

Our reference: 65347-CUR-00-XX-RP-GE-004-V01_Tank Removal

27 September 2019

Mr J Atkinson
IQ Student Accommodation
Suite 8a (8th Floor)
Manchester One
53 Portland Street
Manchester
M1 3LD

Dear James,

Re: Echo Street, Manchester – Underground Storage Tank Removal Verification

Introduction

In July 2019, two adjacent Underground Storage Tank (UST) were identified by Connell Brothers at Echo Street, underlying the former nurse's in the north east of the site. Curtins were instructed to supervise the removal of the underground tanks.

Connell Brothers indicated the structure had been decommissioned as the top was seen to be filled with concrete. It is assumed that the tank, its surrounding concrete and contents, are being removed, tested and disposed of by another party. This letter report details these verification works.

Curtins attended site on 6th August 2019 in order to:

- Observe the removal of the tanks to inspect their integrity;
- Collect soil samples from within the tank pit excavation to validate soils remaining in-situ;
- Collect soil samples from the material removed around the tank;
- Collect soil samples of the soils temporarily used to backfill the excavation; and
- Collect a photographic record of the tank removal.

Tank Removal

A Curtins engineer attended site on 6th August 2019 to supervise the removal of the two UST undertaken by Connell Brothers, check for any evidence of historical contamination associated with leakages and to collect soil samples from within the tank pit and arisings for laboratory environmental chemistry analysis.

A photographic record of the tank removal works is enclosed within *Attachment A*.

Tank 1 was cylindrical in shape, circa 2.4m in length with a diameter of circa 1.5m with an approximate volume of 4.24m³.

Tank 2 was cylindrical in shape, circa 3.5m in length with a diameter of circa 2.1m with an approximate volume of 12.12m³.



The tanks were generally found to be in good condition, contained within a concrete bund. The bund base of the concrete strata was approximately 400mm to 500mm thick. The concrete base was situated on top of the natural clay strata.

During removal of the tanks and concrete casing, a slight hydrocarbon odour and occasional black staining of the concrete was observed by the engineer.

On removal of Tank 1 a small volume of liquids with a slight sheen were observed, on top of the concrete base. The liquids were removed through use of a spill kit before the concrete was broken out.

Tank 2 was broken in situ due to its size to allow removal. A polythene membrane was placed underneath during this process to protect the surrounding soils from leakages of any remaining liquids. No leakages were observed.

Once the tanks were removed were placed on polyethene membrane to protect the surrounding soils from leakages of any remaining liquids. No further leakages were observed. They were later put into skips for disposal.

Upon removal of the tank, surrounding concrete and soils, a visual inspection confirmed the surrounding remaining soils showed no evidence of contamination. Four soil samples TP601A, TP601B, TP601E and TP601F were collected from the side walls around the tank depths of 3.0 – 3.20m bgl and two soil samples TP601C and TP601D were collected from the base of the excavation at 3.20m bgl. All soil samples were sent to the UKAS accredited laboratory (Envirolab) and analysed for lead, BTEX, TPHs and PAHs for validation to remain in-situ. A sample location plan is presented within *Attachment B* laboratory analytical results presented within *Attachment C*.

Soil samples SP01A – SP01C were collected from the stockpile of material that had been removed from around the tank to verify that the material was suitable for 'Commercial' use and be returned to the excavation or disposed of off-site. The locations of these samples are presented within *Attachment B*.

Soil samples SP02A - B were taken after the excavation had been temporarily backfilled with material from an adjacent excavation to verify if these materials were suitable for use.. The locations of these samples are presented within *Attachment B*.

Environmental Testing Results

As the site is currently being developed for student accommodation with commercial uses on the ground floor, the environmental chemistry analysis results have been compared against the General Assessment Criteria (GAC) for a 'Residential without Home Grown Produce' end use (SOM 1%). These can be referred to within *Attachment D* at the end of this report.

No exceedances of the GAC were recorded in any sample and therefore all the soils which were surrounding the tank, underlying soils and soil used to backfill are considered 'suitable for use'. On this basis, no further excavation or delineation is required.

However, it is understood that due to the requirement of a piling mat in the area the soils surrounding the tank and the soils temporarily placed into the excavation have been removed from site with the excavation filled with clean stone (virgin quarried material) to prevent soft spots. The excavated soils have been disposed of off-site.

An initial assessment for the waste classification of the Made Ground and natural soils encountered on site was carried out through a comparison of the soil testing results against Tier 1 Thresholds and



using the Waste Soils Characterisation Assessment Tool. The initial assessment found that each of the soil samples tested have indicated to be non-hazardous with respect to Environment Agency waste classes, under guidance given in WM3.

Construction workers should be provided with appropriate PPE and sanitary facilities with reference to the environmental testing results presented in attachment C.

Conclusions

Curtins have verified the removal of the two UST beneath the former nursesey at Echo Street.

The tanks were filled with concrete and appeared to be in relatively good condition with limited evidence of significant historic leakages and spills. On removal of Tank 1 a small volume of liquids with a slight sheen were observed, on top of the concrete base. The liquids were removed through use of a spill kit before the concrete was broken out.

Once the tanks were removed were placed on polyethene membrane to protect the surrounding soils from leakages of any remaining liquids. No further leakages were observed. They were later put into skips for disposal.

Environmental chemistry analysis results for representative soil samples taken from within and around the excavation identified no exceedances against General Assessment Criteria (GAC) for a 'Residential without Home Grown Produce' end use (SOM 1%). On this basis, these soils are considered suitable for use.

However, it is understood that due to the requirement of a piling mat in the area the soils surrounding the tank and the soils temporarily placed into the excavation have been removed from site with the excavation filled with clean stone to prevent soft spots. The excavated soils have been disposed of off-site.

