SCOPE

This Validation Report pertains to the ground works phase of the development and installation of the capping system in line with the requirements of the Remediation Strategy (UK Remediation 2019) and Asbestos Management Plan and Reactive Strategy (WYG, 2019) for the site.

A separate Verification Report will be produced under separate cover to support the Materials Management Plan which has been developed for the site through the auspices of the CL:AIRE Definition of Waste: Code of Practice.

1.4 LIMITATIONS

The recommendations and opinions expressed in this report are based on information obtained as part of the desk study or provided by others. Information provided from other sources is taken in good faith and Tetra Tech cannot guarantee its accuracy.

This report is subject to the report conditions presented in Appendix A.

The information contained in this report is intended for the use of the Kier Construction Limited and Tetra Tech can take no responsibility for the use of this information by any third party or for uses other than that described in this report or detailed within the terms of our engagement.

2.0 SITE INFORMATION

2.1 INTRODUCTION

This section of the report provides a brief summary of the environmental setting of the site and key findings of the previous ground investigations and assessments.

Further detailed information is available within the reports referenced above in Section 1.2 which should be read in conjunction with this Validation Report.

2.2 SITE LOCATION & DESCRIPTION

The site is located in Cefn-Coed-y-Cymmer, north east of the town of Merthyr Tydfil. The site is approximately 0.65 hectares (ha) in area and is centred on National Grid Reference (NGR) SO 03328 07746.

The site is set in a residential area with back gardens facing the site. The Old Church Street runs along the eastern boundary of the site with the disused Ebenezer church at its southern end. Pont Y Capel Road demarcates the southern boundary and Holford Street bounds the western part of the north of the site.

The site is split into two development areas which are known as the 'Upper Development' and 'Lower Development' sites as detailed below.

A site location plan is presented in Figure 1.

2.2.1 Upper Development Site

The site is located in a residential area of Cefn-Coed-y-Cymmer in the north-west region of Merthyr Tydfil. The site is an irregular shape, with a spur off to the north. Vehicular access can be gained from two locked metal gates one situated along the southern boundary leading onto Pont Y Capel Road and the other located on the western boundary at the end of Southern Terrace.

The topography of the site is sloped, falling towards the south of the site with an approximate difference of 5m across the site. In the smaller northern section of the site, the terrain is partially terraced with two walls approximately 0.6m in height extending from the site boundaries. The site is covered in tarmac and compacted and levelled demolition rubble. Only self-set vegetation was present prior to the development.

2.2.2 Lower Development Site

The proposed playing field and car park site is accessed from Godre'r Coed Road through a set of metal gates. The site predominantly consists of a grass rugby pitch, however, there are two asphalt covered parking areas along the western boundary of the site. At the time of the second phase of site investigation the mature trees on the southern boundary were being removed. The site is generally flat, however, the asphalt covered car park area in the north-western corner of the site sits on a terrace approximately 2m above the level of the rest of the playing field.

2.3 GEOLOGY, HYDROGEOLOGY AND HYDROLOGY

The site is covered by British Geological Survey 1:50,000 (solid and drift) map number 231, Merthyr Tydfil.

The site is indicated to be underlain by superficial deposits of Devensian aged Till which varies in composition and can be made up of clay, silt, sand and gravel. The bedrock geology of the site is composed of the Twrch Sandstone Formation. This formation is composed of quartz arenites and quartz conglomerates with minor mudstones.

Made Ground is also present associated with the historical developments on the site.

2.4 GROUND CONTAMINATION SUMMARY

Ground conditions beneath the site comprise Made Ground overlying glacial deposits which in turn overlie the Twrch Sandstone Formation. Olfactory evidence of hydrocarbon contamination was observed in the made ground within a trial pit during Ysgol Y Graig phase 2 (April 2019). No other visual or olfactory evidence of contamination was observed within the soils encountered during all phases of ground investigation.

Elevated concentrations of PAH and heavy end hydrocarbons as well as asbestos fibres have been identified within the Made Ground on the site of the proposed school structure, only marginal exceedances have been identified within the underlying groundwater.

No contaminants were identified at concentrations in excess of the relevant screening criteria on the site of the proposed playing fields. It is therefore considered necessary to implement risk management procedures to manage the residual risk to future site users.

3.0 SUMMARY OF RISK MANAGEMENT PROCEDURES

The following section provides a summary of the requirements outlined in both the UK Remediation Document and WYG (now Tetra Tech) Reactive Strategy and Asbestos Management Plan for the site.

Requirement for remedial works only apply to the upper plateau as no ground contamination has been identified within the lower development site.

3.1 CLEAN CAPPING SYSTEM

The UK Remediation Options Appraisal and Remediation Method Statement outlines the specification for a cover system to be placed in areas of soft landscaping in order to remove the pollutant linkage between the identified contaminants within the Made Ground Strata and the end users (school development).

The report outlines four capping systems depending on the area of the site.

1. Building slabs in conjunction with sub-base and marker membranes
2. Macadam surfacing in conjunction with sub-base and marker membranes.
3. Soft landscaping with a minimum thickness of 600mm of combined Topsoil and Subsoil material with a visual membrane present at a depth of 600mm.
4. Areas of cut where all Made Ground soils are removed to natural strata.

The report also provides specification for the importation of materials for the construction of the clean cover material. This indicates the material should meet the published screening criteria (C4SL / S4UL) for a residential end use scenario (without plant uptake) relevant at the time of the preparation of the Remediation Strategy report.

3.2 ASBESTOS MANAGEMENT PLAN

The WYG Reactive Strategy and Asbestos Management Plan (2019) outlined the requirement for asbestos monitoring to be undertaken on site during the development phase of works in order to monitor the potential risks to site construction workers and residents in neighbouring properties from asbestos becoming mobilised during the works.

3.3 UNFORESEEN CONTAMINATION

The Reactive Strategy Document (WYG, 2019) outlines the requirement for a reactive approach to any contamination identified during the development works and outlines the procedures whereby any contamination is identified, assessment and the risk management procedures updated appropriately.

4.0 REMEDIAL ACTIONS

4.1 COVER SYSTEMS

The capping system was constructed from layers of imported soil (topsoil and subsoil) and was specified to be a minimum thickness of 600mm. A visible 'no dig membrane' was installed below the capping materials in all areas.

The validation of the capping system was undertaken to confirm both the chemical suitability of the material and the thickness of the constructed capping system.

4.1.1 Capping Thickness

Validation of the capping thicknesses was undertaken by Tetra Tech on 2nd September 2021 on completion of the development on site.

Hand excavated inspection pits were advanced through the capping system to record the thickness of cover system and identify the presence of the visual membrane.

Due to access limitations and planting across the site access to areas of soft landscaping were limited, however inspection pits were advanced to a depth of 600mm in three locations, with the presence of the visual membrane confirmed by a Tetra Tech Engineer overlain by a combination of topsoil and subsoil materials as summarised in the table below.

Additionally, the Tetra Tech Engineer inspected three manhole inspection covers across the site and confirmed the presence of the visual membrane at depths of between 600mm and 700mm bgl.

Table 4-1 - Summary of Cap Thicknesses

Location	Depth of Strata		
	Topsoil (m bgl)	Sub Soil (m bgl)	Visual Membrane identified?
HP101	GL - 0.15	0.15 – 0.60	Yes
HP102	GL - 0.15	0.15 – 0.60	Yes
HP103	GL - 0.20	0.20 – 0.60	Yes
Manhole 1	-	-	Yes
Manhole 2	-	-	Yes
Manhole 3	-	-	Yes

Figure 2 identifies the location of the inspection pits and manhole covers inspected during the Tetra Tech visit to the site.

Photographic plates are presented at the end of the report.

4.1.2 Chemical Suitability

The chemical suitability of the soils used within the cover system was established by the chemical analysis of samples obtained from the material for a suite of determinants outlined within the UK Remediation Strategy document.

The chemical laboratory results were compared to the import / reuse criteria adopted within the Remediation Specification.

Chemical test results from the topsoil were provided by the contractor for topsoil and subsoil materials and were obtained from off site sources and subsequently placed within areas of soft landscaping of the development.

The chemical laboratory results were screened against the import criteria for a residential end use scenario (without associated plant uptake).

The topsoil and subsoil materials were shown to meet the import criteria for the designated end use.

The laboratory results are included in Appendix B of this report.

4.2 ASBESTOS MANAGEMENT

Asbestos air monitoring was undertaken during the groundworks phase of the site and the results were presented in the following document which is also included in Appendix C.

