Grenfell Investigation into Potential Land Contamination Impacts

Technical Note 17: Pilot Study Part 2A Risk Assessment

Royal Borough of Kensington and Chelsea

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1. Introduction

This technical note sets out AECOM's Part 2A quantitative risk assessment for the Stage 1 investigation of potential land contamination impacts resulting from the Grenfell Tower fire on 14 June 2017 and is based on the final agreed specification for the Stage 1 assessment (AECOM Technical Note 1 dated 02 July 2019). The risk assessment undertaken and documented in this Technical Note has been framed in accordance with the requirements of Part 2A of the Environmental Protection Act 1990, with the approach following the Statutory Guidance for Part 2A (Department for Environment, Food and Rural Affairs (Defra), 2012b). The Statutory Guidance requires the following steps and considerations that are directly relevant to the risk assessment process:

- The starting point is that land is not contaminated land unless there is reason to consider otherwise.
- Contaminated Land is land where unacceptable risks are clearly identified on the basis of a risk assessment conducted in accordance with the statutory guidance.
- Risk is the combination of the likelihood of harm and the scale and seriousness of that harm.
- For a relevant risk to exist there needs to be one or more contaminant-pathway-receptor linkages by which a receptor might be adversely affected by the contaminants in question.
- Risks should only be considered in relation to the current use of the land (including temporary and informal use and reasonably likely future use within the bounds of current planning permission for the land).
- "Significant" is defined as a level of risk sufficient to justify land being determined as Contaminated Land.
- The understanding of risk is developed through a staged approach to risk assessment, with the process continuing until it is possible to decide either that there is insufficient evidence that the land might be contaminated land to justify further work, or that the land is or isn't contaminated land. For the risk assessment to proceed to the next stage there should be evidence that an unacceptable risk could exist.
- "Unacceptable risk" means a risk of such a nature that it would give grounds for land to be considered contaminated land under Part 2A. For human health under Part 2A, unacceptable risk is defined as significant harm, or a significant possibility of significant harm (SPOSH).
- The risk assessment should be relevant to the land in question and based on risk reasonably likely to exist, not on what is hypothetically possible.
- The Part 2A regime is not intended to apply to land with levels of contaminants in soil that are commonplace and widespread and for which there is no reason to consider that there is an unacceptable risk. Normal levels of contaminants should not qualify the land as contaminated land unless there is a particular reason to consider otherwise. Normal levels of contaminants may result from naturally occurring concentrations and from low level diffuse pollution caused by human activity (for example traffic pollution).
- Generic assessment criteria (GAC) can be used to help decide when land can be excluded from further investigation or assessment or when further work may be warranted. GAC represent cautious estimates of concentrations in soil that pose no, or at most a minimal, risk to health. At such levels land is very unlikely to pose an unacceptable risk. They are not levels above which there may be an unacceptable risk, and they are not levels above which detailed risk assessment is automatically required. They can be used to identify land that is clearly within Category 4 land.
- Four categories of land are defined in paragraphs 4.19 to 4.25 of the Statutory Guidance:
    - Category 1 – land where a significant possibility of significant harm exists. Defined as an unacceptably high probability that significant harm would occur if no action is taken to stop it.
    - Category 2 – land where there is a strong case for considering that the risks are of sufficient concern that the land poses a SPOSH. This could include land where there is little or no

direct evidence that similar land, situations or levels of exposure have caused harm before, but that there is a strong case for taking action on a precautionary basis.

- Category 3 – land where there isn't a strong case for action and the legal test for significant possibility of significant harm (unacceptable risk) is not met. This can include land where the identified risk is not low but regulatory intervention is not warranted. The strength of the case is measured by the predicted level of risk and the benefits and impacts of intervention.
- Category 4 – land where there is no risk, or the risk is low. This includes land where:
    - no contaminant linkage has been identified.
    - only normal levels of contaminants in soil are present.
    - soil concentrations do not exceed relevant GAC.
    - estimated levels of exposure from soil are likely to form only a small proportion of exposure from other sources.

- All risk assessments involve uncertainty. That uncertainty should be minimised as far as relevant, reasonable and practical. The underlying uncertainty means that there is unlikely to be any single "correct" conclusion on the precise level of risk posed by the land. The statutory guidance requires a reasonable view of what the risks are on the basis of a robust assessment of the available evidence.

2. Objectives

The Part 2A quantitative risk assessment has been completed using analytical data from the Pilot Study element of the Stage 1 scope. This has been designed with the objective of providing a rapid indication of the presence of contaminant linkages resulting from the fire. In doing so it is designed to meet three of the overarching objectives of the Government's strategy[1] for this land investigation, namely:

1. Determine whether the levels of contamination found represent a potentially unacceptable risk to human health or the environment.
2. Assess both potential acute and chronic risks.
3. Provide evidence to the Multi Agency Partnership (MAP) to inform existing and future public health advice.

3. Scope of Work

The risk assessment has been based on the establishment of multiple lines of evidence, which are:

- Comparison to locally reported and published national/regional soil concentrations (including the "normal background concentrations" reported in Defra Science Project SP1008 (Department for Environment, Food and Rural Affairs (Defra), 2011)).
- Generic Quantitative Risk Assessment: Comparison to published generic screening criteria (GSC) (including land-use specific GAC such as LQM/CIEH S4ULs (Nathanail, et al., 2015) and other relevant GSC such as Defra C4SLs (Department for Environment, Food and Rural Affairs (Defra), 2012a)).
- Sensitivity analysis to explore the uncertainties and conservatisms in the generic assumptions that form the basis of the GSC and adopting site-specific parameter values (for example bioaccessibility), if COPC concentrations exceed GSC and such analysis is warranted. An exhaustive sensitivity assessment of all possible assessment options is not proposed.
- Assessment of the presence of potentially significant contaminant linkages and the implications for the Stage 2 design.

[1] Referred to in Stage 1 ITT as 'Multi-Agency Partnership: Strategy for investigation into potential land contamination impacts from Grenfell Tower site.'

4. Pilot Study Location and Dataset

The Pilot Study soil investigation was undertaken at Waynflete Square, an area of communal public open space that forms part of the Silchester estate. The area includes a small children's playground which is fenced and has an artificial surface. The remainder of the area is grassed open space with interwoven pedestrian tarmac paths and soil beds planted with trees and shrubs. A number of brick construction raised soil beds planted with shrubs are located in the northern part of the Square and the southern edge comprises a car parking area. No growing of homegrown produce in the raised beds was noted during the pilot study.

The soil sampling was based on a 20m square grid pattern, with samples taken at two depths (0-5cm, and 10-15cm) at nine sample locations (GTCS1-43 to GTCS1-51). A further eight surface samples were taken on a 5m radial pattern around one of the grid-based sample points (sample location GTCS1-51). The total dataset therefore comprises the analytical results from 26 soil samples, with the analytical testing being consistent with that used for the exploratory soil testing. Sample locations are shown in inset Figure TN17-01 below. The rationale for the choice of location and grid-based sampling is provided in TN03.

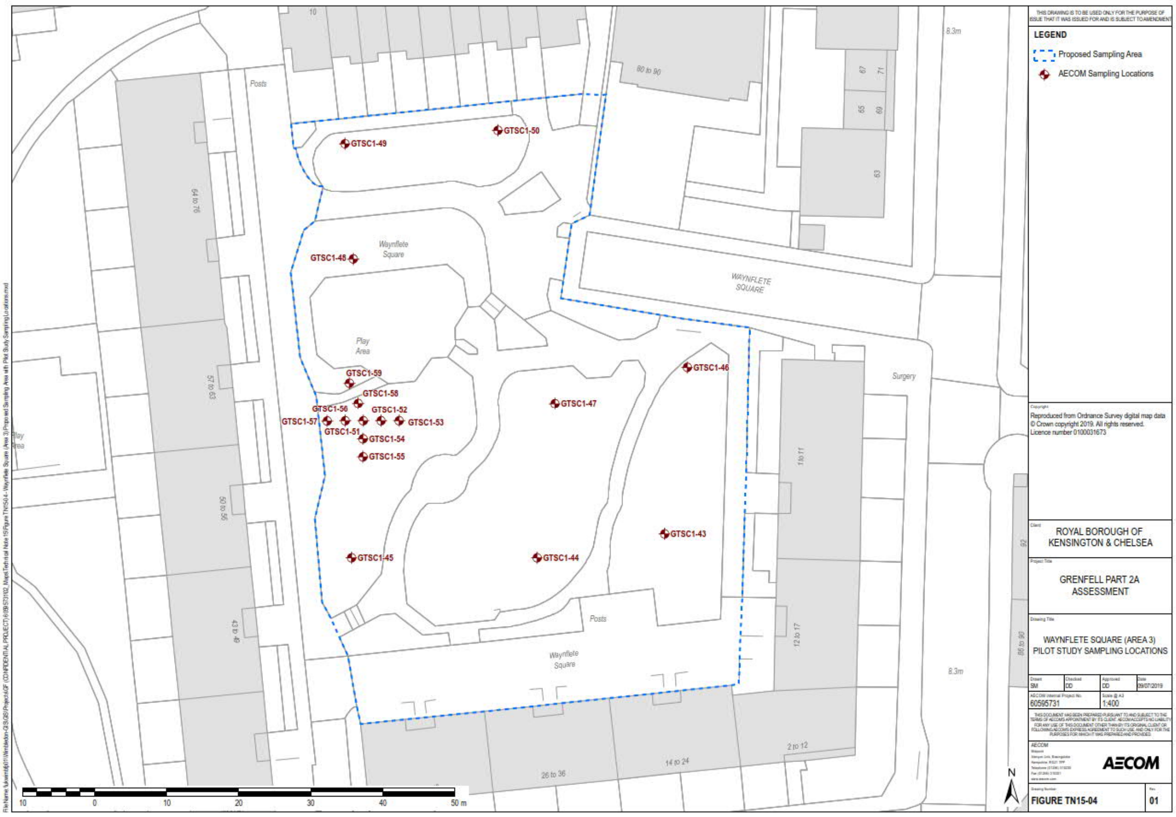

Figure TN17-01. Pilot Study Sample Locations

5. Preliminary Risk Assessment

The preliminary risk assessment (PRA) is detailed in AECOM Technical Note 16 and has established the following contaminant linkages (CLs) for human health in the area of investigation surrounding Grenfell Tower:

Table TN17-01. Contaminant Linkages for non and low volatility COPC affecting Human Health (reproduced from TN16)

Source	COPC	Pathway	Receptor
Dust, ash and debris deposited from the smoke plume Larger pieces debris emitted from the fire and deposited more locally to the Tower relatively independently of the smoke plume behaviour	S1 – metals S3 – Dioxins, furans and dioxin-like PCBs S4 – non-dioxin-like PCBs S6 – phosphate esters S7 – cyanides S8 – asbestos and SVF	P1 - Ingestion of soil and indoor dust	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P2 - Inhalation of soil derived dust (indoor and outdoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P3 - Dermal contact with soil (outdoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P4 - Dermal contact with soil derived dust (indoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area
		P5 - Consumption of produce and attached soil*	R1 – Residents
		P6i - Inhalation of vapours (indoor)*	None
		P6o - Inhalation of vapours (outdoor)*	None

* Pathway only relevant to asbestos fibres within soil attached to produce. Not relevant to plant uptake component of pathway.

** Vapour pathways are greyed out as they are not relevant to non and low volatility chemicals

Table TN17-02. Contaminant Linkages for PAHs affecting Human Health (reproduced from TN16)

Source	COPC	Pathway	Receptor
Dust, ash and debris deposited from the smoke plume Larger pieces debris emitted from the fire and deposited more locally to the Tower relatively independently of the smoke plume behaviour	S2 – PAHs and related SVOC compounds.	P1 - Ingestion of soil and indoor dust	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P2 - Inhalation of soil derived dust (indoor and outdoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P3 - Dermal contact with soil (outdoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P4 - Dermal contact with soil derived dust (indoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area
		P5 - Consumption of produce and attached soil	R1 – Residents
		P6i - Inhalation of vapours (indoor)*	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area
		P6o - Inhalation of vapours (outdoor)*	R1 - Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers

* Vapour pathways are dashed as they are only relevant to the more volatile PAHs; naphthalene, acenaphthene and acenaphthylene

Table TN17-03. Contaminant Linkages for VOCs affecting Human Health (reproduced from TN16)

Source	COPC	Pathway	Receptor
Dust, ash and debris deposited from the smoke plume Larger pieces debris emitted from the fire and deposited more locally to the Tower relatively independently of the smoke plume behaviour	S5 – VOCs (benzene)	P1 - Ingestion of soil and indoor dust	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P2 - Inhalation of soil derived dust (indoor and outdoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P3 - Dermal contact with soil (outdoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers
		P4 - Dermal contact with soil derived dust (indoor)	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area
		P5 - Consumption of produce and attached soil	R1 – Residents
		P6i - Inhalation of vapours (indoor)*	R1 – Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area
		P6o - Inhalation of vapours (outdoor)*	R1 - Residents, R2 - Commercial workers in businesses in the area, R3 - Visitors to the area, R4 - Maintenance and construction workers

The relevant exposure scenario for the pilot study area is that described in the Part 2A Statutory Guidance (Department for Environment, Food and Rural Affairs (Defra), 2012a) for public open space in a residential area. This exposure scenario makes the following assumptions on land-use:

- The land is public open space in close proximity to residential housing that includes predominantly grassed landscaped areas in between residential buildings.
- The land is generally assumed to be up to 500m^2 (0.05ha) and a considerable proportion of this area could be bare soil (up to 50%).
- The area is regularly used by children and may be used for informal sports activities as well as walking, sitting, and general play.
- The critical receptor is judged to be a female child between the ages of 3 and 9 years old, acknowledging that younger children may also use this type of land but on a less frequent basis.
- The relevant exposure pathways are:
  - Ingestion of soil and dust (outdoors and indoors respectively).
  - Dermal contact with soil (outdoors, and soil-derived dust indoors).
  - Inhalation of dust (outdoors and indoors).
  - Inhalation of vapours outdoors.
- Exposure frequency is assumed to be 170 days a year for on average 1 hour per day, with exposure assumed to not be concentrated repeatedly in one small area of the land.

As contaminant linkages have been identified, it is relevant to undertake further assessment steps. In accordance with the definition of Category 4, these steps are:

1. Have the substances been detected in soil?
2. Do the reported concentrations exceed relevant GAC?
3. Do the concentrations exceed normal levels in soil?
4. Is the estimated intake from soil only a small proportion of that from other sources (such as diet)?

6. Generic Quantitative Risk Assessment

The generic quantitative risk assessment (GQRA) has been designed to address the next steps identified above. Reported concentrations have initially been screened against published generic screening criteria that are relevant to the land-uses in question and compared to available evidence on background concentrations in soil. Further consideration of other sources of exposure has been made where reported concentrations are higher than the screening criteria and background.

6.1 Comparison with screening criteria

Health-based generic screening criteria (GSC) are published by a number of authoritative organisations, including in the UK Defra and the Environment Agency, and internationally, the US Environmental Protection Agency (EPA) and the Dutch public health bodies (VROM and RIVM). The derivation of these criteria by these organisations is different – the organisations have each developed technical guidance and methodologies that are slightly different (aligned to their own regulatory frameworks and scientific judgements). The purpose of the criteria however is the same – to define concentrations in soil that are not a health concern and do not warrant further action.

The screening criteria used in this assessment (in order of preference are):

- Category 4 screening levels (C4SLs) (DEFRA, 2012).
- Suitable for use levels (S4ULs) (Nathanail, et al., 2015).
- Environment Agency Soil Guideline Values (SGV) – specifically for dioxins (Environment Agency, 2009).

- Generic assessment criteria (CL:AIRE/AGS/EIC, 2010).
- Intervention values (IV) (Dutch Ministry of Infrastructure and the Environment, 2013).
- Regional screening levels (RSLs) (US EPA, 2019).

The definitions and relevance of these screening criteria to Part 2A are summarised in Table TN17-04 below. More detailed definitions can be found in the reference documents for these criteria.

Table TN17-04. Basis and applicability of chosen screening criteria

Screening Criteria	Basis	Applicability to Part 2A
C4SLs	Levels in soil that pose a low risk to human health. Values are derived using the Environment Agency's CLEA model with updated generic land use exposure assumptions and toxicological criteria termed "Low Levels of Toxicological Concern (LLTC).	Intended as "relevant technical tools" to help decide when land falls with Category 4 for human health. C4SLs present level of risk within the context of Part 2A that is not unacceptable. Not intended to define SPOSH.
S4ULs	Values are derived using the Environment Agency's CLEA model with updated generic land use exposure assumptions defined by SP1010. Toxicological criteria remain as health criteria values (HCV) (i.e. TDI or Index Doses as defined for SGVs)	Similar in purpose to SGVs below. Signify concentrations that fall within Category 4 and represent a tolerable or minimal risk to health.
SGV	Guidelines on the level of long-term human exposure to individual chemicals in soil that, unless stated otherwise, are tolerable or pose a minimal risk to health. Values are calculated using the Environment Agency's CLEA model using precautionary generic land use exposure assumptions and health criteria values that represent a tolerable or minimal risk to health.	Guidelines not specifically derived for the purposes of Part 2A but which indicate concentrations and levels of risk that are firmly within Category 4. Do not define SPOSH.
EIC GAC	Intended to compliment SGVs and derived using the CLEA methodology and CLEA model. The EIC GAC were derived using the more precautionary exposure assumptions used for deriving the SGV (compared to the more recent updated exposure assumptions used for C4SL and S4UL derivation).	As per S4ULs and SGV above.
DIV	Designed to support the Dutch Soil Protection Act 2005 and Soil Quality Decree 2007. DIVs define cases of "severe contamination" if the average concentration of at least one substance exceeds the IV in at least 25m^3 of soil. DIVs are derived using the CSOIL methodology and are defined for the multi-purpose use of soil (human and ecological). Human health risk requiring intervention is defined as a situation where acute or chronic adverse health effects may occur, or the contamination presents a demonstrable nuisance. The toxicological criteria for threshold substances (those that are not genotoxic carcinogens) are set on the same general basis as the TDI for SGV etc. A different approach is taken for genotoxic carcinogens whereby linear extrapolation methods are used to define soil concentrations that might be associated with an excess lifetime cancer risk (ELCR) of 1 in 10,000 for the exposed population. This ELCR is 10x higher than that typically adopted by the World Health Organisation in the derivation of drinking water guidelines, and 100x higher than that used by the US EPA (see below).	The exposure assumptions for the multi-use land-use are slightly different to those used in the UK, but the intent is the same – protection of human health from adverse health effects. The values define concentrations in soil that do not pose a risk to humans where intervention would be required and are designed to be used as the first screening stage in a risk assessment process. They are therefore compatible with the use of similar GSC in identifying land that meets the definition of Category 4 (particularly for threshold substances).
RSLs	Designed to support the US EPA Superfund regime and based on the US EPA RAGS technical guidance. The RSLs are risk-based concentrations derived from standardised exposure equations and toxicological guidelines and intended to screen out land that does not warrant further action under the Superfund	The exposure assumptions for land-uses are slightly different to those used in the UK (for example the absence of indoor vapour intrusion and consumption of homegrown produce), but the