If you have any queries about the above or the attached documents, please don't hesitate to contact the undersigned.

Yours sincerely,

P Neesham
Geo-Environmental Engineer
For and on behalf of
Curtins Consulting Ltd

Enclosed:

- Attachment A – Photographic Record*
- Attachment B – Drawings*
- Attachment C – Environmental Chemical Analysis Results*
- Attachment D – Generic Assessment Criteria*



Attachment A – Photographic Record

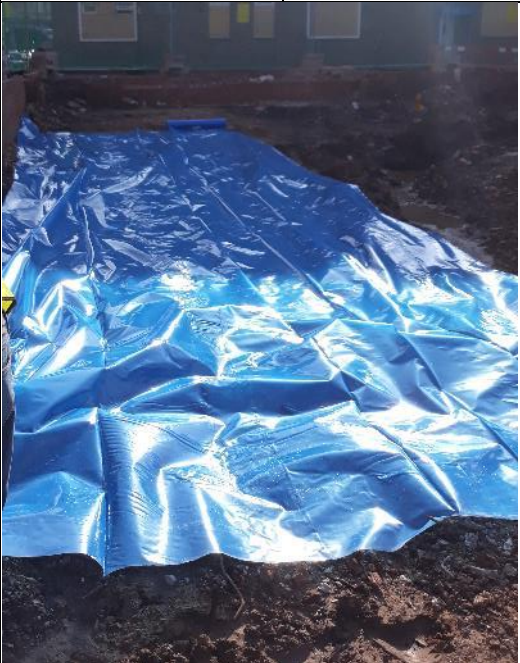
Photo No: 1	Description: Tanks In-Situ
	
Photo No: 2 & 3	Description: Polythene laid out for emplacement of excavation arisings and tanks
	