- Ysgol y Graig. WYG Asbestos Air Monitoring Report. 2nd September 2019.

The report states the following conclusion:

“From the results of the air monitoring it is evident that the risk of exposure to asbestos above the control limit of 0.1 fibres / cm³ of air is considered low so long as site conditions remain consistent and no further incidences of asbestos impacted soils are encountered and disturbed at the site.”

4.3 REACTIVE STRATEGY

As part of the Remediation Strategy document, the requirement for a proactive approach was outlined in the event that any previously unidentified contamination was encountered during the development phase. It was outlined that WYG (now Tetra Tech) should be contacted at the earliest opportunity to ensure the associated risks were fully assessed and appropriate risk management procedures were put in place.

Tetra Tech were not contacted during the development process and Kier Construction have confirmed that no further contamination has been encountered during the development phase of the site.

A copy of the email confirmation from Kier Construction is included in Appendix D.

5.0 COMPLETION STATEMENT

Based on the observations made on site and the information provided to us, and accepted in good faith, Tetra Tech consider the remedial works have been carried out in accordance with the following remediation documents.

- *Remediation Options Appraisal and Remediation Method Statement. Ysgol y Graig, Cefn-Coed-y-Cymmer, Merthyr Tydfil. UK Remediation Ltd. Report Ref. 2428KR-1. Dated April 2019;*
- *Ysgol y Graig – Reactive Strategy and Asbestos Management Plan. WYG. Report Ref A111030-2. June 2019.*

The exposure pathway between the contamination identified within the Made Ground and the future site users has been effectively removed by the placement of a minimum 600mm thick cap of clean imported material (subsoil and topsoil) underlain by a visual 'no dig membrane'.

Asbestos monitoring undertaken during the development phase did not identify any significant mobilisation of asbestos fibres.

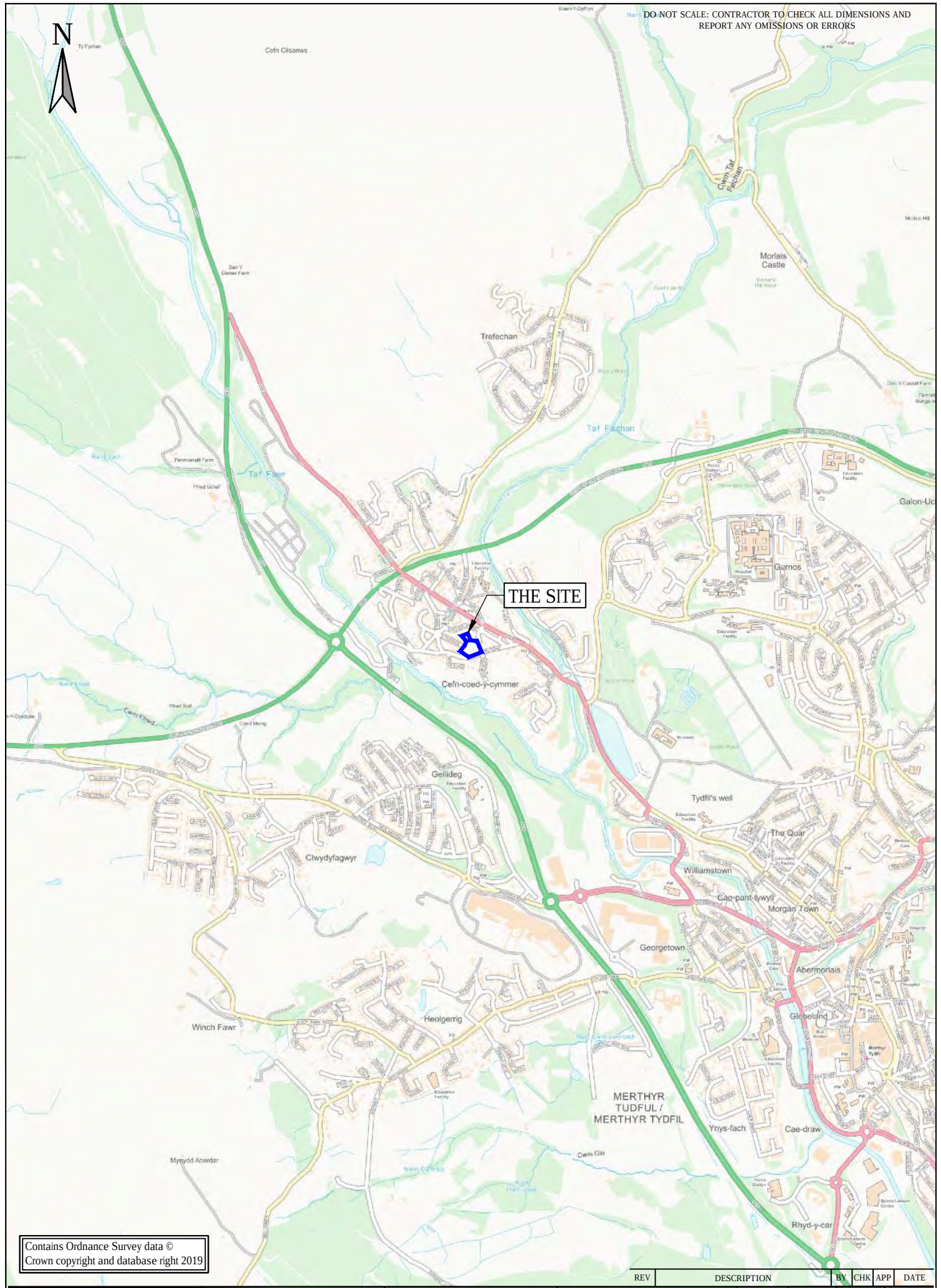
Tetra Tech understand that no other areas of previously unidentified contamination were encountered during the groundworks.

The following key points are highlighted:

- Capping layer thickness (minimum 600 mm) should be preserved and changes in site levels or soft landscaping areas should be undertaken in consideration of maintaining the 600mm depth of cap.
- The site should be monitored for animal activity with regards to burrowing within the capping system. Any damage to the capping system and visual membrane should be repaired at the earliest opportunity.
- All future site owners / operators should be informed of the nature of the contamination associated with the Made Ground on site and the form of the capping system in place to make sure that levels of protection are maintained throughout the future of the site.

FIGURES

Figure 1- Site Location Plan



DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

Contains Ordnance Survey data ©
Crown copyright and database right 2019

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Client:
KIER CONSTRUCTION LTD

Project:
YSGOL Y GRAIG

Drawing Title:
SITE LOCATION PLAN

REV	DESCRIPTION	BY	CHK	APP	DATE
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Scale @ A4 1:20,000	Drawn CM	Date 28.06.19	Checked	Date	Approved	Date
Project No. A111030-2	Office CDF	Type N	Drawing No. 01	Revision		

Figure 2 – Cap Validation Test Locations



Extract from Austin-Smith:Lord drawing reference YYG-ASL-00-XX-DR-L-9010

Tetra Tech Limited 5th Floor, Longcross Court 47 Newport Road Cardiff CF24 0AD	Tel: 029 20 829200 Fax: 029 20 455321 Environmental Consultancy Ground Technologies & Investigation	Project :- Ysgol y Graig - Remediation Verification Report		Client: Kier Construction Limited	
				Project No.: A111030-2	Date : September 2021

PLATES



Plate 1

HP101 Insepection Pit



Plate 2

Tetra Tech
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47 Newport Road
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Fax: 029 20 455321

Environmental Consultancy
Ground Technologies & Investigation



TETRA TECH

Project :-
Ysgol y Graig Validation Report

Project No.:

A111030-2



Plate 3



Plate 4

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Environmental Consultancy
Ground Technologies & Investigation



TETRA TECH

Project :-
Ysgol y Graig Validation Report

Project No.:

A111030-2



Plate 5



Plate 6

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Environmental Consultancy
Ground Technologies & Investigation



Project :-
Ysgol y Graig Validation Report

Project No.:

A111030-2

APPENDICES

APPENDIX A – REPORT CONDITIONS

APPENDIX A - REPORT CONDITIONS

GROUND INVESTIGATION

This report is produced solely for the benefit of Kier Construction Limited and no liability is accepted for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the inspections. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on a visual site inspection, reference to accessible referenced historical records, information supplied by those parties referenced in the text and preliminary discussions with local and Statutory Authorities. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive research. Where ground contamination is suspected but no physical site test results are available to confirm this, the report must be regarded as initial advice only, and further assessment should be undertaken prior to activities related to the site. Where test results undertaken by others have been made available these can only be regarded as a limited sample. The possibility of the presence of contaminants, perhaps in higher concentrations, elsewhere on the site cannot be discounted.

