

By Email

Kamani Property Group
15 Little Peter Street
Manchester
M15 4PS

Our ref 1338-004-002

Date 26/11/2020

FAO: Mr Marc Silcock

RE: 88 School Lane, Didsbury, Manchester, M20 6GH - Post Demolition Sampling

Dear Marc

We are pleased to present our report on post demolition sampling at the above site, as follows.

1.0 Background

Kamani Property Group are redeveloping a site at 88 School Lane, Didsbury for residential end use.

The site is approximately 27m by 29m in plan, and has an area of approximately 0.07 ha (783 m²). It is located at the junction of School Lane and Ladysmith Road in the Manchester suburb of Didsbury, centred at National Grid reference 385156, 391114 (see drawing WL_1338_001 enclosed). The site is relatively flat.

A Phase 1 Desk Study report (ref. 1338-001-001), Phase 2 Ground Investigation (GI) report (ref 1338-002-001) and gas monitoring report (ref 1338-003-001) have already been prepared for the site by Westlakes. These previous reports should be read in conjunction with this report to gain a full understanding of the site.

Planning permission has been granted for the development and Manchester City Council (MCC) have confirmed in their letter referenced CDN/20/0087 and dated 07/02/2020 that "Planning Condition 4 – Contaminated Land" has been partially discharged. However, MCC noted that "to fully discharge the condition a post demolition site investigation, updated final risk assessment and remediation strategy will need to be submitted".

This letter addresses the MCC comments relating to post demolition investigation and contains an updated risk assessment. A separate Remediation Strategy report will subsequently be produced.

2.0 Post Demolition Sampling Works

The site was previously occupied by a disused two-storey commercial building in the northern part of the site, with a yard and two garage buildings in the southern part of the site. The hardstanding to the front and rear of the commercial property comprised concrete and concrete paving slabs.

All former buildings have now been demolished with foundations grubbed out.

An outline remediation strategy was provided within the GI report, noting: *It would be prudent for a suitably qualified and experienced person to inspect the ground beneath the existing buildings, once demolished, to check for visual/olfactory signs of contamination in areas that could not be investigated during the GI. If contamination is suspected, then samples should be taken and tested for a similar range of potential contaminant to the tests undertaken during the GI. Test results should be compared to GAC for a residential end use including plant uptake.*

Site access is now available to parts of the site that were inaccessible during the earlier GI. Therefore, a suitably qualified and experienced person has attended site to inspect the ground beneath the former buildings. The post demolition inspection visit was undertaken 27/10/2020 by an engineering geologist from Westlakes. There were no visual or olfactory signs of contamination. However, to provide reassurance, soil samples were collected as a precautionary check for potential contamination beneath the former building areas, via excavation of 3 trial pits (TP1 to TP3).

Trial pit locations were selected to provide a spread of sampling location across the site whilst also avoiding any areas of buried services or other obstructions. All locations were scanned with a Cable Avoidance Tool (CAT) prior to excavating. Trial pits were lightly compacted and backfilled with arisings on completion. Weather conditions were generally dry with some light rain during the work.

Sampling locations and trial pit logs are enclosed along with the chemical test results.

3.0 Ground Conditions

Ground conditions were logged to British Standard, BS5930 Code of Practice for Ground Investigation. The ground conditions were broadly similar to those encountered previously.

Made Ground was encountered from ground level to 0.5m below ground level (bgl). This typically comprised dark brown clayey slightly sandy gravel or dark brown slightly sandy slightly gravelly clay. The Made Ground also contained cobbles of concrete and red brick.

Natural ground was encountered beneath the Made Ground from 0.5m bgl to 1m bgl which was the maximum depth of excavation. The natural ground was light brown to orange gravelly sand which was sometimes noted to be slightly clayey and slightly silty. These superficial deposits are indicated to be Glaciofluvial Deposits on geological mapping.

The previous GI confirmed that Glacial Till deposits underlie the Glaciofluvial from depths of 3.2m to 3.6m to at least 5m beneath the site. Bedrock was not encountered but geological mapping suggests that the site is underlain by sandstone bedrock of the Wilmslow Sandstone Formation and the Chester Pebble Beds Formation, which are separated by a fault.

4.0 Sampling Strategy

Soil samples were collected in laboratory provided sampling containers (1000ml plastic tubs, 250ml amber glass jars and 60ml amber glass vials), stored in cool boxes and sent to the laboratory one day after collection. All samples were labelled with the sample location, depth and date of sampling. 3 samples of the Made Ground were collected with the objective of determining the concentrations of possible contaminants and 1 of these samples underwent leachable contaminant testing.

Analysis suites were selected to cover potential anthropogenic contaminants associated with the potential sources of contamination, as identified within the earlier reports and Conceptual Site Model, and also to take into account the encountered site conditions.

Soil samples were analysed for the following determinants:

- metals and metalloids (arsenic, water soluble boron, cadmium, chromium, hexavalent chromium, copper, lead, mercury, nickel, selenium, zinc),
- total sulphur, acid soluble sulphate, water soluble sulphate (2:1 extract) and pH.
- identification of asbestos.
- Soil Organic Matter (SOM) content.

- volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), including speciated polyaromatic hydrocarbons (PAHs), benzene, toluene, ethylbenzene, xylene (BTEX), methyl tetra-butyl ether (MTBE), phenol and speciated aliphatic/aromatic TPH analysis.

2 samples of Made Ground and 1 sample of natural ground were also scheduled for Waste Acceptance Criteria (WAC) analysis to inform disposal costs.

5.0 Contamination Test Results

Contamination test results have been compared to the same Generic Assessment Criteria (GAC) which were used for the previous GI results. GAC for human health assessment are for a residential with plant uptake end use, provided by LQM as S4UL and also the C4SL. Leachate analysis results have been compared to GAC for EQS freshwater, UK and WHO Drinking Water Standards. Influence of contaminants on potable water pipes have been assessed using UKWIR guidance.

GAC and test results are enclosed with this letter. There are no deviations noted within the test results, which indicate that best practice sampling protocols have been followed.

Human Health - Soils

All of test results on the Made Ground were below the GAC for a residential with plant uptake use. Asbestos was not detected within any of the samples.

Human Health - Water Pipes

Results were below the UKWIR GAC with the exception of some PAHs, namely phenanthrene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene and benzo(ghi)perylene.

The elevated results ranged from 6.1 mg/kg to 1.5 mg/kg, which are elevated compared to GAC of 2 mg/kg for PE pipes and 1.4 mg/kg for PVC pipes.

Controlled Waters

All of the leachate results on the sample of Made Ground were below the GAC, except for copper which was slightly elevated above the bioavailable EQS Freshwater GAC of 1 µg/l compared to a value of 7 µg/l recorded within the sample. This is, however, well below the GAC Drinking Water Standard for copper of 2,000 µg/l.

Plants

None of the samples were found to contain elevated concentrations of phytotoxic elements.

Below Ground Concrete

Two of the samples of Made Ground had water soluble sulphate results within the DS2 classification (1090 mg/kg and 1460 mg/kg). However, one result was in the DS3 classification (1830 mg/kg).

The maximum total potential sulphate is calculated to be 0.45%, which is within the DS2 classification. pH ranged from 7.9 to 8.2.

Pyrites are unlikely to be present as oxidisable sulphides were calculated at less than 0.3%.

Waste Acceptance Criteria

Two samples of Made Ground underwent WAC analysis. The results are within the inert limits except sulphate, which had a concentration of 2,700 mg/kg compared to the inert limit of 1,000 mg/kg. The result is well within the Stable Non-Reactive Hazardous Waste Limit of 20,000 mg/kg.

One sample of natural ground underwent WAC analysis, and the results were within the inert limits.

6.0 Updated Risk Assessment

The post-demolition contamination test results have been considered alongside the conclusions of the previous GI and the completion of a programme of gas monitoring. The following is noted:

Human Health

Made Ground was tested during the previous GI and one very minor elevation of dibenz(a,h)anthracene was noted in a sample collected from WS1 at 0.3m. The sample had a dibenz(a,h)anthracene concentration of 0.31 mg/kg and a Soil Organic Matter (SOM) content of 3.2%. This compares to a GAC of 0.28 mg/kg (2.5% SOM) and 0.3 mg/kg (6% SOM).

All other previous results were below the human health GAC for residential use with plant uptake.

The results of the post demolition sampling did not find any elevations above the residential with plant uptake GAC.

It is therefore concluded that the risks to human health are very low from the existing soils and remediation is therefore not considered to be required.

A capping layer is not required within garden areas, although there is no topsoil on site and therefore topsoil will need to be imported to form a suitable growing medium for plants. A minimum thickness of topsoil of 150mm is suggested.