Screening Criteria	Basis	Applicability to Part 2A
	regime. They are based on reasonable maximum exposure assumptions for different land uses combined with references doses and reference concentrations that represent exposure estimates that are likely to be without an appreciable risk of deleterious health effects during a lifetime. For genotoxic carcinogens the US EPA adopts linear extrapolation and sets an ELCR limit of 1 in 1,000,000 (100x lower than the Dutch and 10x lower than the WHO. Linear extrapolation is not endorsed by the UK Committee on Carcinogenicity but is a widely adopted approach internationally and has not been shown to underestimate risk relative to the Index Dose approach adopted in the UK.	equations are closely aligned to those adopted in the CLEA methodology and US EPA reference doses have been reviewed and adopted in the derivation of SGVs, S4ULs and EIC GAC. As per DIVs they are therefore compatible with the Part 2A definition of Category 4 whereby land poses a low risk to human health.

Where no screening criteria has been identified, substances have been initially considered on the basis of their detection, the family of substances they belong to, and their reported concentration relative to other substances.

Where screening criteria are presented for a range of different soil organic matter (SOM) contents, the use of values associated with the closest reported SOM have been used. The range of SOM values reported for the pilot study soil samples is 2.3-11.7% with a geometric mean of 6.4%. Screening criteria have been chosen based on a SOM of 2.5% for UK criteria which are typically reported for either 1%, 2.5% or 6% SOM.

Screening criteria have been adopted for a public open space land-use where available (C4SLs and S4ULs). Where these are not available screening criteria for residential land-use have been used. Two options for public open space screening criteria are available, residential areas and park. The most relevant option for Waynflete Square is the residential area option due to the proximity of residential housing. Some of the residential screening criteria also have two options, one incorporating the consumption of homegrown produce, the other not. The most precautionary criteria (those incorporating the consumption of homegrown produce) have been used as initial screening criteria.

The screening process has identified the following substances as contaminants of potential concern (COPC) based on one or more reported concentrations exceeding the chosen criterion:

- Asbestos (and synthetic vitreous fibres (SVF)).
- Lead.
- Chloromethane.
- PCBs (non-dioxin-like).

For the remaining contaminants of potential concern identified in TN4 associated with fire effluents:

- The maximum reported dioxin concentration (sum of concentrations for chlorinated dioxins, furans, and dioxin-like polychlorinated biphenyls) was 279,698ng/kg compared with the SGV for residential land use of 8,700ng/kg. However, because the SGV is only relevant if the dioxin and furan composition is similar to the median composition in the UKSHS (Environment Agency, 2009), and because it excludes brominated dioxins, furans and dioxin-like polybrominated biphenyls, hazard indices (the ratio of average daily exposure from the reported soil concentration and the health-based guidance value (in this case a TDSI) have also been calculated for each sample which sum the combined exposure from all reported compounds (chlorinated and brominated) using the WHO2005 toxicity equivalency factors adopted in (Environment Agency, 2009). The maximum hazard index is 0.57 (calculated for two samples: GTCS1-43 10-15cm and GTCS1-46 10-15cm).
- Benzene was not detected in any sample (limit of detection 5µg/kg; C4SL for public open space in residential areas of 140,000µg/kg).

- The maximum reported aluminium concentration was 2.65%wt/wt compared to the US EPA RSL for residential land-use of 7.7%wt/wt.
- The maximum reported concentration of benzo(a)pyrene was 8.61mg/kg compared to the public open space residential C4SL of 10mg/kg. Because the C4SL is based on the toxicity of coal tar, adopting benzo(a)pyrene as a marker compound for the mixture of compounds present in coal tar, the exceedance of more precautionary screening criteria for individual PAHs (such as dibenzo(a,e)pyrene, dibenz(a,h)anthracene and benzo(b)fluoranthene) does not alter the screening out of PAHs as representing a low risk to health.
- The maximum reported concentration of total cyanides was 10.5mg/kg compared to the Dutch IV for free cyanide of 20mg/kg.
- Organophosphorus flame retardants (phosphate esters) have not been detected in any samples (limit of detection 0.1-0.5mg/kg; screening criteria 170-630mg/kg).
- Brominated flame retardants (PBDEs, HBCDD and TBBPA) have not been detected in any samples (limit of detection 0.1mg/kg; screening criteria 6.3-13mg/kg).
- Isocyanates have not been detected in any samples (limit of detection 0.25mg/kg; screening criteria 3.1-850,000mg/kg).

None of the above COPC require further consideration in the context of Part 2A.

6.2 Further consideration of COPC > Screening Criteria

6.2.1 Asbestos

Asbestos has been detected above the Health and Safety Executive (HSE) definition of trace (i.e. more than two fibres detected based on a qualitative inspection of the soil sample) in ten of the twenty-six soil samples taken from Waynflete Square. The laboratory results for these samples are summarised in Table TN17-02 below. The asbestos testing comprises three stages, a qualitative inspection that identifies asbestos above “trace” (Stage 1), a gravimetric analysis (Stage 2) and a fibre counting stage (Stage 3).

Table TN17-05. Detected asbestos results

Sample ID	Qualitative description (Stage 1)	Gravimetric result (Stage 2)	Fibre Counting (Stage 3)
GTCS1-43 0-5cm	Amosite fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-43 10-15cm	Chrysotile and amosite fibre bundles	0.001%wt/wt	<0.001%wt/wt
GTCS1-46 10-15cm	Chrysotile and amosite fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-47 0-5cm	Amosite fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-49 0-5cm	Chrysotile fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-49 10-15cm	Chrysotile, amosite and crocidolite fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-51 10-15cm	Amosite fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-52 0-5cm	Amosite fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-55 0-5cm	Chrysotile fibre bundles	<0.001%wt/wt	<0.001%wt/wt
GTCS1-59 0-5cm	Chrysotile fibre bundles and ACM debris	0.083%wt/wt	<0.001%wt/wt

The relevant observations from this data are:

- Asbestos has been detected at or above the reporting limit for quantification (0.001%wt/wt) in two samples (GTCS1-43 and GTCS1-59).
- The detection of asbestos does not correlate with the detection of SVF. SVF has been detected in four samples (GTCS1-48 0-5cm and 10-15cm, and GTCS1-50 0-5cm and 10-15cm).

There are no reliable published background soil concentration data for asbestos. A research project funded by Defra (SP1014) was completed in 2015 but publication is still pending. It is expected that asbestos will be present in the urban environment as a result of its common historical use in the UK, including its use in the construction of buildings and use in vehicle brake discs.

Dutch authorities developed a risk assessment methodology that has been adopted/amended for use in other countries and is considered relevant for use here in the absence of UK regulatory guidance. The CIRIA 'Asbestos in Made Ground' guidance (Nathanail, et al., 2014) identifies six factors to consider in the use of non-UK guidelines for asbestos. These six factors are considered in Table TN17-06 below:

Table TN17-06. Consideration of applicability of Dutch asbestos methodology for Part 2A

Factor identified in CIRIA C733	Comment
Differences in national policy, guidance and assumptions to soil risk assessment.	No different to UK in so much that the intent is to identify land that poses a level of risk to human health that triggers regulatory intervention.
Differences in asbestos risk modelling and toxicological approaches.	The UK does not have a risk modelling approach for asbestos in soil. The UK toxicological approach to asbestos is set out by the HSE and the preferred risk model is that developed by Hodgson & Darnton (described in CIRIA C733 guidance (Nathanail, et al., 2014). This model continues to be refined by the authors, as does the risk model used by the Dutch. The most recent review of the toxicology by the Health Council of the Netherlands has not been adopted as policy and illustrates the variability in the interpretation of the epidemiological data that has to be accepted in the risk assessment process.
Differences in potency of the different asbestos types.	The Dutch methodology assumes that amphiboles are 10x more potent than chrysotile. The HSE does not differentiate between asbestos type in setting the control limit for occupational exposure. The Hodgson & Darnton model assumes a potency ratio of 1:100:500 for chrysotile, amosite and crocidolite. Of note, the Dutch methodology is based on airborne fibre concentrations not exceeding 100f/m^3 for amphiboles (amosite and crocidolite), and 1000f/m^3 for chrysotile. This is consistent the WHO air quality guideline value for all asbestos of 1000f/m^3 (all values as measured by TEM).
Differences in climate.	The climate of the Netherlands and the UK is similar.
Appropriateness and applicability of thresholds or toxicological benchmarks.	See above for the air guideline values adopted by the Dutch methodology. Unlike the IV for other substances, the IV for asbestos is based on an asbestos fibre concentration in air associated with a 1 in 1,000,000 excess lifetime cancer risk, not the higher 1 in 10,000 risk normally used. Defra concluded in the development of the C4SLs that an ELCR of 1 in 100,000 should constitute minimal risk and an ELCR of 1 in 50,000 could be specified as "low risk" and be used as a generic level for all human genotoxic carcinogens.

