Site Investigation Report

Rhyl Primary School, Camden

April 2016

S2218-002, Rev. A

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Issue: S2218-002				Revision: A
Date:	**Status:**	**Name:**	**Position:**	**Signature:**
20/04/2017	Prepared By:	Adam Packman	Environmental Engineer	
20/04/2017	Checked By:	Adam Selby	Senior Environmental Engineer	
24/04/2017	Authorised By:	Shaun Tolfree	Technical Director	

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Content Page Number

APPENDICES

1.0 Introduction

Sanctus Limited (Sanctus) was instructed by Kier Major Projects (the Client) to carry out an intrusive site investigation at Rhyl Primary School, Camden, North-West London.

The scope of works included the excavation of a 3No exploratory locations, and laboratory analysis of soil samples to determine the waste classification of materials requiring removal as part of the development and assess for potential contamination within the soils

Sanctus undertook the works on Thursday 6th April 2017. The works comprised the breaking out of tarmacadam hardstanding, followed by the excavation of 3No hand-dug trial pits using insulated hand digging tools.

The investigation included the logging of the ground conditions encountered, and the collection of samples for laboratory analysis.

The findings of the investigation are outlined and assessed below.

This report should be read in conjunction with:

- Sanctus Method Statement S2218-001; Rhyl Primary School Site Investigation RAMS, Ref:S2218-001 Dated: January 2017

2.0 Location and Site Description

The site is located approximately 1.25km north of The Regents Park, London on the co-ordinates 528337mE, 184811mN. The site has a roughly rectangular shape and covers an area of 0.6 hectares. The proposed development area comprises an area of tarmacadam to the south-east of the main school building measuring some 58m^2 and is accessed from the main school by a gated walkway.

The northern site perimeter is bounded by Rhyl Street, the east and west by residential properties. The southern site perimeter is bounded by Marsden Street and some additional residential properties.

2.1 Site Conditions

The works were undertaken across an area of hardstanding that is used by the school as a small car park and as a kitchen garden, comprising a number of above ground large pots and planters. The entire area comprised tarmacadam that in our opinion appeared to be in good condition showed no clear signs of degradation, indicating that the current surface is recent. Some areas of raised soft landscaping were noted around the perimeter of the area that were planted with various bushes and shrubs.

A Site Layout Plan, detailing the locations of the exploratory holes, is included as Appendix A.

2.2 Proposed Development

Sanctus understands that the proposed development will comprise a Teaching Kitchen designed to educate the schools pupils and local community on the benefits of healthy eating. It will comprise a prefabricated unit measuring 58m^2 and will include full cooking and teaching facilities and rooftop garden.

3.0 Site Investigation

Sanctus understands that the primary purpose of this supplementary investigation was to determine the waste classification of the Tarmacadam and Made Ground materials that will be excavated during the installation of the footings for the proposed kitchen unit. The investigation would also allow for the assessment of potential on site contamination.

An Environmental Engineer from Sanctus recorded the different materials encountered in all trial pits, and noted any field evidence for contamination on the exploratory hole logs that are included as Appendix B. A selection of photographs of the investigation is included as Appendix C.

All trial pits were backfilled upon completion and the overlying hardstanding was reinstated using cold lay macadam.

4.0 Ground Conditions

The locations of the exploratory holes are indicated on the Site Investigation Location Plan that is included as Appendix A, and lithographic logs and photographs are included as Appendices B and C, respectively. In total, three hand pits were excavated across the development area, 2no of these (STP101 and STP102) were advanced to a final depth of 0.6m bgl, the third (STP103) was terminated at a depth of 0.37m bgl due to the identification of suspected asbestos tile.

4.1 Surface Material

In all three locations, the surface comprised tarmacadam, 0.13-0.15m thick, and was noted to contain approximately 2-3 separate layers suggesting the area had been resurfaced at some point in the past.

4.2 Made Ground

Underlying the Tarmacadam, Made Ground was encountered and comprised a mixed aggregate of gravel and cobble sized fragments of brick and concrete, with occasional sandstone boulders. As the trial pits were advanced, clay content was noted to increase with depth although gravels of brick and concrete were still abundant.

4.3 Natural Deposits

No natural materials were identified in any of the three locations due to the limited depths achievable by hand dug excavations.

4.4 Groundwater

Sanctus did not encounter any groundwater or what could be considered perched water in any exploratory holes.

4.5 Field Evidence of Contamination

During the works, Sanctus identified a fragment of suspected asbestos roof tile in STP103 at a depth of a sample of 0.37m bgl. This was noted to partially comprise a fibrous material along the broken edge. This was photographed and was collected as a sample in addition to the soil samples for analysis.