Topsoil imported for any future landscaped areas should be tested to ensure it is suitable for use in a residential setting and meets the requirements of BS3882:2015 'Specification for topsoil'.

PAHs have been found to be elevated when compared to potable water supply pipe UKWIR standards. It is therefore concluded that PE and PVC drinking water pipes may be unsuitable at this site, if the pipes are laid in the Made Ground. Alternative types of pipes may therefore be needed, and the view of the local water supply operator considered.

A programme of gas monitoring was also carried out in 2019, comprising a total of 6 monitoring visits over 3 months. The risk posed by ground gas for the site has been assessed and the results suggest that, in accordance with C665, the site can be classified as Characteristic Situation 1 with regard to methane and carbon dioxide. Therefore, it is considered that there is a very low risk from these ground gases and that no gas protection measures will be required.

Controlled Waters

Leachable contaminants were found to be below the GAC except for one elevation which was recorded in Made Ground relative to the EQS Freshwater GAC for copper.

The site contained a 0.5m thickness of surface Made Ground over around 3m of Glaciofluvial sand (Secondary A Aquifer) over at least 1.5m of Glacial Till (clay), which is typically unproductive strata. The Environment Agency defines unproductive strata as low permeability deposits that have negligible significance for water supply or river base flow. The sandstone bedrock is expected to be present at depth and is classed as a Principal Aquifer.

Made Ground is present as a relatively thin layer across the site. Post-development many parts of the site would be covered by buildings or hardstanding which will limit the possibility of downward infiltration of rainwater through any remaining Made Ground.

The nearest surface water course is the River Mersey, located approximately 1km to the southwest of the site. There are no licenced surface water abstractions or recorded discharge consents within 500m of the site.

Considering the above, the risks to controlled waters are considered to be low.

Plants

Risks to plant health are considered to be very low to negligible.

Below Ground Concrete

Below ground concrete will need to incorporate sulphate resistance, where the concrete is in contact with the existing Made Ground. Results for the natural ground have been within the DS1:AC1 classification. However, an appropriate classification for below ground concrete in contact with the Made Ground would be DS3:AC3, based on the mean of the highest two results. Groundwater is assumed to be mobile.

Waste

WAC testing indicates that the natural ground is inert for landfill classification. The Made Ground may also be inert however it could also fall within the Stable Non-Reactive Hazardous Waste landfill classification. The final acceptance for landfill disposal will rest with the landfill operator.

Conceptual Site Model

Considering the above points, an updated Conceptual Site Model is presented below:

Conceptual Site Model (CSM)		
Source	Pathway	Receptor
Elevated PAHs within Made Ground compared to PE and PVC drinking water pipes	Direct contact	PVC and PE potable water supply pipes/human health
Elevated sulphates in Made Ground	Direct contact and migration through the ground	Below ground concrete
Potential for unforeseen contamination in areas of site not investigated	Ingestion, inhalation, dermal contact	Humans: future site users, visitors and construction workers
	Migration through the ground	Underlying aquifers
	Direct uptake from soil	Vegetation

7.0 Conclusion

Overall contamination risks have been found to be very low and the residual risks can easily be managed via appropriate selection of potable water supply pipes, incorporation of sulphate resistance within below ground concrete and by following good working practices during the construction works.

A separate Remediation Strategy Report will document the management of potential residual contamination risks and the validation requirements to ensure the risks are appropriately controlled.



A copy of this letter should be passed to MCC to assist discharge of related planning conditions.

If you have any queries, then please do not hesitate to contact us.

Yours sincerely

H Brown.

Helen Brown

Principal Engineering Geologist

Enc Exploratory Hole Location Plan

Site Photographs

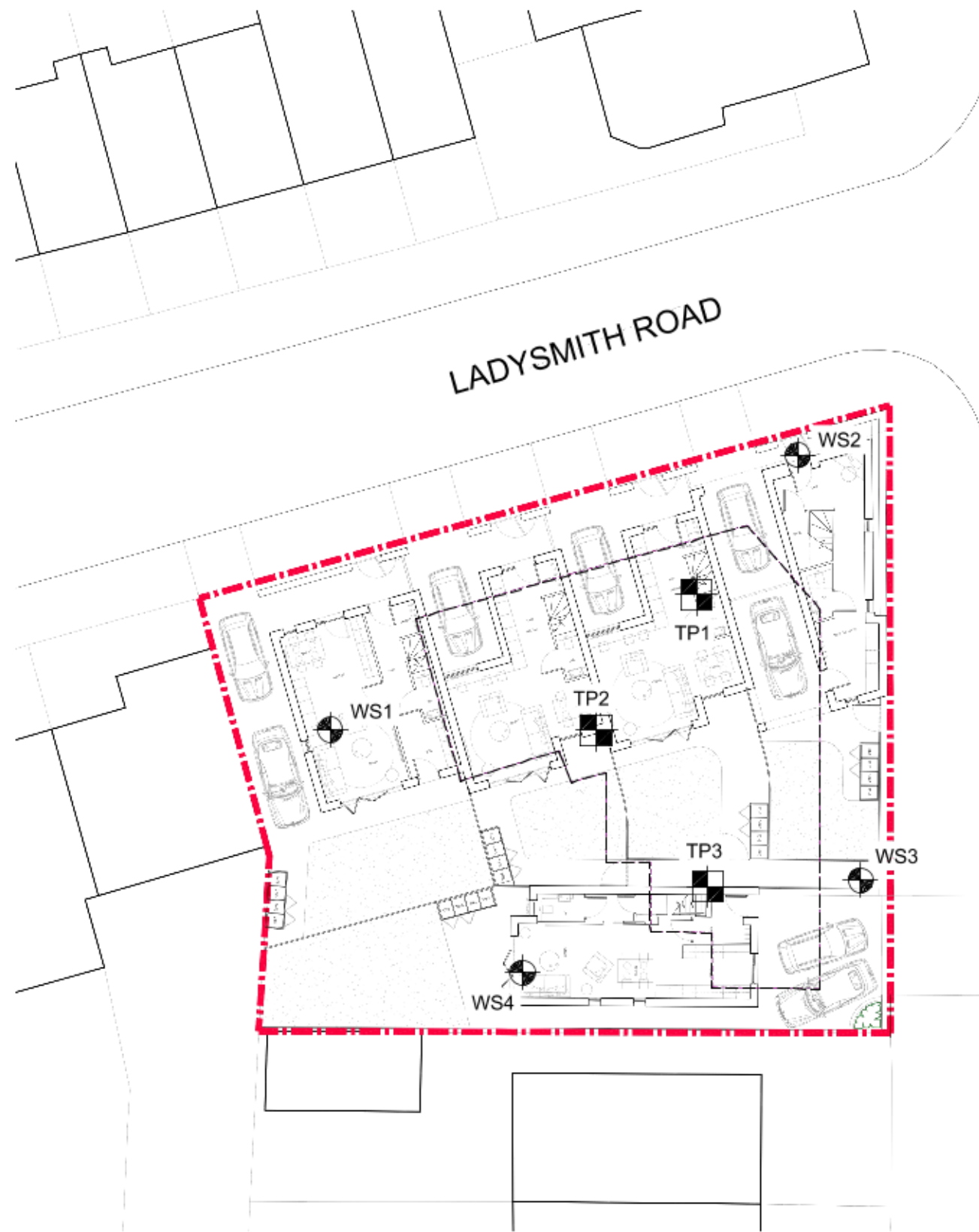
Trial Pit Logs

Chemical Test Results (laboratory report refs 20-38314-1 and 20-38320-1).

Generic Assessment Criteria



Exploratory Hole Location Plan



EXPLORATORY HOLE LOCATION PLAN
(SCALE: NTS)

GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
2. ALL LEVELS ARE IN METRES, RELATIVE TO ORDNANCE DATUM SURVEY
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS, ENGINEERS AND SPECIALISTS DRAWINGS TOGETHER WITH THEIR SPECIFICATIONS AND REPORTS.
4. DO NOT SCALE FROM THIS DRAWING, ONLY WRITTEN OR CALCULATED DIMENSIONS TO BE USED.

LEGEND

- WINDOW SAMPLE BOREHOLE (JUNE 2019)
- POST DEMOLITION SAMPLING TRIAL PITS (OCTOBER 2020)
- OUTLINE OF FORMER BUILDING ON SITE

P2	03.11.20	TRIAL PITS ADDED	MF	HB	HB
P1	JULY 19	PRELIMINARY	JS	JT	CP
Rev	Date	Details	By	Chkd	Appd

Westlakes Engineering

Client

KAMANI PROPERTY GROUP

Project

88 SCHOOL LANE, DIDSBURY

Title

EXPLORATORY HOLE LOCATION PLAN

Drawing No.	Rev
WL_1338_001	P2

Scale	NTS	Date	JULY '19
Drawn	Checked	Approved	
JS	JT	CP	

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Site Photographs



Photo 1: View of site post demolition looking northwards, towards School Lane.