Table TN8-15 in Technical Note 8 describes the tiered assessment approach published by VROM. The two relevant criteria are 0.1%wt/wt for non-friable asbestos (relevant to the ACM debris in GTCS1-59) and 0.01% for friable asbestos (relevant to the chrysotile and amosite fibre bundles in GTCS1-43). The additional requirement of the Dutch guidance is that the relevant soil concentration is representative of an area of 1000m^2. The result from GTCS1-59 is close to but does not exceed the 0.1%wt/wt criterion. The result from GTCS1-43 comprises chrysotile and amosite fibres so on a precautionary basis the result should be multiplied by 10 to account for the amosite content. This makes the result equal to the VROM criterion. Reported fibre concentrations in the shallower sample at GTCS1-43 were less than 0.001%wt/wt. On average it is therefore unlikely that fibre in soil concentrations exceed 0.001%wt/wt, and it is not considered that the detected asbestos concentrations warrant further consideration in the context of Part 2A.

Summary

The reported concentrations of asbestos fibres in soil did not exceed any of the identified GSC. Although typical background concentrations are not available, asbestos is known to be present in urban soils and there is no robust evidence that the concentrations identified in soil at Waynflete Square are higher than typical urban conditions. For Waynflete Square, it was concluded that no further consideration was warranted in the context of Part 2A.

6.2.2 Lead

Lead is not a COPC that has been directly associated with the Tower fire and is associated with urban soils. Defra for example established an urban normal background concentration (NBC) of 820mg/kg (Department for Environment, Food and Rural Affairs (Defra), 2011). It was included as a potential fire effluent COPC on the basis of its identification by the US EPA as a COPC in dust from the New York WTC tower collapse.

The reported soil lead concentrations across Waynflete Square range from 102mg/kg to 757mg/kg. The public open space residential (POS_{resi}) C4SL is 630mg/kg. The only sample result to exceed this C4SL is the 757mg/kg result from GTCS1-43 10-15cm. Because the dominant exposure route for lead is direct soil and dust ingestion, the most relevant soil concentration that is likely to be most representative of long-term exposure for people (including children) using Waynflete Square is the average soil concentration. The freely available ProUCL statistical software developed for the US EPA has been used to calculate statistical estimates of the average concentration of lead across this area of land. The ProUCL outputs are appended and summarised below:

Table TN17-07. Statistical summary for lead data

Dataset	Median	Arithmetic Mean	95% upper confidence limit on the mean (UCL)
Grid-based shallow samples	298	325	417
Grid-based deeper samples	298	313	432
Cluster samples around GTCS1-51	287	280	350

All values mg/kg

Three “averages” have been calculated. The median is the 50^{th} percentile value (the middle value when all values are ranked), the mean is the arithmetic average, the upper confidence limit on the mean is a statistical measure that provides an estimate of the uncertainty in the value of the average – the bigger the difference between the median or mean and the UCL, the bigger the uncertainty in the true value of the average.

To place these concentrations in to context, Lark & Scheib (Lark & Scheib, 2013) calculated the mean lead concentration across London at 297mg/kg. The UK Soil and Herbage Survey report for metals (Environment Agency, 2007a) determined a mean lead concentration for England of 137mg/kg (range 8.6 – 387mg/kg). The authors also cross reference work published by Thornton et al who reported much higher lead concentrations in soils in London (range 28-13,700mg/kg, with a mean for parks of 294mg/kg and a mean for residential gardens of 654mg/kg). Defra (Department for Environment, Food and Rural Affairs (Defra), 2011) references the London Earth data that forms part of the British Geological Society (BGS) G-BASE database of soil concentrations across the UK. The London Earth data comprises 6,494 soil samples taken across London. The reported lead concentrations ranged from 11 - 10,000mg/kg, with a mean of 296mg/kg. It is further noted that the policy companion document for C4SLs published by Defra in 2014 specifically notes the NBC for lead in the urban domain of 820mg/kg, exceeding the C4SL for the POS_{resi} land use scenario.

Summary

Average lead concentrations at Waynflete Square did not exceed the GSC appropriate for a residential public open space land use and are similar to the average background lead concentrations in London reported in the Lark & Scheib study and from the BGS G-BASE data-set. Furthermore, the average concentrations at Waynflete Square are two to three times lower than the NBC for an urban environment published by Defra.

On this basis, the lead concentrations in soil at Waynflete Square are not considered to result in a significant contaminant linkage and therefore no further investigation is warranted under Part 2A.

6.2.3 Chloromethane

Chloromethane has been detected in the majority of samples above the reporting limit of 3µg/kg. The maximum concentration is 16µg/kg in GTCS1-46 10-15cm. The average concentrations are as follows:

Table TN17-08. Chloromethane averages

Dataset	Average*
Grid-based shallow samples	9.6
Grid-based deeper samples	3.3
Cluster samples around GTCS1-51	4.2

All values µg/kg.

** Only arithmetic mean values have been calculated due to the lower significance of this data*

The only UK published screening criteria for chloromethane are those published by CL:AIRE (CL:AIRE/AGS/EIC, 2010). The published residential soil GAC is 9.8µg/kg, with the risk driving exposure pathway being inhalation exposure to vapour intrusion into indoor air. The US EPA RSL (which does not consider indoor vapour inhalation from vapour intrusion) is 110mg/kg by comparison, indicating the significance of the inhalation pathway. The indoor vapour pathway was not included as a relevant pathway for the public open space in a residential area (Department for Environment, Food and Rural Affairs (Defra), 2012a).

The EIC GAC was based on the inhalation toxicity data presented in the IPCS CIDAD dated 2000, using a LOAEL for inhalation exposure of 18mg/m^3 and an uncertainty factor of 1000 to derive a tolerable concentration in air of 0.018mg/m^3. The US EPA published their toxicological evaluation on the IRIS database in 2001 and concluded on a reference concentration in air of 0.09mg/m^3 (5-times higher than the valued adopted in the derivation of the EIC GAC). Also of relevance is the information in the EIC report on the expected ambient concentrations of chloromethane in urban air that led to the estimation in the calculation of the EIC GAC that 50% of exposure at the GAC value in soil would come from background ambient air exposure. The information on urban air concentrations in the CICAD referenced in the EIC publication provided an average urban concentration of 10.6µg/m^3.

Chloromethane is the most abundant halocarbon in the atmosphere and naturally occurs in soil - produced by soil microorganisms in the breakdown of organic matter (Keppler, et al., 2005). This may be the reason for its detection in the soil sampled.

Summary

A number of individual chloromethane concentrations exceeded the GSC protective of a residential scenario, although the average concentration in the shallowest samples was marginally lower than the GSC. The average concentration in the deeper samples was approximately half the GSC. Background soil data for chloromethane was not available; however, chloromethane is known to be naturally occurring in topsoil due to microbial action.

On this basis, the chloromethane concentrations in soil at Waynflete Square are not considered to result in a significant contaminant linkage and therefore no further investigation is warranted under Part 2A.

6.2.4 Non-dioxin-like PCBs

The reported concentration of the sum (∑) of 7 PCB congeners in one sample exceeds the adjusted Dutch Intervention Value (DIV) of 200µg/kg. The reported concentration of GTCS1-58 (0-5cm) is 407µg/kg. This sample is part of the cluster of samples centred around GTCS1-51. The reported soil concentrations in the adjacent samples (GTCS1-51 and GTCS1-59) are <35µg/kg and 111µg/kg respectively, indicating that the elevated concentration reported at GTCS1-58 is not likely to be representative of average soil concentrations in the area. An additionally relevant consideration is the derivation and adjustment of the DIV. The published DIV is 1000µg/kg, and this has been adjusted based on soil organic matter content from 10% to 2% due to the lower SOM content reported in some of the pilot study soil samples (including GTCS1-58). The DIV adjustment for SOM is a generic adjustment set out in the Dutch guidance for all organic compounds, and will be more relevant for compounds where vapour intrusion or plant uptake pathways are significant, and much less relevant for compounds where the dominant exposure pathway is direct contact (especially ingestion). The highest reported concentrations for the individual congeners in sample GTCS1-58 are for PCB 52, 101 and 126. The exposure modelling reported in (Environment Agency, 2009) suggests that exposure will be dominated by soil ingestion and dermal contact for these PCBs (>98%), and hence the SOM adjustment to the DIV is not warranted.

(Vane, et al., 2014) investigated PCB concentrations in a 19km^2 area of east London and reported a range of ∑7 PCB concentrations of 0.6-750µg/kg, with a mean of 21µg/kg and a calculated NBC of 180µg/kg. (Environment Agency, 2007b) reported a range of ∑7 PCB urban soil concentrations across England of 0.5-30.2µg/kg with a mean of 3.2µg/kg. Some of the detected concentrations in Waynflete Square are therefore potentially higher than most concentrations that typify urban soil quality.

Summary

The reported concentrations of the sum of 7 PCB congeners did not exceeded the identified GSC in any samples analysed. Urban background concentrations are likely to be lower than the higher concentrations detected at Waynflete Square.

