

APPENDIX D

Ground Gas Monitoring and Flow Results

AG3094-19

Project Name: Henley Road, Caversham

Date and Time of Monitoring: 29.01.2020 from 10.00 onwards

Phase of Monitoring: 1 of 3

BH No.	Flow Range (litres/hr over 3 mins)			Differential Pressure (mb)	Methane % v/v		Carbon dioxide % v/v		Oxygen % v/v		Diameter of installation (mm)	Water level (m bgl)
	Max	Min	Avg		Peak	Steady	Peak	Steady	Min	Steady		
BH101	<0.1	<0.1	<0.1	-0.07	<0.1	<0.1	2.0	2.0	18.9	18.9	50	8.39
BH102	<0.1	<0.1	<0.1	0.03	<0.1	<0.1	0.5	0.5	19.8	19.8	50	5.71
BH107	<0.1	<0.1	<0.1	0.15	<0.1	<0.1	1.4	1.4	14.9	14.9	50	1.43
BH107	<0.1	-0.1	-0.1	0.48	<0.1	<0.1	2.3	2.3	17.8	17.8	50	1.43
BH108	<0.1	<0.1	<0.1	-0.15	<0.1	<0.1	0.3	0.3	20.2	20.2	50	1.24
BH109	<0.1	-0.1	-0.1	-0.10	<0.1	<0.1	1.5	1.5	18.0	18.0	50	2.89

Additional gases (if required)

BH No.	VOCs (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	

Borehole specific comments/observations
Additional gases not monitored based on conceptual site model.
All boreholes developed during visit 1 using surge block and pump method.

Meterological Data

Atmospheric Pressure (mb)	Start: 994
Atmospheric Pressure (mb)	Finish: 995
Pressure Rising or Falling	Rising
Weather Conditions	Dry and sunny but cold
Atmospheric Oxygen (% vol)	20.0
Wind Speed & Direction	light westerly wind
Ambient Air Temperature (°C)	6 degrees

Site Data

Monitoring Personnel	Malcolm McGlone
GPS Instrument	
Gasmeter Serial Number	G505737
PID Serial Number	108308
Ground Conditions: All exploratory positions located within areas of existing soft landscaping.	

General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

APPLIED GEOLOGY

Ground Gas Monitoring and Flow Results

AG3094-19

Project Name: Henley Road, Caversham

Date and Time of Monitoring: 05.02.2020 from 10.00 onwards

Phase of Monitoring: 2 of 3

BH No.	Flow Range (litres/hr over 3 mins)			Differential Pressure (mb)	Methane % v/v		Carbon dioxide % v/v		Oxygen % v/v		Diameter of installation (mm)	Water level (m bgl)
	Max	Min	Avg		Peak	Steady	Peak	Steady	Min	Steady		
BH101	<0.1	<0.1	<0.1	-0.03	<0.1	<0.1	2.0	2.0	20.2	20.2	50	8.42
BH102	<0.1	-0.1	-0.1	-0.14	<0.1	<0.1	0.1	0.1	20.5	20.5	50	5.81
BH107	<0.1	<0.1	<0.1	7.65	<0.1	<0.1	2.0	2.0	14.8	14.8	50	1.51
BH107	-0.7	-1.5	^	-4.01	<0.1	<0.1	1.9	1.9	18.8	18.8	50	1.51
BH108	<0.1	<0.1	<0.1	0.07	<0.1	<0.1	0.2	0.2	20.4	20.4	50	1.32
BH109	<0.1	<0.1	<0.1	-0.07	<0.1	<0.1	1.4	1.4	18.4	18.4	50	2.96

Additional gases (if required)

BH No.	VOCs (ppm)	Carbon Monoxide (ppm)	Hydrogen Sulphide (ppm)	

Borehole specific comments/observations
Additional gases not monitored based on conceptual site model.
All boreholes sampled during the second monitoring visit using a submersible pump.
^ BH107 - Flow steadily rising in deeper standpipe.

Meteorological Data

Atmospheric Pressure (mb)	Start: 1034
Atmospheric Pressure (mb)	Finish: 1036
Pressure Rising or Falling	Falling
Weather Conditions	Dry and sunny
Atmospheric Oxygen (% vol)	20.3
Wind Speed & Direction	Light south westerly
Ambient Air Temperature (°C)	10.0

Site Data

Monitoring Personnel	Malcolm McGlone
GPS Instrument	
Gasmeter Serial Number	G505737
PID Serial Number	
Ground Conditions: All exploratory positions located within areas of existing soft landscaping.	

General Notes:

1. Instrument specification data and calibration information provided on a separate sheet

APPLIED GEOLOGY

Gas Monitoring Equipment Specification and Accuracy Details

Instrument Specifications

Instrument	Atmospheric Pressure Range	Temperature Range	Flow Range	Flow Resolution	Borehole Pressure Range
GA5000	500-1500 mb +/- 5 mb	-10°C to +50°C	0-20 ltr/hr +/- 0.3 ltr/hr	0.1 ltr/hr	+500/-500 mbar +/- 4 mbar
Phocheck Tiger	-	-20 to +60°C (Certified to -15 to +45°C)	-	-	-

Instrument Accuracy

Instrument	Detection Range	Methane	Lower Explosive Limit	Carbon Dioxide	Oxygen	Volatile Organic Compounds	Hydrogen Sulphide	Carbon Monoxide
GA5000	Detection Accuracy	+/- 0.5% @ 0 to 70 %, +/-1.5% @ 70 to 100% Response < 10 secs	N/A	+/- 0.5% @ 0 to 60 %, +/-1.5% @ 60 to 100% Response < 10 secs	+/- 1.0% @ 0 to 25%, Response < 20 secs	NA	0 -50ppm response <30 secs	0 - 1000ppm response <30 Secs
	Detection Range	N/A	N/A	N/A	N/A	1 ppb - 10,000 ppm	+/- 1.5% FS	+/- 2% of FS
Phocheck Tiger	Detection Accuracy	N/A	N/A	N/A	N/A	+/- 1ppb + 5% of actual displayed accuracy +/- One digit Response < 2sec	N/A	N/A
	Detection Range	N/A	N/A	N/A	N/A			

Calibration Frequency

Equipment Serial Numbers

Instruments are calibrated annually. Details of the instrument calibration certificates and service records are available if required.	
	GA5000 (G503948 , G505363 , G505737) Phocheck Tiger - (T-108308 , T-109597 , T-109598 , T-110423)

APPLIED GEOLOGY

GROUNDWATER SAMPLING RECORD

PROJECT: Henley Road, Caversham		PROJECT No: AG3094-19	
DATE: 05.02.2020		PHASE OF SAMPLING: 2 of 3	
WEATHER: Dry and sunny		FIELD PERSONNEL: Malcolm McGlone	
AIR TEMP (°C): 10			

Monitoring Well	Standpipe Depth (m bgl)	Standpipe Diameter (mm)	Purging Method*1	Sampling Depth (m bgl)	Groundwater Level Before Purging (m bgl)	Groundwater Level After Purging (m bgl)	Purge Volume (l)	Sample Colour, Odour & Turbidity	Samples Taken *2			LNAPL/ DNAPL *3	Product Thickness (mm)
									P (l)	G (l)	V (no.)		
BH102	10.00	50	P	7.00	5.81	5.85	60	Very chalky with no odour	1	1	2	NPD	NPD
BH107	14.00	50	P	10.00	1.51	1.51	60	Cloudy/chalky white brown with no odour	1	1	2	NPD	NPD
BH108	6.00	50	P	4.00	1.32	1.34	40	Tea brown sediment with no odour	1	1	2	NPD	NPD

COMMENTS:
Purge volumes are approximate.

***Notes:**

- 1. W = Waterra Inertia Tubing, B = Disposable Bailer, P = Downhole Pump.
- 2. P = Plastic Bottle (l), G = Glass Bottle (l), V = Glass Vial (no.)
- 3. npd = No Product Detected

See Accompanying Gas Monitoring Sheet: ☒ Y

Sample Storage Method:

Filling	1 of 3
Trial Pit Length (m)	2.01
Trial Pit Width (m)	0.52
Trial Pit Depth (m)	3.04
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 1 is a line graph showing the relationship between Depth (m bgl) and Time (minutes) for a 1000-gallon water tank. The y-axis represents Depth (m bgl) from 0.00 to 3.50, and the x-axis represents Time (minutes) from 0 to 250. A blue dashed line represents the 'Max effective depth' at approximately 0.4 m bgl. A red dashed line with square markers represents the '75%' level at 1.0 m bgl. A green dashed line with triangle markers represents the '25%' level at 2.4 m bgl. A cyan dashed line represents the 'Empty' level at 3.0 m bgl. A solid blue line shows the water level decreasing over time, starting at 0.4 m bgl and reaching 3.0 m bgl at approximately 220 minutes.

Soil Infiltration Rate (m/s)	2.38E-05
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Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

Filling	2 of 3
Trial Pit Length (m)	2.01
Trial Pit Width (m)	0.52
Trial Pit Depth (m)	2.67
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 10 is a line graph showing Depth (m bgl) on the Y-axis versus Time (minutes) on the X-axis. The Y-axis ranges from 0.00 to 2.50 m bgl, and the X-axis ranges from 0 to 200 minutes. The graph displays a solid blue line representing the depth profile and four horizontal dashed lines representing different depth levels: Max effective depth (0.85 m bgl, purple), 75% (1.30 m bgl, red), 25% (2.25 m bgl, green), and Empty (2.70 m bgl, cyan). The depth profile starts at 0.85 m bgl and decreases to 2.70 m bgl at 200 minutes.