Photo 2: View of site post demolition looking southeast.



Photo 3: Trial Pit 1. Showing Made Ground over natural Glaciofluvial sand.



Photo 3: Trial Pit 2. Showing Made Ground over natural Glaciofluvial sand.



Photo 4: Trial Pit 2. East edge of pit showing layering of Made Ground over Glaciofluvial sand.



Photo 5: Trial Pit 2. Close up of excavated natural Glaciofluvial sand.



Photo 6: Example of Made Ground (left) and Glaciofluvial sand (right) in sample containers.



Photo 7: Trial Pit 3. Some perched water in Made Ground flowing into pit to left of photo. Made Ground over Glaciofluvial sand.



Trial Pit Logs

Trial Pit Log

Trial Pit No
TP1
Sheet 1 of 1

Project Name: 88 School Lane, Didsbury

Project No.
1338

Co-ords: -
Level:

Date
27/10/2020

Location: Manchester

Dimensions (m): 1.50

Scale
1:25

Client: Kamani Property Group

Depth
1.00

0.30

Logged
HB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.20	ES		0.15			MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY with many cobbles. Gravel is fine to coarse, very angular to sub rounded of concrete and red brick. Cobbles are angular of whole and broken red bricks. One thin broken grey cable at 0.1m.	
				0.50			MADE GROUND: Dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse, very angular to sub rounded of concrete and red brick.	
	0.80	ES					Light brown to orange slightly clayey slightly silty gravelly SAND. Gravel is fine to coarse sub rounded of natural lithologies. (Glaciofluvial Deposits)	
				1.00			End of Pit at 1.000m	1
								2
								3
								4
								5

Remarks: No groundwater

Stability: Good

Trial Pit Log

Trial Pit No
TP2
Sheet 1 of 1

Project Name: 88 School Lane, Didsbury

Project No.
1338

Co-ords: -
Level:

Date
27/10/2020

Location: Manchester

Dimensions (m): 1.50

Depth
1.00

0.30

Scale
1:25

Logged
HB

Client: Kamani Property Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.10	ES					MADE GROUND: Dark brown clayey slightly sandy GRAVEL. Gravel is fine to coarse, very angular to sub rounded of concrete and red brick. One metal bar 0.2x0.04x0.5cm.	
	0.70	ES		0.50			Light brown to orange gravelly SAND. Gravel is fine to coarse sub rounded of natural lithologies. (Glaciofluvial Deposits)	
				1.00			End of Pit at 1.000m	1
								2
								3
								4
								5

Remarks: No groundwater. Wet on surface.

Stability: Good

Trial Pit Log

Trial Pit No
TP3
Sheet 1 of 1

Project Name: 88 School Lane, Didsbury

Project No.
1338

Co-ords: -
Level:

Date
27/10/2020

Location: Manchester

Dimensions (m): 1.50

Depth
0.90

0.30

Scale
1:25

Logged
HB

Client: Kamani Property Group

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m AOD)	Legend	Stratum Description	
	Depth	Type	Results					
	0.30	ES		0.50			MADE GROUND: Dark brown clayey slightly sandy GRAVEL. Gravel is fine to coarse, very angular to sub rounded of concrete and red brick.	
	0.90	ES		0.90			Light brown to orange gravelly SAND. Gravel is fine to coarse sub rounded of natural lithologies. (Glaciofluvial Deposits)	
							End of Pit at 0.900m	1
								2
								3
								4
								5

Remarks: No groundwater

Stability: Good



Chemical Test Results

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e: helen.brown@westlakes.co.uk

i2 Analytical Ltd.
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Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
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e: reception@i2analytical.com

Analytical Report Number : 20-38314

Project / Site name:	88 School Lane	Samples received on:	28/10/2020
Your job number:	1338	Samples instructed on/ Analysis started on:	29/10/2020
Your order number:		Analysis completed by:	06/11/2020
Report Issue Number:	1	Report issued on:	06/11/2020
Samples Analysed:	1 leachate sample - 3 soil samples		

Signed:



Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 20-38314
Project / Site name: 88 School Lane

Lab Sample Number				1666935	1666936	1666937
Sample Reference				TP1	TP2	TP3
Sample Number				Made Ground	Made Ground	Made Ground
Depth (m)				0.20	0.10	0.30
Date Sampled				27/10/2020	27/10/2020	27/10/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	13	15	12
Total mass of sample received	kg	0.001	NONE	2	1.7	2

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
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General Inorganics

pH - Automated	pH Units	N/A	MCERTS	8.2	7.9	8
Total Sulphate as SO ₄	mg/kg	50	MCERTS	3400	5400	3300
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	2900	3700	2200
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	1.5	1.8	1.1
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	1460	1830	1090
Total Sulphur	mg/kg	50	MCERTS	1300	1500	1400
Organic Matter	%	0.1	MCERTS	4.5	3.2	3.2

Heavy Metals / Metalloids

Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	19	17	18
Boron (water soluble)	mg/kg	0.2	MCERTS	1	1.3	1
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	18	18	18
Copper (aqua regia extractable)	mg/kg	1	MCERTS	45	41	51
Lead (aqua regia extractable)	mg/kg	1	MCERTS	110	94	100
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	0.5	0.8	0.6
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	15	18
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	71	70	74

Analytical Report Number: 20-38314
Project / Site name: 88 School Lane

Lab Sample Number	1666935	1666936	1666937
Sample Reference	TP1	TP2	TP3
Sample Number	Made Ground	Made Ground	Made Ground
Depth (m)	0.20	0.10	0.30
Date Sampled	27/10/2020	27/10/2020	27/10/2020
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status

Monoaromatics & Oxygenates

Benzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
p & m-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
o-xylene	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >EC5 - EC6	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC6 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aliphatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
TPH-CWG - Aliphatic >EC12 - EC16	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH-CWG - Aliphatic >EC16 - EC21	mg/kg	8	MCERTS	< 8.0	8.4	< 8.0
TPH-CWG - Aliphatic >EC21 - EC35	mg/kg	8	MCERTS	40	96	41
TPH-CWG - Aliphatic (EC5 - EC35)	mg/kg	10	MCERTS	46	100	41

TPH-CWG - Aromatic >EC5 - EC7	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC7 - EC8	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC8 - EC10	mg/kg	0.001	MCERTS	< 0.001	< 0.001	< 0.001
TPH-CWG - Aromatic >EC10 - EC12	mg/kg	1	MCERTS	< 1.0	< 1.0	4.3
TPH-CWG - Aromatic >EC12 - EC16	mg/kg	2	MCERTS	4.6	< 2.0	7.3
TPH-CWG - Aromatic >EC16 - EC21	mg/kg	10	MCERTS	27	24	27
TPH-CWG - Aromatic >EC21 - EC35	mg/kg	10	MCERTS	58	97	77
TPH-CWG - Aromatic (EC5 - EC35)	mg/kg	10	MCERTS	89	120	120

Analytical Report Number: 20-38314
Project / Site name: 88 School Lane

Lab Sample Number					1666935	1666936	1666937
Sample Reference					TP1	TP2	TP3
Sample Number					Made Ground	Made Ground	Made Ground
Depth (m)					0.20	0.10	0.30
Date Sampled					27/10/2020	27/10/2020	27/10/2020
Time Taken					None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status	Accred- itation Status			
VOCs							
Chloromethane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Chloroethane	µg/kg	1	NONE		< 1.0	< 1.0	< 1.0
Bromomethane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Vinyl Chloride	µg/kg	1	NONE		< 1.0	< 1.0	< 1.0
Trichlorofluoromethane	µg/kg	1	NONE		< 1.0	< 1.0	< 1.0
1,1-Dichloroethene	µg/kg	1	NONE		< 1.0	< 1.0	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Cis-1,2-dichloroethene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,1-Dichloroethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
2,2-Dichloropropane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Trichloromethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,1,1-Trichloroethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,2-Dichloroethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,1-Dichloropropene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Trans-1,2-dichloroethene	µg/kg	1	NONE		< 1.0	< 1.0	< 1.0
Benzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Tetrachloromethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,2-Dichloropropane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Trichloroethene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Dibromomethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Bromodichloromethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Cis-1,3-dichloropropene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Trans-1,3-dichloropropene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Toluene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,1,2-Trichloroethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,3-Dichloropropane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Dibromochloromethane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Tetrachloroethene	µg/kg	1	NONE		11	22	< 1.0
1,2-Dibromoethane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
Chlorobenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,1,1,2-Tetrachloroethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Ethylbenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
p & m-Xylene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Styrene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Tribromomethane	µg/kg	1	NONE		< 1.0	< 1.0	< 1.0
o-Xylene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,1,2,2-Tetrachloroethane	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Isopropylbenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Bromobenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
n-Propylbenzene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
2-Chlorotoluene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
4-Chlorotoluene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,3,5-Trimethylbenzene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
tert-Butylbenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,2,4-Trimethylbenzene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
sec-Butylbenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,3-Dichlorobenzene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
p-Isopropyltoluene	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0
1,2-Dichlorobenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,4-Dichlorobenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
Butylbenzene	µg/kg	1	MCERTS		< 1.0	< 1.0	< 1.0
1,2-Dibromo-3-chloropropane	µg/kg	1	ISO 17025		< 1.0	< 1.0	< 1.0