Whilst confident in the findings detailed within this report because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categoric assurances that they will be accepted by Authorities or Funds etc. without question as such bodies often have unpublished, more stringent objectives. This report is prepared for the proposed uses stated in the report and should not be used in a different context without reference to Tetra Tech. In time improved practices or amended legislation may necessitate a re-assessment.

The assessment of ground conditions within this report is based upon the findings of the study undertaken. We have interpreted the ground conditions in between locations on the assumption that conditions do not vary significantly. However, no investigation can inspect each and every part of the site and therefore changes or variances in the physical and chemical site conditions as described in this report cannot be discounted.

The report is limited to those aspects of land contamination specifically reported on and is necessarily restricted and no liability is accepted for any other aspect especially concerning gradual or sudden pollution incidents. The opinions expressed cannot be absolute due to the limitations of time and resources imposed by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report and provides an opinion on surrounding sites. If migrating pollution or contamination (past or present) exists further extensive research will be required before the effects can be better determined.

APPENDIX B – CHEMICAL LABORATORY TESTING



Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent BR8 7LT

Attention: Philippa Lambourne

Our Ref: SLC-945-SA

1 July 2021

Dear Philippa

Topsoil Analysis Report: Gilfach Topsoil – July 2021

We have completed the analysis of the topsoil sample recently taken from the above site and it has been forwarded to an approved laboratory for analysis and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes and its compliance with the current British Standard for topsoil (BS3882).

SOIL SAMPLING & EXAMINATION

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined together to form one composite sample for analysis purposes. The soil was described as dark brown, slightly moist and friable with a well-developed, fine to medium granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, roots or rhizomes of pernicious weeds) or unusual odours (eg. hydrocarbons) were recorded.

LABORATORY ANALYSIS

The topsoil sample was submitted to a UKAS and MCERTS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- ⊕ pH & electrical conductivity values;
- ⊕ major plant nutrients (N, P, K, Mg) & organic matter content;
- ⊕ particle size distribution and stone content;
- ⊕ heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- ⊕ sulphate, sulphur, sulphide;
- ⊕ total cyanide and total (mono) phenols;
- ⊕ speciated PAHs (US EPA16)
- ⊕ banded aromatic and aliphatic petroleum hydrocarbons (C₅-C₃₅).
- ⊕ Asbestos

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

Phone: 01322 619161;

***Freeland horticulture Ltd, Registered in England: Rosedale Nursery, College Road, Hextable, Kent BR8 7LT
Company Registration No: 04015968***

COMMENTS

pH & Electrical Conductivity (salinity) Values

The sample was alkaline in nature (pH 8.2) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity (salinity) value using the soil:water extract was (2718 μ S/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

The electrical conductivity values by CaSO₄ extract (BS3882 requirement) fell below the maximum specified value (3300 μ S/cm) given in BS3882:2015.

Organic Matter & Nutrient Status

The sample was rich in organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

The C:N ratio of the sample was acceptable for general landscape purposes

Particle Size Distribution & Stone Content

The sample contained 80% sand and fell into the loamy sand texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was Virtually free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (20.2%). As such, stones will not restrict the use of the soil for landscaping purposes.

Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil. This includes human health, environmental protection and metals considered toxic to plants. In the absence of any site-specific assessment criteria, the concentrations that affect human health have been compared with the 'residential with homegrown produce' land use in the Suitable For Use Levels presented in 'The LQM/CIEH S4UIs' for Human Health Risk Assessment (2015) and DEFRA SP1010: 'Development of Category 4 Screening Levels' for Assessment of Land Affected by Contamination – Policy Companion Document (2014).

Of the potential contaminants determined, none was found at levels that would exceed their respective guideline values.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, loamy sand. The organic matter and nutrient levels are acceptable, and no significant contamination was found with respect to the parameters determined. This soil would adhere to the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

George Longmuir MSc Soil Sci. M.I Soil Sci.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Gilfach, Neath
Month/Year	July 21
Our Ref	0945-SA
Date	01 July 2021

Composite sample

pH Value & Salinity

pH value (1:2.5 soil/water ext)	units	8.2
Electrical Conductivity (1:2.5 soil/water ext)	µS/cm	702
Electrical Conductivity (1:2.5 soil/CaSO ₄ ext)	µS/cm	2718
Neutralising Value (CaCO ₃ equivalent)	%	2.4

Organic Matter & Nutrient Status

Organic Matter (LOI)	%	6.7
Organic Carbon (Derived)	%	3.9
Total Nitrogen	%	0.285
Carbon:Nitrogen Ratio	:1	13.7
Available Phosphorus	mg/l	48.0
Available Potassium	mg/l	883
Available Magnesium	mg/l	199

Particle Size Analysis & Stones

Clay (<0.002mm)	%	7
Silt (0.063-0.002mm)	%	13
Sand (2.0-0.063mm)	%	80
Texture Class	UK Class	Loamy Sand

Stones 2-20mm	% by DW	20.2
Stones 20-50mm	% by DW	0.0
Stones >50mm	% by DW	0.0

Potential Contaminants

Total Arsenic (As)	mg/kg	8.5
Total Cadmium (Cd)	mg/kg	0.25
Total Chromium (Cr)	mg/kg	14.1
Hexavalent Chromium (Cr ^{VI})	mg/kg	1.2
Total Copper (Cu)	mg/kg	16.4
Total Lead (Pb)	mg/kg	22.6
Total Mercury (Hg)	mg/kg	<0.2
Total Nickel (Ni)	mg/kg	27.0
Total Selenium (Se)	mg/kg	0.18
Total Zinc (Zn)	mg/kg	87.7
Total Beryllium (Be)	mg/kg	<1
Total Barium (Ba)	mg/kg	97.0
Total Vanadium (V)	mg/kg	11.6
Hot Water Soluble Boron (B)	mg/kg	1.6
Total Cyanide (CN)	mg/kg	<1
Elemental Sulphur (S)	mg/kg	<5
Easily Liberated Sulphide (S ²⁻)	mg/kg	<1
Water Soluble Sulphate (SO ₄ ²⁻)	mg/l	54.0
Total Phenols Index	mg/kg	<1
Asbestos Screen	-	N.D.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Gilfach, Neath
Month/Year	July 21
Our Ref	0945-SA
Date	01 July 2021

Polyaromatic Hydrocarbons

Naphthalene	mg/kg	<0.05
Acenaphthylene	mg/kg	<0.05
Acenaphthene	mg/kg	<0.05
Fluorene	mg/kg	<0.05
Phenanthrene	mg/kg	<0.1
Anthracene	mg/kg	<0.05
Fluoranthene	mg/kg	<0.1
Pyrene	mg/kg	<0.1
Benzo[a]anthracene	mg/kg	<0.1
Chrysene	mg/kg	<0.1
Benzo[b]fluoranthene	mg/kg	<0.1
Benzo[k]fluoranthene	mg/kg	<0.1
Benzo[a]pyrene	mg/kg	<0.1
Indeno[1,2,3-cd]pyrene	mg/kg	<0.1
Dibenzo[a,h]anthracene	mg/kg	<0.1
Benzo[g,h,i]perylene	mg/kg	<0.1
Total PAHs sum US EPA 16	mg/kg	<1

Banded Petroleum Hydrocarbons

Aliphatic TPH >C ₅ -C ₆	mg/kg	0.16
Aliphatic TPH >C ₆ -C ₈	mg/kg	0.24
Aliphatic TPH >C ₈ -C ₁₀	mg/kg	<0.05
Aliphatic TPH >C ₁₀ -C ₁₂	mg/kg	<10
Aliphatic TPH >C ₁₂ -C ₁₆	mg/kg	<10
Aliphatic TPH >C ₁₆ -C ₂₁	mg/kg	<10
Aliphatic TPH >C ₂₁ -C ₃₅	mg/kg	130
Aliphatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Aromatic TPH >C ₅ -C ₇	mg/kg	<0.05
Aromatic TPH >C ₇ -C ₈	mg/kg	0.15
Aromatic TPH >C ₈ -C ₁₀	mg/kg	<0.05
Aromatic TPH >C ₁₀ -C ₁₂	mg/kg	<10
Aromatic TPH >C ₁₂ -C ₁₆	mg/kg	<10
Aromatic TPH >C ₁₆ -C ₂₁	mg/kg	<10
Aromatic TPH >C ₂₁ -C ₃₅	mg/kg	<10
Aromatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Total Petroleum Hydrocarbons (C ₅ -C ₄₄)	mg/kg	131
---	-------	-----