Soil Infiltration Rate (m/s)	2.67E-05
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Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

Filling	3 of 3
Trial Pit Length (m)	2.01
Trial Pit Width (m)	0.52
Trial Pit Depth (m)	2.67
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 1 is a line graph showing the relationship between Depth (m bgl) and Time (minutes) for a 1000 m³ storage tank. The Y-axis represents Depth (m bgl) from 0.00 to 2.50, and the X-axis represents Time (minutes) from 0 to 200. The graph illustrates the water level decreasing over time, starting from a maximum effective depth of approximately 0.35 m bgl. The water level reaches 1.00 m bgl at approximately 50 minutes, 2.10 m bgl at approximately 175 minutes, and 2.30 m bgl at approximately 225 minutes. The graph also shows the 75%, 25%, and Empty states of the tank.

Time (minutes)	Depth (m bgl)	State
0	0.35	Max effective depth
50	1.00	75%
175	2.10	25%
225	2.30	Empty

Soil Infiltration Rate (m/s)	1.86E-05
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Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

Filling	1 of 3
Trial Pit Length (m)	2.09
Trial Pit Width (m)	0.69
Trial Pit Depth (m)	2.24
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 1 is a line graph showing the relationship between Depth (m bgl) and Time (minutes) for a 1000-gal tank. The y-axis represents Depth (m bgl) from 0.00 to 2.50, and the x-axis represents Time (minutes) from 0 to 120. A blue curve starts at approximately 0.7 m bgl at 0 minutes and decreases to 2.25 m bgl at 90 minutes. Horizontal lines indicate specific depth levels: Max effective depth at ~0.65 m bgl, 75% at ~1.05 m bgl, 25% at ~1.85 m bgl, and Empty at ~2.25 m bgl.

Time (minutes)	Depth (m bgl)	Label
0	~0.7	Start
0	~0.65	Max effective depth
0	~1.05	75%
0	~1.85	25%
0	~2.25	Empty
90	~2.25	Empty (on curve)

Soil Infiltration Rate (m/s)	5.44E-05
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Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

Filling	2 of 3
Trial Pit Length (m)	2.09
Trial Pit Width (m)	0.69
Trial Pit Depth (m)	1.90
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 1 is a line graph showing the relationship between Depth (m bgl) and Time (minutes) for a 1000 m³ storage tank. The y-axis represents Depth (m bgl) from 0.00 to 2.50, and the x-axis represents Time (minutes) from 0 to 200. A blue dashed line shows the water level decreasing over time. Four horizontal dashed lines indicate specific depths: 'Max effective depth' at approximately 0.25 m bgl (purple), '75%' at approximately 0.65 m bgl (red), '25%' at approximately 1.50 m bgl (green), and 'Empty' at approximately 1.90 m bgl (cyan).

Time (minutes)	Depth (m bgl)
0	0.25
50	1.00
100	1.45
150	1.60
160	1.65

Soil Infiltration Rate (m/s)	3.55E-05
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Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

Filling	3 of 3
Trial Pit Length (m)	2.09
Trial Pit Width (m)	0.69
Trial Pit Depth (m)	1.90
Amount of Backfill placed (m)	0
Assumed Backfill Void Ratio	N/A

Figure 1 is a line graph showing Depth (m bgl) on the Y-axis (ranging from 0.00 to 2.50) versus Time (minutes) on the X-axis (ranging from 0 to 200). The graph illustrates the depth profile of a 200m depth over time. The depth starts at approximately 0.25 m bgl and decreases steadily, reaching approximately 1.80 m bgl at 200 minutes. The graph includes several horizontal dashed lines representing different depth levels: Max effective depth (approx. 0.25 m bgl), 75% (approx. 0.65 m bgl), 25% (approx. 1.50 m bgl), and Empty (approx. 1.90 m bgl). The solid blue line with markers represents the actual depth profile, which starts at the Max effective depth and decreases towards the Empty level.

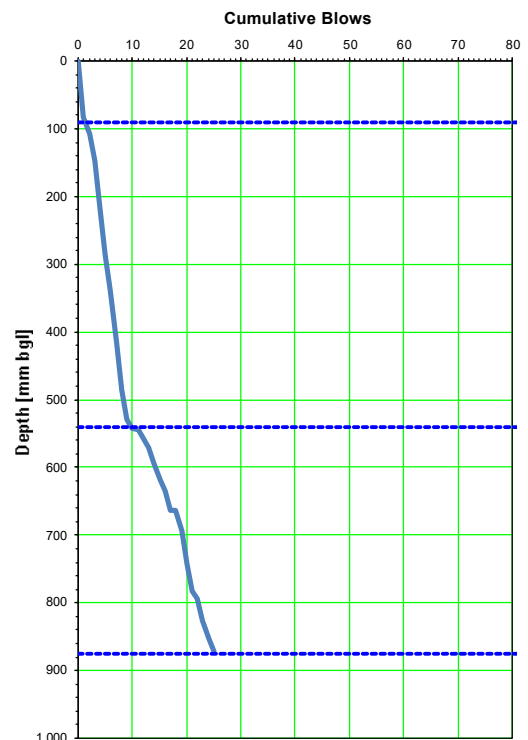
Soil Infiltration Rate (m/s)	2.74E-05
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Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Checked by: GPW

[illegible]

Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Grass encountered at surface.

Remarks:

Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL 102

Date

13.13.19

Operator

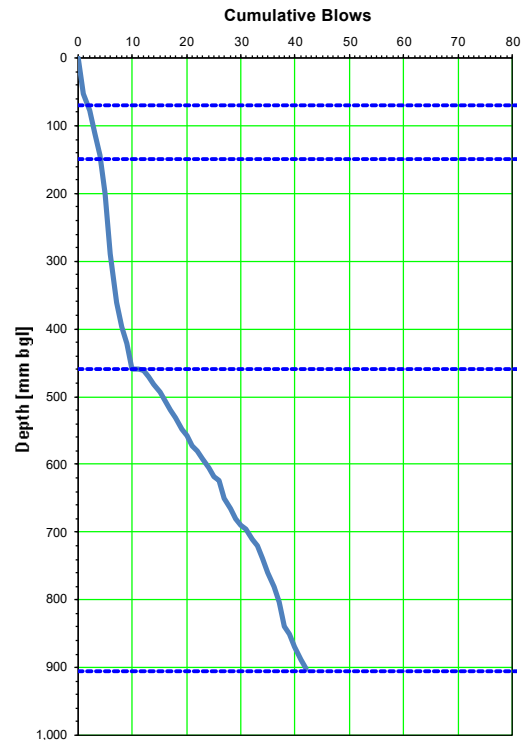
MS

Start Depth (mm bgl)

Ground Level

Checked by: GPW

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	1	1	3	70	70
Layer 2	1	2	3	80	150
Layer 3	5	7	4	310	460
Layer 4	31	38	18	445	905



Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Grass encountered at surface.

Remarks:

Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL 103

Date

13.13.19

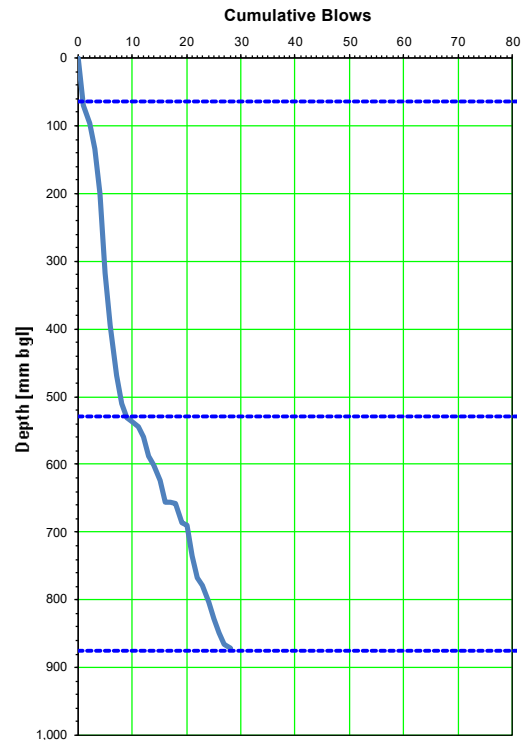
Operator

MS

Start Depth (mm bgl)

Ground Level

Checked by: GPW

[illegible]

Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Grass encountered at surface.

