Ashcourt Contracts Limited

April 2019

Tanglewood Environmental Limited

Phase II Environmental Assessment

Land off Halifax Way

Barmby Moor

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Executive Summary

Tanglewood Environmental Limited have been instructed by Ashcourt Contracts Lts to undertake a Phase II Environmental Assessment of land off Halifax Way, Barmby Moor. The site has a history of being an airfield since at least 1926, now disused. This report highlights environmental considerations predominantly with respect to ground conditions associated with the land in the context of residential development

OBSERVATIONS

The site Is located approximately 2km south west of Pocklington Town Centre and comprises of an L shaped parcel of agricultural land.

Underlying geology comprises of the Pocklington gravel formation and Bielby sand member.

The nearest surface water feature is Pickering Beck at tertiary river to the north and north west.

The investigation comprised of eight trial pits with representative samples taken from each strata.

Soils comprised of topsoil over sandy, gravelly subsoil derived from the parent material.

No evidence of significant contamination was encountered.

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Contaminated Land Liability

Based on the information contained in this report and with due regard to the proposed residential end use, the site is considered to represent a low risk with resect to contaminated land liability issues in its current condition. On this basis remediation work is not required.

Preparatory Works

- Topsoil should be stripped and retained for use onsite.

The risks associated with other potential sources of contamination are considered to be low. However should unusually coloured or fibrous material be encountered then this should be managed in accordance with the unexpected findings protocol.

1.0 Summary of Phase I Information

Tanglewood Environmental Limited completed the Phase I assessment during March 2018, a summary of the Phase I report is provided below.

Current Site Conditions	The site is currently being stripped of topsoil, with the soils being stored in bunds.
Proposal	Development of office building, vehicle maintenance building and concrete mixing plant.
Adjacent Site Conditions	Pocklington Airfield Industrial Estate and agricultural fields.
Site history	The site has historically been an airfield.
Geology	Pocklington Gravel Formation and Bielby Sand Member.
Hydrogeology	Secondary B Aquifer.
Hydrology	Pickering Beck to the north and north west.
Potential Sources of Contaminants	Hydrocarbons from military and agricultural activities, metals from spreading and PAH from fires.
Conclusions	Site is a low to moderate risk due to the history.

2.0 Fieldwork

2.1 Scope of works

The information that forms this report is limited to areas accessible during the investigation. Fieldwork was carried out during March 2019 under the supervision of Tanglewood Environmental Limited.

- Eight tracked excavator trial pits TP01 to TP08.
- Collection of representative soil samples from naturally occurring soils and one area of made ground.

Descriptions of strata encountered made during the investigation are presented in **Appendix C.**

2.2 Trial Pit Locations and Sampling Rationale

Trial pit locations are shown on Drawing No HH022019 in appendix B. Trial pit locations were determined by reference to the Phase I report to evaluate potential sources of contamination.

Location	Rationale
TP01 – TP08	To assess general soils quality in relation to potential contamination sources.

2.3 Geoenvironmental Testing

A total of 15 samples were analysed for metals, TPH CWG and speciated PAH, from TP01 to TP08, analysis is shown in **Appendix D.**

3.0 Ground conditions and Material Properties

3.1 Recorded Ground Conditions

Ground Conditions	Depth Range	Observations
Natural Strata.	0.00 – 0.40	Brown sandy loam.
Natural Strata	0.40 – 1.20	Buff sand with frequent gravel.
Clay	1.20	Orange clay.
Obstructions	Made ground at TP4.	
Groundwater	Groundwater was detected in TP3, TP4, TP6, TP7 and TP8	
Stability	Running sand was encountered in TP3, TP4, TP6, TP7 and TP8.	

3.2 Material Properties

3.2.1 Topsoil

For the purposes of this report, topsoil is defined as the upper layer of a soil profile, which contains a high percentage of organic matter. Topsoil was encountered in all sample locations.

3.2.2 Made Ground

Made ground was encountered in TP4.

3.3 Visual/Olfactory Evidence of Contamination

Excavated material from TP4 contained metal, wood and was discoloured. There was a faint odour of hydrocarbons.

3.4 Ground Gas

No field measurements were taken as organic material was not present at depth.

4.0 Results of Chemical Analysis

4.1 Assessment Methodology

A generic risk assessment has been undertaken in accordance with the principles of CLR 11 using a conceptual site model that has been updated following the ground investigation. Risks from potential contaminant linkages are estimated using standardised methods that involve comparison of site data with published screening values. The screening values used in this report are presented in **Appendix E** and are based on residential use with plant uptake.

4.2 Human Health Risk Assessment

4.2.1 Metals

Metals did not exceeded the relevant S4ULs.

4.2.2 Organic Species

Benzo(a)pyrene and benzo(b)fluranthene exceeded the relevant S4ULs in TP04 at 0.4m.

Hydrocarbon species did not exceed S4ULs.

4.3 Construction Materials

4.3.1 Water Pipelines

The current guidance on the selection of materials for potable water supply pipes is laid in guidance provided by Water UK and the Home Builders Federation (Water UK HBF, 2014).

A formal assessment of water pipe selection is beyond the scope of this document, however as the site is will require minor remediation then barrier pipe is unnecessary.

4.3.2 Hydrocarbon Barrier

Hydrocarbons contamination is not present, hence hydrocarbon barriers are not necessary.

4.4 Plant Life Risk Assessment

Clean topsoil to meet BS3882:2015 may be imported to the site for landscaping, chemical analysis will be required to demonstrate that benzo(a)pyrene is below screening values.

4.5 Radon

The site is not in a radon affected area.

5.0 Revised Conceptual Site Model and Risk Assessment

Based on the desk study information, a preliminary conceptual site model (CSM) was developed. This section summarises the revised understanding following the detailed site investigation of surface and subsurface strata. A qualitative risk assessement is available in **Appendix E**.

5.1 Revised Conceptual Site Model

Sources of Contamination	Benzo(a)pyrene and benzo(b)fluoranthene at shallow depth in TP04.
Potential Contaminant Pathways and Pollutant Linkages	Ingestion of dust and skin contact during the construction phase.
Potential Receptors	Construction workers.

Based on chemical analysis and PAH solubility values the underlying secondary B aquifer is not considered to be vulnerable to leaching contaminants.

PAH of Interest Solubilities in Water at 20°c

Benzo(a)pyrene $1.62x10^{-3}$ mg/mL
Benzo(b)fluoranthene $1.5x10^{-6}$ mg/mL

5.2 Contaminated Land Risk Assessment

The revised conceptual site model indicates that a pollutant linkage is possible to a variety of receptors during the construction phase. Contaminant linkages considered low are not considered significant or requiring remedial action. Risks related to the pollutant linkage are summarized in the following tables.