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Lab Sample Number	1666935	1666936	1666937
Sample Reference	TP1	TP2	TP3
Sample Number	Made Ground	Made Ground	Made Ground
Depth (m)	0.20	0.10	0.30
Date Sampled	27/10/2020	27/10/2020	27/10/2020
Time Taken	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accreditation Status
1,2,4-Trichlorobenzene	µg/kg	1	MCERTS
Hexachlorobutadiene	µg/kg	1	MCERTS
1,2,3-Trichlorobenzene	µg/kg	1	ISO 17025

SVOCs

Aniline	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1
Phenol	mg/kg	0.2	ISO 17025	< 0.2	< 0.2	< 0.2
2-Chlorophenol	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
Bis(2-chloroethyl)ether	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
1,3-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
1,2-Dichlorobenzene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
1,4-Dichlorobenzene	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Bis(2-chloroisopropyl)ether	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
2-Methylphenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Hexachloroethane	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Nitrobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
4-Methylphenol	mg/kg	0.2	NONE	< 0.2	< 0.2	< 0.2
Isophorone	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
2-Nitrophenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
2,4-Dimethylphenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Bis(2-chloroethoxy)methane	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
1,2,4-Trichlorobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
2,4-Dichlorophenol	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
4-Chloroaniline	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1
Hexachlorobutadiene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
4-Chloro-3-methylphenol	mg/kg	0.1	NONE	< 0.1	< 0.1	< 0.1
2,4,6-Trichlorophenol	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
2,4,5-Trichlorophenol	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
2-Methylnaphthalene	mg/kg	0.1	NONE	0.2	< 0.1	< 0.1
2-Chloronaphthalene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
Dimethylphthalate	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
2,6-Dinitrotoluene	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	0.45	< 0.05	< 0.05
2,4-Dinitrotoluene	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Dibenzofuran	mg/kg	0.2	MCERTS	0.3	< 0.2	< 0.2
4-Chlorophenyl phenyl ether	mg/kg	0.3	ISO 17025	< 0.3	< 0.3	< 0.3
Diethyl phthalate	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
4-Nitroaniline	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Fluorene	mg/kg	0.05	MCERTS	0.27	< 0.05	< 0.05
Azobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Bromophenyl phenyl ether	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Hexachlorobenzene	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Phenanthrene	mg/kg	0.05	MCERTS	4.3	1.6	1.4
Anthracene	mg/kg	0.05	MCERTS	0.83	0.32	0.3
Carbazole	mg/kg	0.3	MCERTS	0.3	< 0.3	< 0.3
Dibutyl phthalate	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2
Anthraquinone	mg/kg	0.3	MCERTS	0.4	< 0.3	< 0.3
Fluoranthene	mg/kg	0.05	MCERTS	6.1	3.2	2.6
Pyrene	mg/kg	0.05	MCERTS	5.3	2.9	2.5
Butyl benzyl phthalate	mg/kg	0.3	ISO 17025	< 0.3	< 0.3	< 0.3
Benzo(a)anthracene	mg/kg	0.05	MCERTS	3.4	1.7	1.5
Chrysene	mg/kg	0.05	MCERTS	3.2	1.4	1.1

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Lab Sample Number				1666935	1666936	1666937
Sample Reference				TP1	TP2	TP3
Sample Number				Made Ground	Made Ground	Made Ground
Depth (m)				0.20	0.10	0.30
Date Sampled				27/10/2020	27/10/2020	27/10/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Accred- itation Status			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	4.2	2	1.5
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	1.2	0.48	0.58
Benzo(a)pyrene	mg/kg	0.05	MCERTS	2.9	1.3	1.1
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	1.6	0.72	0.63
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	0.47	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	1.8	0.93	0.71

U/S = Unsuitable Sample I/S = Insufficient Sample



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Lab Sample Number	1666938			
Sample Reference	TP3			
Sample Number	Made Ground			
Depth (m)	0.30			
Date Sampled	27/10/2020			
Time Taken	None Supplied			
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accred- itation Status	Accred- itation Number

Heavy Metals / Metalloids

Arsenic (dissolved)	µg/l	1	ISO 17025	< 1.0
Boron (dissolved)	µg/l	10	ISO 17025	44
Cadmium (dissolved)	µg/l	0.08	ISO 17025	< 0.08
Chromium (dissolved)	µg/l	0.4	ISO 17025	1.2
Copper (dissolved)	µg/l	0.7	ISO 17025	7
Lead (dissolved)	µg/l	1	ISO 17025	5
Mercury (dissolved)	µg/l	0.5	ISO 17025	< 0.5
Nickel (dissolved)	µg/l	0.3	ISO 17025	< 0.3
Selenium (dissolved)	µg/l	4	ISO 17025	< 4.0
Zinc (dissolved)	µg/l	0.4	ISO 17025	4.3

Monoaromatics & Oxygenates

Benzene	µg/l	1	ISO 17025	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	10	NONE	< 10

Petroleum Hydrocarbons

TPH-CWG - Aliphatic >C5 - C6	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C6 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aliphatic >C10 - C12	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C12 - C16	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic >C21 - C35	µg/l	10	NONE	< 10
TPH-CWG - Aliphatic (C5 - C35)	µg/l	10	NONE	< 10

TPH-CWG - Aromatic >C5 - C7	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C7 - C8	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C8 - C10	µg/l	1	ISO 17025	< 1.0
TPH-CWG - Aromatic >C10 - C12	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C12 - C16	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C16 - C21	µg/l	10	NONE	< 10
TPH-CWG - Aromatic >C21 - C35	µg/l	10	NONE	< 10
TPH-CWG - Aromatic (C5 - C35)	µg/l	10	NONE	< 10



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Lab Sample Number				1666938	
Sample Reference				TP3	
Sample Number				Made Ground	
Depth (m)				0.30	
Date Sampled				27/10/2020	
Time Taken				None Supplied	
Analytical Parameter (Leachate Analysis)		Units	Limit of detection mg /L	Accred- itation Status	

VOCs

Chloromethane	µg/l	1	NONE	< 1.0
Chloroethane	µg/l	1	NONE	< 1.0
Bromomethane	µg/l	1	NONE	< 1.0
Vinyl Chloride	µg/l	1	NONE	< 1.0
1,1-dichloroethane	µg/l	1	NONE	< 1.0
1,1,2-Trichloro 1,2,2-Trifluoroethane	µg/l	1	NONE	< 1.0
Cis-1,2-dichloroethene	µg/l	1	NONE	< 1.0
MTBE (Methyl Tertiary Butyl Ether)	µg/l	1	NONE	< 1.0
1,1-dichloroethane	µg/l	1	NONE	< 1.0
2,2-Dichloropropane	µg/l	1	NONE	< 1.0
Trichloromethane	µg/l	1	NONE	< 1.0
1,1,1-Trichloroethane	µg/l	1	NONE	< 1.0
1,2-dichloroethane	µg/l	1	NONE	< 1.0
1,1-Dichloropropene	µg/l	1	NONE	< 1.0
Trans-1,2-dichloroethene	µg/l	1	NONE	< 1.0
Benzene	µg/l	1	ISO 17025	< 1.0
Tetrachloromethane	µg/l	1	NONE	< 1.0
1,2-dichloropropane	µg/l	1	NONE	< 1.0
Trichloroethene	µg/l	1	NONE	< 1.0
Dibromomethane	µg/l	1	NONE	< 1.0
Bromodichloromethane	µg/l	1	NONE	< 1.0
Cis-1,3-dichloropropene	µg/l	1	NONE	< 1.0
Trans-1,3-dichloropropene	µg/l	1	NONE	< 1.0
Toluene	µg/l	1	ISO 17025	< 1.0
1,1,2-Trichloroethane	µg/l	1	NONE	< 1.0
1,3-Dichloropropane	µg/l	1	NONE	< 1.0
Dibromochloromethane	µg/l	1	NONE	< 1.0
Tetrachloroethene	µg/l	1	NONE	< 1.0
1,2-Dibromoethane	µg/l	1	NONE	< 1.0
Chlorobenzene	µg/l	1	NONE	< 1.0
1,1,1,2-Tetrachloroethane	µg/l	1	NONE	< 1.0
Ethylbenzene	µg/l	1	ISO 17025	< 1.0
p & m-xylene	µg/l	1	ISO 17025	< 1.0
Styrene	µg/l	1	NONE	< 1.0
Tribromomethane	µg/l	1	NONE	< 1.0
o-xylene	µg/l	1	ISO 17025	< 1.0
1,1,2,2-Tetrachloroethane	µg/l	1	NONE	< 1.0
Isopropylbenzene	µg/l	1	NONE	< 1.0
Bromobenzene	µg/l	1	NONE	< 1.0
n-Propylbenzene	µg/l	1	NONE	< 1.0
2-Chlorotoluene	µg/l	1	NONE	< 1.0
4-Chlorotoluene	µg/l	1	NONE	< 1.0
1,3,5-Trimethylbenzene	µg/l	1	NONE	< 1.0
ter-Butylbenzene	µg/l	1	NONE	< 1.0
1,2,4-Trimethylbenzene	µg/l	1	NONE	< 1.0
sec-Butylbenzene	µg/l	1	NONE	< 1.0
1,3-dichlorobenzene	µg/l	1	NONE	< 1.0
p-Isopropyltoluene	µg/l	1	NONE	< 1.0
1,2-dichlorobenzene	µg/l	1	NONE	< 1.0
1,4-dichlorobenzene	µg/l	1	NONE	< 1.0
Butylbenzene	µg/l	1	NONE	< 1.0
1,2-Dibromo-3-chloropropane	µg/l	1	NONE	< 1.0
1,2,4-Trichlorobenzene	µg/l	1	NONE	< 1.0