Remarks:

Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL 104

Date

13.13.19

Operator

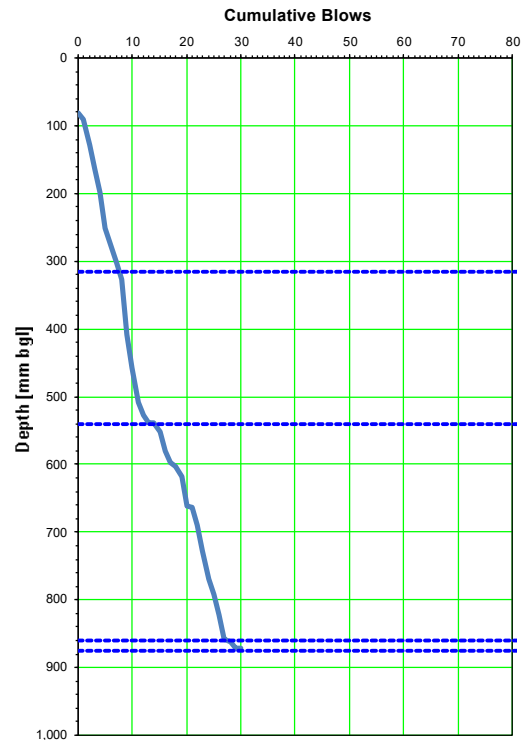
MS

Start Depth (mm bgl)

Ground Level

Checked by: GPW

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	4	4	3	315	315
Layer 2	5	9	5	225	540
Layer 3	19	28	15	320	860
Layer 4	2	30	36	15	875



Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Grass encountered at surface.

Remarks:

Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL 105

Date

13.13.19

Operator

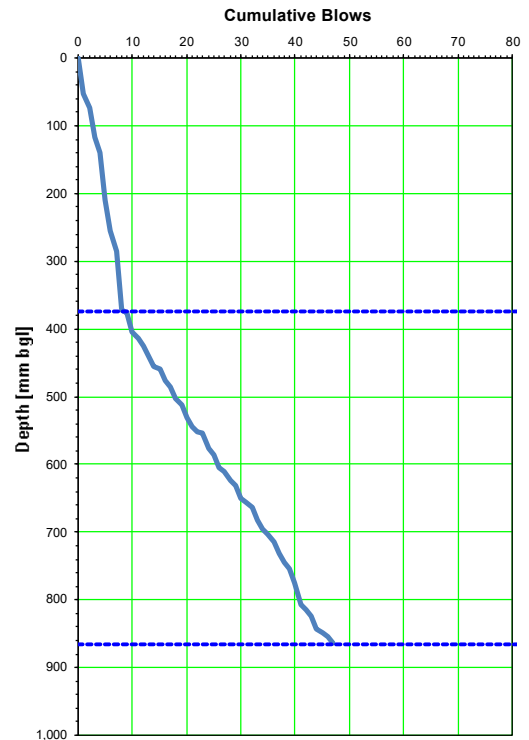
MS

Start Depth (mm bgl)

Ground Level

Checked by: GPW

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	7	7	4	375	375
Layer 2	40	47	21	490	865



Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Grass encountered at surface.

Remarks:

Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

TRL DYNAMIC CONE PENETROMETER TEST RESULT

Test Location

TRL 106

Date

13.13.19

Operator

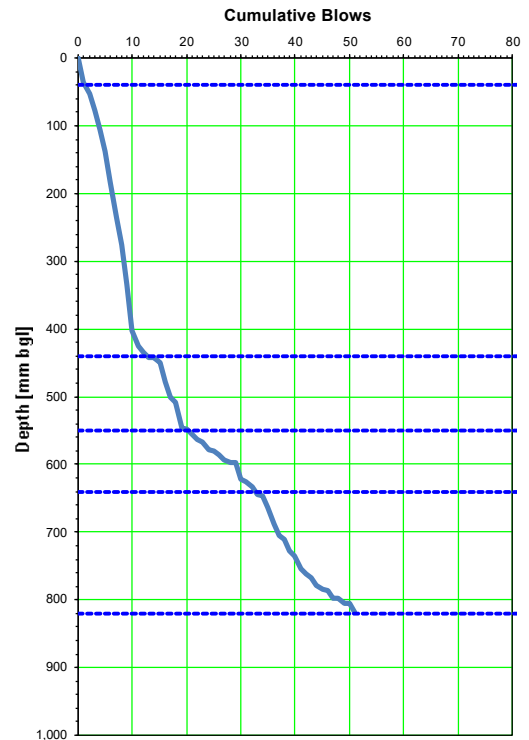
MS

Start Depth (mm bgl)

Ground Level

Checked by: GPW

Layer	No of Blows	Cumulative Blows	CBR [%]	Layer Thickness [mm]	Total Depth [mm]
Layer 1	1	1	6	40	40
Layer 2	8	9	5	400	440
Layer 3	6	15	14	110	550
Layer 4	7	22	20	90	640
Layer 5	29	51	44	180	820



Notes: TRL Equation : $\text{Log}_{10}(\text{CBR}) = 2.480 - 1.057 \times \text{Log}_{10}(\text{mm/blow})$ from IAN 73/06 Revision 1 (2009)
Tested in accordance with in house method, based upon TRL Road Note 31 & 8

Surface materials / condition:

Grass encountered at surface.

Remarks:

Client:	Signature Senior Lifestyle Developments
Project:	Henley Road, Caversham
Project No.	AG3094-19

APPLIED GEOLOGY

APPENDIX E

Land Use:	Residential with Plant Uptake
Case:	All results
Soil Organic Matter (%)	1.0 %

[illegible]

Key -
Values of this sample are low and do not require action



Final Report

Report No.: 19-42344-1

Initial Date of Issue: 10-Jan-2020

Client Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Adam Perks
Lab Results
Melissa Southworth

Project AG3094-19 Henley Road, Caversham

Quotation No.: Q17-09497 **Date Received:** 19-Dec-2019

Order No.: 15249 **Date Instructed:** 19-Dec-2019

No. of Samples: 11

Turnaround (Wkdays): 5 **Results Due:** 02-Jan-2020

Date Approved: 10-Jan-2020

Approved By:


Details: Glynn Harvey, Laboratory Manager

Results - Soil

Client: Applied Geology		Chemtest Job No.:		19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344
Quotation No.: Q17-09497		Chemtest Sample ID.:		945898	945899	945900	945901	945902	945903	945904	945905	945906
Order No.: 15249		Client Sample Ref.:		MG	MG	MG	Topsoil	Topsoil	Topsoil	Topsoil	Head Deposits	Topsoil
		Sample Location:		DCS101	DCS102	TP103	TP101	TP102	HDP103	HDP102	HDP102	HDP101
		Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):		0.30	0.10	0.30	0.10	0.20	0.20	0.10	0.30	0.20
		Date Sampled:		13-Dec-2019	13-Dec-2019	13-Dec-2019	12-Dec-2019	12-Dec-2019	13-Dec-2019	13-Dec-2019	13-Dec-2019	13-Dec-2019
		Asbestos Lab:		COVENTRY	COVENTRY	COVENTRY		COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	Accred.	SOP	Units	LOD								
Organic Matter	M	2625	%	0.40	2.4	2.4	1.7	<0.40	3.6	2.2	0.90	2.4
Arsenic	M	2450	mg/kg	1.0	25	27	20	13	18	13	10	15
Cadmium	M	2450	mg/kg	0.10	0.30	0.32	0.24	0.12	0.39	0.19	0.16	0.28
Chromium	M	2450	mg/kg	1.0	18	22	20	21	22	18	15	21
Chromium (Hexavalent)	N	2490	mg/kg	0.50	<0.50							
Chromium (Trivalent)	N	2490	mg/kg	1.0	18	22						
Copper	M	2450	mg/kg	0.50	21	20	14	9.0	30	18	10	18
Lead	M	2450	mg/kg	0.50	69	120	33	14	93	56	32	64
Magnesium (Water Soluble)	N	2120	g/l	0.010	0.42	0.48	0.41	0.37	0.49	0.54	0.45	0.44
Mercury	M	2450	mg/kg	0.10	0.34	0.16	<0.10	<0.10	0.51	0.13	<0.10	0.15
Nickel	M	2450	mg/kg	0.50	25	32	26	22	27	20	17	26
Selenium	M	2450	mg/kg	0.20	0.29	0.24	0.25	0.23	0.35	0.33	0.21	0.37
Vanadium	U	2450	mg/kg	5.0	45	51	37	40	46	30	26	43
Zinc	M	2450	mg/kg	0.50	69	84	51	40	120	81	39	67
Naphthalene	M	2700	mg/kg	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	M	2700	mg/kg	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	M	2700	mg/kg	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	M	2700	mg/kg	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	M	2700	mg/kg	0.10	0.76	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	M	2700	mg/kg	0.10	0.48	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	M	2700	mg/kg	0.10	2.5	1.1	0.58	<0.10	<0.10	<0.10	<0.10	0.64
Pyrene	M	2700	mg/kg	0.10	2.5	1.0	0.54	<0.10	<0.10	<0.10	<0.10	0.69
Benzofluranthene	M	2700	mg/kg	0.10	1.6	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	M	2700	mg/kg	0.10	1.3	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzofluoranthene	M	2700	mg/kg	0.10	2.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzokifluoranthene	M	2700	mg/kg	0.10	1.2	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzofluoranthene	M	2700	mg/kg	0.10	1.9	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	0.23	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	1.9	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzofluoranthene	M	2700	mg/kg	0.10	1.5	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	18	2.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Phenol	M	2920	mg/kg	0.050	<0.050	<0.050						
Resorcinol	M	2920	mg/kg	0.050	<0.050	<0.050						
Cresols	M	2920	mg/kg	0.050	<0.050	<0.050						
1-Naphthol	N	2920	mg/kg	0.050	<0.050	<0.050						
Trimethylphenols	M	2920	mg/kg	0.050	<0.050	<0.050						
Total Phenols	M	2920	mg/kg	0.30	<0.30	<0.30						