5.2.1 Contaminated Land Risk Assessment (Current Construction Phase)

Assessment		Risk Evaluation
Potential for statutory liability and as designation as contaminated land	**Limited source, pathway and receptor**	**LOW**
Potential for third party liability	**Limited source, pathway and receptor**	**LOW**
Risk of contaminated land liability for owner	**Limited source, pathway and receptor for industrial use.**	**LOW**

5.2.2 Contaminated Land Risk Assessment (Future Industrial Use)

Assessment		Risk Evaluation
Potential for statutory liability and as designation as contaminated land	Limited source, pathway and receptor	LOW
Potential for third party liability	Limited source, pathway and receptor	LOW
Risk of contaminated land liability for owner	In its current condition	LOW

6.0 Conclusions and Recommendations

6.1 Geoenvironmental Assessment

Contaminated Land Risk Assessment	The site is considered to represent a low risk in respect to contaminated land liability for existing use and proposed industrial use in its current condition. As a result, the site poses a very low risk to future industrial users and a very low risk to controlled waters.
Ground Gas	As these soils consist of naturally occurring topsoil and subsoil, then ground gases are not considered to be a risk.

6.2 Outline Remediation Recommendations

6.2.1 Pollutants

Benzo(a)pyrene and benzo(b)fluoranthene.

6.2.2 Evaluation of Risk

Soils arising in the location of TP4 are suitable to remain onsite as there is a very low risk to controlled waters and a future concrete slab will break the pathway for human health risk.

6.3 Disposal of Waste Materials

Removal of materials if necessary from site should be performed in line with current waste management regulations. Soils will generally meet the definition of inert except TP04 0.4m due to benzo(a)anthracene, these wastes will be hazardous waste by HP14.

6.4 Unexpected Findings Protocol

It is possible that areas of contamination may be encountered during excavation and construction works. If unexpected contaminated materials are encountered then work should stop and a suitably experienced environmental consultant should advise on the appropriate course of action.

6.4 Health and Safety

Construction workers should take necessary precautions to avoid dust and be supplied with suitable gloves and washing facilities.

6.4 Regulatory Approvals

The conclusions and recommendations contained within this report are considered reasonable based on current understanding of the site. However these cannot be guaranteed to gain regulatory approval and further clarification work may be required. To avoid potential delays this report should be provided to the Local Authority for approval before work commences.

Appendices

Appendix A – Methodology and Limitations

Methodology

This assessment has been designed to provide information relating to:

- The current and former land uses on and surrounding the site.
- The environmental sensitivity of the location as determined by local geology, hydrology and neighbouring land uses.
- Relevant records held by regulators.

Risk Classification

These methods use a risk based approach as introduced by the Environmental Protection Act 1990. Comment is made regarding the sites status as contaminated land as Part IIA of the above Act, with the actual or potential designation as contaminated land as defined by Section 78A(2). Unless specifically stated as relating to this definition, references to contamination and contaminants relate to the presence of potentially hazardous substances in, on or under the site.

Low Risk

It is unlikely that issues will arise as a liability to the site owner.

Medium Risk

Issues could arise as a liability for the site owner usually further work is required to quantify the risk.

High Risk

It is likely that issues will arise for the site as a liability to the site owner.

Environmental Risk Assessment

The presence of contaminating substances is a concern if an actual or potentially unacceptable risk exists. The definition of significant risk is deemed to be where:

- Significant harm is being caused or there is possibility of such harm being caused (where harm is defined as harm to health of living organisms or other interference with the ecological systems of which they form a part and, in the case of man, includes harm to his property; and/or pollution to Controlled Waters is being caused.

Therefore, the presence of measurable concentrations of contaminants within the ground and subsurface does not automatically imply that a contamination issue exists, since contamination is defined in terms of pollutant linkages and harm.

The nature and importance of both pathways and receptors, which are relevant to the site will vary according to the intended use of the site, its characteristics and its surroundings.

Limitations

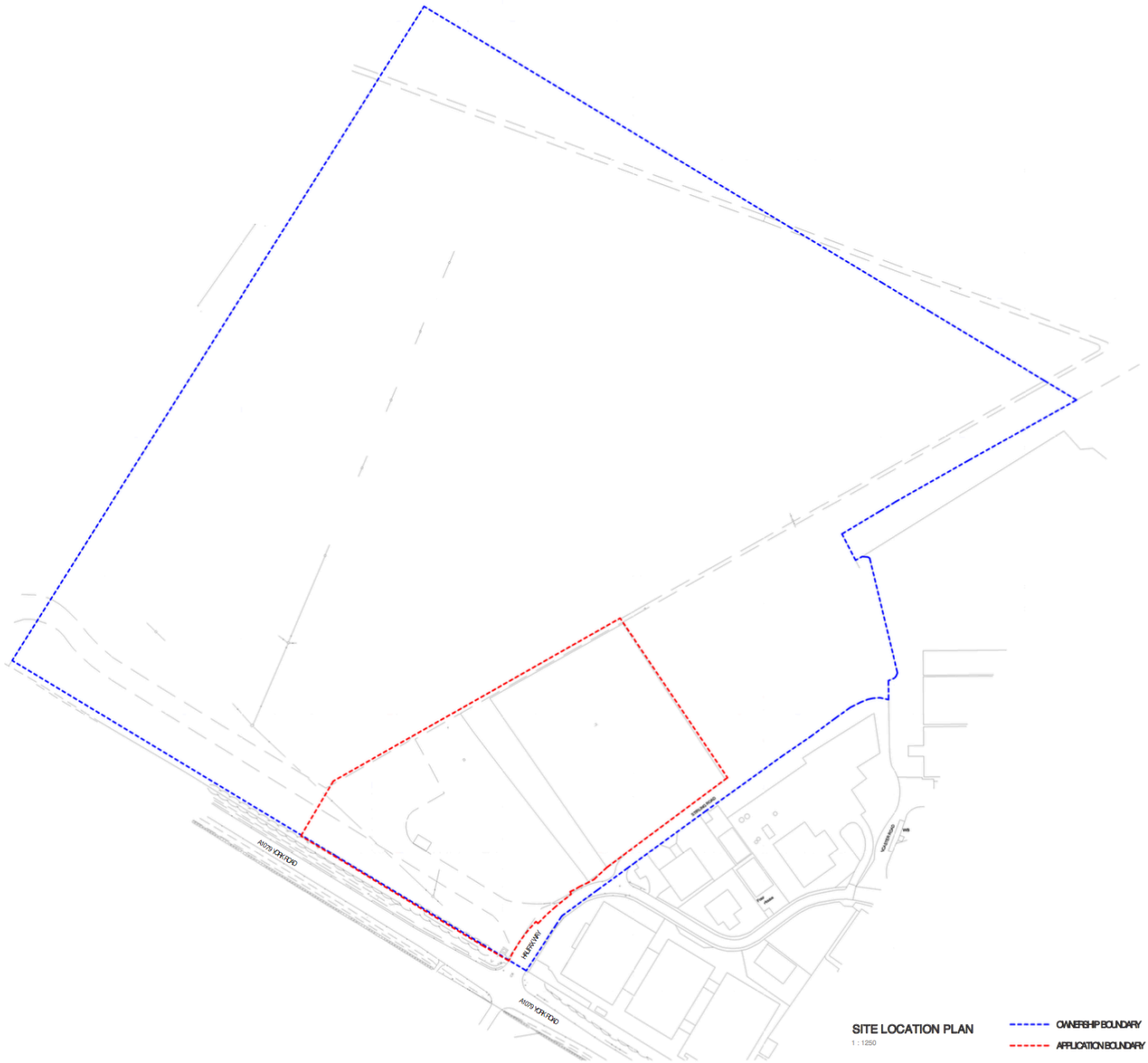
Tanglewood Environmental Limited has prepared this report solely for the use of the client and those parties with whom an agreement has been executed, or with whom assignment has been agreed. Should any third party wish to use or rely upon the contents of this report then, written approval must be obtained.