Photo No: 4	Description: Removal of concrete bund to the side of the two tanks
	
Photo No: 5	Description: Removal of concrete bund to the side of the two tanks
	



Photo No: 6	Description: Slight sheen observed in water observed beneath Tank 1
	
Photo No: 7	Description: Ground beneath the tank after the use of a spill kit
	

Photo No: 8	Description: Removal of Tank 1
	
Photo No: 9	Description: Tank 1
	



Photo No: 10	Description: Tank 2 in-situ
	
Photo No: 11	Description: Polythene put in place prior to cutting Tank 2
	

Photo No: 12

Description: Tank 2 broken in half exposing concrete used for decommissioning



Photo No: 13

Description: Concrete base removed



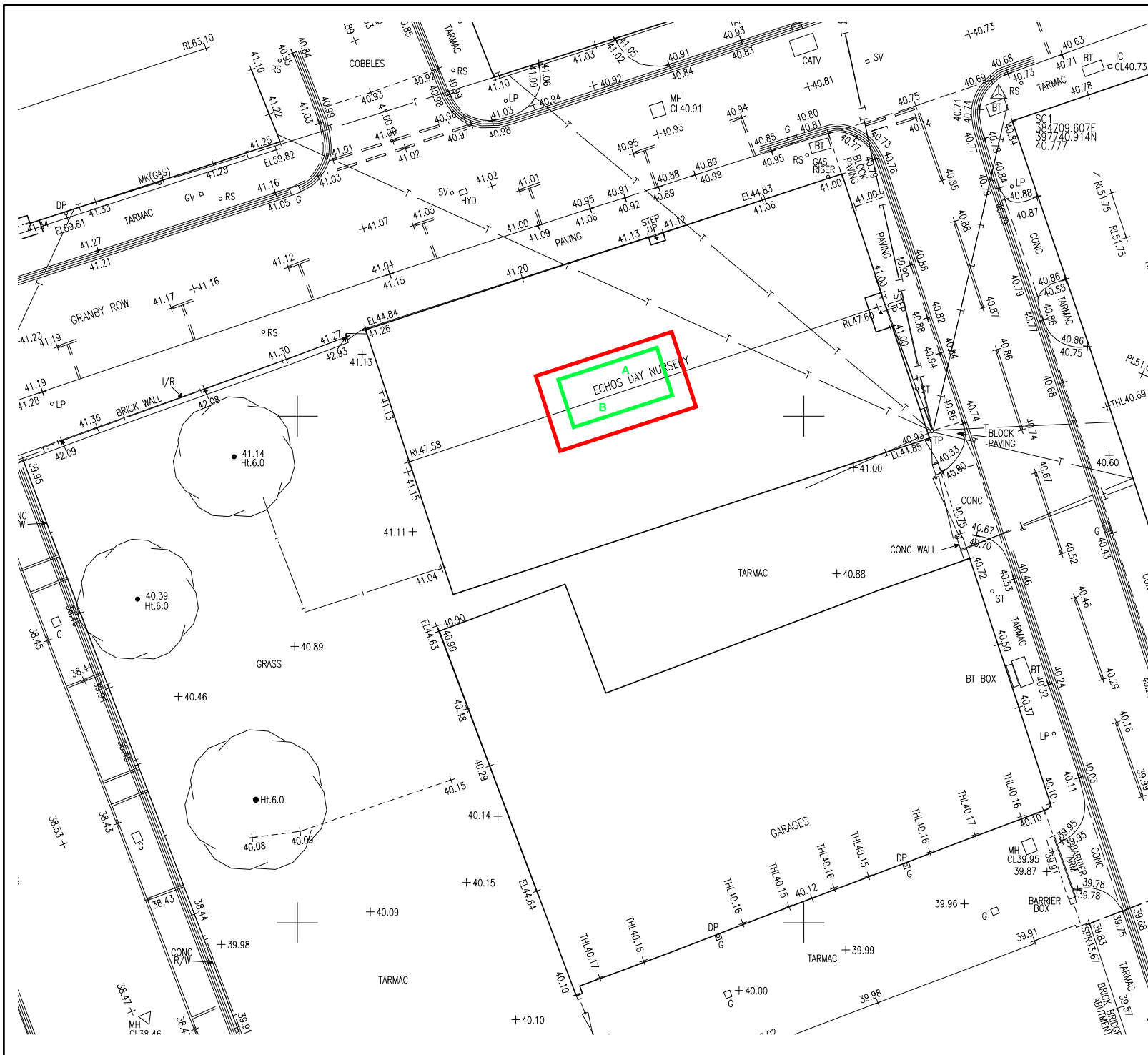
Photo No: 15

Description: Stockpiled material removed from around the tank (SP01)





Attachment B – Drawings



- APPROXIMATE STOCKPILE LOCATION (SP02)
(GENERAL SITE WON SOILS)
- A APPROXIMATE SOIL SAMPLE LOCATION

Rev:	Description:	Date:	By:	Chkd:
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Structures - Civils - Environmental - Infrastructure - Transport Planning - Sustainability - Expert Advisory Services
Birmingham - Bristol - Cardiff - Douglas - Edinburgh - Kendal - Leeds - Liverpool - London - Manchester - Nottingham

Status:

INFORMATION

Project:

ECHO STREET, TANK REMOVAL

Drg Title:

APPROXIMATE EXCAVATION LOCATION PLAN

Scale:	Size:	First Issue:	Drawn:	Checked:
NTS	A3	27/08/2019	MH	PN

Drg No:	Rev:
065374-CUR-00-XX-DR-GE-008-V01	V01

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Attachment C – Environmental Chemical Analysis Results

FINAL ANALYTICAL TEST REPORT SUPPLEMENT TO TEST REPORT 19/06313/1

Amendments: Request for Additional Analysis

Envirolab Job Number: 19/06313
Issue Number: 2

Date: 08 August, 2019

Client: Curtins Consulting
Merchant Exchange
17-19 Whitworth Street
Manchester
UK
M1 5WG

Project Manager: Amber Hatch-Walling/Jonathan Lord/Niall Farnworth
Project Name: Echo Street
Project Ref: B065374.001
Order No: EBMA1949
Date Samples Received: 03/07/19
Date Instructions Received: 04/07/19
Date Analysis Completed: 06/08/19

Prepared by:


Melanie Marshall
Laboratory Coordinator

Approved by:


Holly Neary-King
Client Manager

Envirolab Job Number: 19/06313

Client Project Name: Echo Street

Client Project Ref: B065374.001

Lab Sample ID	19/06313/1	19/06313/2	19/06313/3	19/06313/4	19/06313/5	19/06313/6	19/06313/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH201	BH201	BH201	BH201	BH201	BH201	BH201			
Depth to Top	0.32	2.40	3.60	3.00	5.00	7.00	7.20			
Depth To Bottom				3.45	5.45					
Date Sampled	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	02-Jul-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - U	Soil - U	Soil - ES	Soil - U			
Sample Matrix Code	4A	5AB	5A			5	4A			
% Stones >10mm _A	15.1	3.4	<0.1	-	-	<0.1	<0.1	% w/w	0.1	A-T-044
pH _D ^{M#}	8.64	8.20	7.87	-	-	8.55	8.65	pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.08	0.26	0.10	-	-	0.11	0.08	g/l	0.01	A-T-026s
Cyanide (total) _A ^{M#}	<1	<1	<1	-	-	-	-	mg/kg	1	A-T-042sTCN
Phenols - Total by HPLC _A	<0.2	<0.2	<0.2	-	-	-	-	mg/kg	0.2	A-T-050s
Organic matter _D ^{M#}	8.7	3.4	0.8	-	-	-	-	% w/w	0.1	A-T-032 OM
Arsenic _D ^{M#}	11	11	4	-	-	-	-	mg/kg	1	A-T-024s
Boron (water soluble) _D ^{M#}	<1.0	1.1	<1.0	-	-	-	-	mg/kg	1	A-T-027s
Cadmium _D ^{M#}	1.1	1.1	0.9	-	-	-	-	mg/kg	0.5	A-T-024s
Copper _D ^{M#}	65	26	9	-	-	-	-	mg/kg	1	A-T-024s
Chromium _D ^{M#}	25	27	31	-	-	-	-	mg/kg	1	A-T-024s
Chromium (hexavalent) _D	<1	<1	<1	-	-	-	-	mg/kg	1	A-T-040s
Lead _D ^{M#}	25	75	16	-	-	-	-	mg/kg	1	A-T-024s
Mercury _D	<0.17	<0.17	<0.17	-	-	-	-	mg/kg	0.17	A-T-024s
Nickel _D ^{M#}	35	26	24	-	-	-	-	mg/kg	1	A-T-024s
Selenium _D ^{M#}	<1	<1	<1	-	-	-	-	mg/kg	1	A-T-024s
Zinc _D ^{M#}	33	51	43	-	-	-	-	mg/kg	5	A-T-024s
1.01 % Moisture BS1377 1990 pt2 cl3.2 _D [#]	-	-	-	-	-	Appended	Appended		0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _D [#]	-	-	-	-	-	Appended	-		1	Subcon SS
1.10 PSD (Grading/63um/sand fraction/wet sieve) BS1377 pt 2 1990 cl 9.2 _D [#]	-	-	-	-	-	-	Appended		0.1	Subcon SS
4.01 Dimensional Consolidation (5 days) (75mm) BS1377:1990 Part5 cl 3 _D	-	-	-	Appended	-	-	-	N/A		Subcon SS
5.02 Hand Vane Test (Natural Shear Strength by Hand Vane) (3 measurements) _D	-	-	-	-	Appended	-	-			Subcon SS
5.05 QUT Multistage (100mm) BS1377 1990 pt7 cl9 (Undrained Shear Strength) _D [#]	-	-	-	-	US	-	-	N/A		Subcon SS