Results - Soil

Client: Applied Geology		Chemtest Job No.:		19-42344		19-42344		19-42344		19-42344		19-42344		19-42344		19-42344		19-42344	
Quotation No.: Q17-09497		Chemtest Sample ID.:		945898		945900		945901		945902		945903		945904		945905		945906	
Order No.: 15249		Client Sample Ref.:		MG		MG		TP101		TP102		Topsoil		Topsoil		Head Deposits		Topsoil	
		Sample Location:		DCS101		DCS102		TP103		TP102		HDP103		HDP102		HDP102		HDP101	
		Sample Type:		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
		Top Depth (m):		0.30		0.10		0.30		0.20		0.20		0.10		0.30		0.20	
		Date Sampled:		13-Dec-2019		13-Dec-2019		13-Dec-2019		12-Dec-2019		13-Dec-2019		13-Dec-2019		13-Dec-2019		13-Dec-2019	
		Asbestos Lab:		COVENTRY		COVENTRY		COVENTRY		COVENTRY		COVENTRY		COVENTRY		COVENTRY		COVENTRY	
Determinand	Accred.	SOP		Units		LOD													
		2760	2760	µg/kg	1.0	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Benzene	M	2760	2760	µg/kg	1.0	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	M	2760	2760	µg/kg	1.0	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	M	2760	2760	µg/kg	1.0	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	M	2760	2760	µg/kg	1.0	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	M	2760	2760	µg/kg	1.0	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C5-C6	N	2670	2670	mg/kg	1.0	mg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C6-C7	N	2670	2670	mg/kg	1.0	mg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C7-C8	N	2670	2670	mg/kg	1.0	mg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C8-C10	N	2670	2670	mg/kg	1.0	mg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C10-C12	N	2670	2670	mg/kg	1.0	mg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C12-C16	N	2670	2670	mg/kg	1.0	mg/kg	1.0					< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
TPH >C16-C21	N	2670	2670	mg/kg	1.0	mg/kg	1.0					5.9	5.9					23	23
TPH >C21-C35	N	2670	2670	mg/kg	1.0	mg/kg	1.0					42	42					45	45
TPH >C35-C44	N	2670	2670	mg/kg	1.0	mg/kg	1.0					2.8	2.8					4.8	4.8
Total TPH >C5-C44	N	2670	2670	mg/kg	1.0	mg/kg	1.0					51	51					72	72
Aliphatic TPH >C5-C6	N	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	M	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	2680	mg/kg	1.0	mg/kg	1.0	170	170	19	19	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	2680	mg/kg	1.0	mg/kg	1.0	9.1	9.1	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	2680	mg/kg	5.0	mg/kg	5.0	180	180	19	19	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C7-C8	N	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	2680	mg/kg	1.0	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	2680	mg/kg	1.0	mg/kg	1.0	3.9	3.9	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	M	2680	2680	mg/kg	1.0	mg/kg	1.0	280	280	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	N	2680	2680	mg/kg	1.0	mg/kg	1.0	240	240	4.3	4.3	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	2680	mg/kg	1.0	mg/kg	1.0	520	520	5.1	5.1	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Aromatic Hydrocarbons	N	2680	2680	mg/kg	10.0	mg/kg	10.0	710	710	24	24	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Total Petroleum Hydrocarbons	N	2680	2680	mg/kg	10.0	mg/kg	10.0	710	710	24	24	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Sulphate (2:1 Water Soluble) as SO4	M	2120	2120	g/l	0.010	g/l	0.010	< 0.010	< 0.010	0.020	0.020	0.19	0.19	0.011	0.011	< 0.010	< 0.010	< 0.010	< 0.010
ACM Type	U	2192	2192		N/A		N/A	-	-	-	-	-	-	-	-	-	-	-	-

Results - Soil

Client: Applied Geology		Chemtest Job No.:	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344	19-42344
Quotation No.: Q17-09497		Chemtest Sample ID.:	945898	945900	945901	945902	945903	945904	945905	945906	945907	945908
Order No.: 15249		Client Sample Ref.:	MG	MG	TP101	TP102	TP103	TP104	TP105	TP106	TP107	TP108
		Sample Location:	DCS101	DCS102	TP103	TP104	TP105	TP106	TP107	TP108	TP109	TP110
		Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
		Top Depth (m):	0.30	0.10	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
		Date Sampled:	13-Dec-2019	13-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019
		Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	Accred.	SOP	Units	LOD	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
Asbestos Identification	U	2192	%	0.001	-	-	-	-	-	-	-	-
ACM Detection Stage	U	2192	%	N/A	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	13	16	16	16	16	16	16	16
Soil Colour	N	2040		N/A	Brown,	Brown,	Brown,	Brown,	Brown,	Brown,	Brown,	Brown,
Other Material	N	2040		N/A	Stones,	Stones, Roots,	Stones,	Stones,	Stones,	Stones,	Stones,	Stones,
Soil Texture	N	2040		N/A	Sand,	Sand,	Sand,	Sand,	Sand,	Sand,	Sand,	Sand,
pH	M	2010		4.0	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
Boron	N	2450	mg/kg	0.40	6.6	1.2	4.3	1.7	0.62	2.6	1.0	1.0
Beryllium	U	2450	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Client: Applied Geology		Chemtest Job No.:	19-42344	19-42344
Quotation No.: Q17-09497		Chemtest Sample ID.:	945907	945908
Order No.: 15249		Client Sample Ref.:	Topsoil	Topsoil
		Sample Location:	DCS104	TP104
		Sample Type:	SOIL	SOIL
		Top Depth (m):	0.20	0.20
		Date Sampled:	13-Dec-2019	17-Dec-2019
		Asbestos Lab:		COVENTRY
Determinand	Accred.	SOP	Units	LOD
Organic Matter	M	2625	%	0.40
Arsenic	M	2450	mg/kg	1.0
Cadmium	M	2450	mg/kg	0.10
Chromium	M	2450	mg/kg	1.0
Chromium (Hexavalent)	N	2490	mg/kg	0.50
Chromium (Trivalent)	N	2490	mg/kg	1.0
Copper	M	2450	mg/kg	0.50
Lead	M	2450	mg/kg	0.50
Magnesium (Water Soluble)	N	2120	g/l	0.010
Mercury	M	2450	mg/kg	0.10
Nickel	M	2450	mg/kg	0.50
Selenium	M	2450	mg/kg	0.20
Vanadium	U	2450	mg/kg	5.0
Zinc	M	2450	mg/kg	0.50
Naphthalene	M	2700	mg/kg	0.10
Acenaphthylene	M	2700	mg/kg	0.10
Acenaphthene	M	2700	mg/kg	0.10
Fluorene	M	2700	mg/kg	0.10
Phenanthrene	M	2700	mg/kg	0.10
Anthracene	M	2700	mg/kg	0.10
Fluoranthene	M	2700	mg/kg	0.10
Pyrene	M	2700	mg/kg	0.10
Benzofl anthracene	M	2700	mg/kg	0.10
Chrysene	M	2700	mg/kg	0.10
Benzofl uoranthene	M	2700	mg/kg	0.10
Benzokl uoranthene	M	2700	mg/kg	0.10
Benzofl a pyrene	M	2700	mg/kg	0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10
Benzofl g,h,i)perylene	M	2700	mg/kg	0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0
Phenol	M	2920	mg/kg	0.050
Resorcinol	M	2920	mg/kg	0.050
Cresols	M	2920	mg/kg	0.050
1-Naphthol	N	2920	mg/kg	0.050
Trimethylphenols	M	2920	mg/kg	0.050
Total Phenols	M	2920	mg/kg	0.30

Client: Applied Geology		Chemtest Job No.:	19-42344	19-42344
Quotation No.: Q17-09497		Chemtest Sample ID.:	945907	945908
Order No.: 15249		Client Sample Ref.:	Topsoil	Topsoil
		Sample Location:	DCS104	TP104
		Sample Type:	SOIL	SOIL
		Top Depth (m):	0.20	0.20
		Date Sampled:	13-Dec-2019	17-Dec-2019
		Asbestos Lab:		COVENTRY
Determinand	Accred.	SOP	Units	LOD
Benzene	M	2760	µg/kg	1.0
Toluene	M	2760	µg/kg	1.0
Ethylbenzene	M	2760	µg/kg	1.0
m & p-Xylene	M	2760	µg/kg	1.0
o-Xylene	M	2760	µg/kg	1.0
TPH >C5-C6	N	2670	mg/kg	1.0
TPH >C6-C7	N	2670	mg/kg	1.0
TPH >C7-C8	N	2670	mg/kg	1.0
TPH >C8-C10	N	2670	mg/kg	1.0
TPH >C10-C12	N	2670	mg/kg	1.0
TPH >C12-C16	N	2670	mg/kg	1.0
TPH >C16-C21	N	2670	mg/kg	1.0
TPH >C21-C35	N	2670	mg/kg	1.0
TPH >C35-C44	N	2670	mg/kg	1.0
Total TPH >C5-C44	N	2670	mg/kg	1.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0
Aromatic TPH >C21-C35	M	2680	mg/kg	1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0
Sulphate (2:1 Water Soluble) as SO4	M	2120	g/l	0.010
ACM Type	U	2192		N/A