The photographic log of the works can be found in Appendix C

Additionally, a hydrocarbon odour was noted to come from the tarmacadam during the works, as such a sample was recovered to assist determining binding agent, be it coal tar or bitumen.

5.0 Laboratory Analysis

5.1 Sampling Protocol

Sample collection was carried out in general accordance with BS EN ISO 22475-1:2006.

Soil samples were collected using a steel trowel and disposable gloves and stored in containers specific to the intended chemical analysis. All samples were couriered to an independent MCerts/UKAS accredited laboratory, by the client.

5.2 Analytical Strategy

Soil samples were analysed for a full waste suite including the following

- Asbestos Screen and Semi-quantification (Where identified)
- Inorganics and Metals
- Waste Banded Total Petroleum Hydrocarbons (TPH)
- Speciated Polyaromatic Hydrocarbons (PAHs)

The bulk sample recovered from STP103 comprising a fragment of potential Asbestos Containing Material (ACM) was scheduled for an asbestos screen.

The sample of Tarmac was scheduled for Waste Banded TPH and Speciated PAH only.

The analytical results are presented in Appendix D.

6.0 Waste Classification

6.1 Waste Classification Framework

The classification of waste is a complex and ever evolving process. Sanctus has classified the soils based on our current interpretation of regulations and guidance notes including the following documents:

- 'The Landfill (England and Wales) Regulations 2002 with 2004 & 2005 Amendments'
- 'Hazardous Waste (England and Wales) Regulations'
- 'Framework for the Classification of Hazardous Waste'
- 'EA Technical Guidance Note WM3. Hazardous Waste: Interpretation of the definition and classification of Hazardous waste' (1st Edition, 2015)
- 'The List of Waste Regulations 2005'
- 'European Classification, Labelling and Packaging of Chemicals Regulations 2009' and 'Adaptations to Technical Progress (ATPs)'
- 'Revised European Waste Catalogue'

Waste soils are assigned an Inert, Non-Hazardous or Hazardous waste classification.

Please note that legislation requires all waste transfer notes include the declaration that all reasonable measures have been taken to apply the waste hierarchy as follows: prevention of waste, preparing for reuse, recycling, other recovery and finally disposal.

It is a legal requirement that all soils to be removed from site undergo some form of pre-treatment prior to disposal. Pre-treatment is a physical / chemical / thermal or biological process, including sorting, that also changes the characteristics of the waste and must do so in order to: reduce its volume; or reduce its hazardous nature; or facilitate its handling; or enhance its recovery.

The legislation and guidance for classifying soils is updated regularly, the waste classifications shown below were correct at the time of writing.

6.2 Waste Classifications

Sanctus has assessed the results of chemical analysis using the Waste Classification Framework above; materials for disposal at each excavation location were classified based on the chemical analysis of the sample taken. The classifications of each location and the rationale for the classification can be found in Table 1 below

Table 1. Waste Classification of Materials Sampled on Site.

Sample Location	Material Type	Depth (m)	Waste Classification	Determinants	EWC Code
STP101	Made Ground	0.10-0.45	Hazardous †	TPH	17 05 03*
STP102	Made Ground	0.15-0.65	Hazardous	TPH, Asbestos Fragments	17 05 03*
STP103	Made Ground	0.15-0.37	Hazardous	TPH, PAH	17 05 03*
STP102 Tarmac	Tarmacadam	0.00-0.15	Hazardous	TPH, PAH	17 05 03*

†Also noted to contain asbestos free fibre.

Full laboratory analysis for the samples can be found in Appendix D.

Due to the classification of the materials as Hazardous Waste, additional chemical analysis for Waste Acceptance Criteria (WAC) will be required before the materials can be removed from site.

7.0 Human Health Risk Assessment

7.1 Assessment Criteria

Sanctus considers that the assumptions used to derive GAC for 'Public Open Space – Residential' are much more comparable to a school scenario in that they include a school-aged female receptor and comparable exposure activities including tracking back of soils into a building.

Sanctus has adopted the following guidance for assessing the risk of contamination to human health:

- Chartered Institute of Environmental Health (CIEH) and CL:AIRE (2008). Guidance on Comparing Soil Contamination Data with a Critical Concentration;
- DEFRA and CL:AIRE, SP1010 (December 2013). Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination.
- Land Quality Management (LQM) / Chartered Institute for Environmental Health (CIEH) Generic Assessment Criteria for Human Health 3rd Edition (2015).
- HSE. Workplace Exposure Limits. EH40/2005.
- Control of Asbestos Regulations 2012.