BTEX

Benzene	mg/kg	<0.02
Toluene	mg/kg	<0.2
Ethyl Benzene	mg/kg	<0.04
m- & p- Xylene	mg/kg	<0.2
o-Xylene	mg/kg	<0.1



2531



ANALYTICAL TEST REPORT

Contract no: 97128
Contract name: Quarterly Testing
Client reference: -
Clients name: Neal Soil Suppliers
Clients address: Ty-To-Maen Farm
Newton Road
Rumney, Cardiff
CF3 2EJ

Samples received: 19 July 2021
Analysis started: 19 July 2021
Analysis completed: 20 July 2021
Report issued: 20 July 2021

Notes: Opinions and interpretations expressed herein are outside the UKAS accreditation scope.
Unless otherwise stated, Chemtech Environmental Ltd was not responsible for sampling.
All testing carried out at Unit 6 Parkhead, Stanley, DH9 7YB, except for subcontracted testing.
Methods, procedures and performance data are available on request.
Results reported herein relate only to the material supplied to the laboratory.
This report shall not be reproduced except in full, without prior written approval.
Samples will be disposed of 6 weeks from initial receipt unless otherwise instructed.

Key: U UKAS accredited test
M MCERTS & UKAS accredited test
\$ Test carried out by an approved subcontractor
I/S Insufficient sample to carry out test
N/S Sample not suitable for testing
NAD No Asbestos Detected

Approved by:

Rachael Burton
Customer Support Squad Leader

Chemtech Environmental Limited

SAMPLE INFORMATION

MCERTS (Soils):

Soil descriptions are only intended to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions. MCERTS accreditation applies for sand, clay and loam/topsoil, or combinations of these whether these are derived from naturally occurring soils or from made ground, as long as these materials constitute the major part of the sample. Other materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

All results are reported on a dry basis. Samples dried at no more than 30°C in a drying cabinet.

Analytical results are inclusive of stones.

Lab ref	Sample id	Depth (m)	Sample description	Material removed	% Removed	% Moisture
97128-1	Residential SubSoil	-	Loam with Gravel & Roots	-	-	20.2
97128-2	Residential SubSoil	-	Loam with Gravel & Roots	-	-	17.5
97128-3	Residential SubSoil	-	Loam with Gravel & Roots	-	-	19.6
97128-4	Residential TopSoil	-	Loam with Gravel & Roots	-	-	22.2
97128-5	Residential TopSoil	-	Loam with Gravel & Roots	-	-	21.0
97128-6	Residential TopSoil	-	Loam with Gravel & Roots	-	-	22.3

Chemtech Environmental Limited

SOILS

Lab number			97128-1 Residential Subsoil	97128-2 Residential Subsoil	97128-3 Residential Subsoil	97128-4 Residential Topsoil	97128-5 Residential Topsoil	97128-6 Residential Topsoil
Sample id			-	-	-	-	-	-
Depth (m)			-	-	-	-	-	-
Date sampled			12/07/2021	12/07/2021	12/07/2021	12/07/2021	12/07/2021	12/07/2021
Test	Method	Units						
Arsenic (total)	CE127 ^M	mg/kg As	11	22	19	21	20	15
Cadmium (total)	CE127 ^M	mg/kg Cd	1.7	1.2	1.5	0.8	0.5	0.5
Chromium (total)	CE127 ^M	mg/kg Cr	48	33	35	37	29	27
Chromium (VI)	CE146	mg/kg CrVI	<1	<1	<1	<1	<1	<1
Copper (total)	CE127 ^M	mg/kg Cu	15	18	18	29	17	15
Lead (total)	CE127 ^M	mg/kg Pb	41	33	48	42	60	55
Mercury (total)	CE127 ^M	mg/kg Hg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Nickel (total)	CE127 ^M	mg/kg Ni	19	15	19	17	13	25
Selenium (total)	CE127 ^M	mg/kg Se	1.0	1.0	1.2	1.3	1.0	1.9
Zinc (total)	CE127 ^M	mg/kg Zn	150	225	200	269	274	316
pH	CE004 ^M	units	8.1	8.0	7.5	7.9	8.4	8.3
PAH								
Naphthalene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthylene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Acenaphthene	CE087 ^M	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluorene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Phenanthrene	CE087 ^M	mg/kg	0.09	0.04	2.7	<0.02	<0.02	<0.02
Anthracene	CE087 ^U	mg/kg	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Fluoranthene	CE087 ^M	mg/kg	0.22	0.36	0.37	<0.02	<0.02	<0.02
Pyrene	CE087 ^M	mg/kg	0.18	1.5	<0.02	<0.02	<0.02	<0.02
Benzo(a)anthracene	CE087 ^U	mg/kg	0.12	<0.02	<0.02	<0.02	<0.02	<0.02
Chrysene	CE087 ^M	mg/kg	0.14	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(b)fluoranthene	CE087 ^M	mg/kg	0.17	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(k)fluoranthene	CE087 ^M	mg/kg	0.06	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(a)pyrene	CE087 ^U	mg/kg	0.12	<0.02	<0.02	<0.02	<0.02	<0.02
Indeno(123cd)pyrene	CE087 ^M	mg/kg	0.11	<0.02	<0.02	<0.02	<0.02	<0.02
Dibenz(ah)anthracene	CE087 ^M	mg/kg	0.03	<0.02	<0.02	<0.02	<0.02	<0.02
Benzo(ghi)perylene	CE087 ^M	mg/kg	0.11	<0.02	<0.02	<0.02	<0.02	<0.02
PAH (total of USEPA 16)	CE087	mg/kg	1.36	1.9	3.07	<0.02	<0.02	<0.02
TPH								
VPH Aromatic (>EC5-EC7)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC7-EC8)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
VPH Aromatic (>EC8-EC10)	CE067	mg/kg	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EPH Aromatic (>EC10-EC12)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC12-EC16)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC16-EC21)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
EPH Aromatic (>EC21-EC35)	CE068	mg/kg	<1	<1	<1	<1	<1	<1
VPH Aliphatic (>C5-C6)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

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SOILS

Lab number			97128-1	97128-2	97128-3	97128-4	97128-5	97128-6
Sample id			Residential Subsoil	Residential Subsoil	Residential Subsoil	Residential Topsoil	Residential Topsoil	Residential Topsoil
Depth (m)			-	-	-	-	-	-
Date sampled			12/07/2021	12/07/2021	12/07/2021	12/07/2021	12/07/2021	12/07/2021
Test	Method	Units						
VPH Aliphatic (>C6-C8)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
VPH Aliphatic (>C8-C10)	CE067	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
EPH Aliphatic (>C10-C12)	CE068	mg/kg	<4	<4	<4	<4	<4	<4
EPH Aliphatic (>C12-C16)	CE068	mg/kg	<4	<4	<4	<4	<4	<4
EPH Aliphatic (>C16-C35)	CE068	mg/kg	22	50	76	24	49	35
Total Aliphatic/Aromatic (>C5-C35)	CE225	mg/kg	22	50	76	24	49	35
Subcontracted analysis								
Asbestos (qualitative)	\$	-	NAD	NAD	NAD	NAD	NAD	NAD