Tanglewood Environmental Limited accepts no responsibility or liability for the consequences of this document being used for any other purpose or project other than for which it was commissioned.

The information provided should not be considered exhaustive and has been accepted in good faith as providing true and representative environmental information relating to the site.

It should be noted that any risks identified in this report are perceived risks based on the information provided, actual risks can only be assessed by intrusive investigation of the site.

Appendix B - Drawings



Tanglewood Environmental Limited	Client: Ashcourt Contracts Limited	Site: Land off Halifax Way, Barmby Moor.	Title: Red Line Boundary
	Scale: NTS	Date: 10/5/2019	DWG No: ASH012019

Tanglewood Environmental Limited	Client: Ashcourt Contracts Limited	Site: Land off Halifax Way, Barmby Moor.	Title: Trial Pit Locations
	Scale: NTS	Date: 10/5/2019	DWG No: ASH022019

Appendix C – Exploratory Hole Records

Halifax Way, Barmby Moor Trial Pit Log, TP01

Depth From	Depth to	Strata Description	Legend	Samples
0.0	0.4	Clayey topsoil with frequent gravel.		YES
0.4	2.0	Buff sand, with frequent gravel and flint.		YES
2.0		Red boulder clay. End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit remained stable Trial pit remained dry on completion Tracked excavator with 0.6m toothed bucket	2.0m	**1**

Halifax Way, Barmby Moor, Trial Pit Log, TP2

Depth From	Depth to	Strata Description	Legend	Samples
0.0	0.25	Brown sandy loam, with frequent gravel and occasional rootlets.		YES
0.25	1.25	Buff sand with frequent gravel and flint.		YES
1.25		Red boulder clay End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit remained stable Trial pit remained dry on completion Tracked excavator with 0.6m toothed bucket	1.25m	**2**

Halifax Way, Barmby Moor, Trial Pit Log, TP3

Depth From	Depth to	Strata Description	Legend	Samples
0.0	0.25	Brown sandy loam with occasional rootlets.		YES
0.25	1.85	Buff sand with infrequent gravel.		YES
1.85	2.15	Red boulder clay. End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Running sand and groundwater ingress from 1.85m Trial pit holding water at base. Tracked excavator with 0.6m toothed bucket	1.1m	**3**

Halifax Way, Barmby Moor, Trial Pit Log, TP4

Depth From	Depth to	Strata Description	Legend	Samples
0.0	0.15	Brown sandy loam with frequent sand and gravel.		
0.15	0.35	Red/grey mottled clay, with sand and gravel.		YES
0.35	2.25	Red clay, ash, wood, reinforced concrete, wire fencing, barbed wire and automotive parts.		YES
2.25	3.05	Red boulder clay. End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit remained stable Water seepage at 1.75m Tracked excavator with 0.6m toothed bucket	3.05m	**4**

Halifax Way, Barmby Moor, Trial Pit Log, TP5

Depth From	Depth to	Strata Description	Legend	Samples
0.0	1.0	Brown fine sand		YES
1.0	1.4	Buff sand with frequent gravel and flint.		YES
1.4		Red boulder clay End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit remained stable Water ingress at 1.4m Tracked excavator with 0.6m toothed bucket	1.4m	**5**

Halifax Way, Barmby Moor, Trial Pit Log, TP6

Depth From	Depth to	Strata Description	Legend	Samples
0.0	0.2	Dark brown sandy loam with frequent gravel.		YES
0.2	0.4	Sand and gravel with substantial water ingress. Suspected broken pipe.		YES
0.4	1.1	Red boulder clay with grey mottling. End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit unstable, surface water logged. Water ingress at 0.4m Tracked excavator with 0.6m toothed bucket	1.9m	**6**

Halifax Way, Barmby Moor, Trial Pit Log, TP7

Depth From	Depth to	Strata Description	Legend	Samples
0.0	2.5	Buff sand with frequent gravel and flint.		YES
2.5		Red boulder clay with grey mottling. End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit unstable. Running sand at 2.1m Tracked excavator with 0.6m toothed bucket	2.5m	**7**

Halifax Way, Barmby Moor, Trial Pit Log, TP8

Depth From	Depth to	Strata Description	Legend	Samples
0.0	0.3	Dark brown sandy loam with frequent gravel.		YES
0.3	2.0	Buff sand with infrequent gravel and flint.		YES
2.0		Red boulder clay with grey mottling. End of exploration (target depth)		

Remarks and Observations	**Final Depth**	**Trial Pit No:**
Trial pit unstable. Running sand at 1.5m Tracked excavator with 0.6m toothed bucket	2.5m	**8**

Appendix D – Chemical Laboratory Results

TERRA TEK
SITE INVESTIGATION & LABORATORY SERVICES

Tanglewood Environmental Ltd
Brook Cottage
36 Leeds Road
Oulton
LS26 8JU

For the attention of Steve Ward

Report No: B22584
Issue No 01

LABORATORY TEST REPORT

Project Name	**POCKLINGTON**		
Project Number	**B22584**	Date samples received	09/04/2019
Your Ref		Date written instructions received	09/04/2019
Purchase Order		Date testing commenced	09/04/2019

Please find enclosed the results as summarised below

Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	15	Client Specified Suite - Soil	Yes
2	15	PAHs (speciated) - Soil	Yes
App S1	~	Sample Descriptions - Soil	N/A
App S2	~	Deviating Samples - Soil	N/A
App S3	~	Summary of In-House Analytical Test Methods - Soil	N/A