Because the sum of 7 PCB congeners concentrations in soil at Waynflete Square do not exceed the GSC, they are not considered to result in a significant contaminant linkage and therefore no further investigation is warranted under Part 2A.

6.3 Further consideration of COPC without Screening Criteria

6.3.1 Semi-Volatile Organic Compounds (SVOC)

A number of combustion-related semi-volatile organic compounds (SVOCs) have been quantified or tentatively identified by the laboratory analysis. These include carbazole, non-target PAHs (i.e. those not listed in the US EPA 16) and alkyl PAHs. One specific alkyl PAH identified as a potential COPC was 7,12-dimethylbenzo(a)anthracene. This was not detected above the reporting limit of 0.1mg/kg in any sample.

Without undertaking a detailed review of the likely presence of these alkyl PAHs and other SVOCs in coal tar, it is considered reasonable at this stage of assessment to assume that the toxicological approach used in the derivation of the C4SL for benzo(a)pyrene, using benzo(a)pyrene as a surrogate marker for PAHs in coal tar, accounts for exposure to a wider range of unidentified coal tar constituents that may or may not include those detected in this study. The PAH ratios for all samples (pilot and exploratory) have been plotted in accordance with the assessment published by Public Health England (Public Health England, 2017). This is shown on the graph in Figure TN17-02 below and indicates that the PAH compositions in the soil samples are within the limits for the approach to be valid.

Hence the tentatively identified alkyl PAHs and combustion related SVOCs are considered to be satisfactorily assessed through the use of benzo(a)pyrene as a surrogate marker for PAHs in coal tar.

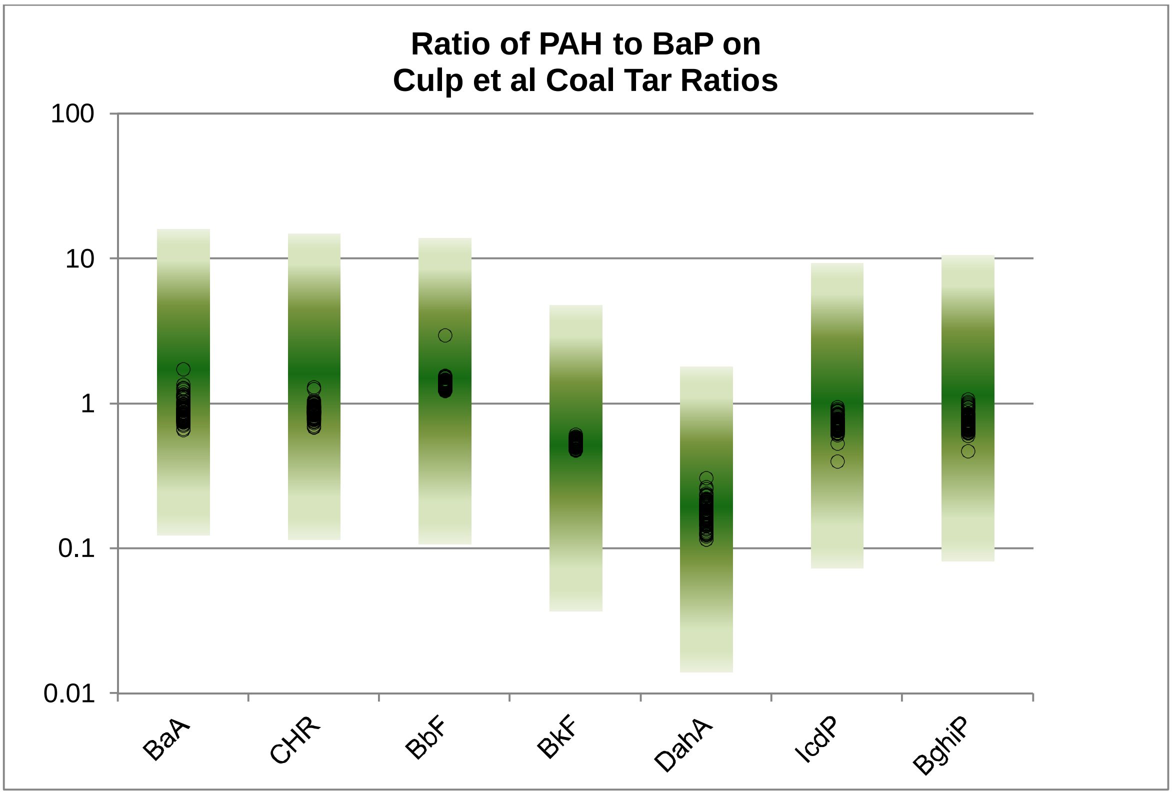

Figure TN17-02. PAH ratio plots for soil sample PAH compositions against Culp et al ratios

6.3.2 Synthetic Vitreous Fibres

SVFs do not have published soil screening criteria. An occupational exposure limit for SVFs has been set by the HSE of 2f/cm^3. The HSE Control Limit for asbestos fibres by comparison is 0.1f/cm^3, suggesting that from an occupational health perspective, asbestos fibres are of more concern than SVFs. No information has been found on typical background levels of SVFs in soil. There is emerging evidence that exposure to very high levels of airborne SVFs might be a causal factor in adverse respiratory health effects noted in people affected by the WTC collapse (Lippmann, et al., 2015), but such exposures are not consistent with the substantially lower exposure levels that might be associated with low levels of SVFs in soil. The occupational exposure limits appear to be associated with short-term reversible irritation to skin, eyes, nose, throat and lungs (therefore unlikely to meet the definition of significant harm), rather than chronic long-term adverse health effects.

No commercially available laboratory method for reliably quantifying the number of synthetic vitreous (or machine-made mineral) fibres has been found and therefore a quantitative assessment of the SVF identified in soil at locations GTCS1-48 and GTCS-50 is not possible.

Summary

Laboratory quantification of SVF could not be completed during Stage 1 (due to absence of a reliable commercially available laboratory). Equally, no information on background soil concentrations could be identified, therefore a quantitative assessment of SVF in soil could not be completed.

However, the PRA (TN16) concluded that the identified SVF in the exploratory sampling and pilot study was unlikely to represent a source with a reasonable possibility of resulting in a significant contaminant linkage and therefore no further investigation is warranted under Part 2A.

6.4 Dioxins, furans and dioxin-like biphenyls

Soil concentrations for the individual chlorinated dioxins, furans and biphenyls have been summed and compared to the residential land-use SGV published by the Environment Agency in 2009 of 8700ng/kg. The maximum reported concentration in soils from Waynflete Square was 279,698ng/kg, with the dominant congeners being PCB-105 (103,000ng/kg) and PCB-118 (154,000ng/kg). Because the SGV is only applicable to soil PCDD/F and PCB12 concentrations where the composition is very similar to the median UKSHS urban soil composition used in the SGV calculation, and because (COT, 2010) has recommended that the WHO TEFs are also applicable to brominated dioxins and furans, hazard indices have been calculated for each sample based on the unique mixture of congeners detected in each sample. The hazard indices for the pilot study samples range from 0.05 to 0.57. This indicates that exposure is not expected to exceed ¼ of the tolerable daily intake chosen by the EA, since the hazard indices and SGV are based on a tolerable daily soil intake (TDSI) which has been set at 50% of the TDI due to people's background exposure to dioxins and furans in their diet.

It is noted in TN8 that EFSA produced a revised toxicological assessment of dioxins in 2019, in which the tolerable daily intake was reduced from 2pg/kgBW/day to a tolerable weekly intake (TWI) of 2pg/kgBW/week; a seven-fold decrease. The adoption of revised health-based guideline value would reduce the SGV to 1200ng/kg, but the FSA has advised against this on the basis of the recommendation of EFSA to review the TEFs (though driven mainly by the dominance of PCB-126). Furthermore, the FSA also advised that it is premature to apply the TWI of 2pg/kgBW/week as COT has not yet provided advice and has not fully assessed the health impacts.

This group of compounds has been detected in every soil sample, but this is expected for an urban area of land. The Environment Agency (Environment Agency, 2009) makes reference to the UK Soil and Herbage Survey and two earlier soil surveys in its discussion of background soil concentrations of dioxins. The UK average urban soil TEQ concentration for chlorinated dioxins was 11ng/kg (maximum 65ng/kg) in the UKSHS, for the UK as a whole (16ng/kg for England), with reported values for three samples from Hyde Park and three samples from Richmond Park quoted as 7.9, 6.9, 9.1, 26.7, 2.0 and 6.8ng/kg respectively.

Table TN17-09. Statistical summary for dioxin TEQ data

Dataset	Median	Mean	95% upper confidence limit on the mean
Grid-based shallow samples	12.7	16.2	21.2
Grid-based deeper samples	11	22.1	34.9
Cluster samples around GTCS1-51	10.9	11.9	15.2

All values ng/kg

The reported concentrations for the study area are slightly higher than the England UKSHS average, but within the reported range. People are also exposed to dioxins via diet, with EFSA estimating that average European dietary intake is 0.39-2.59pg/kgBW/day, and the EA estimating that the average UK dietary intake was 0.7pg/kgBW/day. For comparison the EFSA health-based guideline value is 0.29pg/kgBW/day, so average dietary exposure is already expected to exceed this value.