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
CE127	Arsenic (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg As
CE127	Cadmium (total)	Aqua regia digest, ICP-MS	Dry	M	0.2	mg/kg Cd
CE127	Chromium (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cr
CE146	Chromium (VI)	Acid extraction, Colorimetry	Dry		1	mg/kg CrVI
CE127	Copper (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Cu
CE127	Lead (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Pb
CE127	Mercury (total)	Aqua regia digest, ICP-MS	Dry	M	0.5	mg/kg Hg
CE127	Nickel (total)	Aqua regia digest, ICP-MS	Dry	M	1	mg/kg Ni
CE127	Selenium (total)	Aqua regia digest, ICP-MS	Dry	M	0.3	mg/kg Se
CE127	Zinc (total)	Aqua regia digest, ICP-MS	Dry	M	5	mg/kg Zn
CE004	pH	Based on BS 1377, pH Meter	As received	M	-	units
CE197	Total Organic Carbon (TOC)	Carbon Analyser	Dry		0.1	% w/w C
CE197	Estimate of OMC (calculated from TOC)	Calculation from Total Organic Carbon	Dry		0.1	% w/w
CE087	Naphthalene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Acenaphthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Fluorene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Phenanthrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(a)anthracene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Chrysene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(b)fluoranthene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(k)fluoranthene	Solvent extraction, GC-MS	As received	M	0.03	mg/kg
CE087	Benzo(a)pyrene	Solvent extraction, GC-MS	As received	U	0.02	mg/kg
CE087	Indeno(123cd)pyrene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Dibenz(ah)anthracene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	Benzo(ghi)perylene	Solvent extraction, GC-MS	As received	M	0.02	mg/kg
CE087	PAH (total of USEPA 16)	Solvent extraction, GC-MS	As received		0.34	mg/kg
CE067	VPH Aromatic (>EC5-EC7)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC7-EC8)	Headspace GC-FID	As received		0.01	mg/kg
CE067	VPH Aromatic (>EC8-EC10)	Headspace GC-FID	As received		0.01	mg/kg
CE068	EPH Aromatic (>EC10-EC12)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC12-EC16)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC16-EC21)	Solvent extraction, GC-FID	As received		1	mg/kg
CE068	EPH Aromatic (>EC21-EC35)	Solvent extraction, GC-FID	As received		1	mg/kg
CE067	VPH Aliphatic (>C5-C6)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C6-C8)	Headspace GC-FID	As received		0.1	mg/kg
CE067	VPH Aliphatic (>C8-C10)	Headspace GC-FID	As received		0.1	mg/kg
CE068	EPH Aliphatic (>C10-C12)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C12-C16)	Solvent extraction, GC-FID	As received		4	mg/kg
CE068	EPH Aliphatic (>C16-C35)	Solvent extraction, GC-FID	As received		4	mg/kg
CE225	Total Aliphatic/Aromatic (>C5-C35)	Sum of Aliphatic & Aromatic VPH (>C5-C10) & EPH (>C10-C35)	As received		16	mg/kg

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METHOD DETAILS

METHOD	SOILS	METHOD SUMMARY	SAMPLE	STATUS	LOD	UNITS
\$	Asbestos (qualitative)	HSG 248, Microscopy	Dry	U	-	-

Chemtech Environmental Limited

DEVIATING SAMPLE INFORMATION

Comments

Sample deviation is determined in accordance with the UKAS note "Guidance on Deviating Samples" and based on reference standards and laboratory trials.

For samples identified as deviating, test result(s) may be compromised and may not be representative of the sample at the time of sampling.

Chemtech Environmental Ltd cannot be held responsible for the integrity of sample(s) received if Chemtech Environmental Ltd did not undertake the sampling. Such samples may be deviating.

Key

N	No (not deviating sample)
Y	Yes (deviating sample)
NSD	Sampling date not provided
NST	Sampling time not provided (waters only)
EHT	Sample exceeded holding time(s)
IC	Sample not received in appropriate containers
HP	Headspace present in sample container
NCF	Sample not chemically fixed (where appropriate)
OR	Other (specify)

Lab ref	Sample id	Depth (m)	Deviating	Tests (Reason for deviation)
97128-1	Residential Subsoil	-	N	
97128-2	Residential Subsoil	-	N	
97128-3	Residential Subsoil	-	N	
97128-4	Residential Topsoil	-	N	
97128-5	Residential Topsoil	-	N	
97128-6	Residential Topsoil	-	N	

APPENDIX C – ASBESTOS MONITORING REPORT

Kier c/o WYG Environment

Ysgol Y Graig

WYG Asbestos Air Monitoring Report

02nd September 2019



3 Sovereign Square, Sovereign Street, Leeds, LS1 4ER

Tel: 0113 278 7111

Document Control

Project: Ysgol Y Graig
Client: Kier c/o WYG Environment
Job Number: A111030-2

Document Checking:

Prepared by:	Paul Bayliss	Signed:	
Associate			

Verified by:	Mark Thomson	Signed:	
Principal Asbestos Consultant			

Issue	Date	Status
1	02 nd September 2019	Final
2		
3		
4		

Contents Page

0.0	Executive Summary.....	1
1.0	Introduction.....	2
2.0	Discussion and Conclusions	3
3.0	Glossary of Terms	5
4.0	References	6

Appendix Contents

Appendix A – Report Conditions for WYG Asbestos Air Monitoring

Appendix B – Fibre Count Reports



0.0 Executive Summary

Site Location	The site address is: Ysgol y Graig, Cefn Coed-y-Cymmer, Merthyr-Tydfil, South Wales
Date and extent of works undertaken	Air monitoring during excavation of asbestos impacted soils between 29 th July and 2 nd August 2019
General Recommendations	• Carry out asbestos sampling of soils in any areas where no data exists • Watching brief by a competent person during future excavations to verify that no high risk / visible asbestos containing materials are present



1.0 Introduction

1.1 General

WYG Environment Planning Transport Ltd (WYG) was commissioned by Adam James of WYG on behalf of Kier to carry out air monitoring during excavation of asbestos impacted soils at Ysgol Y Graig.

The works were carried out from the 29th July August 2019 to the 2nd August 2019

1.2 Extents

The works were as follows:

- Excavation of asbestos impacted soils.

All work was carried out to a satisfactory standard with no elevated concentrations of airborne fibres recorded.

1.3 Report Conditions

This report has been prepared in accordance with the accepted service details, terms and conditions of our accepted proposal. The report is further subject to the conditions detailed in Appendix A.



2.0 Discussion and Conclusions

2.1 Discussion

Asbestos air monitoring (based upon methodologies within HSG248) was carried out over five consecutive days during the excavation of soils found to contain small amounts of loose asbestos fibre. The air monitoring was carried out to assess whether exposure to asbestos above the control limit of 0.1 fibre / cm³ was likely to occur and if current control measures employed were suitable and sufficient to maintain compliance with the Control of Asbestos Regulations 2012.

2.2 Conclusions

From the results of the air monitoring it is evident that the risk of exposure to asbestos above the control limit of 0.1 fibres / cm³ of air is considered low so long as site conditions remain consistent and no further incidences of asbestos impacted soils are encountered and disturbed at the site.

2.3 Recommendations for future management

It is advised that further sampling of soils for asbestos content is carried out where invasive works are planned should no pre-existing data for any such sampling and analysis of the soils be available.

A watching brief should be maintained by a suitably trained and competent person so that if asbestos materials are exposed during further ground excavation work, works can be temporarily halted and the asbestos dealt with appropriately.

The Control of Asbestos Regulations 2012 stipulates under Regulation 6, employers have a responsibility to carry out a suitable risk assessment for exposure to asbestos and regularly review it to ensure it remains valid. The air monitoring carried out over the five day period between the 29th July and 2nd August provides reassurance that risk of asbestos exposure during excavation activities is low and this assessment of the risk would remain valid until any site conditions change such as a major change in work activity or change in level of asbestos contamination present in areas work works are being carried out.

In accordance with Regulation 11 of the Control of Asbestos Regulations, an employer has a duty to prevent or if prevention is not possible then to reduce exposure to asbestos. Air monitoring data for the activities carried out during the period of the works shows that any potential exposure was well below the control limit





and it is reasonable to assume that Respiratory Protective Equipment would not be required for excavation activities so long as all other controls / recommendations mentioned above remain in place.





3.0 Glossary of Terms

ACM	Asbestos Containing Material
AIB	Asbestos Insulating Board
AMP	Asbestos Management Plan
CAR	Control of Asbestos Regulations
EA	Environment Agency
HSE	Health and Safety Executive
HSG	Health and Safety Guidance
MMM	Machine Made Mineral Fibre
NADIS	No Asbestos Detected in Sample
UKAS	United Kingdom Accreditation Service
WYG	WYG Environment Planning Transport Ltd



4.0 References

- | | |
|----------|---|
| HSG 248 | Asbestos: The Analysts Guide for Sampling, Analysis and Clearance Procedures, 2005. |
| CAR 2012 | Control of Asbestos Regulations 2012, April 2012. |



Appendices



Appendix A – Report Conditions for WYG Asbestos Air Monitoring



WYG ENVIRONMENT PLANNING TRANSPORT LTD

This report is produced solely for the benefit of Kier c/o WYG no account is taken for any reliance placed on it by any other party unless specifically agreed in writing otherwise.

This report refers, within the limitations stated, to the condition of the site at the time of the project. No warranty is given as to the possibility of future changes in the condition of the site.