Remarks :

Issued by : Stephen Langman Date of Issue : 16/04/2019

Approved Signatories : S. Langman 16/04/2019
G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)

Key to symbols used in this report
S/C : Testing was sub-contracted

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.
The results reported relate to samples received in the laboratory only.
All results contained in this report are provisional unless signed by an approved signatory
This report should not be reproduced except in full without the written approval of the laboratory.
Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory.
The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw
our report if we have not received cleared funds in accordance with our standard terms and conditions
Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.
Feedback on the this report may be left via our website www.terratek.co.uk/contact-us

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 0126
25 YEARS 1990-2015

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TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: POCKLINGTON

Client: Tanglewood Environmental Ltd

Engineer:

Contract No B22584

Sample Identification				Lab Sample ID	Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Lead mg/kg	Mercury mg/kg	Selenium mg/kg	Copper mg/kg	Nickel mg/kg	Zinc mg/kg	Total petroleum hydrocarbons mg/kg
Hole	Depth m	Sample Ref	Sample Type											
TP01	0.30		D	487614	5.7	0.29	8	17	0.34	<0.5	7	10	31	<1
TP01	0.90		D	487615	7.4	0.24	5	6	0.36	<0.5	6	11	21	<1
TP02	0.20		D	487616	6.3	0.38	11	25	0.16	<0.5	9	11	43	<1
TP02	0.60		D	487617	5.4	0.25	8	9	0.12	<0.5	5	10	25	<1
TP03	0.20		D	487618	7.4	0.58	20	33	0.50	<0.5	10	18	54	<1
TP03	0.80		D	487619	4.5	0.29	7	6	0.37	<0.5	7	1	26	<1
TP04	0.40		D	487620	7.3	0.50	16	26	0.63	<0.5	12	14	60	1,621
TP04	1.60		D	487621	6.7	0.46	40	6	0.97	<0.5	11	34	59	<1
TP05	0.30		D	487622	1.1	<0.10	5	5	0.15	<0.5	3	6	13	<1
TP05	1.40		D	487623	4.7	0.22	6	6	<0.10	<0.5	5	10	21	<1
Limits of Detection					0.5	0.10	1	1	0.10	0.5	1	1	0.5	1
Terra Tek Analysis Method					TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP067 M
Accreditation M=Mcerts U=UKAS N=No accreditation														

Originator	Checked & Approved
TH	S. Langman 16/04/2019

RESULTS OF CHEMICAL CONTAMINATION TESTS - SOIL

KEY

* - deviating result (refer to Appendix S2 for details)

^ - result expressed on as-received basis

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: POCKLINGTON

Client: Tanglewood Environmental Ltd

Engineer:

Contract No B22584

Sample Identification				Lab Sample ID	Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Lead mg/kg	Mercury mg/kg	Selenium mg/kg	Copper mg/kg	Nickel mg/kg	Zinc mg/kg	Total petroleum hydrocarbons mg/kg
Hole	Depth m	Sample Ref	Sample Type											
TP06	0.10		D	487624	8.1	0.35	6	8	<0.10	<0.5	8	11	30	<1
TP06	0.50		D	487625	7.8	0.36	6	12	0.40	1.9	10	11	42	<1
TP07	0.70		D	487626	9.7	0.42	6	7	0.47	<0.5	9	14	31	<1
TP08	0.90		D	487627	25.2	0.69	5	6	0.96	<0.5	11	13	30	<1
TP08	0.30		D	487628	4.6	0.33	10	14	0.45	<0.5	7	10	33	<1
Limits of Detection					0.5	0.10	1	1	0.10	0.5	1	1	0.5	1
Terra Tek Analysis Method					TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP137 M	TP067 M
Accreditation M=Mcerts U=UKAS N=No accreditation														

Originator	Checked & Approved
TH	S. Langman 16/04/2019

RESULTS OF CHEMICAL CONTAMINATION TESTS - SOIL

KEY

* - deviating result (refer to Appendix S2 for details)

^ - result expressed on as-received basis

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: POCKLINGTON

Client: Tanglewood Environmental Ltd

Engineer:

Contract No B22584

Sample Identification																								
Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Naphthalene mg/kg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Fluorene mg/kg	Phenanthrene mg/kg	Anthracene mg/kg	Fluoranthene mg/kg	Pyrene mg/kg	Benzo (a) anthracene mg/kg	Chrysene mg/kg	Benzo (b) fluoranthene mg/kg	Benzo (k) fluoranthene mg/kg	Benzo (a) pyrene mg/kg	Indeno (1,2,3 - cd) pyrene mg/kg	Dibenzo (ah) anthracene mg/kg	Benzo (ghi) perylene mg/kg	Total PAHs (USEPA 16) mg/kg			
TP01	0.30		D	487614	<0.05	<0.05	<0.10	<0.05	0.20	<0.10	0.35	0.31	0.31	0.18	0.30	0.13	0.22	0.13	<0.10	0.16	2.3			
TP01	0.90		D	487615	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP02	0.20		D	487616	<0.05	<0.05	<0.10	<0.05	0.22	<0.10	0.30	0.25	0.24	0.13	0.22	0.09	0.15	<0.10	<0.10	0.11	1.7			
TP02	0.60		D	487617	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP03	0.20		D	487618	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.07	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP03	0.80		D	487619	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP04	0.40		D	487620	0.60	1.20	11.14	24.96	124.09	33.75	135.09	111.23	52.50	50.61	70.38	30.07	50.59	30.91	6.77	33.95	767.8			
TP04	1.60		D	487621	<0.05	<0.05	0.15	0.38	1.86	0.57	2.47	2.02	1.06	0.88	1.38	0.52	0.87	0.59	<0.10	0.65	13.4			
TP05	0.30		D	487622	<0.05	<0.05	<0.10	<0.05	0.27	<0.10	0.22	0.18	0.19	<0.10	0.12	<0.05	0.08	<0.10	<0.10	<0.10	<1.3			
TP05	1.40		D	487623	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
Limits of Detection					0.05	0.05	0.10	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.05	0.10	0.10	0.10	1.3			
Terra Tek Analysis Method					TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045			
Accreditation M=Mcerts U=UKAS N=No accreditation					M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M			

Originator	Checked & Approved
DAB	S. Langman 16/04/2019

POLYAROMATIC HYDROCARBONS (USEPA 16) - SOIL

KEY

* - deviating result (refer to Appendix S2 for details)

^ - result expressed on as-received basis

Figure 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: POCKLINGTON

Client: Tanglewood Environmental Ltd

Engineer:

Contract No B22584

Sample Identification																									
Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Naphthalene mg/kg	Acenaphthylene mg/kg	Acenaphthene mg/kg	Fluorene mg/kg	Phenanthrene mg/kg	Anthracene mg/kg	Fluoranthene mg/kg	Pyrene mg/kg	Benzo (a) anthracene mg/kg	Chrysene mg/kg	Benzo (b) fluoranthene mg/kg	Benzo (k) fluoranthene mg/kg	Benzo (a) pyrene mg/kg	Indeno (1,2,3 - cd) pyrene mg/kg	Dibenzo (ah) anthracene mg/kg	Benzo (ghi) perylene mg/kg	Total PAHs (USEPA 16) mg/kg			
TP06	0.10		D	487624	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	0.06	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP06	0.50		D	487625	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP07	0.70		D	487626	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP08	0.90		D	487627	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
TP08	0.30		D	487628	<0.05	<0.05	<0.10	<0.05	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.05	<0.05	<0.05	<0.10	<0.10	<0.10	<1.3			
Limits of Detection					0.05	0.05	0.10	0.05	0.10	0.10	0.10	0.10	0.10	0.10	0.05	0.05	0.05	0.10	0.10	0.10	1.3			
Terra Tek Analysis Method					TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045	TP045			
Accreditation M=Mcerts U=UKAS N=No accreditation					M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M			

Originator	Checked & Approved
DAB	S. Langman 16/04/2019

POLYAROMATIC HYDROCARBONS (USEPA 16) - SOIL

KEY

* - deviating result (refer to Appendix S2 for details)

^ - result expressed on as-received basis

Figure 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No E13009/1

Sample Identification				Lab Sample ID	Date Sampled	Temperature on receipt °C	PRIMARY MATRIX	Secondary Matrix	Additional matrix	% Loss at 30C	% Retained 2mm
Exploratory Hole	Depth m	Sample Ref	Sample Type								
TP01	0.30		D	487614	08/04/19	10.0	Clayey SAND	Fine to medium gravel		9.2	44.8
TP01	0.90		D	487615	08/04/19	10.0	GRAVEL with sand			8.3	63.7
TP02	0.20		D	487616	08/04/19	10.0	SAND	Fine gravel		13.8	25.5
TP02	0.60		D	487617	08/04/19	10.0	GRAVEL with sand			7.9	64.9
TP03	0.20		D	487618	08/04/19	10.0	SAND	Fine to medium gravel		17.0	4.8
TP03	0.80		D	487619	08/04/19	10.0	GRAVEL with clayey sand			10.7	61.9
TP04	0.40		D	487620	08/04/19	10.0	Sandy CLAY	Fine to medium gravel		19.6	54.2
TP04	1.60		D	487621	08/04/19	10.0	CLAY	Fine to medium gravel		19.4	36.5
TP05	0.30		D	487622	08/04/19	10.0	SAND	Fine gravel		17.2	26.5
TP05	1.40		D	487623	08/04/19	10.0	Clayey SAND	Fine to medium gravel		12.5	40.4
TP06	0.10		D	487624	08/04/19	10.0	GRAVEL with some sand			8.2	78.8
TP06	0.50		D	487625	08/04/19	10.0	Clayey SAND	Fine to medium gravel		11.3	50.3
TP07	0.70		D	487626	08/04/19	10.0	GRAVEL with sand			8.3	64.7
TP08	0.90		D	487627	08/04/19	10.0	GRAVEL with some sand			10.9	84.6
TP08	0.30		D	487628	08/04/19	10.0	SAND	Fine gravel		10.6	23.3

Notes

Terra Tek are accredited for clay, sand and loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials such as gravel, are not accredited where they comprise the major component of the sample.

Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.

The laboratory removes any material > 2mm prior to analysis. The quantity and nature of the material is shown as the secondary and additional matrix types in the above table.

Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors List, which is subject to performance assessment, will be selected.

Originator	Checked & Approved	SAMPLE DESCRIPTIONS	Appendix S1
TGH	S. Langman 16/04/2019		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No B22584

Sample Identification				Lab Sample ID	Date Sampled	Deviating conditions						Preservatives used
Exploratory Hole	Depth m	Sample Ref	Sample Type			Sampling date has not been provided	Exceeded maximium holding time for selected test(s)	Presence of headspace in sample vial	Poorly fitting cap or lid	Damaged container		
TP01	0.30		D	487614	08/04/19							
TP01	0.90		D	487615	08/04/19							
TP02	0.20		D	487616	08/04/19							
TP02	0.60		D	487617	08/04/19							
TP03	0.20		D	487618	08/04/19							
TP03	0.80		D	487619	08/04/19							
TP04	0.40		D	487620	08/04/19							
TP04	1.60		D	487621	08/04/19							
TP05	0.30		D	487622	08/04/19							
TP05	1.40		D	487623	08/04/19							
TP06	0.10		D	487624	08/04/19							
TP06	0.50		D	487625	08/04/19							
TP07	0.70		D	487626	08/04/19							
TP08	0.90		D	487627	08/04/19							
TP08	0.30		D	487628	08/04/19							

NOTES
1 Results reported for samples classified as deviating may be compromised. Deviation types are shown as "X" or "Yes" in the table above.
2 The absence of "X" or "Yes" in the table above indicates no reported deviations.
3 Deviations due to use of incorrect sample container are shown on result tables.
4 Deviating results are indicated within result tables.