The contamination assessment criteria have been derived for a number of standard generic scenarios, which represented a wide range of sensitivities due to the assumptions of the active exposure pathways for each including: exposure duration, receptor and building parameters. The scenarios included 'residential with plant uptake' representing the most sensitive land use to 'industrial/commercial' representing the least sensitive.

Sanctus considers that the assumptions used to derive GAC for 'Public Open Space – Residential' are the most comparable to a school scenario in that they include a school-aged female receptor and comparable exposure activities including tracking back of soils into a building.

For organic contaminants, the assessment criteria are dependent on the organic matter content of the soil (SOM). Sanctus has selected the most conservative GAC of 1% to assess the results.

7.2 Comparison of Soil and Water Chemical Analysis Results

The analysis results of the soil samples obtained indicated that there were a number of exceedances of the generic assessment criteria identified within all 3no of the samples including asbestos and a number of PAHs.

Exceedances of the soil criteria indicates that the soils are unsuitable to remain onsite without some form of control measure in place to sever the contaminant pathway and prevent exposure of site users to the impacted materials. These can include capping with an impermeable material i.e. tarmacadam or a cover layer that prevents physical contact and minimises dust and vapour release.

A summary of the soil chemical analysis results be seen in Table 2 below and a drawing is included in Appendix A indicating the locations of where the investigation samples were retrieved from within the excavation. The soil analysis results are included in Appendix D.

Table 2. Chemical analysis of soil samples retrieved from Rhyl Primary School.

Determinant	GAC (mg/kg)	STP101	STP102	STP103
		Depth (m)	Depth (m)	Depth (m)
		0.13-0.45	0.15-0.65	0.15-0.37
Asbestos	Presence	Fibres (0.005%)	None Detected	Cement Fragment
Arsenic	79	17	21	26
Cadmium	120	0.41	0.43	0.62
Chromium	910	24	21	19
Copper	12,000	26	32	21
Mercury	120	0.39	0.34	0.15
Nickel	230	26	24	16
Lead	630	220	430	170
Selenium	1,100	< 0.20	< 0.20	< 0.20
Zinc	81,000	160	310	150
Chromium (Hexavalent)	23	< 0.50	< 0.50	< 0.50
TPH >C6-C10	5,000	< 1.0	< 1.0	< 1.0
TPH >C10-C25	3,800	1300	1000	2400
TPH >C25-C40	3,800	1000	1200	3100
Acenaphthene	15,000	10	7.9	16
Acenaphtylene	15,000	0.70	0.51	1.2
Anthracene	74,000	26	24	66
Benz[a]anthracene	29	37	32	87
Benzo[a]pyrene	5.7	26	25	64
Benzo[b]fluoranthene	7.1	44	39	100
Benzo[ghi]perylene	640	22	20	49
Benzo[k]fluoranthene	190	16	14	33
Chrysene	57	44	38	100
Dibenzo[ah]anthracene	0.57	5.8	5.1	13
Fluoranthene	3,100	130	100	280
Fluorene	9,900	10	9.3	24
Indeno[123-cd]pyrene	82	24	22	56
Naphthalene	4,900	1.5	0.10	0.13
Phenanthrene	3,100	100	85	210
Pyrene	7,400	98	80	210

Note:

All samples collected on 6th April 2017

Exceedances of the GAC for Public Open Space Near Residential are highlighted in red.

8.0 Human Health Risk Assessment

8.1 Conceptual Model

The conceptual model represents the environmental setting of the site and identifies potential sources of contamination, pathways for the contamination to be brought into contact with potential receptors and the receptors themselves for the contamination to impact upon. In doing this, the conceptual model allows for the identification of contaminant linkages that may be significant and require further investigation.

The sources, pathways and receptors for pollution are discussed in turn below.

8.1.1 Sources and Pollutants

The primary source for contamination identified at the site is the asbestos and PAH impacted Made Ground identified during the investigation works.

The organic contaminants also have the potential to naturally break down under biological action and produce gases, such as carbon dioxide and methane, deplete oxygen levels, and produce organic vapours.

8.1.2 Pathways

Exposure of the source (hydrocarbon-impacted materials) represents a potential contaminant pathway to the site users and nearby residents through direct contact, ingestion and inhalation.

During the development works the most likely pathways will be through skin contact and the release of dust during the enabling works and from any exposed soils remaining once the groundworks have been completed.

8.1.3 Receptors

Sanctus had identified the following receptors following review of the background information, the investigation findings and identification of potential pollutant pathways.