This report is based on collation of specification documents, contractors method statements, air testing and four-stage clearance certificates produced during remediation works. Information was supplied by those parties referenced in the text. Some of the opinions are based on unconfirmed data and information and are presented as the best that can be obtained without further extensive site inspection works and possible disturbance. The test results that are available can only be regarded as a limited but likely representative sample assessed against current guidelines. The impact of our assessment on other aspects of the development requires evaluation by other involved parties. The possibility of the presence of asbestos, perhaps in higher concentrations, elsewhere on the site where not accessed, cannot be discounted.

Whilst the findings detailed within this report reflect our best assessment, because there are no exact UK definitions of these matters, being subject to risk analysis, we are unable to give categorical assurances that they will be accepted by authorities or funds without question as such bodies have unpublished, more stringent objectives. This report is prepared and written for the purposed uses stated in the report and should not be used in a different context without reference to WYG. In time improved practices or amended legislation may necessitate a re-assessment.

The report is limited to those aspects specifically reported on and is necessarily restricted and no liability is accepted for any other aspect. The opinions expressed cannot be absolute due to the limitations of time and resources accepted by the agreed brief and the possibility of unrecorded previous use and abuse of the site and adjacent sites. The report concentrates on the site as defined in the report.





Appendix B – Fibre Count Reports



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 5A

Our Ref: J172069-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Background

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 29/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	K1	MG1	South-East of the area	10:34	11:34	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
2	ENV4	MG2	South-West of the area	10:35	11:35	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
3	ENV5	MG3	North-West of the area	10:37	11:37	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
4	61	MG4	North-East of the area	10:38	11:38	8.0	8.0	8.0	480	200	1.0	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 20
Pressure (mb): 1008
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in South-East of the area).
Debris of Asbestos Cement visible in the central part of the site.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfil, CF48 SA

Our Ref: J172069-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Background

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 29/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
7	K1	MG1	South-East of the area	13:33	14:33	8.0	8.0	8.0	480	200	2.0	0.001	<0.01
8	ENV4	MG2	South-West of the area	13:34	14:34	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
9	ENV5	MG3	North-West of the area	13:36	14:36	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
10	61	MG4	North-East of the area	13:38	14:38	8.0	8.0	8.0	480	200	1.0	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 22
Pressure (mb): 1007
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area).
Debris of Asbestos Cement visible in the central part of the site.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfil, CF48 SA

Our Ref: J172069-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Personal monitoring

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 29/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
5	AP1	MG5	Personal pump worn by digger driver: Barry Cooper (working in the South -East part of the site / cab)	10:39	11:39	2.0	2.0	2.0	120	200	1.0	0.002	<0.04
6	6526	MG6	Personal pump worn by operative dumper driver: Jason Lloyd working in the South -East part of the site	10:53	11:53	2.0	2.0	2.0	120	200	1.0	0.002	<0.04

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM41

Environment:

Temperature (°C): 22
Pressure (mb): 1007
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Personal air-monitoring carried out to establish concentration of airborne asbestos fibres. Sample taken during excavation works (moving soil)

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens
Broadcut, Fareham
Hampshire. PO16 8SS

Tel: (01329) 287777
Fax: (01329) 287755

Ref No: J172069-FC10

Personal Monitoring Observation Form

Type & Scale of work: excavation works

Purpose of monitoring: (select all that apply)

Checking effectiveness of methods ☐

Providing data for personal exposure records ☒

Confirming appropriate RPE being worn ☒

General control measures in use: (select all that apply)

Enclosure (under negative pressure) ☐

Partial enclosure ☐

Injection ☐

Gel/Foam ☐

Shadow vacuum ☐

Spraying ☒

Other (Please specify): N/A

Sampling Details:

Operative's Name/job title: Barry Cooper/digger driver, Jason Lloyd/ dumper driver

Type of RPE worn: Disposable, valved half-mask with P3 filter.

Length of time Operative is / has been exposed: 8.5 hours/ day, ongoing

Asbestos Product(s) being removed including detail of fixings, size, surface treatment and tools used during works and dust suppression methods being used by operative:
spraying to suppress dust

General Description of activities being undertaken during sampling:
excavation, loading and transporting soil (top layer)

Is the asbestos in good or bad condition (as per the method statements description): debris

Other factors which may affect the result (eg approximate size of the enclosure, external location, etc):
external location

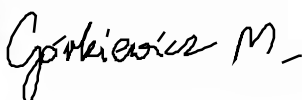
Time weighted average (4 Hour TWA) =
$$\frac{(F1 \times T1) + (F2 \times T2) + \dots + (Fn \times Tn)}{4}$$
 N/A

Where F = concentration f/ml

T = Time for that exposure, hours and minutes, 1 hr 30 mins = 1.5

Notes: The sampling period must be sufficient to ensure it is fully representative of the work. Sampling periods should be for 4 hours to access the control limit or for the duration of a specific task for shorter duration activities. A minimum sample time of 10 minutes is required to assess the Short Term Exposure Limit. In general, the client is to specify their requirements depending on previous personal air sampling carried out. All information was collected from the method statement or / and the site contact and this information is deemed as accurate / correct for the purpose of this report.

Analyst: Mieczyslaw Gorkiewicz

Signature: 



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 SA

Our Ref: J172070-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 30/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	K1	MG1	South-East of the area	10:30	11:30	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
2	ENV4	MG2	South-West of the area	10:32	11:32	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
3	ENV5	MG3	North-West of the area	10:34	11:34	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
4	61	MG4	North-East of the area	10:37	11:37	8.0	8.0	8.0	480	200	0.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 17
Pressure (mb): 1001
Correction Factor (F): N/A

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area). Debris of Asbestos Cement are hand picked during excavation works; soil wet due to weather conditions. Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfil, CF48 5A

Our Ref: J172070-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 30/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
7	K1	MG1	South-East of the area	12:31	13:31	8.0	8.0	8.0	480	200	2.0	0.001	<0.01
8	ENV4	MG2	South-West of the area	12:32	13:32	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
9	ENV5	MG3	North-West of the area	12:34	13:34	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
10	61	MG4	North-East of the area	12:36	13:36	8.0	8.0	8.0	480	200	0.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 17
Pressure (mb): 1001
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area). Debris of Asbestos Cement are hand picked during excavation works; soil wet due to weather conditions. Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 SA

Our Ref: J172070-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Personal monitoring

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 30/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
5	AP1	MG5	Personal pump worn by digger driver: Barry Cooper (working in the East part of the site / cab)	10:47	11:47	2.0	2.0	2.0	120	200	0.5	0.001	<0.04
6	6526	MG6	Personal pump worn by operative dumper driver: Jason Lloyd working in the East part of the site	10:49	11:49	2.0	2.0	2.0	120	200	0.5	0.001	<0.04

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM41

Environment:

Temperature (°C): 17
Pressure (mb): 1001
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments Personal air-monitoring carried out to establish concentration of airborne asbestos fibres. Sample taken during excavation works (moving soil)

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens
Broadcut, Fareham
Hampshire. PO16 8SS

Tel: (01329) 287777
Fax: (01329) 287755

Ref No: J172070-FC10

Personal Monitoring Observation Form

Type & Scale of work: excavation works

Purpose of monitoring: (select all that apply)

Checking effectiveness of methods ☐

Providing data for personal exposure records ☒

Confirming appropriate RPE being worn ☐

General control measures in use: (select all that apply)

Enclosure (under negative pressure) ☐

Partial enclosure ☐

Injection ☐

Gel/Foam ☐

Shadow vacuum ☐

Spraying ☒

Other (Please specify): N/A

Sampling Details:

Operative's Name/job title: Barry Cooper/digger driver, Jason Lloyd/ dumper driver

Type of RPE worn: Disposable, valved half-mask with P3 filter.

Length of time Operative is / has been exposed: 8.5 hours/ day, ongoing

Asbestos Product(s) being removed including detail of fixings, size, surface treatment and tools used during works and dust suppression methods being used by operative:

Soil wet due to weather conditions

General Description of activities being undertaken during sampling:

excavation, loading and transporting soil

Is the asbestos in good or bad condition (as per the method statements description): debris

Other factors which may affect the result (eg approximate size of the enclosure, external location, etc):
external location

Time weighted average (4 Hour TWA) =
$$\frac{(F1 \times T1) + (F2 \times T2) + \dots (Fn \times Tn)}{4}$$
 N/A

Where F = concentration f/ml

T = Time for that exposure, hours and minutes, 1 hr 30 mins = 1.5

Notes: The sampling period must be sufficient to ensure it is fully representative of the work. Sampling periods should be for 4 hours to access the control limit or for the duration of a specific task for shorter duration activities. A minimum sample time of 10 minutes is required to assess the Short Term Exposure Limit. In general, the client is to specify their requirements depending on previous personal air sampling carried out. All information was collected from the method statement or / and the site contact and this information is deemed as accurate / correct for the purpose of this report.