Summary

The reported concentrations of dioxins, furans and dioxin-like PCBs were used to calculate hazard indices based on the unique mixture of congeners in each sample. None of the hazard indices exceeded 1, which is the hazard index value that can be considered to be equivalent to a GSC. Reported concentrations at Waynflete Square, whilst slightly higher than the England average, were all within the reported background range. In addition, data from EFSA and the EA indicates that dietary exposure to these compounds is expected to exceed the potential exposure from soil at Waynflete Square.

On this basis, the reported dioxins, furans and dioxin-like PCBs concentrations in soil at Waynflete Square are not considered to result in a significant contaminant linkage and therefore no further investigation is warranted under Part 2A.

6.5 Consideration of additional soil exposure outside study area

The assessment of the pilot study data in the sections above has been made by considering the potential exposure to soil contaminants in that area in isolation. However, the source of the contaminants being investigated in this study is not limited to this particular area of land. People could be exposed to soil contaminants in this area, but also could be exposed to the same contaminants in other public open spaces that they visit, in private gardens and community gardens, and in schools in the source area. If the reported average soil concentrations of the study area were representative of wider exposure, one mechanism for gaining an understanding of the potential health risk is to screen the data against the lowest published screening criteria for any land-use. In this case for the majority of contaminants this is the screening criterion for either residential land-use or allotments. This is much more precautionary as the residential and allotment land-uses assume greater exposure times and frequencies and addition routes of exposure that those assumed in the conceptual model for public open space. The significance of this has been explored by comparing the data for benzo(a)pyrene (as a marker for all PAHs), and lead. Table TN17-010 summarises the screening criteria.

Table TN17-010. Summary of Screening Criteria for BaP and lead

Contaminant	Residential	Commercial	Allotments	Public Open Space
Benzo(a)pyrene C4SL (mg/kg)	5.0	77	5.7	10-21
Lead C4SL (mg/kg)	200	2300	80	630-1300

Statistical averages have been calculated in ProUCL for the study area soil data, summarised in Table TN17-011.

Table TN17-011. Pilot Study average soil concentrations*

Contaminant	Median	Mean	95^{th} upper confidence limit on the mean
Benzo(a)pyrene(mg/kg)	1.97	2.76	3.6-3.8
Lead (mg/kg)	298	319	390

** Shallow and deeper samples from GTCS1-43 – GTCS1-50 only (not including cluster samples to avoid spatial bias)*

The only average concentrations to exceed the residential and allotment screening criteria are those for lead. The reported averages are consistent with reported background urban soil concentrations as summarised in section 6.2.2. Urban lead concentrations in excess of the published C4SLs are therefore likely to be commonplace and not isolated to this study area.

7. Conclusions

The concluding points from this assessment are:

- Some of the potential fire effluent COPCs have been identified in shallow soils in the pilot study area. The reported concentrations are either below screening criteria that are designed to indicate minimal or low health risk, and/or below or within the range of normal urban background concentrations.
- Where elevated concentrations of COPC have been identified relative to the remaining reported concentrations, these concentrations are not widespread.
- The conceptual model for this area identified the critical human health concern to be children playing in the area. Consideration of health to children is considered to be adequately protective of groundworkers and pets given the exposure assumptions inherent in the screening criteria for land uses where the critical receptor is young children.
- The dominant exposure pathway for the majority of contaminants is expected to be direct soil and dust ingestion. Dermal contact, and dust or vapour inhalation are expected to be minor contributors to exposure of COPC, with the exception of asbestos where the dominant exposure route is dust inhalation, not ingestion or dermal contact.

- The presence of the identified COPC in urban soil is expected to be commonplace because of the multiple urban sources of the majority of these COPC. It is also expected that exposure to some of the COPC will occur from other routes such as diet.

The evidence for each COPC is summarised below:

Table TN17-012. Summary of COPC Discussion

COPC	Detections relative to GSC	Concentrations relative to background	Exposure relative to non-soil sources
Benzene	Not detected above laboratory DL (GSC > DL)	Not considered	Not considered
Aluminium	Not detected above GSC	Not considered	Not considered
Benzo(a)pyrene (as a surrogate marker for PAHs)	Not detected above GSC	Not considered	Not considered
Total, free and complex cyanides	Not detected above GSC	Not considered	Not considered
Organophosphorus flame retardants	Not detected above laboratory DL (GSC > DL)	Not considered	Not considered
Brominated flame retardants	Not detected above laboratory DL (GSC > DL)	Not considered	Not considered
Isocyanates	Not detected above laboratory DL (GSC > DL)	Not considered	Not considered
Dioxins, furans and dioxin-like PCBs	Calculated HI < 1 for all samples	Within range of London background	Exposure from soil likely to be lower than dietary exposure
Lead	One sample concentration > GSC. Average concentrations < GSC	All concentrations < NBC. Average concentrations similar to reported London background ranges	Not considered
Asbestos	One sample concentration equal to GSC.	No background data; however, no strong evidence that concentrations different to typical urban conditions	Not considered
Synthetic Vitreous Fibres	No quantification of detections and no GSC available	No background data	Not considered
Chloromethane	Eight individual sample concentrations > GSC (with maximum concentration exceeding GSC by 1.6 times). Average concentrations < GSC	No background data, though chloromethane known to be naturally occurring in topsoil	Not considered
Non dioxin like PCBs	Not detected above GSC	Some of the higher reported individual concentrations potentially higher than typical urban background range	Not considered

Based on the available evidence, the land meets the definition of Category 4 under Part 2A of the Environmental Protection Act. This defines land where the risk is considered to be no higher than low. Concentrations of all COPC considered in the pilot study are typically below screening criteria and/or are within normal background concentrations.

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Appendix TN17-A - Pilot Study Soil Sample Analytical Results