Human Health:	Nearby property residents
	Groundworkers
	School Children
Structural	Property footings
	Services

8.2 Qualitative Risk Assessment

Following the identification of sources, pathways and receptors in the previous sections, Sanctus has summarised the pollutant pathway linkages present at the site in the table below, and indicated if control measures need implementation to remove any potential risk. Sanctus has based their consideration on their professional opinion of the likelihood and duration of exposure of the source to the receptor, source characterisation (concentration, mass, type, toxicity, etc.) and sensitivity of the receptor.

Source	Pathways	Receptors	Potential Contaminant Linkage	Control Measures to be implemented	Revised Contaminant Linkage
Asbestos and PAH Impacted Soils	Soil contacting skin and clothing.	Site users and groundworkers	Yes Groundworks will expose and be working directly with the impacted soils	Asbestos control measures during works. Excavations to be undertaken using mechanical means, and capping exposed soils after completing enable works.	No Working with soils will be minimised and capping layer will break exposure pathway.
PAH Impacted Soils	Ingestion of contaminated soil	Site users and groundworkers	Yes Impacted soils will undergo excavation and be exposed likely coming into contact with site users.	Excavations to be undertaken using mechanical means, and operatives will utilise good hygiene practices and PPE with capping of exposed soils after completing enable works.	No Capping layer will sever the contaminant pathway prevent site users from coming into contact with impacted soils

Source	Pathways	Receptors	Potential Contaminant Linkage	Control Measures to be implemented	Revised Contaminant Linkage
Asbestos and PAH Impacted Soils	Inhalation of dust	Current site users and groundworkers	Yes Exposed soils could dry out and producing dust and releasing asbestos fibres	Asbestos Control measures e.g. Dust suppression and RPE during excavation works followed by capping of exposed soils upon completion of the enabling works	No Control measures will minimise dust production during works and capping layer will sever the pollutant pathway prevent site users from coming into contact with impacted soils.
PAH Impacted Soils	Direct Contact	Service Pipes	Yes Hydrocarbons could penetrate the HDPE pipe work and migrate away from the source.	Place all services into ducts and bury in clean imported materials to prevent impacted soils from coming into contact with the pipes or use contaminant resistant	No Segregation of services from impacted materials prevents interaction of contaminants with sub-surface pipes.

9.0 Recommendations

Any areas requiring excavation through or into Made Ground should be segregated and undertaken under controlled conditions to prevent both uncontrolled access and the potential spread of asbestos contaminated materials. Should any asbestos contaminated materials remain, it is a legal requirement to record the location, type and condition of any asbestos containing materials on site, within the building's asbestos register.

9.1 Contaminant Risk to Human Health

The contamination risk assessment has identified potential contamination from polyaromatic hydrocarbons (PAHs) and asbestos. These do not currently represent a risk to the site users as they are covered by hardstanding, and there is no requirement to specifically remove the contaminated soil provided it remains or is capped by hardstanding/buildings.

Due to the presence of asbestos all contaminated soil left *in situ* will need to be added to the school's asbestos register and managed in accordance with their management plan to inform future construction/maintenance works carried out in the area and the asbestos controls that will be required. Sanctus has recommended asbestos controls for the construction works in Section 9.3 below.

The contaminant pathway will become active during the development when the groundworks expose and excavate contaminated soils, and remediation measures will be required to mitigate the risks and these should be documented in a Remediation Strategy, and agreed with the local Environmental Health Officer as part of the planning process.

Sanctus understands that there is no net deficit or requirement for fill at the site, and so all soils excavated during construction will become waste and will be disposed from site; Sanctus has recommended a waste disposal strategy in Section 9.2 below.

9.2 Waste Strategy

Any materials excavated should be placed on polythene prior to offsite disposal to ensure no cross contamination of underlying materials. Due to the presence of asbestos within the Made Ground, the stockpile will also need to be kept damp and sheeted to prevent fibre release and will need to be disposed of at a suitably licensed offsite disposal facility.

Due to the classification of the materials as Hazardous waste, prior to removal from site a further sample will need collecting for Waste Acceptance Criteria (WAC) to determine its suitability for disposal at a landfill facility.

Upon removal from site all Hazardous materials will have to be undertaken by a suitably licensed haulier and will need to be accompanied by Hazardous Waste consignment notes a suitable transfer documentation.

9.3 Asbestos

9.3.1 Legislation for works

As a minimum, all works should be carried out in accordance with:

- Health and Safety at work Act 1974;
- Control of Asbestos Regulations 2012 (CAR2012);
- L143 ACoP Managing and Working with Asbestos; and
- HSG247 The Licensed Contractors Guide (where applicable).