Envirolab Job Number: 19/06313

Client Project Name: Echo Street

Client Project Ref: B065374.001

Lab Sample ID	19/06313/1	19/06313/2	19/06313/3	19/06313/4	19/06313/5	19/06313/6	19/06313/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH201	BH201	BH201	BH201	BH201	BH201	BH201			
Depth to Top	0.32	2.40	3.60	3.00	5.00	7.00	7.20			
Depth To Bottom				3.45	5.45					
Date Sampled	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	02-Jul-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - U	Soil - U	Soil - ES	Soil - U			
Sample Matrix Code	4A	5AB	5A			5	4A			
Asbestos in Soil (inc. matrix)										
Asbestos in soil [#]	NAD	NAD	NAD	-	-	-	-			A-T-045
Asbestos ACM - Suitable for Water Absorption Test?	N/A	N/A	N/A	-	-	-	-			

Envirolab Job Number: 19/06313

Client Project Name: Echo Street

Client Project Ref: B065374.001

Lab Sample ID	19/06313/1	19/06313/2	19/06313/3	19/06313/4	19/06313/5	19/06313/6	19/06313/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH201	BH201	BH201	BH201	BH201	BH201	BH201			
Depth to Top	0.32	2.40	3.60	3.00	5.00	7.00	7.20			
Depth To Bottom				3.45	5.45					
Date Sampled	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	02-Jul-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - U	Soil - U	Soil - ES	Soil - U			
Sample Matrix Code	4A	5AB	5A			5	4A			
PAH-16MS										
Acenaphthene _A ^{M#}	1.29	<0.01	<0.01	-	-	-	-	mg/kg	0.01	A-T-019s
Acenaphthylene _A ^{M#}	0.08	<0.01	<0.01	-	-	-	-	mg/kg	0.01	A-T-019s
Anthracene _A ^{M#}	4.96	<0.02	<0.02	-	-	-	-	mg/kg	0.02	A-T-019s
Benzo(a)anthracene _A ^{M#}	8.81	<0.04	<0.04	-	-	-	-	mg/kg	0.04	A-T-019s
Benzo(a)pyrene _A ^{M#}	5.40	<0.04	<0.04	-	-	-	-	mg/kg	0.04	A-T-019s
Benzo(b)fluoranthene _A ^{M#}	6.90	<0.05	<0.05	-	-	-	-	mg/kg	0.05	A-T-019s
Benzo(ghi)perylene _A ^{M#}	2.30	<0.05	<0.05	-	-	-	-	mg/kg	0.05	A-T-019s
Benzo(k)fluoranthene _A ^{M#}	2.78	<0.07	<0.07	-	-	-	-	mg/kg	0.07	A-T-019s
Chrysene _A ^{M#}	7.75	<0.06	<0.06	-	-	-	-	mg/kg	0.06	A-T-019s
Dibenzo(ah)anthracene _A ^{M#}	0.66	<0.04	<0.04	-	-	-	-	mg/kg	0.04	A-T-019s
Fluoranthene _A ^{M#}	21.8	0.09	<0.08	-	-	-	-	mg/kg	0.08	A-T-019s
Fluorene _A ^{M#}	1.14	<0.01	<0.01	-	-	-	-	mg/kg	0.01	A-T-019s
Indeno(123-cd)pyrene _A ^{M#}	2.84	<0.03	<0.03	-	-	-	-	mg/kg	0.03	A-T-019s
Naphthalene _A ^{M#}	0.24	<0.03	<0.03	-	-	-	-	mg/kg	0.03	A-T-019s
Phenanthrene _A ^{M#}	20.6	0.09	<0.03	-	-	-	-	mg/kg	0.03	A-T-019s
Pyrene _A ^{M#}	17.2	<0.07	<0.07	-	-	-	-	mg/kg	0.07	A-T-019s
Total PAH-16MS _A ^{M#}	105	0.18	<0.08	-	-	-	-	mg/kg	0.01	A-T-019s