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC															
				Location	GTCS 1-43		GTCS 1-44		GTCS 1-45		GTCS 1-46		GTCS 1-47		GTCS 1-48		GTCS 1-49	
				Date	05/06/2019		05/06/2019		05/06/2019		05/06/2019	05/06/2019	05/06/2019		05/06/2019		05/06/2019	
				Sample Type	Normal		Normal		Normal		Normal	Normal	Normal		Normal		Normal	
				Field ID	GTCS 1-43A		GTCS 1-44A		GTCS 1-45A		GTCS 1-46A	GTCS 1-46A	GTCS 1-47A		GTCS 1-48A		GTCS 1-49A	
				ple_Depth_Range	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0.1-0.15	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05
Metals																		
Aluminium	mg/kg	50	77,000[#1]		18,370 - 19,986	12,090 - 16,479	26,240	12,470	5,096	11,600	15,790	14,510 - 15,350	7,847	7,261 - 9,007	12,170	12,790	10,730 - 11,696	10,160 - 12,335
Arsenic	mg/kg	0.5	79[#6]		36.6 - 40.6	22.8 - 27.1	12.8	13.3	6.7	16	26.2	35.5 - 36.6	13.6	13 - 13.2	12.5	15.3	17.4 - 19.4	16.6 - 18.9
Barium	mg/kg	1	1,300[#3]		455 - 537	249 - 291	158	179	77	172	289	339 - 376	181	133 - 148	189	172	182 - 209	165 - 188
Beryllium	mg/kg	0.5	2.2[#2]		2 - 2.2	1.3 - 1.6	2	1.2	0.6	1.1	1.5	1.9 - 2	0.9	0.8 - 0.9	1.3	1.4	1.3	1.2 - 1.5
Boron	mg/kg	0.1	21,000[#2]		1.6	2.1 - 2.6	1	2.3	0.9	2	4.3	3.1 - 3.2	4.6	6.6 - 8	1.8	4.4	1.5 - 1.7	1.8 - 2
Cadmium	mg/kg	0.1	220[#6]		44.1 - 46.2	11.3 - 14.5	1.2	1.8	0.4	0.8	15.8	42.7 - 46.8	0.7	0.8	3.7	3.3	0.9 - 1.1	1 - 1.1
Chromium (Trivalent)	mg/kg	0.5	1,500[#2]		232.2 - 271.4	78.2 - 98.3	76.6	104.5	240.5	72.1	176.8	208.7 - 212.1	88.2	22.3 - 23.8	101.1	58.4	33.3	32 - 36.9
Chromium (hexavalent)	mg/kg	0.3	21[#6]		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium (III+VI)	mg/kg	0.5	either CrIII or CrVI[#2]		232.2 - 271.4	78.2 - 98.3	76.6	104.5	240.5	72.1	176.8	208.7 - 212.1	88.2	22.3 - 23.8	101.1	58.4	33.3	32 - 36.9
Copper	mg/kg	1	12,000[#2]		474 - 487	166 - 215	65	67	26	58	199	392 - 400	45	55 - 56	64	64	82 - 83	70 - 105
Lead	mg/kg	5	630[#6]		637 - 757	553 - 603	111	232	115	318	578	441 - 448	385	215 - 257	176	137	298 - 429	250 - 298
Mercury	mg/kg	0.1	120[#2]		1.4 - 1.8	1.1 - 1.2	0.3	0.6	0.3	0.9	0.8	0.9 - 1.6	0.5	0.3 - 0.6	1.8	1.3	0.2 - 1.1	0.4 - 1.2
Nickel	mg/kg	0.7	230[#2]		95.4 - 103.4	38.5 - 49	52.1	26.3	16.6	24.5	46.5	80.4 - 82.1	18.6	17 - 17.5	23.2	23.1	27.5 - 29.3	24.5 - 32
Selenium	mg/kg	1	1,100[#2]		2	2	2	2	1	1	2	2 - 3	2	1	2	2	1	1
Vanadium	mg/kg	1	2,000[#2]		86 - 95	53 - 67	94	49	30	53	62	73 - 75	37	35 - 38	48	49	52 - 55	49 - 57
Zinc	mg/kg	5	81,000[#2]		1,111 - 1,283	471 - 610	142	233	104	231	545	951 - 962	201	188 - 211	250	253	1,359 - 1,418	1,344 - 1,357
VOCs																		
1,1,1,2-tetrachloroethane	ug/kg	5	1,400,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-trichloroethane	ug/kg	5	140,000,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-tetrachloroethane	ug/kg	3	140,000,000[#2]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,1,2-trichloroethane	ug/kg	4	1,800[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,1-dichloroethane	ug/kg	6	4,100[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1,1-dichloroethene	ug/kg	6	410[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1,1-dichloropropene	ug/kg	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,2,3-trichlorobenzene	ug/kg	7	1,800,000[#2]		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
1,2,3-trichloropropane	ug/kg	4	5.1[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,2,4-trimethylbenzene	ug/kg	6	990[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1,2-dibromo-3-chloropropane	ug/kg	4	5.3[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,2-dibromoethane	ug/kg	3	36[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,2-dichloroethane	ug/kg	5	29,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-dichloropropane	ug/kg	4	42[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,3,5-trimethylbenzene	ug/kg	3	270,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,3-dichloropropane	ug/kg	4	1,600,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
2,2-dichloropropane	ug/kg	4			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
2-chlorotoluene	ug/kg	3	1,600,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
4-chlorotoluene	ug/kg	3	1,600,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Benzene	ug/kg	5	140,000[#6]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromobenzene	ug/kg	2	2,100[#3]		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bromochloromethane	ug/kg	4	150,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Bromodichloromethane	ug/kg	4	290[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Bromoform	ug/kg	4	11,000[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Bromomethane	ug/kg	1	6,800[#1]		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3-Methyl butanal	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	ug/kg	4	56[#2]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chlorobenzene	ug/kg	4	13,000,000[#2]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chlorodibromomethane	ug/kg	5	8,300[#1]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	ug/kg	6	11,000[#3]		<6	<6	<6	<6	<6	<6	<6	8	<6	<6	<6	<6	<6	<6
Chloroform	ug/kg	5	2,500,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane	ug/kg	3	9.9[#3]		6	10	<3	10	<3	13	12	16	5	14	<3	10	<3	6
cis-1,2-dichloroethene	ug/kg	7	200[#3]		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
cis-1,3-dichloropropene	ug/kg	4			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Dibromomethane	ug/kg	4	24,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Dichlorodifluoromethane	ug/kg	2	87,000[#1]		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Dichloromethane	ug/kg	30	2,800[#3]		<30	<30	<30	<30	<30	<30	<30	72	<30	<30	<30	<30	<30	<30
Ethylbenzene	ug/kg	3	24,000,000[#2]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Eucalyptol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	ug/kg	3	28,000[#3]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Methyl Methacrylate	ug/kg	100	4,400,000[#1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-
MTBE	ug/kg	6	120,000[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
n-butylbenzene	ug/kg	4	3,900,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
n-propylbenzene	ug/kg	4	97,000[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
sec-butylbenzene	ug/kg	4	7,800,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Styrene	ug/kg	3	78,000[#3]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
tert-butylbenzene	ug/kg	5	7,800,000[#1]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	ug/kg	3	1,400,000[#2]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Toluene	ug/kg	3	56,000,000[#2]		9	<3	<3	<3	<3	<3	<3	6	<3	<3	<3	<3	<3	<3
trans-1,2-dichloroethene	ug/kg	3	350[#3]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
trans-1,3-dichloropropene	ug/kg	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Trichloroethene	ug/kg	5	120,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	ug/kg	3	23,000,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Undecane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Xylene (m & p)	ug/kg	4			12	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Xylene (o)	ug/kg	4	se Xylenes Total		6	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Vinyl chloride	ug/kg	2	3,500[#2]		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
VOC TICs	None				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Trihalomethanes	ug/kg				<18	<18	<18	<18	<18	<18	<18	<18	<18	<18	<18	<18	<18	<18
SVOCs																		
Dibenzo[a,e]pyrene	ug/kg	100	42[#1]		-	-	-	-	-	-	-	-	-	-	-	6,277	-	-
2-methylnaphthalene	ug/kg	10	240,000[#1]		232	98	36	82	55	57	86	194	167 - 266	1,425	49	25	88	53
4-bromophenyl phenyl ether	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chlorophenyl phenyl ether	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Azobenzene	ug/kg	10	5,600[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bis(2-chloroethoxy) methane	ug/kg	10	190,000[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bis(2-chloroethyl)ether	ug/kg	10	230[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbazole	ug/kg	10			636	167	128	76	92	71	202	604	131	3,290	70	75	141	81
Dibenzofuran	ug/kg	10	73,000[#1]		249	77	51	36	50	40	96	230	93	3,082	36	26	79	48
Hexachlorobutadiene	ug/kg	4	25,000[#2]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hexachlorocyclopentadiene	ug/kg	10	1,800[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Hexachloroethane	ug/kg	10	540[#3]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Anilines																		