9.3.2 Asbestos Works Classification

Due to the presence of free fibres of asbestos and fragment of materials containing asbestos, Sanctus would classify the works as Notifiable Non-Licensed Works (NNLW) and the appropriate notification should be submitted to the HSE in advance of the works. Kier should select a contractor with sufficient competence and insurance to work with the asbestos impacted soil and complete the enabling works.

9.3.3 Personnel and Training

In accordance with CAR 2012 Regulation 10 and L143 Managing and Working with Asbestos, all personnel undertaking the works should have undergone current, task-specific asbestos training at the correct level.

9.3.4 Site Segregation

The areas required to be excavated will be required to be segregated from the remainder of the site using solid hoarding a hazard warning signs to prevent unauthorised access. No access to the school occupants or general public should be possible until the works have been completed.

9.3.5 Personal Protective Equipment

Suitable protective clothing will be required to be worn during all tasks involving asbestos contaminated materials.

- Type 5 particle tight disposable coveralls with elasticated cuffs and hood for working in the respirator zone.
- RPE with FFP3 filters (face-fitted).

9.3.6 Dust Suppression

As a main control measure the material should be kept damp during excavation using either localised or perimeter dust suppression.

9.3.7 Air Monitoring

Reassurance background and personal air monitoring should be undertaken to provide proof that the control measures employed during the works are adequate. The action trigger level for air monitoring, taken from CAR (2012) is >0.1 fibres per ml; if any filters are found to contain >0.1 fibres per ml the works are to be stopped immediately and the methodology should be re-assessed.

9.3.8 Decontamination

All personnel should pass undertake personal decontamination procedures at the end of each shift, in a designated area or unit, with a sufficient supply of decontamination materials e.g. clean water, wipes and asbestos waste bags.

9.4 Unforeseen Contamination

Due to the contamination and the variable Made Ground identified during the investigation, the potential exists for further unforeseen contamination to be uncovered during the groundworks. This could have implications for the waste disposal strategy and health and safety of construction workers. Therefore, Sanctus would recommend a contamination watching brief from a suitably qualified person during the reduced level dig.

10.0 Summary

In April 2017 Sanctus undertook an intrusive site investigation at Rhyl Primary School, Camden, North London. A total of 3no hand dug pits were excavated within an area of tarmacadam hardstanding with the aim of classifying materials that are to be excavated as part of the installation of a kitchen teaching facility at the school. All three excavations were advanced in to the Made Ground underlying the tarmac, 2no of which (STP101 &STP102) reached 0.6m bgl with the third (STP103) being terminated at 0.37m bgl due to the identification of a suspected ACM.

Representative samples were collected from each of the excavations arisings as well as a bulk sample of the suspected ACM and a sample of the tarmac. These samples were kept cool and couriered to an independent MCERTS accredited laboratory for a range of chemical analyses.