Originator	Checked & Approved
TGH	S. Langman 16/04/2019

DEVIATING SAMPLES - SOIL

Appendix S2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No B22584

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
GP001	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Preparation of soil samples for chemical analysis	Yes	Yes	N/A
GP012	BS EN 12457-3: Characterisation of Waste - Compliance test for leaching of granular waste materials and sludges (two-stage batch test)	Preparation of soil samples for two-stage leachate test			Dry
TP019	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of pH in 2.5:1 water/soil extract using pH meter.	Yes	Yes	Dry
TP032	MAFF Book 427: The Analysis of Agricultural Materials: Method 8	Determination of water soluble boron by colorimetry	Yes		Dry
TP040	APHA/AWWA, 19th edition: Method 3500Cr-D	Determination of hexavalent chromium by colorimetry.	Yes		Dry
TP041	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of organic matter by titrimetry.	Yes		Dry
TP042	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of loss on ignition at 50-440°C by gravimetry	Yes	Yes	Dry
TP045	GACHAMJA A.M. Chromatography and Analysis: 1992 9-11 (modified)	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS	Yes	Yes	Dry
TP046	MEWAM method: Phenols in water and Effluents: 4-aminoantipyrine method	Determination of monohydric phenols by steam distillation/colorimetry	Yes	Yes	Dry
TP047	MEWAM method: Cyanide in Waters etc	Determination of free cyanide by steam distillation/colorimetry	Yes		Dry
TP048	MEWAM method: Cyanide in Waters etc	Determination of total cyanide by steam distillation/colorimetry.	Yes	Yes	Dry
TP049	MEWAM method: Cyanide in Waters etc	Determination of complex cyanide by calculation	Yes		Dry
TP050	MEWAM method: Determination of Thiocyanate ,1985	Determination of thiocyanate by colorimetry	Yes	Yes	Dry
TP051	USEPA Method 9030B	Determination of acid soluble sulphides by steam distillation/colorimetry.	Yes	Yes	Wet
TP067	TNRCC Method 1005: 2001 (modified)	Determination of pentane/acetone extractable petroleum hydrocarbons (C8 - C40) by GC/FID	Yes	Yes	Wet
TP072	In-house documented method	Determination of ammoniacal nitrogen by colorimetry			Dry
TP073	In-house documented method	Determination of anionic detergent (MBAS) by colorimetry			Dry
TP074	In-house documented method	Determination of water soluble fluoride by ion selective electrode			Dry
TP098	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of acid soluble chloride by titrimetry			Dry
TP099	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry

Notes

1. Terra Tek (Birmingham) are MCERTS accredited for clay, sand & loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials, ie gravel, are not accredited where they comprise the major component of the sample.
2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
4. The laboratory records the date of analysis of each parameter. This information is available on request.
5. Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors list, which is subject to performance assessment, will be selected.

Originator	Checked & Approved
N/A	N/A

SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)

Appendix S3

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No B22584

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
TP100	Wisconsin DNR Modified GRO method, Method for Determining Gasoline Range Organics	Determination of Volatile Petroleum Hydrocarbons/GRO.	Yes	Yes	Wet
TP110	USEPA Methods 8082A & 3665A	Determination of Total & Speciated 7 PCB Congeners by GC/MS SIM	Yes	Yes	Wet
TP114	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of carbonate in soil (rapid titration method)			Dry
TP126	TNRCC Method 1006 (modified)	Extracted petroleum hydrocarbons from TP067 split into aromatic and aliphatic fractions. Analysed by GC/FID.	Yes		Wet
TP129	In-house documented method	Determination of total sulphur by ICP-OES spectroscopy	Yes	Yes	Dry
TP134	In-house documented method	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry
TP135	USEPA Methods 8100 & 8270D. In-house method TP045	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS (with concentration stage)			Dry
TP137	BS7755: Section 3.9: 1995/ISO 11466:1995	Determination of acid extractable metals in soil by ICP-OES	Selected	Selected	Dry
TP145	USEPA Methods 3550C & 8270D	Determination of Semi-Volatile Organic Compounds by GC/MS	Yes	Yes	Wet
TP147	USEPA Methods 8082A & 3665A	Determination of total & speciated WHO 12 PCB Congeners by GC/MS SIM.			Wet
TP150	USEPA Methods 8081B & 8141B	Determination of pesticides and herbicides in soil by GC/MS SIM			Dry
TP152	USEPA Method 556	Determination of carbonyls by GC/MS.			Wet
TP154	USEPA Method 5021. Wisconsin DNR modified GRO method	Determination of volatiles in by GC/MS headspace	Yes	Selected	Wet
TP158	USEPA Method 1671	Determination of glycols by GC/FID DI			Wet
TP169	In-house documented method	Determination of water soluble sulphate in 2:1 water/soil extract by ICP-OES spectroscopy	Yes	Yes	Dry
TP171	In-house documented method	Determination of acid soluble sulphate by ICP-OES spectroscopy	Yes	Yes	Dry
TP178	In-house documented method	Determination of water soluble nitrate by ion selective electrode			Dry

Notes

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2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
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Originator	Checked & Approved
N/A	N/A

SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)

Appendix S3

TERRA TEK
SITE INVESTIGATION & LABORATORY SERVICES

Tanglewood Environmental Ltd
Brook Cottage
36 Leeds Road
Oulton
LS26 8JU

For the attention of Steve Ward

Report No: B22584-2
Issue No 01

LABORATORY TEST REPORT

Project Name	**POCKLINGTON**		
Project Number	**B22584-2**	Date samples received	30/04/2019
Your Ref		Date written instructions received	30/04/2019
Purchase Order		Date testing commenced	30/04/2019

Please find enclosed the results as summarised below

Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	1	TPHCWG - Soil	Yes
2	1	VPHCWG - Soil	Yes
App S1	~	Sample Descriptions - Soil	N/A
App S2	~	Deviating Samples - Soil	N/A
App S3	~	Summary of In-House Analytical Test Methods - Soil	N/A

Remarks :

Issued by : Stephen Langman Date of Issue : 03/05/2019

Approved Signatories : S. Langman 03/05/2019
G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)

Key to symbols used in this report
S/C : Testing was sub-contracted

Unless we are notified to the contrary, samples will be disposed after a period of one month from this date.
The results reported relate to samples received in the laboratory only.
All results contained in this report are provisional unless signed by an approved signatory
This report should not be reproduced except in full without the written approval of the laboratory.
Under multisite accreditation the testing contained in this report may have been performed at another Terra Tek laboratory.
The enclosed results remain the property of Terra Tek Limited and we reserve the right to withdraw
our report if we have not received cleared funds in accordance with our standard terms and conditions
Only those results indicated in this report are UKAS accredited and any opinions or interpretations expressed are outside the scope of UKAS accreditation.
Feedback on the this report may be left via our website www.terratek.co.uk/contact-us

mCERTS THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME
UKAS TESTING 0126
25 YEARS 1990-2015

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: POCKLINGTON

Client: Tanglewood Environmental Ltd

Engineer:

Contract No B22584-2

Sample Identification																							
Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	TPH (Aliphatics C8-C10) mg/kg	TPH (Aliphatics >C10-C12) mg/kg	TPH (Aliphatics >C12-C16) mg/kg	TPH (Aliphatics >C16-C21) mg/kg	TPH (Aliphatics >C21-C35) mg/kg	TPH (Aliphatics >C35-C40) mg/kg	TPH (Aromatics >C10-C12) mg/kg	TPH (Aromatics >C12-C16) mg/kg	TPH (Aromatics >C16-C21) mg/kg	TPH (Aromatics >C21-C35) mg/kg	TPH (Aromatics >C35-C40) mg/kg								**Sample received in appropriate container**
TP04	0.40		D	487620	<1	<1	<1	12	67	<1	<1	37	362	950	15								**No**
Limits of Detection					1	1	1	1	1	1	1	1	1	1	1								
Terra Tek Analysis Method					TP126	TP126	TP126	TP126	TP126	TP126	TP126	TP126	TP126	TP126	TP126								
Accreditation U=UKAS N=No accreditation					U	U	U	U	U	U	U	U	U	U	U								