Client: Applied Geology		Chemtest Job No.:	19-42344	19-42344
Quotation No.: Q17-09497		Chemtest Sample ID.:	945907	945908
Order No.: 15249		Client Sample Ref.:	Topsoil	Topsoil
		Sample Location:	DCS104	TP104
		Sample Type:	SOIL	SOIL
		Top Depth (m):	0.20	0.20
		Date Sampled:	13-Dec-2019	17-Dec-2019
		Asbestos Lab:		COVENTRY
Determinand	Accred.	SOP	Units	LOD
Asbestos Identification	U	2192	%	0.001
ACM Detection Stage	U	2192		N/A
Moisture	N	2030	%	0.020
Soil Colour	N	2040		N/A
Other Material	N	2040		N/A
Soil Texture	N	2040		N/A
pH	M	2010		4.0
Boron	N	2450	mg/kg	0.40
Beryllium	U	2450	mg/kg	1.0
Methyl Tert-Butyl Ether	M	2760	µg/kg	1.0

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
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
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; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
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

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- 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
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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.com



Final Report

Report No.: 19-42345-1

Initial Date of Issue: 09-Jan-2020

Client Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Adam Perks
Lab Results
Melissa Southworth

Project AG3094-19 Henley Road, Caversham

Quotation No.: Q17-09497 **Date Received:** 19-Dec-2019

Order No.: 15249 **Date Instructed:** 19-Dec-2019

No. of Samples: 2

Turnaround (Wkdays): 7 **Results Due:** 06-Jan-2020

Date Approved: 09-Jan-2020

Approved By:


Details: Glynn Harvey, Laboratory Manager

Results - 2 Stage WAC

Project: AG3094-19 Henley Road, Caversham

Chemtest Job No: 19-42345				Chemtest Sample ID: 945909				Head Deposits			
Sample Ref:				Sample ID: DCS101							
Sample Location: Top Depth(m): Bottom Depth(m): Sampling Date:				0.80 13-Dec-2019							
Determinand	SOP	Accred.	Units								
Total Organic Carbon	2625	U	%								
Loss On Ignition	2610	U	%								
Total BTEX	2760	U	mg/kg								
Total PCBs (7 Congeners)	2815	U	mg/kg								
TPH Total WAC (Mineral Oil)	2670	U	mg/kg								
Total (Of 17) PAH's	2700	N	mg/kg								
pH	2010	U									
Acid Neutralisation Capacity	2015	N	mol/kg								
Eluate Analysis				2:1 m g/l	8:1 m g/l	2:1 m g/kg	Cumulative m g/kg 10:1				
Arsenic	1450	U	<0.0010	<0.0010	<0.0010	<0.050	<0.050	0.33	3	5	8
Barium	1450	U	0.0031	0.0023	<0.50	<0.50	<0.50	2.7	--	--	10
Cadmium	1450	U	<0.00010	<0.00010	<0.010	<0.010	<0.010	<0.010	6	--	--
Chromium	1450	U	<0.0010	<0.0010	<0.050	<0.050	<0.050	<0.10	1	--	--
Copper	1450	U	0.0011	<0.0010	<0.050	<0.050	<0.050	25	500	--	--
Mercury	1450	U	<0.00050	<0.00050	<0.0010	<0.0010	<0.0050	<2.0	100	--	--
Molybdenum	1450	U	<0.0010	<0.0010	<0.050	<0.050	<0.050	8.6	--	>6	--
Nickel	1450	U	<0.0010	<0.0010	<0.050	<0.050	<0.050	0.024	--	To evaluate	To evaluate
Lead	1450	U	<0.0010	<0.0010	<0.010	<0.010	<0.010			To evaluate	To evaluate
Antimony	1450	U	<0.0010	<0.0010	<0.010	<0.010	<0.010				
Selenium	1450	U	<0.0010	<0.0010	<0.010	<0.010	<0.010				
Zinc	1450	U	<0.0010	0.0011	<0.50	<0.50	<0.50				
Chloride	1220	U	<1.0	<1.0	<1.0	<1.0	<1.0				
Fluoride	1220	U	0.27	0.30	<1.0	<1.0	<1.0				
Sulphate	1220	U	1.5	<1.0	<1.0	<1.0	<1.0				
Total Dissolved Solids	1020	N	85	84	170	850	850				
Phenol Index	1820	U	<0.030	<0.030	<0.30	<0.30	<0.50				
Dissolved Organic Carbon	1610	U	6.2	4.1	<50	<50	<50				

Landfill Waste Acceptance Criteria Limits				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg						
				0.5	2	25
				20	100	300
				0.04	1	5
				0.5	10	70
				2	50	100
				0.01	0.2	2
				0.5	10	30
				0.4	10	40
				0.5	10	50
				0.06	0.7	5
				0.1	0.5	7
				4	50	200
				800	15000	25000
				10	150	500
				1000	20000	50000
				4000	60000	100000
				1	--	--
				500	800	1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.319
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.149

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: AG3094-19 Henley Road, Caversham

Chemtest Job No: 19-42345				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 945910				Limits			
Sample Ref: Chalk				Inert Waste Landfill		Stable, Non-reactive hazardous waste in non-hazardous Landfill	
Sample ID: DCS103				Hazardous Waste Landfill			
Sample Location: 0.90							
Top Depth(m):							
Bottom Depth(m):							
Sampling Date: 13-Dec-2019							
Determinand	SOP	Accred.	Units	8:1 m g/l	2:1 m g/kg	Cumulative m g/kg 10:1	Limit values for compliance using BS EN 12457 at L/S 10 l/kg
Total Organic Carbon	2625	U	%	< 0.0010	< 0.050	< 0.050	0.5
Loss On Ignition	2610	U	%	0.0026	< 0.50	< 0.50	20
Total BTEX	2760	U	mg/kg	< 0.00010	< 0.010	< 0.010	0.04
Total PCBs (7 Congeners)	2815	U	mg/kg	< 0.0010	< 0.050	< 0.050	0.5
TPH Total WAC (Mineral Oil)	2670	U	mg/kg	< 0.0010	< 0.050	< 0.050	2
Total (Of 17) PAH's	2700	N	mg/kg	0.0022	< 0.0010	< 0.0050	0.01
pH	2010	U		< 0.00050	< 0.010	< 0.0050	0.5
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0010	< 0.050	< 0.050	0.4
Eluate Analysis				< 0.0010	< 0.050	< 0.050	10
Arsenic	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	10
Barium	1450	U	0.0062	< 0.0010	< 0.010	< 0.010	10
Cadmium	1450	U	< 0.00010	< 0.0010	< 0.010	< 0.010	10
Chromium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	10
Copper	1450	U	0.0022	< 0.0010	< 0.010	< 0.010	10
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.2
Molybdenum	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5
Nickel	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.4
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	10
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	10
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	10
Zinc	1450	U	0.0045	< 0.0010	< 0.50	< 0.50	50
Chloride	1220	U	< 1.0	< 1.0	< 1.0	< 1.0	15000
Fluoride	1220	U	0.39	0.19	< 1.0	2.2	150
Sulphate	1220	U	3.8	< 1.0	< 1.0	< 1.0	1000
Total Dissolved Solids	1020	N	63	30	120	360	4000
Phenol Index	1920	U	< 0.030	< 0.030	< 0.30	< 0.50	1
Dissolved Organic Carbon	1610	U	5.8	4.3	< 50	< 50	800
							1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.309
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.311

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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Sample Deviation Codes

- A - Date of sampling not supplied
- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 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.com



Final Report

Report No.: 20-01684-1

Initial Date of Issue: 24-Jan-2020

Client Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Adam Perks
Lab Results
Melissa Southworth

Project AG3094-19 Henley Road, Caversham

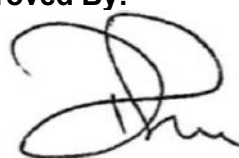
Quotation No.: Q17-09497 **Date Received:** 20-Jan-2020

Order No.: **Date Instructed:** 20-Jan-2020

No. of Samples: 3

Turnaround (Wkdays): 5 **Results Due:** 24-Jan-2020

Date Approved: 24-Jan-2020

Approved By:


Details: Darrell Hall, Director

Client: Applied Geology		Chemtest Job No.:		20-01684	20-01684	20-01684
Quotation No.: Q17-09497		Chemtest Sample ID.:		956197	956198	956199
Order No.:		Client Sample Ref.:		Topsoil	Topsoil	Topsoil
		Sample Location:		BH104	BH103	BH105
		Sample Type:		SOIL	SOIL	SOIL
		Top Depth (m):		0.30	0.50	0.30
		Date Sampled:		08-Jan-2020	10-Jan-2020	06-Jan-2020
Determinand	Accred.	SOP	Units	LOD		
Organic Matter	U	2625	%	0.40	1.7	2.6
Arsenic	U	2450	mg/kg	1.0	23	14
Cadmium	U	2450	mg/kg	0.10	0.29	0.13
Chromium	U	2450	mg/kg	1.0	32	24
Copper	U	2450	mg/kg	0.50	14	15
Lead	U	2450	mg/kg	0.50	63	23
Magnesium (Water Soluble)	N	2120	g/l	0.010	<0.010	<0.010
Mercury	U	2450	mg/kg	0.10	0.13	<0.10
Nickel	U	2450	mg/kg	0.50	38	33
Selenium	U	2450	mg/kg	0.20	0.32	0.27
Vanadium	U	2450	mg/kg	5.0	73	36
Zinc	U	2450	mg/kg	0.50	67	58
Naphthalene	U	2700	mg/kg	0.10	<0.10	<0.10
Acenaphthylene	U	2700	mg/kg	0.10	<0.10	<0.10
Acenaphthene	U	2700	mg/kg	0.10	<0.10	<0.10
Fluorene	U	2700	mg/kg	0.10	<0.10	<0.10
Phenanthrene	U	2700	mg/kg	0.10	<0.10	<0.10
Anthracene	U	2700	mg/kg	0.10	<0.10	<0.10
Fluoranthene	U	2700	mg/kg	0.10	<0.10	<0.10
Pyrene	U	2700	mg/kg	0.10	<0.10	<0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	<0.10	<0.10
Chrysene	U	2700	mg/kg	0.10	<0.10	<0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	<0.10	<0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	<0.10	<0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	<0.10	<0.10
Dibenz[a,h]anthracene	U	2700	mg/kg	0.10	<0.10	<0.10
Indeno[1,2,3-c,d]Pyrene	U	2700	mg/kg	0.10	<0.10	<0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	<0.10	<0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	<2.0	<2.0
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.023	<0.010
Moisture	N	2030	%	0.020	16	10
pH	U	2010		4.0	7.8	8.3
Boron	N	2450	mg/kg	0.40	6.9	6.3
Beryllium	U	2450	mg/kg	1.0	<1.0	<1.0

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.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / 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.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)

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- B - Sample age exceeds stability time (sampling to extraction)
- C - Sample not received in appropriate containers
- D - Broken Container
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

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All water samples will be retained for 14 days from the date of receipt

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customerservices@chemtest.com



Final Report

Report No.: 20-01686-1

Initial Date of Issue: 28-Jan-2020

Client Applied Geology

Client Address: Unit 23, Abbey Park
Stareton
Kenilworth
Warwickshire
CV8 2LY

Contact(s): Adam Perks
Lab Results
Melissa Southworth

Project AG3094-19 Henley Road, Caversham

Quotation No.: Q17-09497 **Date Received:** 20-Jan-2020

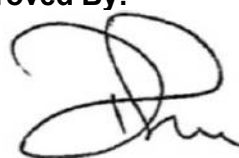
Order No.: **Date Instructed:** 20-Jan-2020

No. of Samples: 2

Turnaround (Wkdays): 7 **Results Due:** 28-Jan-2020

Date Approved: 28-Jan-2020

Approved By:



Details: Darrell Hall, Director

Results - 2 Stage WAC

Project: AG3094-19 Henley Road, Caversham

Chemtest Job No: 20-01686				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 966200				Limits			
Sample Ref: Chalk				Inert Waste Landfill		Stable, Non-reactive hazardous waste in non-hazardous Landfill	
Sample ID: BH102				Hazardous Waste Landfill			
Sample Location: 0.50							
Top Depth(m):							
Bottom Depth(m):							
Sampling Date: 06-Jan-2020							
Determinand	SOP	Accred.	Units	8:1 m/g/l	2:1 m/g/kg	Cumulative m/g/kg 10:1	Limit values for compliance using BS EN 12457 at L/S 10 l/kg
Total Organic Carbon	2625	M	%	< 0.0010	< 0.050	< 0.050	0.5
Loss On Ignition	2610	M	%	0.0078	< 0.50	< 0.50	20
Total BTEX	2760	M	mg/kg	< 0.00010	< 0.010	< 0.010	0.04
Total PCBs (7 Congeners)	2815	M	mg/kg	< 0.0010	< 0.050	< 0.050	0.5
TPH Total WAC (Mineral Oil)	2670	M	mg/kg	< 0.0010	< 0.050	< 0.050	0.5
Total (Of 17) PAH's	2700	N	mg/kg	0.0027	< 0.050	< 0.050	2
pH	2010	M		< 0.00050	< 0.0010	< 0.0050	0.01
Acid Neutralisation Capacity	2015	N	mol/kg	< 0.0010	< 0.050	< 0.050	0.5
Eluate Analysis				< 0.0010	< 0.050	< 0.050	0.4
Arsenic	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5
Barium	1450	U	0.0078	0.0028	< 0.50	< 0.50	20
Cadmium	1450	U	< 0.00010	< 0.00010	< 0.010	< 0.010	0.04
Chromium	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5
Copper	1450	U	0.0027	< 0.0010	< 0.050	< 0.050	2
Mercury	1450	U	< 0.00050	< 0.00050	< 0.0010	< 0.0050	0.01
Molybdenum	1450	U	< 0.0010	< 0.0010	< 0.050	< 0.050	0.5
Nickel	1450	U	0.0011	< 0.0010	< 0.050	< 0.050	0.4
Lead	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.5
Antimony	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.7
Selenium	1450	U	< 0.0010	< 0.0010	< 0.010	< 0.010	0.1
Zinc	1450	U	< 0.0010	< 0.0010	< 0.50	< 0.50	4
Chloride	1220	U	< 1.0	< 1.0	< 1.0	< 1.0	800
Fluoride	1220	U	0.21	0.18	< 1.0	1.8	10
Sulphate	1220	U	< 1.0	< 1.0	< 1.0	< 1.0	1000
Total Dissolved Solids	1020	N	78	43	150	470	4000
Phenol Index	1820	U	< 0.030	< 0.030	< 0.30	< 0.50	1
Dissolved Organic Carbon	1610	U	5.6	5.7	< 50	56	500
							800
							1000

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	19

Leachate Test Information	
Leachant volume 1st extract/l	0.310
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.207

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Results - 2 Stage WAC

Project: AG3094-19 Henley Road, Caversham

Chemtest Job No: 20-01686				Landfill Waste Acceptance Criteria			
Chemtest Sample ID: 956201				Limits			
Sample Ref: Chalk				Inert Waste Landfill		Stable, Non-reactive hazardous waste in non-hazardous Landfill	
Sample ID: BH101				Hazardous Waste Landfill			
Sample Location: Top Depth(m): Bottom Depth(m): Sampling Date:							
1.65							
13-Jan-2020							
Determine and				SOP		Units	
Total Organic Carbon				2625		M	
Loss On Ignition				2610		M	
Total BTEX				2760		M	
Total PCBs (7 Congeners)				2815		M	
TPH Total WAC (Mineral Oil)				2670		M	
Total (Of 17) PAH's				2700		N	
pH				2010		M	
Acid Neutralisation Capacity				2015		N	
Eluate Analysis				2:1		m g/l	
Arsenic				1450		U	
Barium				1450		U	
Cadmium				1450		U	
Chromium				1450		U	
Copper				1450		U	
Mercury				1450		U	
Molybdenum				1450		U	
Nickel				1450		U	
Lead				1450		U	
Antimony				1450		U	
Selenium				1450		U	
Zinc				1450		U	
Chloride				1220		U	
Fluoride				1220		U	
Sulphate				1220		U	
Total Dissolved Solids				1020		N	
Phenol Index				1820		U	
Dissolved Organic Carbon				1610		U	
				1810		U	

Solid Information	
Dry mass of test portion/kg	0.175
Moisture (%)	15

Leachate Test Information	
Leachant volume 1st extract/l	0.319
Leachant volume 2nd extract/l	1.400
Eluant recovered from 1st extract/l	0.189

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

SOP	Title	Parameters included	Method summary
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1450	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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.
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
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; Dibenzo[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge
650	Characterisation of Waste (Leaching WAC)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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
- E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

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.com

Applied Geology Ltd

Unit 23 Abbey Park

Stareton

Kenilworth

Warwickshire

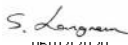
CV8 2LY

For the attention of Melissa Southworth

Report No: B24091

Issue No 03

LABORATORY TEST REPORT

Project Name		HENLEY ROAD, CAVERSHAM	
Project Number		B24091	Date samples received 23/01/2020
Your Ref			Date written instructions received 23/01/2020
Purchase Order		15344	Date testing commenced 23/01/2020
Please find enclosed the results as summarised below			
Figure / Table	Test Quantity	Description	ISO 17025 Accredited
1	24	BRE Suites - 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 : 05/02/2020	Key to symbols used in this report S/C : Testing was sub-contracted
Approved Signatories :  G Wilson (JMD/Laboratories Director), S Langman (Laboratory Coordinator)			
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			



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www.terratek.co.uk

Terra Tek Ltd is registered in Scotland No. 121594
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TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES				HENLEY ROAD, CAVERSHAM														Contract No B24091																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
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Sample Identification				Hole	Depth m	Sample Ref	Sample Type	Lab Sample ID	Total Sulphur		Sulphate (acid soluble as SO4)		Sulphate (water soluble in 2:1 extract) as SO4		pH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							

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Sample Identification				Lab Sample ID	Total Sulphur %	Sulphate (acid soluble as SO4) %	Sulphate (water soluble in 2:1 extract) as SO4 g/l	pH																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															