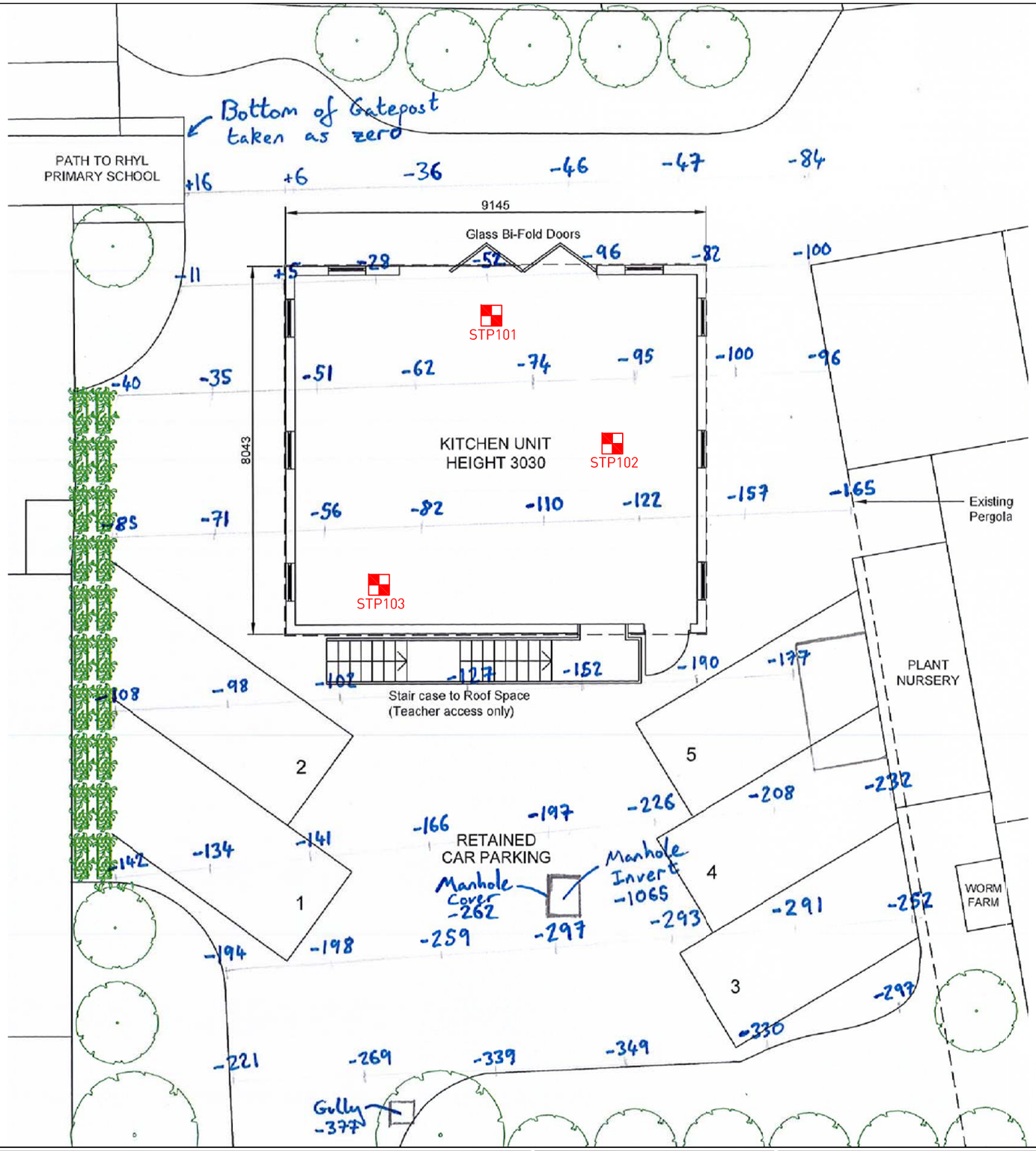
The analysis results confirmed the presence of asbestos within 2no of the locations comprising both free fibre and visible fragments of cement board. Additionally, high levels of both TPH and PAH were noted in all 3no soil samples and the tarmac sample, as such all materials encountered during the works would be classified as Hazardous waste for the purpose of offsite disposal. Due to the materials being classified as Hazardous waste, additional chemical analysis for WAC will be required in order to arrange disposal of the material at a Hazardous waste licensed landfill.

Due to the presence of both free fibres and visible fragments of asbestos in the materials underlying the hardstanding Sanctus recommends that any future excavations be undertaken under controlled circumstances to minimise risk to site users. Due to the identification of asbestos in fragmental and free fibre form, Sanctus would classify the enabling works as Notifiable Non-Licensed Work (NNLW).

Sanctus recommends that prior to works commencing a Remediation Strategy is developed that will outline how the works required to complete the development will be completed without exposing workers to significant environmental risks whilst producing a development that will not pose a risk to future site users.

Appendix A

Sanctus Drawings



sanctus

Sanctus House, The Waterfront, Stonehouse Park,
Stonehouse, Glos, GL10 3UT
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E: info@sanctusltd.co.uk www.sanctusltd.com

Legend:

STP102 Sanctus Trial Pit

Drawing Notes:

Based on Ingleton Woods Proposed Site Plan.
All Locations are approximate.

Site Address:

Rhyl Primary School
London
NW5 3HB

Rev.	Description	Date
A	First Issue	24/01/2017

Project Name:
Rhyl Primary School

Drawing Title:
Site Investigation Location Plan

Contract No:	Drawing No:	Scale @ A3:
S2218	D2218/002	1:100
Drawn By:	Checked By:	Approved By:
JH	AKS	ST

Appendix B

Exploratory Hole Logs

Sanctus Limited
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Fax: 01453 827915
email: info@sanctusltd.co.uk

Trial Pit No
STP101
Sheet 1 of 1

Project Name: Rhyl Primary School	Project No. **S2218**	Co-ords: Level: mAD	Date 06/04/2017
Location: Marsden Street, Camden		Dimensions: m Depth 0.60m m	Scale 1 : 6.25
Client: Kier Major Projects			Logged By AP

Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
	Depth (m)	No/Type	Results				
							TARMACADAM
	0.13 - 0.45	ES		0.13			MADE GROUND comprising brown, slightly clayey gravelly sand of fine to coarse sub-angular brick, concrete, tile and glass. 5-6 cobbles of brick and sandstone were also identified.
				0.45			MADE GROUND comprising slightly sandy slightly gravelly clay. Gravels and sands are fine to medium sub-angular to sub-rounded brick fragments.
				0.60			Trial Pit completed at 0.60m.
				{1.00}			

0

1

Remarks:

- Hardstanding removed using battery powered SDS drill.
- Excavated using fully insulated using hand digging tools.
- No groundwater was encountered during the works.
- Sides remained stable throughout the works
- Backfilled with arisings upon completion.
- Cold lay tarmacadam used to reinstate hardstanding surface.