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Lab Sample Number					1666938
Sample Reference					TP3
Sample Number					Made Ground
Depth (m)					0.30
Date Sampled					27/10/2020
Time Taken					None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accred- itation Status	Accred- itation Status	
Hexachlorobutadiene	µg/l	0.1	NONE		< 0.1
1,2,3-Trichlorobenzene	µg/l	1	NONE		< 1.0

SVOCs

Aniline	µg/l	0.05	NONE		< 0.05
Phenol	µg/l	0.05	NONE		< 0.05
2-Chlorophenol	µg/l	0.05	NONE		< 0.05
Bis(2-chloroethyl)ether	µg/l	0.05	NONE		< 0.05
1,3-Dichlorobenzene	µg/l	0.05	NONE		< 0.05
1,2-Dichlorobenzene	µg/l	0.05	NONE		< 0.05
1,4-Dichlorobenzene	µg/l	0.05	NONE		< 0.05
Bis(2-chloroisopropyl)ether	µg/l	0.05	NONE		< 0.05
2-Methylphenol	µg/l	0.05	NONE		< 0.05
Hexachloroethane	µg/l	0.05	NONE		< 0.05
Nitrobenzene	µg/l	0.05	NONE		< 0.05
4-Methylphenol	µg/l	0.05	NONE		< 0.05
Isophorone	µg/l	0.05	NONE		< 0.05
2-Nitrophenol	µg/l	0.05	NONE		< 0.05
2,4-Dimethylphenol	µg/l	0.05	NONE		< 0.05
Bis(2-chloroethoxy)methane	µg/l	0.05	NONE		< 0.05
1,2,4-Trichlorobenzene	µg/l	0.05	NONE		< 0.05
Naphthalene	µg/l	0.01	NONE		< 0.01
2,4-Dichlorophenol	µg/l	0.05	NONE		< 0.05
4-Chloroaniline	µg/l	0.05	NONE		< 0.05
Hexachlorobutadiene	µg/l	0.05	NONE		< 0.05
4-Chloro-3-methylphenol	µg/l	0.05	NONE		< 0.05
2,4,6-Trichlorophenol	µg/l	0.05	NONE		< 0.05
2,4,5-Trichlorophenol	µg/l	0.05	NONE		< 0.05
2-Methylnaphthalene	µg/l	0.05	NONE		< 0.05
2-Chloronaphthalene	µg/l	0.05	NONE		< 0.05
Dimethylphthalate	µg/l	0.05	NONE		< 0.05
2,6-Dinitrotoluene	µg/l	0.05	NONE		< 0.05
Acenaphthylene	µg/l	0.01	NONE		< 0.01
Acenaphthene	µg/l	0.01	NONE		< 0.01
2,4-Dinitrotoluene	µg/l	0.05	NONE		< 0.05
Dibenzofuran	µg/l	0.05	NONE		< 0.05
4-Chlorophenyl phenyl ether	µg/l	0.05	NONE		< 0.05
Diethyl phthalate	µg/l	0.05	NONE		< 0.05
4-Nitroaniline	µg/l	0.05	NONE		< 0.05
Fluorene	µg/l	0.01	NONE		< 0.01
Azobenzene	µg/l	0.05	NONE		< 0.05
Bromophenyl phenyl ether	µg/l	0.05	NONE		< 0.05
Hexachlorobenzene	µg/l	0.02	NONE		< 0.02
Phenanthrene	µg/l	0.01	NONE		< 0.01
Anthracene	µg/l	0.01	NONE		< 0.01
Carbazole	µg/l	0.05	NONE		< 0.05
Dibutyl phthalate	µg/l	0.05	NONE		< 0.05
Anthraquinone	µg/l	0.05	NONE		< 0.05
Fluoranthene	µg/l	0.01	NONE		< 0.01
Pyrene	µg/l	0.01	NONE		< 0.01
Butyl benzyl phthalate	µg/l	0.05	NONE		< 0.05
Benzo(a)anthracene	µg/l	0.01	NONE		< 0.01
Chrysene	µg/l	0.01	NONE		< 0.01
Benzo(b)fluoranthene	µg/l	0.01	NONE		< 0.01



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Lab Sample Number					1666938
Sample Reference					TP3
Sample Number					Made Ground
Depth (m)					0.30
Date Sampled					27/10/2020
Time Taken					None Supplied
Analytical Parameter (Leachate Analysis)	Units	Limit of detection	Accred- itation Status	Accred- itation Status	
Benzo(k)fluoranthene	µg/l	0.01	NONE		< 0.01
Benzo(a)pyrene	µg/l	0.01	NONE		< 0.01
Indeno(1,2,3-cd)pyrene	µg/l	0.01	NONE		< 0.01
Dibenz(a,h)anthracene	µg/l	0.01	NONE		< 0.01
Benzo(ghi)perylene	µg/l	0.01	NONE		< 0.01

U/S = Unsuitable Sample I/S = Insufficient Sample

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* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1666935	TP1	Made Ground	0.2	Brown clay and loam with gravel.
1666936	TP2	Made Ground	0.1	Brown clay and loam with gravel and vegetation.
1666937	TP3	Made Ground	0.3	Brown loam and clay with gravel and vegetation.

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Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
NRA Leachate Prep	10:1 extract with de-ionised water shaken for 24 hours then filtered.	In-house method based on National Rivers Authority	L020-PL	W	NONE
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Metals by ICP-OES in leachate	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L039-PL	W	ISO 17025
Boron in leachate	Determination of boron in leachate. Sample acidified and followed by ICP-OES.	In-house method based on MEWAM	L039-PL	W	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 °C)	In house method.	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Semi-volatile organic compounds in leachate	Determination of semi-volatile organic compounds in leachate by extraction in dichloromethane followed by GC-MS.	In-house method based on USEPA 8270	L070-PL	W	NONE
Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds in soil by extraction in dichloromethane and hexane followed by GC-MS.	In-house method based on USEPA 8270	L064-PL	D	MCERTS

Analytical Report Number : 20-38314
Project / Site name: 88 School Lane

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
TPHCWG (Leachates)	Determination of dichloromethane extractable hydrocarbons in leachate by GC-MS.	In-house method	L070-PL	W	NONE
Volatile organic compounds in leachate	Determination of volatile organic compounds in leachate by headspace GC-MS	In-house method based on USEPA8260	L073B-PL	W	NONE
Volatile organic compounds in soil	Determination of volatile organic compounds in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in soil (Monoaromatics)	Determination of BTEX in soil by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	MCERTS
BTEX and MTBE in leachates (Monoaromatics)	Determination of BTEX and MTBE in leachates by headspace GC-MS.	In-house method based on USEPA8260	L073B-PL	W	ISO 17025
TPHCWG (Soil)	Determination of hexane extractable hydrocarbons in soil by GC-MS/GC-FID.	In-house method with silica gel split/clean up.	L088/76-PL	W	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

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Analytical Report Number : 20-38320