Originator	Checked & Approved
DAB	S. Langman 03/05/2019

TPHCWG - SOIL

KEY

* - deviating result (refer to Appendix S2 for details)

^ - result expressed on as-received basis

Figure 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site: POCKLINGTON

Client: Tanglewood Environmental Ltd

Engineer:

Contract No B22584-2

Sample Identification																						
Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	TPH (Aliphatics C5-C6) µg/kg	TPH (Aliphatics C6-C8) µg/kg	TPH (Aromatics C6-C7) µg/kg	TPH (Aromatics C7-C8) µg/kg	TPH (Aromatics C8-C10) µg/kg	Benzene µg/kg	Ethylbenzene µg/kg	m & p - Xylene µg/kg	o - Xylene µg/kg	Toluene µg/kg	MTBE µg/kg								**Sample received in appropriate container**
TP04	0.40		D	487620	<10	<10	<10	<10	<10	~	~	~	~	~	~								**No**
Limits of Detection					10	10	10	10	10	5	5	10	5	5	5								
Terra Tek Analysis Method					TP154 M	TP154 M	TP154 M	TP154 M	TP154 M	TP154 M	TP154 M	TP154 M	TP154 M	TP154 M	TP154 M								
Accreditation U=UKAS N=No accreditation																						

Originator	Checked & Approved
DAB	03/05/2019

VPHCWG - SOIL

KEY

* - deviating result (refer to Appendix S2 for details)

^ - result expressed on as-received basis

Figure 2

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No E13009/1

Sample Identification				Lab Sample ID	Date Sampled	Temperature on receipt °C	PRIMARY MATRIX	Secondary Matrix	Additional matrix	% Loss at 30C	% Retained 2mm
Exploratory Hole	Depth m	Sample Ref	Sample Type								
TP04	0.40		D	487620	08/04/19	10.0	Sandy CLAY	Fine to medium gravel		19.6	54.2

Notes

Terra Tek are accredited for clay, sand and loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials such as gravel, are not accredited where they comprise the major component of the sample.

Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.

The laboratory removes any material > 2mm prior to analysis. The quantity and nature of the material is shown as the secondary and additional matrix types in the above table.

Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors List, which is subject to performance assessment, will be selected.

Originator	Checked & Approved	**SAMPLE DESCRIPTIONS**	**Appendix S1**
TGH	S. Langman 03/05/2019		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No B22584-2

Sample Identification				Lab Sample ID	Date Sampled	Deviating conditions						Preservatives used
Exploratory Hole	Depth m	Sample Ref	Sample Type			Sampling date has not been provided	Exceeded maximium holding time for selected test(s)	Presence of headspace in sample vial	Poorly fitting cap or lid	Damaged container		
TP04	0.40		D	487620	08/04/19							

NOTES

1 Results reported for samples classified as deviating may be compromised. Deviation types are shown as "X" or "Yes" in the table above.
2 The absence of "X" or "Yes" in the table above indicates no reported deviations.
3 Deviations due to use of incorrect sample container are shown on result tables.
4 Deviating results are indicated within result tables.

Originator	Checked & Approved	DEVIATING SAMPLES - SOIL	Appendix S2
TGH	S. Langman 03/05/2019		Sheet 1 of 1

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No B22584-2

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
GP001	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Preparation of soil samples for chemical analysis	Yes	Yes	N/A
GP012	BS EN 12457-3: Characterisation of Waste - Compliance test for leaching of granular waste materials and sludges (two-stage batch test)	Preparation of soil samples for two-stage leachate test			Dry
TP019	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of pH in 2.5:1 water/soil extract using pH meter.	Yes	Yes	Dry
TP032	MAFF Book 427: The Analysis of Agricultural Materials: Method 8	Determination of water soluble boron by colorimetry	Yes		Dry
TP040	APHA/AWWA, 19th edition: Method 3500Cr-D	Determination of hexavalent chromium by colorimetry.	Yes		Dry
TP041	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of organic matter by titrimetry.	Yes		Dry
TP042	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of loss on ignition at 50-440°C by gravimetry	Yes	Yes	Dry
TP045	GACHAMJA A.M. Chromatography and Analysis: 1992 9-11 (modified)	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS	Yes	Yes	Dry
TP046	MEWAM method: Phenols in water and Effluents: 4-aminoantipyrine method	Determination of monohydric phenols by steam distillation/colorimetry	Yes	Yes	Dry
TP047	MEWAM method: Cyanide in Waters etc	Determination of free cyanide by steam distillation/colorimetry	Yes		Dry
TP048	MEWAM method: Cyanide in Waters etc	Determination of total cyanide by steam distillation/colorimetry.	Yes	Yes	Dry
TP049	MEWAM method: Cyanide in Waters etc	Determination of complex cyanide by calculation	Yes		Dry
TP050	MEWAM method: Determination of Thiocyanate ,1985	Determination of thiocyanate by colorimetry	Yes	Yes	Dry
TP051	USEPA Method 9030B	Determination of acid soluble sulphides by steam distillation/colorimetry.	Yes	Yes	Wet
TP067	TNRCC Method 1005: 2001 (modified)	Determination of pentane/acetone extractable petroleum hydrocarbons (C8 - C40) by GC/FID	Yes	Yes	Wet
TP072	In-house documented method	Determination of ammoniacal nitrogen by colorimetry			Dry
TP073	In-house documented method	Determination of anionic detergent (MBAS) by colorimetry			Dry
TP074	In-house documented method	Determination of water soluble fluoride by ion selective electrode			Dry
TP098	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of acid soluble chloride by titrimetry			Dry
TP099	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry

Notes

1. Terra Tek (Birmingham) are MCERTS accredited for clay, sand & loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials, ie gravel, are not accredited where they comprise the major component of the sample.
2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
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Originator	Checked & Approved
N/A	N/A

SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)