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Trial Pit No
STP102
Sheet 1 of 1

Project Name: Rhyl Primary School	Project No. **S2218**	Co-ords: Level: mAD	Date 06/04/2017
Location: Marsden Street, Camden		Dimensions: m Depth 0.65m m	Scale 1 : 6.25
Client: Kier Major Projects			Logged By AP

Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
	Depth (m)	No/Type	Results				
	0.00 - 0.15	ES					TARMACADAM
	0.15 - 0.65	ES		0.15			MADE GROUND comprising red-brown, slightly clayey gravelly sand with angular to sub-angular brick, concrete, glass and tile.
				0.50			MADE GROUND comprising clayey gravel of sub-angular brick.
				0.65			Trial Pit completed at 0.65m.
				{1.00}			

0

1

Remarks:

- Hardstanding removed using battery powered SDS drill.
- Excavated using fully insulated using hand digging tools.
- No groundwater was encountered during the works.
- Sides remained stable throughout the works
- Backfilled with arisings upon completion.
- Cold lay tarmacadam used to reinstate hardstanding surface.

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Trial Pit No
STP103
Sheet 1 of 1

Project Name: Rhyl Primary School	Project No. **S2218**	Co-ords: Level: mAD	Date 06/04/2017
Location: Marsden Street, Camden		Dimensions: m Depth 0.37m m	Scale 1 : 6.25
Client: Kier Major Projects			Logged By AP

Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
							TARMACADAM
	0.15 - 0.37	ES		0.15			Grey-brown MADE GROUND comprising slightly clayey slightly cobbly gravelly sand. Gravels and cobbles are sub-angular brick and concrete and angular tile fragments.
	0.37	ACM		0.37			Fragment of Suspected Asbestos Containing Material identified. Trial Pit completed at 0.37m.
				{1.00}			

0
1

Remarks:

- Hardstanding removed using battery powered SDS drill.
- Excavated using fully insulated using hand digging tools.
- No groundwater was encountered during the works.
- Sides remained stable throughout the works
- Backfilled with arisings upon completion.
- Cold lay tarmacadam used to reinstate hardstanding surface.
- Trial pit terminated at 0.37m bgl due to identification of suspected ACM fragment.

Appendix C

Photographic Plates

Figure 1. Excavation, arisings and reinstatement of STP101

Figure 2. Excavation, arisings and reinstatement of STP102.

Figure 3. Excavation, reinstatement and Asbestos Cement Board identified in STP103.

Appendix D

Laboratory Analysis

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.co.uk

Final Report

Report No.:	17-08606-1
Initial Date of Issue:	13-Apr-2017
Client	Sanctus Limited
Client Address:	The Waterfront Stonehouse Park Stonehouse Gloucestershire GL10 3UT
Contact(s):	Labs
Project	S2218 - Rhyl Primary School, London

Quotation No.:		**Date Received:**	10-Apr-2017
Order No.:		**Date Instructed:**	10-Apr-2017
No. of Samples:	5		
Turnaround (Wkdays):	3	**Results Due:**	12-Apr-2017
Date Approved:	13-Apr-2017		

Approved By:

Details: Glynn Harvey, Laboratory Manager

Bulk Identification Certificate

Client:	Sanctus Limited	**Your Ref.:**	
Site Address:		**Project:**	S2218 - Rhyl Primary School, London
Date Sampled:	06-Apr-2017	**Job Number:**	17-08606
Date Received:	10-Apr-2017	**No Samples:**	
		Date Reported:	13-Apr-2017

Sample No.	Sample Ref.	Description	SOP	Accred.	Laboratory	Material	Result
437459	STP103 Bulk		2185	U	COVENTRY	Cement	Chrysotile

The in-house procedure SOP2185 is in accordance with the requirements of Appendix 2 of the Analyst Guide (HSG 248).

The results relate only to items tested as supplied by the client.

Comments and interpretations are beyond the scope of UKAS accreditation.