Project / Site name:	88 School Lane	Samples received on:	28/10/2020
Your job number:	1338	Samples instructed on/ Analysis started on:	29/10/2020
Your order number:		Analysis completed by:	09/11/2020
Report Issue Number:	1	Report issued on:	09/11/2020
Samples Analysed:	3 wac multi samples		

Signed: 

Zina Abdul Razzak
Senior Quality Specialist
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

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Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

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Waste Acceptance Criteria Analytical Results

Report No:	20-38320					
				Client: WESTLAKESC		
Location	88 School Lane					
Lab Reference (Sample Number)	1666991			Landfill Waste Acceptance Criteria		
				Limits		
Sampling Date	27/10/2020			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP1 Made Ground					
Depth (m)	0.20					
Solid Waste Analysis						
TOC (%)**	1.7			3%	5%	6%
Loss on Ignition (%) **	5.1			--	--	10%
BTEX (µg/kg) **	< 10			6000	--	--
Sum of PCBs (mg/kg) **	< 0.30			1	--	--
Mineral Oil (mg/kg) #	< 10			500	--	--
Total PAH (WAC-17) (mg/kg)	22.8			100	--	--
pH (units)**	4.8			--	>6	--
Acid Neutralisation Capacity (mol / kg)	-21			--	To be evaluated	To be evaluated
Eluate Analysis	2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test	
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)	
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2
Barium *	0.027	0.057		0.54	20	100
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1
Chromium *	0.0011	0.0018		0.017	0.5	10
Copper *	0.071	0.044		0.47	2	50
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2
Molybdenum *	< 0.0030	< 0.0030		0.022	0.5	10
Nickel *	0.0032	0.0048		0.046	0.4	10
Lead *	0.0055	< 0.0050		0.040	0.5	10
Antimony *	< 0.0050	< 0.0050		0.042	0.06	0.7
Selenium *	< 0.010	< 0.010		< 0.040	0.1	0.5
Zinc *	0.023	0.0113		0.13	4	50
Chloride *	7.8	< 4.0		< 15	800	15000
Fluoride	0.055	0.12		1.1	10	150
Sulphate *	390	59		960	1000	20000
TDS*	760	180		2500	4000	60000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-
DOC	39	40		400	500	800
Leach Test Information						
Stone Content (%)	< 0.1					
Sample Mass (kg)	2.0					
Dry Matter (%)	87					
Moisture (%)	13					
Stage 1						
Volume Eluate L2 (litres)	0.32					
Filtered Eluate VE1 (litres)	0.20					
Results are expressed on a dry weight basis, after correction for moisture content where applicable.				* = UKAS accredited (liquid eluate analysis only)		
Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation				** = MCFRTS accredited		

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

* = UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

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Waste Acceptance Criteria Analytical Results

Report No:	20-38320					
				Client: WESTLAKESC		
Location	88 School Lane					
Lab Reference (Sample Number)	1666992			Landfill Waste Acceptance Criteria		
Sampling Date	27/10/2020			Limits		
Sample ID	TP1 Natural			Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Depth (m)	0.80					
Solid Waste Analysis						
TOC (%)**	0.2			3%	5%	6%
Loss on Ignition (%) **	1.7			--	--	10%
BTEX (µg/kg) **	< 10			6000	--	--
Sum of PCBs (mg/kg) **	< 0.30			1	--	--
Mineral Oil (mg/kg) #	< 10			500	--	--
Total PAH (WAC-17) (mg/kg)	< 0.85			100	--	--
pH (units)**	6.3			--	>6	--
Acid Neutralisation Capacity (mol / kg)	-8.4			--	To be evaluated	To be evaluated
Eluate Analysis				Limit values for compliance leaching test		
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)	2:1	8:1		Cumulative 10:1	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)	
	mg/l	mg/l		mg/kg		
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2
Barium *	0.10	0.026		0.34	20	100
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1
Chromium *	< 0.0010	0.0023		0.021	0.5	10
Copper *	0.044	0.0067		0.11	2	50
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2
Molybdenum *	< 0.0030	< 0.0030		< 0.020	0.5	10
Nickel *	0.0022	0.0016		0.016	0.4	10
Lead *	< 0.0050	< 0.0050		0.034	0.5	10
Antimony *	< 0.0050	< 0.0050		< 0.020	0.06	0.7
Selenium *	< 0.010	< 0.010		0.085	0.1	0.5
Zinc *	0.037	0.0186		0.21	4	50
Chloride *	< 4.0	< 4.0		< 15	800	15000
Fluoride	< 0.050	< 0.050		0.24	10	150
Sulphate *	27	13		140	1000	20000
TDS*	260	58		810	4000	60000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-
DOC	5.9	9.4		90	500	800
Leach Test Information						
Stone Content (%)	< 0.1					
Sample Mass (kg)	2.0					
Dry Matter (%)	89					
Moisture (%)	11					
Stage 1						
Volume Eluate L2 (litres)	0.32					
Filtered Eluate VE1 (litres)	0.20					
Results are expressed on a dry weight basis, after correction for moisture content where applicable.						
Stated limits are for guidance only and IZ cannot be held responsible for any discrepancies with current legislation						
** = MICERTS accredited						
* = UKAS accredited (liquid eluate analysis only)						

Results are expressed on a dry weight basis, after correction for moisture content where applicable.

* = UKAS accredited (liquid eluate analysis only)

Stated limits are for guidance only and i2 cannot be held responsible for any discrepancies with current legislation

** = MCERTS accredited

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
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Iss No 20-38320-1 88 School Lane 1338

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The results included within the report are representative of the samples submitted for analysis.

Page 3 of 7

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Waste Acceptance Criteria Analytical Results							
Report No:	20-38320						
					Client: WESTLAKESC		
Location	88 School Lane						
Lab Reference (Sample Number)	1666993				Landfill Waste Acceptance Criteria		
					Limits		
Sampling Date	27/10/2020				Inert Waste Landfill	Stable Non-reactive HAZARDOUS waste in non-hazardous Landfill	Hazardous Waste Landfill
Sample ID	TP3 Made Ground						
Depth (m)	0.30						
Solid Waste Analysis							
TOC (%)**	1.7				3%	5%	6%
Loss on Ignition (%) **	4.5				--	--	10%
BTEX (µg/kg) **	< 10				6000	--	--
Sum of PCBs (mg/kg) **	< 0.30				1	--	--
Mineral Oil (mg/kg) #	< 10				500	--	--
Total PAH (WAC-17) (mg/kg)	10.6				100	--	--
pH (units)**	7.9				--	>6	--
Acid Neutralisation Capacity (mol / kg)	8.3				--	To be evaluated	To be evaluated
Eluate Analysis		2:1	8:1		Cumulative 10:1	Limit values for compliance leaching test	
(BS EN 12457 - 3 preparation utilising end over end leaching procedure)		mg/l	mg/l		mg/kg	using BS EN 12457-3 at L/S 10 l/kg (mg/kg)	
Arsenic *	< 0.010	< 0.010		< 0.050	0.5	2	25
Barium *	0.068	0.064		0.64	20	100	300
Cadmium *	< 0.0005	< 0.0005		< 0.0020	0.04	1	5
Chromium *	0.0015	< 0.0010		0.0092	0.5	10	70
Copper *	0.056	0.016		0.21	2	50	100
Mercury *	< 0.0015	< 0.0015		< 0.010	0.01	0.2	2
Molybdenum *	0.037	0.011		0.14	0.5	10	30
Nickel *	0.0034	0.0016		0.018	0.4	10	40
Lead *	0.0054	< 0.0050		0.040	0.5	10	50
Antimony *	< 0.0050	< 0.0050		0.031	0.06	0.7	5
Selenium *	< 0.010	< 0.010		0.055	0.1	0.5	7
Zinc *	0.030	0.0066		0.095	4	50	200
Chloride *	< 4.0	< 4.0		< 15	800	15000	25000
Fluoride	0.44	0.54		5.3	10	150	500
Sulphate *	1100	150		2700	1000	20000	50000
TDS*	970	270		3600	4000	60000	100000
Phenol Index (Monohydric Phenols) *	< 0.13	< 0.13		< 0.50	1	-	-
DOC	21	15		160	500	800	1000
Leach Test Information							
Stone Content (%)	< 0.1						
Sample Mass (kg)	2.0						
Dry Matter (%)	88						
Moisture (%)	12						
Stage 1							
Volume Eluate L2 (litres)	0.31						
Filtered Eluate VE1 (litres)	0.22						
Results are expressed on a dry weight basis, after correction for moisture content where applicable.				** = UKAS accredited (liquid eluate analysis only)			
Stated limits are for guidance only and I2 cannot be held responsible for any discrepancies with current legislation				** = MCERTS accredited			

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes as defined by the Waste (England and Wales) Regulations 2011 (as amended) and EA Guidance WM3.
This analysis is only applicable for landfill acceptance criteria (The Environmental Permitting (England and Wales) Regulations) and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Analytical Report Number : 20-38320

Project / Site name: 88 School Lane

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1666991	TP1	Made Ground	0.2	Brown clay and loam with gravel.
1666992	TP1	Natural	0.8	Brown clay and sand with gravel.
1666993	TP3	Made Ground	0.3	Brown loam and clay with gravel and vegetation.