TERRA TEK Soil Investigation and Laboratory Services				Site HENLEY ROAD, CAVERSHAM					Contract No E13009/1			
				Client								
				Engineer								
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									
BH107	1.20		D	717789	Deviating	11.0	CLAY	Fine to Medium Gravel		15.6	21.4	
BH108	2.00		D	717790	Deviating	11.0	CLAY	Fine to Medium Gravel		17.4	24.9	
BH109	0.80		D	717791	Deviating	11.0	Sandy CLAY	Fine to Medium Gravel		15.4	29.5	
BH103	1.00		B	717792	Deviating	11.0	CLAY	Fine to Medium Gravel		16.0	37.4	
BH103	2.00		B	717793	Deviating	11.0	Sandy CLAY	Fine to Medium Gravel		15.8	9.7	
BH105	3.30		B	717794	Deviating	11.0	CLAY/Chalky	Fine to Medium Gravel		13.4	27.4	
BH106	4.45		B	717795	Deviating	11.0	SAND	Fine to Medium Gravel		5.7	71.0	
BH104	4.00		B	717796	Deviating	11.0	CLAY/Slurry	Fine to Medium Gravel		17.0	31.9	
TP101	1.50		B	717797	Deviating	11.0	Sandy CLAY	Fine to Medium Gravel		13.5	17.3	
BH107	3.55		B	717798	Deviating	11.0	SAND/Slurry	Fine to Medium Gravel		13.8	34.2	
BH101	4.80		D	717802	Deviating	11.0	CHALK	Fine to Medium Gravel		19.7	~	
BH105	11.20		D	717803	Deviating	11.0	CHALK	Fine to Medium Gravel		20.7	24.3	
BH103	3.00		D	717805	Deviating	11.0	CHALK	Fine to Medium Gravel		19.9	33.0	
BH103	6.00		D	717806	Deviating	11.0	CHALK	Fine to Medium Gravel		24.7	12.8	
BH103	14.00		D	717807	Deviating	11.0	CHALK	Fine to Medium Gravel		13.8	59.1	
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) 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 15/01/2021											
Sheet 1 of 2												

TERRA TEK TESTING INVESTIGATION AND LABORATORY SERVICES				Site HENLEY ROAD, CAVERSHAM				Contract No E13009/1			
				Client							
				Engineer							
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								
BH102	10.50		D	717810	Deviating	11.0	CHALK			20.8	~
BH106	13.00		D	717812	Deviating	11.0	CHALK			20.5	~
BH106	17.00			717813	Deviating	11.0	CHALK	Fine to Medium Gravel		18.8	47.7
BH101	1.65		B	717814	Deviating	11.0	CHALK	Fine to Medium Gravel		18.1	22.1
DCS102	0.80		B	717815	Deviating	11.0	CLAY/Chalky	Fine to Medium Gravel		16.7	37.7
BH104	8.00		D	717837	Deviating	11.0	CHALK	Fine to Medium Gravel		20.3	~
BH106	9.50		D	717841	Deviating	11.0	CHALK	Fine to Medium Gravel		19.7	19.8
BH102	2.00-2.45		D	717842	Deviating	11.0	CHALK	Fine to Medium Gravel		19.3	17.9
BH102	5.00-5.45		D	717843	Deviating	11.0	CHALK	Fine to Medium Gravel		19.5	11.7
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) 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	<i>S. Langman</i> US/UZ/UZ/20								Sheet 2 of 2		

 TERRA TEK STE INVESTIGATION AND LABORATORY SERVICES				Site HENLEY ROAD, CAVERSHAM				Contract No B24091				
				Client								
				Engineer								
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 maximum holding time for selected test(s)	Presence of headspace in sample vial	Poorly fitting cap or lid	Damaged container		
BH107	1.20		D	717789	Deviating							
BH108	2.00		D	717790	Deviating							
BH109	0.80		D	717791	Deviating							
BH103	1.00		B	717792	Deviating							
BH103	2.00		B	717793	Deviating							
BH105	3.30		B	717794	Deviating							
BH106	4.45		B	717795	Deviating							
BH104	4.00		B	717796	Deviating							
TP101	1.50		B	717797	Deviating							
BH107	3.55		B	717798	Deviating							
BH101	4.80		D	717802	Deviating							
BH105	11.20		D	717803	Deviating							
BH104	8.00		D	717837	Deviating							
BH103	3.00		D	717805	Deviating							
BH103	6.00		D	717806	Deviating							
NOTES - Results reported for samples classified as deviating may be compromised. Deviation types are shown as "X" or "Yes" in the table above. - The absence of "X" or "Yes" in the table above indicates no reported deviations. - Deviations due to use of incorrect sample container are shown on result tables. - Deviating results are indicated within result tables.												
Originator		Checked & Approved		DEVIATING SAMPLES - SOIL						 Appendix S2		
TGH		 05/02/2020										
Sheet 1 of 2												

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES				Site HENLEY ROAD, CAVERSHAM		Contract No B24091						
				Client								
				Engineer								
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 maximum holding time for selected test(s)	Presence of headspace in sample vial	Poorly fitting cap or lid	Damaged container		
BH103	14.00		D	717807	Deviating							
BH102	2.00-2.45		D	717842	Deviating							
BH102	5.00-5.45		D	717843	Deviating							
BH102	10.50		D	717810	Deviating							
BH106	9.50		D	717841	Deviating							
BH106	13.00		D	717812	Deviating							
BH106	17.00		D	717813	Deviating							
BH101	1.65		B	717814	Deviating							
DCS102	0.80		B	717815	Deviating							
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					Tk Appendix S2 Sheet 2 of 2			
TGH		S. Langren 05/02/2020										

 TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site HENLEY ROAD, CAVERSHAM		Contract No B24091	
		Client			
		Engineer			
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	SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)		 Appendix S3	
N/A	N/A				
Sheet 1 of 2					

TERRA TEK SITE INVESTIGATION AND LABORATORY SERVICES		Site HENLEY ROAD, CAVERSHAM		Contract No B24091	
		Client			
		Engineer			
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
TP174	In-house documented method	Determination of Total Organic Carbon in soils by high temperature combustion & NDIR detection			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	SUMMARY OF IN-HOUSE ANALYTICAL TEST METHODS (SOIL)			Tk Appendix S3
N/A	N/A				
Sheet 2 of 2					

APPENDIX F

APPENDIX F

STANDARD FIELDWORK AND ASSESSMENT PROCEDURES

Scope of Work

The scope of work undertaken is defined in Section 1 of the Report. It should be noted that Applied Geology Limited does not provide arboricultural surveys, specialist surveys for the detection of invasive plant species (such as Japanese Knotweed) or protected species of wildlife. Information from environmental and ecological datasets is included from a review of the MAGIC (Multi-Agency Geographic Information for the Countryside) website, however, if a full assessment of Environmental or Ecological aspects is required, it is recommended that other specialists are consulted. Similarly, information on flood risk is included; obtained from the Environment Agency Web site and the GroundSure report; but this is not intended to be a full hydrological study and, if a flood risk assessment is needed, additional analysis by others is recommended to confirm this aspect of the development. Also, whilst our field staff have undergone asbestos awareness training, Applied Geology does not undertake asbestos surveys or provide specific advice relating to asbestos-containing materials. Any suspected asbestos-containing materials observed by our field staff will be mentioned in the report but further assessment by others may be required.

Fieldwork

Fieldwork is generally carried out in accordance with BS5930 (2015) "Code of Practice for Site Investigations" and BS10175 (2011) Investigation of Potentially Contaminated Sites, unless otherwise stated.

Prior to commencement on site, statutory services plans are generally obtained and verbal enquiries are also made regarding the positions of private or statutory services on site. Prior to excavation or drilling, locations are scanned with a cable avoidance tool (CAT) and service pits are generally excavated at borehole positions, where possible.

Descriptions and depths of the various strata recovered are presented on the exploratory hole records, reproduced in the report appendices, together with sample depths, the results of in-situ testing, comments on groundwater inflows, and any other pertinent information. The strata descriptions are in general accordance with BS5930:2015. Disturbed plastic pot and glass amber jar samples are recovered from the various strata and stored and transported in cool boxes, where relevant, for possible future laboratory testing.

Light cable percussion boreholes are generally drilled using a Pilcon Wayfarer or Dando rig and are advanced using equipment to bore 200/150mm diameter boreholes. Disturbed plastic pot samples are recovered from all deposits encountered to allow examination and laboratory testing. Certain strata are cased off due to their tendency to collapse, particularly in the presence of groundwater inflows and/or to reduce the risk of cross contamination. In situ Standard Penetration Tests, using Split Spoon (SPT) and Cone (CPT) are undertaken in the boreholes to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Within the fine grained (cohesive) deposits, "undisturbed" 100mm driven open tube samples were recovered from the various deposits to provide samples for examination and laboratory testing. On encountering groundwater, boring is usually suspended for 20 minutes while any rise in water level is recorded. Full details of the groundwater observations and monitoring results during boring operations are included on the borehole records. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion, unless otherwise stated on the individual logs.

Unless otherwise stated on the relevant logs, trial pits are excavated using a wheeled backhoe excavator, usually with a 0.6m wide bucket. The excavations are logged from the ground surface by an Engineering Geologist / Geo-environmental Engineer and relevant field testing, appropriate to the soils encountered, is carried out on samples brought to the surface. Representative disturbed soil

samples are collected from selected horizons for subsequent laboratory testing. The trial pits are usually unshored and where reasonable, left open for a period of time to allow observations of pit stability and depth and inflow rate of any groundwater ingress. The excavations are backfilled with arisings prior to moving on to the next position. Any trial pits carried out as part of this or previous investigations may represent soft spots and conduits/sumps for groundwater or surface water. In excavations, such materials may also be loose and unstable.