Samples associated with asbestos in building surveys are retained for six months (HSG 264 refers)

Chemtest
The right chemistry to deliver results

Results - Soil

Project: S2218 - Rhyl Primary School, London

Client: Sanctus Limited					**Chemtest Job No.:**	17-08606	17-08606	17-08606	17-08606
Quotation No.:					**Chemtest Sample ID.:**	437456	437457	437458	437460
					Client Sample ID.:	STP101	STP102	STP103	STP102 Tarmac
					Sample Type:	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.13	0.15	0.15	0.15
					Bottom Depth (m):	0.45	0.65	0.37	
					Date Sampled:	06-Apr-2017	06-Apr-2017	06-Apr-2017	06-Apr-2017
					Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
ACM Type	U	2192		N/A		Fibres/Clumps	-	-	
Asbestos Identification	U	2192	%	0.001		Chrysotile	No Asbestos Detected	No Asbestos Detected	
Asbestos by Gravimetry	U	2192	%	0.001		0.005			
Total Asbestos	N	2192	%	0.001		0.005			
Moisture	N	2030	%	0.020		9.6	8.6	4.5	< 0.020
Stones	N	2030	%	0.020		< 0.020	< 0.020	< 0.020	
Soil Colour	N	2040		N/A		Brown	Brown	Brown	Black
Other Material	N	2040		N/A		Stones, Brick	Stones, Brick	Stones	Tarmac
Soil Texture	N	2040		N/A		Sand	Sand	Sand	Tarmac
pH	M	2010		N/A		9.0	9.0	10.7	
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40		< 0.40	< 0.40	< 0.40	
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010		0.030	0.024	0.044	
Cyanide (Free)	M	2300	mg/kg	0.50		< 0.50	< 0.50	< 0.50	
Cyanide (Total)	M	2300	mg/kg	0.50		< 0.50	< 0.50	< 0.50	
Sulphate (Acid Soluble)	M	2430	%	0.010		0.11	0.15	0.15	
Arsenic	M	2450	mg/kg	1.0		17	21	26	
Cadmium	M	2450	mg/kg	0.10		0.41	0.43	0.62	
Chromium	M	2450	mg/kg	1.0		24	21	19	
Copper	M	2450	mg/kg	0.50		26	32	21	
Mercury	M	2450	mg/kg	0.10		0.39	0.34	0.15	
Nickel	M	2450	mg/kg	0.50		26	24	16	
Lead	M	2450	mg/kg	0.50		220	430	170	
Selenium	M	2450	mg/kg	0.20		< 0.20	< 0.20	< 0.20	
Zinc	M	2450	mg/kg	0.50		160	310	150	
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	< 0.50	< 0.50	
TPH >C6-C10	N	2670	mg/kg	1.0		< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C25	N	2670	mg/kg	1.0		1300	1000	2400	890
TPH >C25-C40	N	2670	mg/kg	1.0		1000	1200	3100	7500
Total TPH >C6-C40	M	2670	mg/kg	10		2300	2200	5500	8400
Naphthalene	M	2700	mg/kg	0.10		1.5	0.10	0.13	0.64
Acenaphthylene	M	2700	mg/kg	0.10		0.70	0.51	1.2	8.1
Acenaphthene	M	2700	mg/kg	0.10		10	7.9	16	77
Fluorene	M	2700	mg/kg	0.10		10	9.3	24	100
Phenanthrene	M	2700	mg/kg	0.10		100	85	210	890
Anthracene	M	2700	mg/kg	0.10		26	24	66	330
Fluoranthene	M	2700	mg/kg	0.10		130	100	280	1300

Chemtest
The right chemistry to deliver results

Results - Soil

Project: S2218 - Rhyl Primary School, London

Client: Sanctus Limited			**Chemtest Job No.:**		17-08606	17-08606	17-08606	17-08606
Quotation No.:			**Chemtest Sample ID.:**		437456	437457	437458	437460
			Client Sample ID.:		STP101	STP102	STP103	STP102 Tarmac
			Sample Type:		SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.13	0.15	0.15	0.15
			Bottom Depth (m):		0.45	0.65	0.37	
			Date Sampled:		06-Apr-2017	06-Apr-2017	06-Apr-2017	06-Apr-2017
			Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Pyrene	M	2700	mg/kg	0.10	98	80	210	970
Benzo[a]anthracene	M	2700	mg/kg	0.10	37	32	87	400
Chrysene	M	2700	mg/kg	0.10	44	38	100	480
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	44	39	100	490
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	16	14	33	170
Benzo[a]pyrene	M	2700	mg/kg	0.10	26	25	64	330
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	24	22	56	270
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	5.8	5.1	13	80
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	22	20	49	300
Total Of 16 PAH's	M	2700	mg/kg	2.0	600	510	1300	6100
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2185	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by ‘Aquakem 600’ Discrete Analyser using 1,5-diphenylcarbazide.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

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

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.co.uk