Analyst: Mieczyslaw Gorkiewicz

Signature: *Gorkiewicz M.*



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfil, CF48 SA

Our Ref: J172071-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 31/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	K1	MG1	South-East of the area	09:52	10:52	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
2	ENV4	MG2	South-West of the area	09:54	10:54	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
3	ENV5	MG3	North-West of the area	09:56	10:56	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
4	61	MG4	North-East of the area	09:59	10:59	8.0	8.0	8.0	480	200	1.0	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 17
Pressure (mb): 1014
Correction Factor (F): N/A

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area).
Debris of Asbestos Cement are hand picked during excavation works.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

Gorkiewicz M.

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfil, CF48 5A

Our Ref: J172071-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 31/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
7	K1	MG1	South-East of the area	12:39	13:39	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
8	ENV4	MG2	South-West of the area	12:40	13:40	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
9	ENV5	MG3	North-West of the area	12:42	13:42	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
10	61	MG4	North-East of the area	12:43	13:43	8.0	8.0	8.0	480	200	0.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 18
Pressure (mb): 1014
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area).
Debris of Asbestos Cement are hand picked during excavation works.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 SA

Our Ref: J172071-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Personal monitoring

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 31/07/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
5	AP1	MG5	Personal pump worn by digger driver: Barry Cooper (working in the East part of the site / cab)	10:57	11:57	2.0	2.0	2.0	120	200	0.5	0.001	<0.04
6	6526	MG6	Personal pump worn by operative dumper driver: Jason Lloyd working in the East part of the site	10:58	11:58	2.0	2.0	2.0	120	200	0.5	0.001	<0.04

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM41

Environment:

Temperature (°C): 17
Pressure (mb): 1014
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments Personal air-monitoring carried out to establish concentration of airborne asbestos fibres. Sample taken during excavation works (moving soil)

SIGNATURE:
(on behalf of Envirochem by an authorised signatory)

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens
Broadcut, Fareham
Hampshire. PO16 8SS

Tel: (01329) 287777
Fax: (01329) 287755

Ref No: J172071-FC10

Personal Monitoring Observation Form

Type & Scale of work: excavation works, pit approx. 12 mW x 18 mL x 2 m (Depth)

Purpose of monitoring: (select all that apply)

Checking effectiveness of methods ☐ Providing data for personal exposure records ☒ Confirming appropriate RPE being worn ☐

General control measures in use: (select all that apply)

Enclosure (under negative pressure) ☐ Partial enclosure ☐ Injection ☐
Gel/Foam ☐ Shadow vacuum ☐ Spraying ☒

Other (Please specify): N/A

Sampling Details:

Operative's Name/job title: Barry Cooper/digger driver, Jason Lloyd/ dumper driver

Type of RPE worn: Disposable, valved half-mask with P3 filter.

Length of time Operative is / has been exposed: 8.5 hours/ day, ongoing

Asbestos Product(s) being removed including detail of fixings, size, surface treatment and tools used during works and dust suppression methods being used by operative:

Asbestos debris found on the surface, spay used during handpicking.

General Description of activities being undertaking during sampling:

excavation, loading and transporting soil

Is the asbestos in good or bad condition (as per the method statements description): debris

Other factors which may affect the result (eg approximate size of the enclosure, external location, etc):
external location

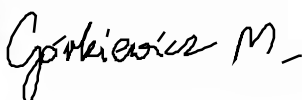
Time weighted average (4 Hour TWA) =
$$\frac{(F1 \times T1) + (F2 \times T2) + \dots (Fn \times Tn)}{4}$$
 N/A

Where F = concentration f/ml

T = Time for that exposure, hours and minutes, 1 hr 30 mins = 1.5

Notes: The sampling period must be sufficient to ensure it is fully representative of the work. Sampling periods should be for 4 hours to access the control limit or for the duration of a specific task for shorter duration activities. A minimum sample time of 10 minutes is required to assess the Short Term Exposure Limit. In general, the client is to specify their requirements depending on previous personal air sampling carried out. All information was collected from the method statement or / and the site contact and this information is deemed as accurate / correct for the purpose of this report.

Analyst: Mieczyslaw Gorkiewicz

Signature: 



ENVIROCHEM

Analytical Laboratories Ltd

12 The Gardens, Broadcut, Fareham
Hampshire. PO16 8SS

Fibre Counting Report



Tel: (01329) 287777
Fax: (01329) 287755

CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 5A

Our Ref: J172072-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 01/08/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	K1	MG1	South-East of the area	09:35	10:35	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
2	ENV4	MG2	South-West of the area	09:37	10:37	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
3	ENV5	MG3	North-West of the area	09:39	10:39	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
4	61	MG4	North-East of the area	09:40	10:40	8.0	8.0	8.0	480	200	1.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 20
Pressure (mb): 1019
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area).
Debris of Asbestos Cement are hand picked during excavation works.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



ENVIROCHEM

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Hampshire. PO16 8SS

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CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 SA

Our Ref: J172072-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 01/08/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
7	K1	MG1	South-East of the area	13:36	14:36	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
8	ENV4	MG2	South-West of the area	13:37	14:37	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
9	ENV5	MG3	North-West of the area	13:42	14:42	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
10	61	MG4	North-East of the area	13:43	14:43	8.0	8.0	8.0	480	200	0.5	0.001	<0.01

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2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 20
Pressure (mb): 1019
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area).
Debris of Asbestos Cement are hand picked during excavation works.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

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CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfil, CF48 SA

Our Ref: J172072-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Personal monitoring

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 01/08/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
5	AP1	MG5	Personal pump worn by operative dumper driver: Jason Lloyd working in the East part of the site	10:47	11:47	2.0	2.0	2.0	120	200	0.5	0.001	<0.04
6	6526	MG6	Personal pump worn by digger driver: Barry Cooper (working in the East part of the site / cab)	10:53	11:53	2.0	2.0	2.0	120	200	0.5	0.001	<0.04

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM41

Environment:

Temperature (°C): 20
Pressure (mb): 1019
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Personal air-monitoring carried out to establish concentration of airborne asbestos fibres. Sample taken during excavation works (moving soil)

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

Mieczyslaw Gorkiewicz

PRINT NAME: Mieczyslaw Gorkiewicz



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Tel: (01329) 287777
Fax: (01329) 287755

Ref No: J172072-FC10

Personal Monitoring Observation Form

Type & Scale of work: excavation works, pit approx. 12 mW x 18 mL x 2 m (Depth)

Purpose of monitoring: (select all that apply)

Checking effectiveness of methods ☐ Providing data for personal exposure records ☒ Confirming appropriate RPE being worn ☐

General control measures in use: (select all that apply)

Enclosure (under negative pressure) ☐ Partial enclosure ☐ Injection ☐
Gel/Foam ☐ Shadow vacuum ☐ Spraying ☒

Other (Please specify): N/A

Sampling Details:

Operative's Name/job title: Jason Lloyd/ dumper driver, Barry Cooper/digger driver

Type of RPE worn: Disposable, valved half-mask with P3 filter.

Length of time Operative is / has been exposed: 8.5 hours/ day, ongoing

Asbestos Product(s) being removed including detail of fixings, size, surface treatment and tools used during works and dust suppression methods being used by operative:

Asbestos debris found on the surface, spay used during handpicking.

General Description of activities being undertaking during sampling:

excavation, loading and transporting soil

Is the asbestos in good or bad condition (as per the method statements description): debris

Other factors which may affect the result (eg approximate size of the enclosure, external location, etc):
external location

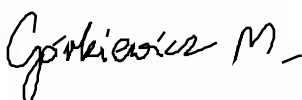
Time weighted average (4 Hour TWA) =
$$\frac{(F1 \times T1) + (F2 \times T2) + \dots (Fn \times Tn)}{4}$$
 N/A

Where F = concentration f/ml

T = Time for that exposure, hours and minutes, 1 hr 30 mins = 1.5

Notes: The sampling period must be sufficient to ensure it is fully representative of the work. Sampling periods should be for 4 hours to access the control limit or for the duration of a specific task for shorter duration activities. A minimum sample time of 10 minutes is required to assess the Short Term Exposure Limit. In general, the client is to specify their requirements depending on previous personal air sampling carried out. All information was collected from the method statement or / and the site contact and this information is deemed as accurate / correct for the purpose of this report.