Analytical Report Number : 20-38320

Project / Site name: 88 School Lane

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Preparation WAC leachate		In-house method	L043-PL	W	NONE
Speciated WAC-17 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270. MCERTS accredited except Coronene.	L064-PL	D	MCERTS
Chloride in WAC leachate (BS EN 12457-3 Prep)	Determination of Chloride colorimetrically by discrete analyser.	In house based on MEWAM Method ISBN 0117516260.	L082-PL	W	ISO 17025
Fluoride in WAC leachate (BS EN 12457-3 Prep)	Determination of fluoride in leachate by 1:1ratio with a buffer solution followed by Ion Selective Electrode.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L033-PL	W	ISO 17025
Phenol Index in WAC leachate (BS EN 12457-3 Prep)	Determination of monohydric phenols in leachate by continuous flow analyser.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	ISO 17025
Sulphate in WAC leachate (BS EN 12457-3 Prep)	Determination of sulphate in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025
TDS in WAC leachate (BS EN 12457-3 Prep)	Determination of total dissolved solids in leachate by electrometric measurement.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L031-PL	W	NONE
DOC in WAC leachate (BS EN 12457-3 Prep)	Determination of dissolved organic carbon in leachate by TOC/DOC NDIR analyser.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L037-PL	W	NONE
Acid neutralisation capacity of soil	Determination of acid neutralisation capacity by addition of acid or alkali followed by electronic probe.	In-house method based on Guidance on Sampling and Testing of Wastes to Meet Landfill Waste Acceptance	L046-PL	W	NONE
Loss on ignition of soil @ 450oC	Determination of loss on ignition in soil by gravimetrically with the sample being ignited in a muffle furnace.	In house method.	L047-PL	D	MCERTS
Mineral Oil in Soil C10 - C40	Determination of dichloromethane/hexane extractable hydrocarbons in soil by GC-MS.	In-house method based on USEPA 8270	L076-PL	D	NONE
pH in soil	Determination of pH in soil by addition of water followed by electrometric measurement.	In house method.	L005-PL	W	MCERTS
Total organic carbon in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L023-PL	D	MCERTS
Metals in WAC leachate (BS EN 12457-3 Prep)	Determination of metals in leachate by acidification followed by ICP-OES.	In-house method based on Standard Methods for the Examination of Water and Waste Water, 21st Ed.	L039-PL	W	ISO 17025

Analytical Report Number : 20-38320

Project / Site name: 88 School Lane

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
PCB's by GC-MS in soil	Determination of PCB by extraction with acetone and hexane followed by GC-MS.	In-house method based on USEPA 8082	L027-PL	D	MCERTS
BTEX (Sum of BTEX compounds) in soil	Determination of BTEX in soil by headspace GC-MS. Individual components MCERTS accredited	In-house method based on USEPA8260	L073B-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.



Generic Assessment Criteria



Soil Assessment Values (mg/kg) – S4UL			
Metals	Residential with home-grown produce	Residential without home-grown produce	Source
Arsenic	37	40	CIEH/LQM/C4SL
Beryllium	1.7	1.7	CIEH/LQM
Boron	290	11,000	CIEH/LQM
Cadmium	11 (22)	85 (150)	CIEH/LQM (C4SL)
Chromium III	910	910	CIEH/LQM
Chromium VI	6 (21)	6 (21)	CIEH/LQM (C4SL)
Copper	2,400	7,100	CIEH/LQM
Lead	200	310	C4SL
Mercury elemental	1.2	1.2	CIEH/LQM
Mercury Inorganic	40	56	CIEH/LQM
Mercury Methyl	11	15	CIEH/LQM
Nickel	130	180	CIEH/LQM
Selenium	250	430	CIEH/LQM
Vanadium	410	1,200	CIEH/LQM
Zinc	3,700	40,000	CIEH/LQM
Generic assessment criteria (GAC) taken from the 'Chartered Institute of Environmental Health / Land Quality Management 'The LQM/CIEH S4ULs for Human Health Risk Assessment'.			



Residential Land Use Value (CIEH/LQM) – S4UL (RW and RWO = with and without plant uptake)

Petroleum Hydrocarbons	1% RW	1% RWO	2.5% RW	2.5% RWO	6% RW	6% RWO
Aliphatic EC 5-6	42	42	78	78	160	160
Aliphatic EC >6-8	100	100	230	230	530	530
Aliphatic EC >8-10	27	27	65	65	150	150
Aliphatic EC >10-12	130	130	330	330	760	770
Aliphatic EC >12-16	1,100	1,100	2,400	2,400	4,300	4,400
Aliphatic EC >16-35	65,000	65,000	92,000	92,000	110,000	110,000
Aliphatic EC >35-44	65,000	65,000	92,000	92,000	110,000	110,000
Aromatic EC 5-7 (benzene)	70	370	140	690	300	1,400
Aromatic EC >7-8 (toluene)	130	860	290	1,800	660	3,900
Aromatic EC >8-10	34	47	83	110	190	270
Aromatic EC >10-12	74	250	180	590	380	1,200
Aromatic EC >12-16	140	1,800	330	2,300	660	2,500
Aromatic EC >16-21	260	1,900	540	1,900	930	1,900
Aromatic EC >21-35	1,100	1,900	1,500	1,900	1,700	1,900
Aromatic EC >35-44	1,100	1,900	1,500	1,900	1,700	1,900
Aliphatic+Aromatic EC >44-70	1,600	1,900	1,800	1,900	1,900	1,900
Benzene	0.087	0.38	0.17	0.70	0.37	1.4
Ethylbenzene	47	83	110	190	260	440
Toluene	130	880	290	1,900	660	3,900
O-xylene	60	88	140	210	330	480
M-xylene	59	82	140	190	320	450
P-xylene	56	79	130	180	310	430
Phenol	120	440	200	690	380	1,200
Generic assessment criteria (GAC) taken from the 'Chartered Institute of Environmental Health / Land Quality Management 'The LQM/CIEH S4ULs for Human Health Risk Assessment'.						



Residential Land Use Value (CIEH/LQM) – S4UL (RW and RWO = with and without plant uptake)

Polyaromatic Hydrocarbons	1% RW	1% RWO	2.5% RW	2.5% RWO	6% RW	6% RWO
Acenaphthene	210	3,000	510	4,700	1,100	6,000
Acenaphthylene	170	2,900	420	4,600	920	6,000
Anthracene	2,400	31,000	5,400	35,000	11,000	37,000
Benz(a)anthracene	7.2	11	11	14	13	15
Benzo(a)pyrene (only)	2.2	3.2	2.7	3.2	3.0	3.2
Benzo(b)fluoranthene	2.6	3.9	3.3	4.0	3.7	4.0
Benzo(ghi)perylene	320	360	340	360	350	360
Benzo(k)fluoranthene	77	110	93	110	100	110
Chrysene	15	30	22	31	27	32
Dibenz(ah)anthracene	0.24	0.31	0.28	0.32	0.3	0.32
Fluoranthene	280	1,500	560	1,600	890	1,600
Fluorene	170	2,800	400	3,800	860	4,500
Indeno(123-cd)pyrene	27	45	36	46	41	46
Naphthalene	2.3	2.3	5.6	5.6	13	13
Phenanthrene	95	1,300	220	1,500	440	1,500
Pyrene	620	3,700	1,200	3,800	2,000	3,800
Coal Tar (Bap as surrogate marker)	0.79	1.2	0.98	1.2	1.1	1.2
Generic assessment criteria (GAC) taken from the 'Chartered Institute of Environmental Health / Land Quality Management 'The LQM/CIEH S4ULs for Human Health Risk Assessment'.						