Driven Continuous Sampling (DCS) boreholes are drilled using a track mounted Global mini-rig or similar using sampling tubes of varying diameter (decreasing with depth). Samples of the deposits encountered are recovered in 1m long clear plastic liners, which are logged and sub-sampled on site by an Engineering Geologist. Generally for geotechnical investigations, during the drilling process in-situ Standard Penetration Tests (SPTs) are undertaken at selected depths to provide a measure of the relative density of the granular (coarse grained) deposits or shear strength of the clay/chalk/ weathered rock deposits using industry recognised correlation guidelines of shear strength against SPT "N" value results. Groundwater seepages are noted during drilling if encountered. All boreholes without monitoring wells installed are usually backfilled with arisings upon completion.

Unless specifically stated in the report, exploratory hole locations should be regarded as approximate. Consideration should be given to accurate location of the exploratory holes where it is considered they may impact on proposed development.

It should be noted that groundwater levels at any particular site may fluctuate due to rainfall, seasonal variations etc and, therefore, levels may be different to those measured during the course of the fieldwork and monitoring period.

Laboratory Testing

The geotechnical testing was carried out in accordance with BS 1377:1990 Method of Tests for Soils for Civil Engineering Purposes and was undertaken by a UKAS accredited specialist laboratory. Chemical testing was undertaken by a UKAS accredited specialist chemical testing laboratory and MCERTS accredited methods, in accordance with Environment Agency recommendations, were specified where available.

Contamination Assessment – Human Health

Applied Geology Limited has followed the guidance given in the CLR 11 publication and other available guidance to assess the contaminant concentrations. Details of the methodology followed are briefly outlined below.

The available chemical data is sorted into appropriate datasets depending on sampling regime and ground conditions. An initial generic quantitative risk assessment is undertaken on this data using statistical tests, where appropriate, and relevant screening values. Risk to human health has been initially assessed by comparing soil results against various published screening criteria. These have been sourced from the following, in order of preference:

- DEFRA. Category 4 Screening Levels (C4SL), March 2014;
- LQM/CIEH S4UL for Human Health Risk Assessment (S4UL), 2015*;
- Environment Agency/DEFRA, Soil Guideline Values (SGV) published in 2009;
- EIC/AGS/CL:AIRE Soil Generic Assessment Criteria (GAC), 2010.

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Except for lead and benzo(a)pyrene, the assessments will be carried out by comparing results against the LQM/CIEH S4UL in the first instance, where these values are exceeded, then reference will be made to the C4SLs where such exist. Lead will only be compared to the C4SL because no S4UL exists for lead. For Benzo(a)pyrene, Applied Geology has chosen to adopt the approach presented by the C4SL committee rather than the approach proposed by LQM/CIEH. Further discussion on this is presented below.

It is our view, and the view of others in the industry, that the C4SL were derived for use in both the Part IIA system and through the planning system, as they allow identification of those sites that fall within Category 4 (not contaminated) and are therefore able to be developed with no further remedial action. The C4SLs are considered to represent a contamination level that is 'low' from a toxicological view point, which we therefore consider to be 'acceptable' under planning.

Historically, the level of contamination has been assessed with reference to SGV values which were derived to represent a 'minimal' level of contamination. The SGVs are still valid and can be used alongside C4SL, however both screening values are only intended to provide guidance as to the level of contamination and, where concentrations fall below these screening values, the site is not contaminated (and is within Category 4). Exceedance of a SGV/S4UL/C4SL does not automatically indicate that an 'unacceptable' risk exists at a site; simply that further consideration of that particular contaminant is required.

At this time, there are two toxicological methodologies that can be used in the derivation of screening criteria for PAHs; Relative Potency Factor (RPFs) or the Surrogate Marker approach. Applied Geology has chosen (based on the latest guidance from the Health Protection Agency (HPA) to use the surrogate marker approach proposed in the C4SL methodology, whereby benzo(a)pyrene can be used as a surrogate marker for all 'genotoxic' (gene damaging) PAHs. The surrogate marker approach estimates the toxicity of a mixture of PAHs in an environmental matrix by using data from toxicity studies in which a PAH mixture of known composition was tested. Exposure to the surrogate marker benzo(a)pyrene is assumed to represent exposure to all the PAHs in the environmental matrix. Thus, the level of toxicity ascribed to the surrogate represents the toxicity of the PAH mixture. This allows an assessment of the combined carcinogenic risk associated with genotoxic PAHs using only benzo(a)pyrene. In order to confirm that the mixture of genotoxic PAH in the soil is similar to the coal tar mixture used in the toxicological study, various PAH ratios are plotted and checked to see that they fall within the limits set in HPA, 2010.

Contamination Assessment – Water Quality

Risks to water quality has been assessed by following the Environment Agency guidance on groundwater protection (previously known as GP3), updated on their website in March 2017, see <https://www.gov.uk/government/policies/water-quality> and 'The Environment Agency's approach to groundwater protection' (March 2017 Version 1.0).

For hazardous substances, which should be prevented from entering groundwater, the screening criteria are initially set as the limit of detection, however, if groundwater has already been impacted, an appropriate environmental standard will then be used. For hazardous substances, background quality may also be taken into account.

For non-hazardous compounds, their release should not result in any pollution or significant risk of pollution in the future, as such comparison with UK DWS or EQS standards will allow determination of whether pollution could occur. Typically screening criteria will be sourced from the following:

- Environmental Standards (ES), which are defined in European legislation such as the Water Framework Directive (WFD) (2000/60/EC) and the Priority Substances Directive (PSD) (2008/105/EC) a daughter directive of the WFD.
- The River Basin Districts Typology, Standards and Groundwater Threshold Values (Water Framework Directive) (England and Wales) Direction, 2010.
- UK Water Supply (Water Quality) Regulations, 2010.
- UK quality standards for water to be used for direct abstraction to potable supply e.g. Surface Water (Abstraction for Drinking Water) (Classification) Regulations, 1996.
- World Health Organisation (WHO) Guidelines for Drinking Water Quality.

Re-use of Soils and Waste Soil Disposal

It is noted that if any excavated material is to be reused on site, a Waste Management Plan (WMP) and / or a Materials Management Plan (MMP) will probably be required. Any such materials must be suitable for re-use without further treatment, and only the quantity necessary for the specified works should be used. Any materials not within these definitions may need to be considered as waste whereby a Waste Management Licence Exemption may also be required.

A specific categorisation and assessment of potential waste soils arising from the proposed development has not been undertaken as part of the investigation, unless otherwise detailed in the report text. However, generic comments and advice are made below for the reader.

All waste soils should be sorted to prevent mixtures of waste types. Where possible, any waste soil should be recycled and the volume of soil to be disposed of should be minimised. Any excavated soil material and excess spoil disposed of off-site should be treated as Waste and classified as Inert, Non-hazardous or Hazardous, prior to removal from site, as required by the "Duty of Care" (Environmental Protection Act, 1990) legislation together with Annex II of Directive 1999/31/EC ("Landfill Directive"). Initially, Basic Characterisation of the waste is required whereby the material should be described and its source of origin recorded (a site plan, exploratory hole records and the certificates of chemical analysis in this report should be included). This should also include data on its composition and leaching behaviour, its European Waste Catalogue (EWC) code, and where relevant any hazardous properties according to Annex III of Directive 91/689/EEC. This information should be provided to the licensed waste contractor.

Soils excavated on many sites would generally fall under the EWC description "Soil and Stones", EWC code 17 05 04. Waste Acceptance Criteria (WAC) testing is required for many Inert wastes and generally for all Hazardous Waste but not for non-hazardous waste. There are certain restrictions for inert wastes regarding topsoil and peat. Any asbestos must be disposed of by suitably licensed contractors to a suitably licensed facility.

Health & Safety Aspects

As outlined within the HSE publication 'Successful Health and Safety Management - HSG65', this report should inform your development of safe systems of work and information as an input into the safety management system.

When developing risk control systems we suggest making reference to the CIRIA report 132 "A guide for safe working on contaminated sites" and the HSE document "Protection of workers and the general public during the development of contaminated land – HSG66". All risk control measures should be in accordance with the guidelines laid down within the Management of Health and Safety at Work Regulations 1999.

The contents of this report may be used to supplement the contents of the Health and Safety File as required under the Construction Design and Management (CDM) Regulations.

Where excavations are undertaken on site, trench support or the angle of batter should be designed by an appropriately qualified engineer or competent person to suit the required depth and the ground and groundwater conditions. Care should be taken when digging excavations to prevent undermining or causing loss of support to the foundations of the nearby adjoining structures. Surcharging such as from spoil or vehicle movements close to excavation sides should be avoided. Practical guidance on trench excavation is given in CIRIA Report 97 Trenching Practice. Guidance on groundwater control is given in CIRIA Report 113 Control of groundwater for temporary works. Temporary works should be designed by a suitably qualified engineer or a competent person particularly where personnel access is necessary, in accordance with the requirements of the Construction (Design and Management) (CDM) Regulations.