Analyst: Mieczyslaw Gorkiewicz

Signature: 



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CLIENT: Kier Regional Building c/o WYG

SITE ADDRESS: Former school site in Cefn-Coed-y-Cymmer, Cyfarthfa Gardens,
Merthyr Tydfill, CF48 SA

Our Ref: J172073-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 02/08/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
1	K1	MG1	South-East of the area	09:25	10:25	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
2	ENV5	MG2	South-West of the area	09:28	10:28	8.0	8.0	8.0	480	200	1.0	0.001	<0.01
3	ENV4	MG3	North-West of the area	09:30	10:30	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
4	61	MG4	North-East of the area	09:32	10:32	8.0	8.0	8.0	480	200	0.5	0.001	<0.01

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

3. Comments, observations and opinions are outside the scope of UKAS accreditation.

5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

4. Fibres were counted on membrane filter(s) in accordance with the HSE Guidance Note HSG 248.

Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 20
Pressure (mb): 1020
Correction Factor (F): N/A

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in East of the area).
Debris of Asbestos Cement are hand picked during excavation works.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



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Merthyr Tydfil, CF48 5A

Our Ref: J172073-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Reassurance

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 02/08/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
7	K1	MG1	South-East of the area	12:30	13:30	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
8	ENV5	MG2	South-West of the area	12:31	13:31	8.0	8.0	8.0	480	200	3.0	0.002	<0.01
9	ENV4	MG3	North-West of the area	12:33	13:33	8.0	8.0	8.0	480	200	0.5	0.001	<0.01
10	61	MG4	North-East of the area	12:35	13:35	8.0	8.0	8.0	480	200	1.5	0.001	<0.01

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Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM20

Environment:

Temperature (°C): 21
Pressure (mb): 1020
Correction Factor (F): N/A

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Lab RE61 WPT

Comments

Boundary monitoring carried out to establish concentration of airborne asbestos fibres, air samples taken during excavation works of asbestos impacted soil (works in South of the area).
Debris of Asbestos Cement are hand picked during excavation works.
Results satisfactory.

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

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Merthyr Tydfil, CF48 SA

Our Ref: J172073-FC10

Your Ref: 10005743

SAMPLING PROTOCOL: Personal monitoring

SAMPLED BY: Mieczyslaw Gorkiewicz

DATE OF SAMPLING: 02/08/2019

ANALYSED BY (if different):

DATE OF ANALYSIS (if different):

Filter No.	Pump	Head	Location	Time on	Time off	Flow (litres/min)			Volume (V) litres	Grats (n)	Fibres (N)	Calculation fibres/ml	Reported result fibres/ml
						Flow (start)	Flow (finish)	Flow (used)					
5	AP1	MG5	Personal pump worn by operative dumper driver: Jason Lloyd working in the South part of the site	10:53	11:53	2.0	2.0	2.0	120	200	0.5	0.001	<0.04
6	6526	MG6	Personal pump worn by digger driver: Barry Cooper (working in the South part of the site / cab)	10:54	11:54	2.0	2.0	2.0	120	200	0.5	0.001	<0.04

1. Unless otherwise stated, the detection limit is 0.01 fibres/ml.

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5. For clearance sampling, this report must be read in conjunction with the certificate of reoccupation.

2. Samples collected by the client are evaluated using information provided by the client.

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Equipment Numbers:

Microscope: Meiji13
Stage Micrometer: WSM19
Tally Counter: ☒/US

Barometer: TBC20
Thermometer: TBC20
Flow Meter: FM41

Environment:

Temperature (°C): 20
Pressure (mb): 1020
Correction Factor (F): N/A

Diam. of dust deposit (D) (mm): 22.5
Test Slide (5 bands): Yes/No
W/B Grate diameter (µm): 100

Blank Filter

Head: MG7
Graticules: -
Fibres: -

Place of Analysis:

Lab
On Site
☒ Mob Lab RE61 WPT

Comments

Personal air-monitoring carried out to establish concentration of airborne asbestos fibres. Sample taken during excavation works (moving rubble)

SIGNATURE:

(on behalf of Envirochem by an authorised signatory)

ENVIROCHEM/FORMS/WORKSHEETS/02/ISSUE07/NOV06

PRINT NAME: Mieczyslaw Gorkiewicz



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Ref No: J172073-FC10

Personal Monitoring Observation Form

Type & Scale of work: Moving rubble (stones bricks, mortar)

Purpose of monitoring: (select all that apply)

Checking effectiveness of methods ☐

Providing data for personal exposure records ☒

Confirming appropriate RPE being worn ☐

General control measures in use: (select all that apply)

Enclosure (under negative pressure) ☐

Partial enclosure ☐

Injection ☐

Gel/Foam ☐

Shadow vacuum ☐

Spraying ☒

Other (Please specify): N/A

Sampling Details:

Operative's Name/job title: Barry Cooper/digger driver, Jason Lloyd/ dumper driver

Type of RPE worn: Disposable, valved half-mask with P3 filter.

Length of time Operative is / has been exposed: 8.5 hours/ day, ongoing

Asbestos Product(s) being removed including detail of fixings, size, surface treatment and tools used during works and dust suppression methods being used by operative:

Asbestos debris found on the surface of the area, spray used during handpicking.

General Description of activities being undertaken during sampling:

excavation, loading and transporting of rubble.

Is the asbestos in good or bad condition (as per the method statements description): debris

Other factors which may affect the result (eg approximate size of the enclosure, external location, etc):
external location

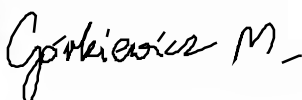
Time weighted average (4 Hour TWA) =
$$\frac{(F1 \times T1) + (F2 \times T2) + \dots (Fn \times Tn)}{4}$$
 N/A

Where F = concentration f/ml

T = Time for that exposure, hours and minutes, 1 hr 30 mins = 1.5

Notes: The sampling period must be sufficient to ensure it is fully representative of the work. Sampling periods should be for 4 hours to access the control limit or for the duration of a specific task for shorter duration activities. A minimum sample time of 10 minutes is required to assess the Short Term Exposure Limit. In general, the client is to specify their requirements depending on previous personal air sampling carried out. All information was collected from the method statement or / and the site contact and this information is deemed as accurate / correct for the purpose of this report.

Analyst: Mieczyslaw Gorkiewicz

Signature: 

APPENDIX D – EMAIL CONFIRMATION FROM KIER CONSTRUCTION

Roberts, Sarah

From: Poole, Mark (Cardiff) <Mark.Poole@kier.co.uk>
Sent: 30 September 2021 09:49
To: James, Adam
Cc: Lloyd, Adele; Rowbotham, Adam; Flemming, Michael; Pugh, Chris; Roberts, Sarah
Subject: RE: 210927 - YYG - Soils Verification Report

Hi Adam,

All the top soil stock piled on the lower site has been / or will be used on the lower site. We are currently site working on the lower site completing the landscaping.

No further contamination was discovered on site.

Kind Regards

Mark.

From: James, Adam <Adam.James@tetrattech.com>
Sent: 30 September 2021 09:45
To: Poole, Mark (Cardiff) <Mark.Poole@kier.co.uk>
Cc: Lloyd, Adele <Adele.Lloyd@kier.co.uk>; Rowbotham, Adam <Adam.Rowbotham@kier.co.uk>; Flemming, Michael <Michael.Flemming@kier.co.uk>; Pugh, Chris <Chris.Pugh@tetrattech.com>; Roberts, Sarah <Sarah.Roberts2@tetrattech.com>
Subject: RE: 210927 - YYG - Soils Verification Report

[This email was sent from an external sender outside of the Kier Group, please treat this email, links and attachments with caution.]

Hi Mark,

Almost there with the Validation Report but just need you to confirm a couple of points for me please?

1. All Topsoil that was stockpiled and tested on the lower development area, was this all kept on site and subsequently used within the Upper Development area?
2. Can you confirm that no further contamination was encountered during the development?

Cheers

Adam James BSc (Hons) MSc FGS
Principal Geo-Environmental Consultant

Tetra Tech

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[tetrattechurope.com](https://www.tetrattechurope.com)

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TETRA TECH