Envirolab Job Number: 19/06313

Client Project Name: Echo Street

Client Project Ref: B065374.001

Lab Sample ID	19/06313/1	19/06313/2	19/06313/3	19/06313/4	19/06313/5	19/06313/6	19/06313/7	Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH201	BH201	BH201	BH201	BH201	BH201	BH201			
Depth to Top	0.32	2.40	3.60	3.00	5.00	7.00	7.20			
Depth To Bottom				3.45	5.45					
Date Sampled	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	01-Jul-19	02-Jul-19			
Sample Type	Soil - ES	Soil - ES	Soil - ES	Soil - U	Soil - U	Soil - ES	Soil - U			
Sample Matrix Code	4A	5AB	5A			5	4A			
TPH CWG										
Ali >C5-C6 _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
Ali >C6-C8 _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
Ali >C8-C10 _A	<1	22	<1	-	-	-	-	mg/kg	1	A-T-055s
Ali >C10-C12 _A ^{M#}	<1	9	<1	-	-	-	-	mg/kg	1	A-T-055s
Ali >C12-C16 _A ^{M#}	2	<1	<1	-	-	-	-	mg/kg	1	A-T-055s
Ali >C16-C21 _A ^{M#}	6	2	<1	-	-	-	-	mg/kg	1	A-T-055s
Ali >C21-C35 _A	15	8	<1	-	-	-	-	mg/kg	1	A-T-055s
Total Aliphatics _A	22	43	<1	-	-	-	-	mg/kg	1	A-T-055s
Aro >C5-C7 _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
Aro >C7-C8 _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
Aro >C8-C10 _A	2	7	<1	-	-	-	-	mg/kg	1	A-T-055s
Aro >C10-C12 _A ^{M#}	3	2	<1	-	-	-	-	mg/kg	1	A-T-055s
Aro >C12-C16 _A	29	1	<1	-	-	-	-	mg/kg	1	A-T-055s
Aro >C16-C21 _A ^{M#}	261	2	<1	-	-	-	-	mg/kg	1	A-T-055s
Aro >C21-C35 _A ^{M#}	610	6	1	-	-	-	-	mg/kg	1	A-T-055s
Total Aromatics _A	906	20	1	-	-	-	-	mg/kg	1	A-T-055s
TPH (Ali & Aro >C5-C35) _A	928	62	1	-	-	-	-	mg/kg	1	A-T-055s
BTEX - Benzene _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
BTEX - Toluene _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
BTEX - Ethyl Benzene _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
BTEX - m & p Xylene _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
BTEX - o Xylene _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s
MTBE _A [#]	<0.01	<0.05	<0.01	-	-	-	-	mg/kg	0.01	A-T-022s

Envirolab Job Number: 19/06313

Client Project Name: Echo Street

Client Project Ref: B065374.001

Lab Sample ID	19/06313/9							Units	Limit of Detection	Method ref
Client Sample No										
Client Sample ID	BH201									
Depth to Top	3.45									
Depth To Bottom	3.50									
Date Sampled										
Sample Type	Soil - D									
Sample Matrix Code	5A									
% Stones >10mm _A	<0.1							% w/w	0.1	A-T-044
pH _D ^{M#}	8.04							pH	0.01	A-T-031s
Sulphate (water sol 2:1) _D ^{M#}	0.08							g/l	0.01	A-T-026s
1.01 % Moisture BS1377 1990 pt2 cl3.2 _D [#]	Appended								0.1	Subcon SS
1.02 Atterburg 4Pt BS1377 1990 pt2 cl4.4,5.3+5.4 _D [#]	Appended								1	Subcon SS

REPORT NOTES

General

This report shall not be reproduced, except in full, without written approval from Envirolab.

The results reported herein relate only to the material supplied to the laboratory.

The residue of any samples contained within this report, and any received with the same delivery, will be disposed of six weeks after initial scheduling. For samples tested for Asbestos we will retain a portion of the dried sample for a minimum of six months after the initial Asbestos testing is completed.

Analytical results reflect the quality of the sample at the time of analysis only.

Opinions and interpretations expressed are outside the scope of our accreditation.

If results are in italic font they are associated with an AQC failure, these are not accredited and are unreliable.

A deviating samples report is appended and will indicate if samples or tests have been found to be deviating. Any test results affected may not be an accurate record of the concentration at the time of sampling and, as a result, may be invalid.

The Client Sample No, Client Sample ID, Depth to Top, Depth to Bottom and Date Sampled were all provided by the client.

Soil chemical analysis:

All results are reported as dry weight (<40°C).

For samples with Matrix Codes 1 - 6 natural stones, brick and concrete fragments >10mm and any extraneous material (visible glass, metal or twigs) are removed and excluded from the sample prior to analysis and reported results corrected to a whole sample basis. This is reported as '% stones >10mm'.

For samples with Matrix Code 7 the whole sample is dried and crushed prior to analysis and this supersedes any "A" subscripts

All analysis is performed on the sample as received for soil samples which are positive for asbestos or the client has informed asbestos may be present and/or if they are from outside the European Union and this supersedes any "D" subscripts.

TPH analysis of water by method A-T-007:

Free and visible oils are excluded from the sample used for analysis so that the reported result represents the dissolved phase only.

Electrical Conductivity of water by Method A-T-037:

Results greater than 12900µS/cm @ 25°C / 11550µS/cm @ 20°C fall outside the calibration range and as such are unaccredited.

Asbestos:

Asbestos in soil analysis is performed on a dried aliquot of the submitted sample and cannot guarantee to identify asbestos if only present in small numbers as discrete fibres/fragments in the original sample.

Stones etc. are not removed from the sample prior to analysis.

Quantification of asbestos is a 3 stage process including visual identification, hand picking and weighing and fibre counting by sedimentation/phase contrast optical microscopy if required. If asbestos is identified as being present but is not in a form that is suitable for analysis by hand picking and weighing (normally if the asbestos is present as free fibres) quantification by sedimentation is performed. Where ACMs are found a percentage asbestos is assigned to each with reference to 'HSG264, Asbestos: The survey guide' and the calculated asbestos content is expressed as a percentage of the dried soil sample aliquot used.

Predominant Matrix Codes:

1 = SAND, 2 = LOAM, 3 = CLAY, 4 = LOAM/SAND, 5 = SAND/CLAY, 6 = CLAY/LOAM, 7 = OTHER, 8 = Asbestos bulk ID sample.

Samples with Matrix Code 7 & 8 are not predominantly a SAND/LOAM/CLAY mix and are not covered by our BSEN 17025 or MCERTS accreditations, with the exception of bulk asbestos which are BSEN 17025 accredited.

Secondary Matrix Codes:

A = contains stones, B = contains construction rubble, C = contains visible hydrocarbons, D = contains glass/metal,

E = contains roots/twigs.

Key:

IS indicates Insufficient Sample for analysis.