Appendix S3

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES

Site POCKLINGTON

Client Tanglewood Environmental Ltd

Engineer

Contract No B22584-2

Method Code	Reference	Description of Method	ISO17025 Accredited	MCERTS Accredited	Wet/Dry Sample Tested
TP100	Wisconsin DNR Modified GRO method, Method for Determining Gasoline Range Organics	Determination of Volatile Petroleum Hydrocarbons/GRO.	Yes	Yes	Wet
TP110	USEPA Methods 8082A & 3665A	Determination of Total & Speciated 7 PCB Congeners by GC/MS SIM	Yes	Yes	Wet
TP114	BS1377, Part 3, 1990: Soils for Civil Engineering Purposes.	Determination of carbonate in soil (rapid titration method)			Dry
TP126	TNRCC Method 1006 (modified)	Extracted petroleum hydrocarbons from TP067 split into aromatic and aliphatic fractions. Analysed by GC/FID.	Yes		Wet
TP129	In-house documented method	Determination of total sulphur by ICP-OES spectroscopy	Yes	Yes	Dry
TP134	In-house documented method	Determination of water soluble chloride by titrimetry	Yes	Yes	Dry
TP135	USEPA Methods 8100 & 8270D. In-house method TP045	Determination of polyaromatic hydrocarbons extractable in dichloromethane, by GC/MS (with concentration stage)			Dry
TP137	BS7755: Section 3.9: 1995/ISO 11466:1995	Determination of acid extractable metals in soil by ICP-OES	Selected	Selected	Dry
TP145	USEPA Methods 3550C & 8270D	Determination of Semi-Volatile Organic Compounds by GC/MS	Yes	Yes	Wet
TP147	USEPA Methods 8082A & 3665A	Determination of total & speciated WHO 12 PCB Congeners by GC/MS SIM.			Wet
TP150	USEPA Methods 8081B & 8141B	Determination of pesticides and herbicides in soil by GC/MS SIM			Dry
TP152	USEPA Method 556	Determination of carbonyls by GC/MS.			Wet
TP154	USEPA Method 5021. Wisconsin DNR modified GRO method	Determination of volatiles in by GC/MS headspace	Yes	Selected	Wet
TP158	USEPA Method 1671	Determination of glycols by GC/FID DI			Wet
TP169	In-house documented method	Determination of water soluble sulphate in 2:1 water/soil extract by ICP-OES spectroscopy	Yes	Yes	Dry
TP171	In-house documented method	Determination of acid soluble sulphate by ICP-OES spectroscopy	Yes	Yes	Dry
TP178	In-house documented method	Determination of water soluble nitrate by ion selective electrode			Dry

Notes

1. Terra Tek (Birmingham) are MCERTS accredited for clay, sand & loam matrix types only, where they constitute the major component of the sample. Other coarse granular materials, ie gravel, are not accredited where they comprise the major component of the sample.
2. Results are expressed on a dry-weight basis (samples dried at 30°C ± 5°C) except where stated.
3. The laboratory removes any material >2mm prior to analysis. The quantity and nature of any material removed from samples is recorded and the information is available on request.
4. The laboratory records the date of analysis of each parameter. This information is available on request.
5. Where a parameter cannot be determined in house it is our policy to use a UKAS/MCERTS accredited laboratory wherever possible. Terra Tek will assume responsibility for the quality of subcontracted tests and the performance of the subcontractor chosen. Where there is no known UKAS/MCERTS laboratory for a particular parameter, a laboratory listed within the Terra Tek Approved Subcontractors list, which is subject to performance assessment, will be selected.

Originator	Checked & Approved
N/A	N/A

SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)

Appendix S3

Appendix E – Chemical Analysis Results Summary Table

	Units	Stage 1 Screening Value	Lower analytical value	Upper analytical value
Metals				
Arsenic (S4UL)	mg/kg	640	1.1	25.2
Cadmium (S4UL)	mg/kg	190	<0.1	0.69
Chromium (S4UL)	mg/kg	8600	5	40
Copper (S4UL)	mg/kg	68000	3	12
Lead (C4SL)	mg/kg	2300	5	33
Mercury (S4UL)	mg/kg	1100	<0.1	0.97
Nickel (S4UL)	mg/kg	980	1	34
Zinc (S4UL)	mg/kg	730000	23	60
Asbestos	N/A			
Polyaromatic Hydrocarbons				
Naphthalene (S4UL)	mg/kg	190	<0.05	0.6
Acenanaphthylene (S4UL)	mg/kg	83000	<0.05	1.2
Acenaphthene (S4UL)	mg/kg	84000	<0.1	11.14
Fluorine (S4UL)	mg/kg	2800	<0.05	24.96
Phenanthrene (S4UL)	mg/kg	1300	<0.1	124.09
Anthracene (S4UL)	mg/kg	31000	<0.1	33.75
Fluoranthene (S4UL)	mg/kg	1500	<0.1	135.09
Pyrene (S4UL)	mg/kg	3700	<0.1	111.23
Benzo(a)anthracene (S4UL)	mg/kg	170	<0.1	52.5
Chrysene (S4UL)	mg/kg	350	<0.1	50.61
Benzo(b)fluoranthene (S4UL)	mg/kg	44	<0.05	**70.38** (TP04)
Benzo(k)fluoranthene (S4UL)	mg/kg	1200	<0.05	30.07
Benzo(a)pyrene (S4UL)	mg/kg	35	<0.05	**50.59**(TP04)
Indeno(1,2,3-cd)pyrene (S4UL)	mg/kg	500	<0.1	30.91
Dibenzo(a,h)anthracene (S4UL)	mg/kg	35	<0.1	6.77
Benzo(g,h,i)perylene (S4UL)	mg/kg	3900	<0.1	33.95
BTEX				
Benzene (S4UL)	mg/kg	27	-	-
Toluene (S4UL)	mg/kg	56000	-	-
Ethylebenzene (S4UL)	mg/kg	5700	-	-
M/P Xylene (S4UL)	mg/kg	6200	-	-
O Xylene (S4UL)	mg/kg	6600	-	-
Total Petroleum Hydrocarbons				
TPH (C5 - C6 aliphatic) (S4UL)	ug/kg	3200	<10	<100
TPH (C6 - C8 aliphatic) (S4UL)	ug/kg	7800	<10	<100
TPH (C8 - C10 aliphatic) (S4UL)	mg/kg	2000	<1	<1

TPH (C10 - C12 aliphatic) (S4UL)	mg/kg	9700	<1	2
TPH (C12 - C16 aliphatic) (S4UL)	mg/kg	59000	<1	37
TPH (C16 - C21 aliphatic) (S4UL)	mg/kg	1600000	<1	12
TPH (C21 - C35 aliphatic) (S4UL)	mg/kg		<1	67
TPH (C8 - C10 aromatic) (S4UL)	ug/kg	3500	<10	<100
TPH (C10 - C12 aromatic) (S4UL)	mg/kg	16000	<1	<1
TPH (C12 - C16 aromatic) (S4UL)	mg/kg	36000	<1	37
TPH (C16 - C21 aromatic) (S4UL)	mg/kg	28000	<1	362
TPH (C21 - C35 aromatic) (S4UL)	mg/kg	28000	<1	950

Category 4 Screening Level

LQM/CIEH Soil assessment criteria for human health residential with plant uptake assuming 1% SOM

End of Report