Residential Land Use Value (CIEH/LQM) – S4UL (RW and RWO = with and without plant uptake)

Chloroalkanes & Alkenes	1% RW	1% RWO	2.5% RW	2.5% RWO	6% RW	6% RWO
1,2-Dichloroethane	0.0071	0.0092	0.011	0.013	0.019	0.023
1,1,1-Trichloroethane	8.8	9.0	18	18	39	40
1,1,2,2- Tetrachloroethane	1.6	3.9	3.4	8.0	7.5	17
1,1,1,2- Tetrachloroethane	1.2	1.5	2.8	3.5	6.4	8.2
Tetrachloroethene	0.18	0.18	0.39	0.40	0.90	0.92
Tetrachloromethane (aka carbon tetrachloride)	0.026	0.026	0.056	0.056	0.13	0.13
Trichloroethene	0.016	0.017	0.034	0.036	0.075	0.080
Trichloromethane (aka chloroform)	0.91	1.2	1.7	2.1	3.4	4.2
Chloroethene (aka vinyl chloride)	0.00064	0.00077	0.00087	0.0010	0.0014	0.0015
Generic assessment criteria (GAC) taken from the 'Chartered Institute of Environmental Health / Land Quality Management 'The LQM/CIEH S4ULs for Human Health Risk Assessment'.						



Residential Land Use Value (CIEH/LQM) – S4UL (RW and RWO = with and without plant uptake)

Chlorobenzenes	1% RW	1% RWO	2.5% RW	2.5% RWO	6% RW	6% RWO
Chlorobenzene	0.46	0.46	1.0	1.0	2.4	2.4
1,2-Dichlorobenzene	23	24	55	57	130	130
1,3-Dichlorobenzene	0.40	0.44	1.0	1.1	2.3	2.5
1,4-Dichlorobenzene	61	61	150	150	350	350
1,2,3-Trichlorobenzene	1.5	1.5	3.6	3.7	8.6	8.8
1,2,4-Trichlorobenzene	2.6	2.6	6.4	6.4	15	15
1,3,5-Trichlorobenzene	0.33	0.33	0.81	0.81	1.9	1.9
1,2,3,4-Tetrachlorobenzene	15	24	36	56	78	120
1,2,3,5-Tetrachlorobenzene	0.66	0.75	1.6	1.9	3.7	4.3
1,2,4,5-Tetrachlorobenzene	0.33	0.73	0.77	1.7	1.6	3.5
Pentachlorobenzene	5.8	19	12	30	22	38
Hexachlorobenzene	1.8 (0.2) ^{vap}	4.1 (0.2) ^{vap}	3.3 (0.5) ^{vap}	5.7 (0.5) ^{vap}	4.9	6.7 (1.2) ^{vap}

Other Organics	1% RW	1% RWO	2.5% RW	2.5% RWO	6% RW	6% RWO
Chlorophenols (except pentachlorophenol)	0.87	94	2.0	150	4.5	210
Pentachlorophenol	0.22	27 (16.4) ^{vap}	0.52	29	1.2	31
Carbon disulphide (aka carbon bisulphide, carbon sulphide ad dithiocarbonic anhydride)	0.14	0.14	0.29	0.29	0.62	0.62
Hexachlorobutadiene (aka perchlorobutadiene, 1,1,2,3,4,4-hexachloro-1,3-butadiene, 1,3-hexachlorobutadiene, HCB or HCBd)	0.29	0.32	0.7	0.78	1.6	1.8
Generic assessment criteria (GAC) taken from the 'Chartered Institute of Environmental Health / Land Quality Management 'The LQM/CIEH S4ULs for Human Health Risk Assessment'.						



Final Category 4 Screening Levels (C4SL)

Substance	Residential (with home- grown produce)	Residential (without home- grown produce)	Allotments	Commercial	Public Open Space 1	Public Open Space 2
Arsenic	37 mg/kg	40 mg/kg	49 mg/kg	640 mg/kg	79 mg/kg	170 mg/kg
Benzene	0.87 mg/kg	3.3 mg/kg	0.18 mg/kg	98 mg/kg	140 mg/kg	230 mg/kg
Benzo(a)pyrene	5.0 mg/kg	5.3 mg/kg	5.7 mg/kg	77 mg/kg	10 mg/kg	21 mg/kg
Cadmium	22 mg/kg	150 mg/kg	3.9 mg/kg	410 mg/kg	220 mg/kg	880 mg/kg
Chromium VI	21 mg/kg	21 mg/kg	170 mg/kg	49 mg/kg	21 mg/kg	250 mg/kg
Lead	200 mg/kg	310 mg/kg	80 mg/kg	2300 mg/kg	630 mg/kg	1300 mg/kg

This table should be read in conjunction with the Final C4SL R&D report.

C4SL reproduced from SP1010: Development of Category 4 Screening Levels for Assessment of Land Affected by Contamination – Policy Companion Document. December 2014.



	Water Assessment Values (units µg/l, unless stated otherwise)		
	EQS Freshwater ¹	UK Drinking Water ^{2&3}	WHO Health ^{4&5}
Metals and Metalloids			
Arsenic	50 (long term)	10	10
Cadmium (depends on hardness)	MAC-EQS ^{IV} ≤ 0.45 (CaCO ₃ <40mg/l) 0.45 (CaCO ₃ 40 to <50mg/l) 0.60 (CaCO ₃ 50to<100mg/l) 0.90(CaCO ₃ 100to<200mg/l) 1.50 (CaCO ₃ ≥ 200mg/l)	5	3
Chromium	CrIII 32 (short term) CrIII 4.7 (long term) CrVI 3.4 (long term)	50	50
Copper	1 (bioavailable)	2,000	2,000
Lead	MAC-EQS ^{IV} 14	10	10
Mercury	20 (biota value)	1	6 (inorganic mercury)
Nickel	MAC-EQS ^{IV} 34	20	70
Selenium	-	10	40
Zinc	10.9 (long term. Bioavailable plus ABC ^V)	5,000*	3,000 (ATO value)**
Other			
Calcium	-	-	100-300mg/l(taste)
Chloride	188 mg/l (groundwater)	250 mg/l	250 mg/l (ATOvalue)
Magnesium	-	-	100-300mg/l(taste)
Sulphate	188 mg/l (groundwater)	250 mg/l	250 mg/l (ATOvalue)



Organics			
Benzene (Aromatic EC5-EC6)	MAC-EQS ^{IV} 50	1	10
Toluene (Aromatic EC6-EC8)	74 (long term)	-	700
Ethylbenzene (Aromatic EC8-EC10)	-	-	300
Xylene (Aromatic EC8-EC10)	30*& ^{VI}	-	500
Aromatic EC10-EC12	-	-	94***
Aromatic EC12-EC16	-	-	94***
Aromatic EC16-EC21	-	-	90***
Aromatic EC21-EC35	-	-	90***
Aromatic >EC25	10 ^{VI}	-	-
Aliphatic EC5-EC6	-	-	15,000***
Aliphatic EC7-EC8	-	-	15,000***
Aliphatic EC9-EC10	-	-	300***
Aliphatic EC10-EC12	-	-	300***
Aliphatic EC12-EC16	-	-	300***
Aliphatic >EC12	10 ^{VI}	-	-
Oils/hydrocarbons	-	10*	-
MTBE	-	-	15***
PAH	0.27 ^{VIII}	0.1 ^{VII}	-
Anthracene	0.1	-	-
Benzo(a)pyrene	MAC-EQS ^{IV} 0.27	0.01	0.7
Chloroform	12*	100	300
Fluoranthene	MAC-EQS ^{IV} 0.12	-	-
Napthalene	10 ^{VI}	-	-
Phenol	46 (short term)	0.5*	-
Vinyl Chloride	-	0.5	0.3



References

1. Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
2. The Water Supply (Water Quality) Regulations 2010 - Water, England and Wales
3. What are the Drinking Water Standards? Drinking Water Inspectorate. 2010.
4. Guidelines for Drinking Water Quality. 4th Edition incorporating the 1st Addendum. World Health Organisation. 2017.
5. Petroleum Products in Drinking Water. WHO. 2008.

Notes

- *. Environment Agency technical advice to third parties on Pollution to Controlled Waters for Part IIA of the EPA1990' published by the Environment Agency 2001.
- **. The ATO Value is the concentration of the substance, at or below the health-based guideline value, which may affect the appearance, taste or odour of the water. The concentrations given are those likely to give rise to consumer complaints.
- ***. These values should be used in conjunction with sensory assessment for taste and odour, which will, in most cases be detectable at concentrations below those concentrations of concern for health. Formal health-based guidelines for petroleum products in drinking water have not been set by WHO.
- IV MAC = Maximum Allowable Concentration
- V ABC = Ambient Background Concentration. Obtained from Table 2, P27 of Reference 1 WFD.
- VI Petroleum Hydrocarbons in Groundwater: Supplementary Guidance for hydrogeological Risk Assessment. Environment Agency. 2009
- VII Based on the sum of: benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(ghi)perylene and indeno(1,2,3-cd)pyrene)
- VIII Benzo(a)pyrene considered as a marker for other PAH.

Conductivity, pH, dissolved organic carbon (DOC) and hardness are taken into account within assessments where applicable.