US indicates Unsuitable Sample for analysis.

NDP indicates No Determination Possible.

NAD indicates No Asbestos Detected.

N/A indicates Not Applicable.

Superscript # indicates method accredited to ISO 17025.

Superscript "M" indicates method accredited to MCERTS.

Subscript "A" indicates analysis performed on the sample as received.

Subscript "D" indicates analysis performed on the dried sample, crushed to pass a 2mm sieve

Please contact us if you need any further information.

Envirolab Deviating Samples Report

Units 7&8 Sandpits Business Park, Mottram Road, Hyde, SK14 3AR
Tel. 0161 368 4921 email. ask@envlab.co.uk

Client: Curtins Consulting, Merchant Exchange, 17-19 Whitworth Street , Manchester,
UK, M1 5WG

Project: Echo Street
Clients Project No: B065374.001

Project No: 19/06313
Date Received: 04/07/2019 (am)
Cool Box Temperatures (°C): 20.6

Lab Sample ID	19/06313/9
Client Sample No	
Client Sample ID/Depth	BH201 3.45-3.50m
Date Sampled	
Deviation Code	
E (no date)	✓

Key
E (no date) No sampling date provided (all results affected if not provided)

If, at any point before reaching the laboratory, the temperature of the samples has breached those set in published standards, e.g. BS-EN 5667-3, ISO 18400-102:2017, then the concentration of any affected analytes may differ from that at the time of sampling.



Attachment D – General Assessment Criteria

Adopted Soil Generic Assessment Criteria
Sandy loam with 6% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 21	6 21	1.8 170	33 49	7.7 21	220 250
Lead	200	310	80	2,300	630	1,300
Mercury (<i>elemental</i>)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (<i>inorganic</i>)	170	240	80	3600	120	240
Nickel	130⁽¹⁰⁾	180⁽¹⁰⁾	53⁽¹¹⁾	980⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 79	170 170
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅₋₅ - EC ₆	160	160	3900	12000	600000	180000
EC ₅₋₆ - EC ₈	530	530	13000	40000	620000	320000
EC ₅₋₈ - EC ₁₀	150	150	1700	11000	13000	21000
EC ₁₀₋₁₀ - EC ₁₂	760	770	7300	47000	13000	24000
EC ₁₂₋₁₂ - EC ₁₆	4300	4400	13000	90000	13000	26000
EC ₅₋₁₆ - EC ₃₅	110000	110000	270000	1800000	250000	490000
EC ₃₅₋₃₅ - EC ₄₄	110000	110000	270000	1800000	250000	490000
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅₋₅ - EC ₇	300	1400	57	86000	56000	92000
EC ₅₋₇ - EC ₈	660	3900	120	180000	56000	100000
EC ₅₋₈ - EC ₁₀	190	270	51	17000	5000	9300
EC ₁₀₋₁₀ - EC ₁₂	380	1200	74	34000	5000	10000
EC ₁₂₋₁₂ - EC ₁₆	660	2500	130	38000	5000	10000
EC ₅₋₁₆ - EC ₂₁	930	1900	260	28000	3800	7800
EC ₂₁₋₂₁ - EC ₃₅	1700	1900	1600	28000	3800	7900
EC ₃₅₋₃₅ - EC ₄₄	1700	1900	1600	28000	3800	7900
Aliph + Arom EC >44-70	1900	1900	3000	28000	3800	7900
Aromatic						
Benzene	0.33 0.87	1.0 3.3	0.07 0.18	95 98	73 140	110 230
Ethyl benzene	350	840	90	2800⁽⁸⁾ [66000]	2800⁽⁸⁾ [25000]	2800⁽⁸⁾ [27000]
Toluene	610	2700	120	4400⁽⁸⁾ [190000]	4400⁽⁸⁾ [56000]	4400⁽⁸⁾ [100000]
Xylene ⁽⁹⁾	230	290	160	2600⁽⁸⁾ [32000]	2600⁽⁸⁾ [43000]	2600⁽⁸⁾ [31000]
Phenol	420	520	280	3200⁽¹⁴⁾ (38000)	3200⁽¹⁴⁾ (10000)	3200⁽¹⁴⁾ (9300)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	13	13	24	1100	4900	3000
Acenaphthylene	920	6000	160	100000	15000	30000
Acenaphthene	1100	6000	200	100000	15000	30000
Fluorene	860	4500	160	71000	9900	20000
Phenanthrene	440	1500	90	23000	3100	6300
Anthracene	11000	37000	2200	540000	74000	150000
Fluoranthene	890	1600	290	23000	3100	6400
Pyrene	2000	3800	620	54000	7400	15000
Benz(a)anthracene	13	15	13	180	29	62
Chrysene	27	32	19	350	57	120
Benzo(b)fluoranthene	3.7	4.0	3.9	45	7.2	16.0
Benzo(k)fluoranthene	100	110	130	1200	190	440
Benzo(a)pyrene	3.0 5.0	3.2 5.3	3.5 5.7	36 77	5.7 10	13 21
Indeno(123cd)pyrene	41	46	39	510	82	180
Dibenzo(ah)anthracene	0.3	0.32	0.43	3.6	0.58	1.4
Benzo(ghi)perylene	350	360	640	4000	640	1600
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.0014	0.0015	0.0018	0.12	3.5	5.4
Trichloroethene (TCE)	0.075	0.08	0.21	5.7	120	120
1,1,1,2 Tetrachlorethane	6.4	8.2	4.4	560	1400	2100
Tetrachlorethane (PCE)	0.90	0.92	3.6	95	1400	1500
1,1,1 Trichlorethane	39	40	240	3000	140000	100000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs**
- Soil organic matter (SOM) is assumed to be 6% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 2.5% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 <u>21</u>	6 <u>21</u>	1.8 <u>170</u>	33 <u>49</u>	7.7 <u>21</u>	220 <u>250</u>
Lead	<u>200</u>	<u>310</u>	<u>80</u>	<u>2,300</u>	<u>630</u>	<u>1,300</u>
Mercury (elemental)	1	1	26	26	16	26 ⁽⁸⁾ [30]
Mercury (inorganic)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 <u>79</u>	170 <u>170</u>
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
<i>Aliphatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅ - EC ₆	78	78	1700	5900	590000	130000
EC ₆ - EC ₈	230	230	5600	17000	610000	220000
EC ₈ - EC ₁₀	65	65	770	4800	13000	18000
EC ₁₀ - EC ₁₂	330	330	4400	23000	13000	23000
EC ₁₂ - EC ₁₆	2400	2400	13000	82000	13000	25000
EC ₁₆ - EC ₃₅	92000	92000	270000	1700000	250000	480000
EC ₃₅ - EC ₄₄	92000	92000	270000	1700000	250000	480000
<i>Aromatic risk banded hydrocarbons - TPHCWG method</i>						
EC ₅ - EC ₇	140	690	27	46000	56000	84000
EC ₇ - EC ₈	290	1800	51	110000	56000	95000
EC ₈ - EC ₁₀	83	110	21	8100	5000	8500
EC ₁₀ - EC ₁₂	180	590	31	28000	5000	9700
EC ₁₂ - EC ₁₆	330	2300	57	37000	5100	10000
EC ₁₆ - EC ₂₁	540	1900	110	28000	3800	7700
EC ₂₁ - EC ₃₅	1500	1900	820	28000	3800	7800
EC ₃₅ - EC ₄₄	1500	1900	820	28000	3800	7800
Aliph + Arom EC >44-70	1800	1900	2100	28000	3800	7800
<i>Aromatic</i>						
Benzene	0.16	0.49	0.035	50	72	100
Ethyl benzene	150	380	39	1200⁽⁸⁾ [35000]	1200⁽⁸⁾ [24000]	1200⁽⁸⁾ [22000]
Toluene	270	1300	51	1900⁽⁸⁾ [110000]	1900⁽⁸⁾ [56000]	1900⁽⁸⁾ [95000]
Xylene ⁽⁹⁾	98	120	70	1200⁽⁸⁾ [14000]	1200⁽⁸⁾ [42000]	1200⁽⁸⁾ [23000]
Phenol	290	420	140	1500⁽¹⁴⁾ (35000)	1500⁽¹⁴⁾ (10000)	1500⁽¹⁴⁾ (8300)
<i>Polycyclic Aromatic Hydrocarbons (PAH)</i>						
Naphthalene	5.6	5.6	10	460	4900	1900
Acenaphthylene	420	4600	69	97000	15000	30000
Acenaphthene	510	4700	85	97000	15000	30000
Fluorene	400	3800	67	68000	9900	20000
Phenanthrene	220	1500	38	22000	3100	6200
Anthracene	5400	35000	950	540000	74000	150000
Fluoranthene	560	1600	130	23000	3100	6300
Pyrene	1200	3800	270	54000	7400	15000
Benz(a)anthracene	11	14	6.5	170	29	56
Chrysene	22	31	9.4	350	57	110
Benzo(b)fluoranthene	3.3	4.0	2.1	44	7.2	15
Benzo(k)fluoranthene	93	110	75	1200	190	410
Benzo(a)pyrene	2.7	3.2	2	35	5.7	12
Indeno(123cd)pyrene	36	46	21	510	82	170
Dibenzo(ah)anthracene	0.28	0.32	0.27	3.6	0.57	1.3
Benzo(ghi)perylene	340	360	470	4000	640	1500
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00087	0.001	0.001	0.077	3.5	5
Trichloroethene (TCE)	0.034	0.036	0.091	2.6	120	91
1,1,1,2 Tetrachlorethane	2.8	3.5	1.9	250	1400	1800
Tetrachlorethane (PCE)	0.39	0.4	1.5	42	1400	1100
1,1,1 Trichlorethane	18	18	110	1300	140000	76000

Notes

- All values above are in mg/kg
- Numbers in bold are SGVs or GAC that are derived based on SGV report input parameters, numbers in italics are S4ULs, numbers in bold-italics are based on EIC/AGS/CL:AIRE numbers & input parameters and underlined numbers are C4SLs
- Soil organic matter (SOM) is assumed to be 2.5% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

Adopted Soil Generic Assessment Criteria
Sandy loam with 1% SOM



Contaminants	Residential <u>with</u> home grown produce	Residential <u>without</u> home grown produce	Allotments	Commercial	Public open space near residential housing POS _{resi}	Public park POS _{park}
Metals						
Beryllium	1.7	1.7	35	12	2.2	63
Boron	290	11,000	45	240,000	21,000	46,000
Cadmium	10⁽¹³⁾ 22	85⁽¹³⁾ 150	1.8 3.9	230 410	120 220	560 880
Chromium III	910	910	18,000	8,600	1,500	33,000
Chromium VI	6 21	6 21	1.8 170	33 49	7.7 21	220 250
Lead	200	310	80	2,300	630	1,300
Mercury (<i>elemental</i>)	1	1	26	26	16	26⁽⁸⁾ [30]
Mercury (<i>inorganic</i>)	170	240	80	3600	120	240
Nickel	130 ⁽¹⁰⁾	180 ⁽¹⁰⁾	53 ⁽¹¹⁾	980 ⁽¹⁰⁾	230	800
Vanadium	410	1200	91	9000	2000	5000
Copper	2400	7100	520	68000	12000	44000
Zinc	3700	40000	620	730000	81000	170000
Semi-Metals and non-metals						
Arsenic	32⁽¹²⁾ 37	35⁽¹²⁾ 40	43⁽¹²⁾ 49	640⁽¹²⁾ 640	79 79	170 170
Antimony		550		7500	1500	3300
Selenium	350	600	120	13000	1100	1800
Inorganic chemicals						
Cyanide	34	34	34	34	34	34
Organic contaminants						
Aliphatic risk banded hydrocarbons - TPHCWG method						
EC ₅₋₅ - EC ₆	42	42	730	3200	570000	95000
EC ₆₋₆ - EC ₈	100	100	2300	7800	600000	150000
EC ₈₋₈ - EC ₁₀	27	27	320	2000	13000	14000
EC ₁₀₋₁₀ - EC ₁₂	130	130	2200	9700	13000	21000
EC ₁₂₋₁₂ - EC ₁₆	1100	1100	11000	59000	13000	25000
EC ₁₆₋₁₆ - EC ₃₅	65000	65000	260000	1600000	250000	450000
EC ₃₅₋₃₅ - EC ₄₄	65000	65000	260000	1600000	250000	450000
Aromatic risk banded hydrocarbons - TPHCWG method						
EC ₅₋₅ - EC ₇	70	370	13	26000	56000	76000
EC ₇₋₇ - EC ₈	130	860	22	56000	56000	87000
EC ₈₋₈ - EC ₁₀	34	47	8.6	3500	5000	7200
EC ₁₀₋₁₀ - EC ₁₂	74	250	13	16000	5000	9200
EC ₁₂₋₁₂ - EC ₁₆	140	1800	23	36000	5100	10000
EC ₁₆₋₁₆ - EC ₂₁	260	1900	46	28000	3800	7600
EC ₂₁₋₂₁ - EC ₃₅	1100	1900	370	28000	3800	7800
EC ₃₅₋₃₅ - EC ₄₄	1100	1900	370	28000	3800	7800
Aliph + Arom EC >44-70	1600	1900	1200	28000	3800	7800
Aromatic						
Benzene	0.08	0.3	0.017	28	72	90
Ethyl benzene	65	170	16	520⁽⁸⁾ [17000]	520⁽⁸⁾ [24000]	520⁽⁸⁾ [17000]
Toluene	120	610	22	860⁽⁸⁾ [59000]	860⁽⁸⁾ [56000]	860⁽⁸⁾ [87000]
Xylene ⁽⁹⁾	41	53	28	480⁽⁸⁾ [69000]	480⁽⁸⁾ [41000]	480⁽⁸⁾ [17000]
Phenol	180	310	66	760⁽¹⁴⁾ (31000)	760⁽¹⁴⁾ (10000)	760⁽¹⁴⁾ (7600)
Polycyclic Aromatic Hydrocarbons (PAH)						
Naphthalene	2.3	2.3	4.1	190	4900	1200
Acenaphthylene	170	2900	28	83000	15000	29000
Acenaphthene	210	3000	34	84000	15000	29000
Fluorene	170	2800	27	63000	9900	20000
Phenanthrene	95	1300	15	22000	3100	6200
Anthracene	2400	31000	380	520000	74000	150000
Fluoranthene	280	1500	52	23000	3100	6300
Pyrene	620	3700	110	54000	7400	15000
Benz(a)anthracene	7.2	11	2.9	170	29	49
Chrysene	15	30	4.1	350	57	93
Benzo(b)fluoranthene	2.6	3.9	0.99	44	7.1	13
Benzo(k)fluoranthene	77	110	37	1200	190	370
Benzo(a)pyrene	2.2	3.2	0.97	35	5.7	11
Indeno(123cd)pyrene	27	45	9.5	500	82	150
Dibenzo(ah)anthracene	0.24	0.31	0.14	3.5	0.57	1.1
Benzo(ghi)perylene	320	360	290	3900	640	1400
Chlorinated Aliphatic Hydrocarbons						
Vinyl chloride	0.00064	0.00077	0.00055	0.059	3.5	4.8
Trichloroethene (TCE)	0.016	0.017	0.041	1.2	120	70
1,1,1,2 Tetrachlorethane	1.2	1.5	0.79	110	1400	1500
Tetrachlorethane (PCE)	0.18	0.18	0.65	19	1400	810
1,1,1 Trichlorethane	8.8	9	48	660	140000	57000

Notes

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- Soil organic matter (SOM) is assumed to be 1% - DEFAULT VALUE
- Soil type is assumed to be sandy loam - DEFAULT SOIL TYPE
- For residential, the building type is conservatively assumed to be a small terrace house where the development includes bungalows change to more conservative bungalow setting in computer model
- For commercial, the building type is conservatively assumed to be a pre 1970s office building, where the proposed development comprises houses, flat with living spaces changes setting in model accordingly
- For classrooms consider increasing the dust loading factor in the 'Soil and Building Data' of the CLEA 1.04 model from 50 to 100µg m⁻³
- Based on vapour saturation limit as suggested by EA / [] model value
- Lowest of o-, m- and p-xylene
- Based on comparison of inhalation exposure with inhalation TDI
- Based on comparison of oral, dermal, and inhalation exposure with the oral TDI
- Based on a comparison of oral and dermal soil exposure with oral Index Dose only
- Averaged over and based on lifetime exposure
- Based on critical concentration for skin irritation in humans arising from contact with phenol in aqueous solution (number in brackets based on health effects following long term exposure for illustration)
- NA: Not applicable