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC	Location	GTCS 1-43		GTCS 1-44		GTCS 1-45		GTCS 1-46		GTCS 1-47		GTCS 1-48		GTCS 1-49	
				Date	05/06/2019		05/06/2019		05/06/2019		05/06/2019	05/06/2019	05/06/2019		05/06/2019		05/06/2019	
				Sample Type	Normal		Normal		Normal		Normal	Normal	Normal		Normal		Normal	
				Field ID	GTCS 1-43A		GTCS 1-44A		GTCS 1-45A		GTCS 1-46A	GTCS 1-46A	GTCS 1-47A		GTCS 1-48A		GTCS 1-49A	
				ple_Depth_Range	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0.1-0.15	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05
2-nitroaniline	ug/kg	10	630,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
3-nitroaniline	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chloroaniline	ug/kg	10	2,700#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-nitroaniline	ug/kg	10	27,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Amino Aliphatics																		
N-nitrosodi-n-propylamine	ug/kg	10	78#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Explosives																		
2,4-Dinitrotoluene	ug/kg	10	170,000#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,6-dinitrotoluene	ug/kg	10	84,000#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Nitrobenzene	ug/kg	10	5,100#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Phenolics																		
2,4-dimethylphenol	ug/kg	10	410,000#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-chloronaphthalene	ug/kg	10	9,300#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-methylphenol	ug/kg	10	e Cresols Total#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	67	<10	<10	<10	<10
2-nitrophenol	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chloro-3-methylphenol	ug/kg	10	6,300,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-methylphenol	ug/kg	10	e Cresols Total#3		76	<10	<10	<10	<10	<10	<10	<10	<10	246	<10	<10	<10	<10
4-nitrophenol	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phenol	ug/kg	10	690,000#2		<10	<10	<10	<10	<10	<10	<10	<10	<10	310	<10	<10	<10	<10
SVOC - Halogenated Phenols																		
2,4,5-trichlorophenol	ug/kg	10	6,300,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,6-trichlorophenol	ug/kg	10	49,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-dichlorophenol	ug/kg	10	190,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-chlorophenol	ug/kg	10	390,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	ug/kg	10	60,000#2		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Halogenated Benzenes																		
1,2,4-trichlorobenzene	ug/kg	7	17,000,000#2		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
1,2-dichlorobenzene	ug/kg	4	95,000,000#2		<4 - 22	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,3-dichlorobenzene	ug/kg	4	300,000#2		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,4-dichlorobenzene	ug/kg	4	17,000,000#2		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hexachlorobenzene	ug/kg	10	16,000#2		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Phthalates																		
Bis(2-ethylhexyl) phthalate	ug/kg	100	2,800,000#3		516	1,002	140	611	221	911	1,013	619	206	355	551	1,001	202	443
Butyl benzyl phthalate	ug/kg	100	44,000,000#3		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Diethylphthalate	ug/kg	100	3,500,000#3		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Dimethyl phthalate	ug/kg	100	16,400#5		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Di-n-butyl phthalate	ug/kg	100	450,000#3		1,520	698	<100	<100	<100	<100	822	2,226	<100	<100	980	617	<100	<100
Di-n-octyl phthalate	ug/kg	100	3,400,000#3		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
SVOC - Solvents																		
Isophorone	ug/kg	10	570,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC TIC																		
SVOC TICs	None				-	-	-	-	-	-	-	-	-	-	-	-	-	-
.alpha.-Phellandrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
.alpha.-Pinene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
.beta.-Guaiene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
[1,1-Biphenyl]-4-carboxaldehyde	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1(2Aminobenzylidene)1234-tetrahydroacridineN	ug/kg	100			-	-	1,994	-	-	-	-	-	-	-	-	-	-	-
1,1-Biphenyl, 2,3,3,4-tetrachloro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Biphenyl, 2,3,3,5-tetrachloro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Biphenyl, 2,3,4,6-tetrachloro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,4,8-Tetramethylbicyclo[6.3.0]undeca-2,4-die	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,9,10-Dibenzopyrene	ug/kg	100			-	-	27,925	-	-	-	-	-	-	-	-	-	-	-
1,5,5-Trimethyl-6-methylene-cyclohexene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,6-Dimethylphenazine	ug/kg	100			-	-	885	-	-	-	-	-	-	-	-	-	-	-
10,18-Bisnorabieta-5,7,9(10),11,13-pentaene	ug/kg	100			-	-	-	1,968	-	-	-	-	-	-	-	-	-	-
10,18-Bisnorabieta-8,11,13-triene	ug/kg	100			-	-	-	3,492	-	-	-	-	-	-	-	-	-	-
10s,11s-Himachala-3(12),4-diene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
11H-Benzo[a]carbazole	ug/kg	100			9,597	-	-	-	224	-	-	-	200	4,085	-	-	199	-
11H-Benzo[a]fluoren-11-one	ug/kg	100			7,792	146	1,819	-	302	-	417	1,249	328	4,093	-	-	451	-
11H-Benzo[a]fluoren-11-one, 10-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	1,544	-	-	-	-
11H-Benzo[a]fluorene	ug/kg	100			-	-	-	-	-	-	-	-	1,115	-	-	-	-	-
11H-Benzo(b)fluorene	ug/kg	100			-	632	-	-	337	-	-	-	-	-	-	353	594	-
11H-Indeno(1,2-b)quinoline	ug/kg	100			-	-	2,706	-	-	-	-	-	-	-	-	-	-	-
13-Docosenamide, (Z)-	ug/kg	100			-	-	-	-	1,273	-	-	-	-	-	-	-	-	-
13-Isopropylpodocarpen-12-ol-20-al	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1H-Cyclopropa[l]phenanthrene,1a,9b-dihydro-	ug/kg	100			-	-	-	-	-	-	-	944	-	1,760	-	-	-	-
1H-Inden-1-one, 2,3-dihydro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methyldibenzothiophene	ug/kg	100			-	-	-	-	-	-	-	1,290	-	-	-	-	-	-
1-Naphthalenecarboxylic acid, 2-benzoyl-	ug/kg	100			14,484	-	-	-	-	-	-	-	-	-	-	-	-	-
2-(2H-Benzotriazol-2-yl)-5-methylphenol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-(Acetoxymethyl)-3-(methoxycarbonyl)biphenyle	ug/kg	100			7,465	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,3,,5,6-Pentachloro-1,1-biphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,3,6-Tetrachloro-1,1-biphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,3,4,6-Tetrachloro-1,1-biphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4,6-Cycloheptatrien-1-one, 2-phenyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	1,122	-	-	-	-
2,6-Dimethyldibenzothiophene	ug/kg	100			1,791	-	-	-	-	-	-	-	-	-	-	-	-	-
2,9-Dimethyl-2,3,4,5,6,7hexahydro-1H-2-benzaz	ug/kg	100			4,203	-	-	-	-	-	-	866	-	-	1,046	-	-	-
2-Bromo-4,5-dimethoxycinnamic acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
2Chloro2methyl1oxa2sila-1,2-dihydronaphthalen	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylchrysene	ug/kg	100			15,129	-	5,119	-	-	-	-	-	930	-	-	-	-	-
2-Propenal, 3-(4-hydroxy-3-methoxyphenyl)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,3-Dimethylbiphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,4:8,9-Dibenzopyrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	1,671	-	-
3,4-Dichlorobenzonitrile	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
3,5-Dimethoxy-4-hydroxycinnamaldehyde	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Bromo-5-ethoxy-4-hydroxybenzaldehyde	ug/kg	100			-	-	-	-	-	-	-	-	-	-	2,959	-	-	-
4,4-Bis(tetrahydrothiopyran)	ug/kg	100			-	-	-	-	-	267	-	618	-	546	-	-	-	190
4H-Cyclopenta[def]phenanthrene	ug/kg	100			-	-	-	-	-	-	734	-	-	-	-	-	-	-
6H-Benz[de]anthracen-6-one	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
7H-Benz(de)anthracen-7-one	ug/kg	100			-	-	-	-	-	-	-	-	-	2,001	-	-	-	-
8,9-Dihydro-7H-cyclopenta[a]pyrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC	Location	GTCS 1-43		GTCS 1-44		GTCS 1-45		GTCS 1-46		GTCS 1-47		GTCS 1-48		GTCS 1-49	
				Date	05/06/2019		05/06/2019		05/06/2019		05/06/2019	05/06/2019	05/06/2019		05/06/2019		05/06/2019	
				Sample Type	Normal		Normal		Normal		Normal	Normal	Normal		Normal		Normal	
				Field ID	GTCS 1-43A		GTCS 1-44A		GTCS 1-45A		GTCS 1-46A	GTCS 1-46A	GTCS 1-47A		GTCS 1-48A		GTCS 1-49A	
				ple_Depth_Range	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0.1-0.15	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05
9,10-Anthracenedione	ug/kg	100	14,000[#1]		6,326	-	-	-	118	-	372	1,381	313	1,864	-	-	-	-
9,10-Anthracenedione, 2-methyl-	ug/kg	100			3,572	-	-	-	-	-	-	1,430	-	-	-	-	-	-
9,10-Bis(bromomethyl)anthracene	ug/kg	100			-	-	1,138	-	-	-	-	-	-	-	-	-	-	-
9,10-Dimethylanthracene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
9-Anthracenecarbonitrile	ug/kg	100			-	-	-	-	-	-	-	-	251	-	-	-	-	-
9H-Cyclopenta[a]pyrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
9H-Fluoren-9-ol	ug/kg	100			1,577	-	-	-	-	-	-	-	-	730	-	-	-	-
9H-Fluoren-9-one	ug/kg	100			-	-	-	-	-	-	-	-	213	1,634	-	-	292	-
9H-Fluorene, 1-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
9H-Fluorene, 2-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	203	-	-	-	-	-
9H-Fluorene, 9-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Abietic acid	ug/kg	100			-	-	-	8,872	-	-	-	-	-	-	-	-	-	-
Alloaromadendrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthra(1,2-b)thiophene	ug/kg	100			-	-	-	-	542	-	-	-	512	-	-	-	-	-
Anthra(2,3-b)thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	440	-
Anthracene, 1-methyl-	ug/kg	100			8,921	-	-	-	-	159	-	-	-	-	2,064	-	-	-
Anthracene, 2-ethyl-	ug/kg	100			-	-	-	-	-	-	-	-	177	-	-	-	-	-
Anthracene, 2-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	1,128	-	282	-
Aromandendrene	ug/kg	100			-	-	-	1,425	-	-	-	-	-	-	-	-	-	-
Benz(A)anthracene-7,12-dione	ug/kg	100			-	-	-	-	-	-	-	-	-	921	-	-	-	-
Benz(a)anthracene-7-carbonitrile	ug/kg	100			-	-	-	-	-	-	-	-	-	1,671	-	-	-	-
Benz[a]anthracene, 12-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz[a]anthracene, 1-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	966	-
Benz[a]anthracene, 7-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz[j]aceanthrylene, 3-methyl-	ug/kg	100			6,337	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzaldehyde, 4-hydroxy-3,5-dimethoxy-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzenamine, 2,4,6-tribromo-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzene, (4,5,5-trimethyl-1,3-cyclopentadien-1-y	ug/kg	100			1,135	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Sulfonylbis (4-chlorobenzene)	ug/kg	100	51,000[#1]		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzenesulfonamide, 4-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b]naphtho[1,2-d]furan	ug/kg	100			-	-	-	-	-	-	-	-	-	1,400	-	-	-	-
Benzo(c)carbazole	ug/kg	100			-	-	-	-	-	-	-	1,178	-	-	-	-	-	-
Benzo[b]naphtho[1,2-d]thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b]naphtho[2,1-d]thiophene	ug/kg	100			9,542	-	2,821	-	-	236	690	2,396	-	3,939	2,276	-	-	-
Benzo[b]naphtho[2,3-d]furan	ug/kg	100			6,475	235	1,194	-	207	144	-	1,649	386	2,865	860	-	-	-
Benzo[b]naphtho[2,3-d]thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	476	-
Benzo[b]triphenylene	ug/kg	100			-	-	-	-	-	-	-	-	-	2,785	-	-	-	-
Benzo[c]cinnoline	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[c]phenanthrene	ug/kg	100			-	-	-	-	-	-	-	-	-	2,561	-	-	-	-
Benzo(e)pyrene	ug/kg	100			30,260	-	16,972	-	2,136	-	3,012	17,873	3,091	6,399	8,828	-	2,311	-
Benzo[ghi]fluoranthene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo[h]quinoline, 2,4-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	1,220	-	-	-
Benzo[kl]xanthene	ug/kg	100			-	-	-	-	-	-	-	-	-	4,578	-	-	-	-
Benzoic acid, hexyl ester	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Biphenyl	ug/kg	100	500,000[#3]		-	-	-	-	-	-	-	-	-	276	-	-	-	-
Biphenylene	ug/kg	100			-	-	-	-	-	-	-	-	-	2,580	-	-	-	-
Butylated Hydroxytoluene	ug/kg	100	150,000[#1]		-	-	-	1,566	-	-	-	-	-	-	-	-	-	-
Camphor (TIC)	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene, 1-methyl-	ug/kg	100			-	409	-	-	635	314	715	2,844	-	4,408	-	-	-	-
Chrysene, 5-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	514	-	-	-	-	-
Chrysene, 6-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	5,382	-	-	-
Cyclopenta(cd)pyrene, 3,4-dihydro-	ug/kg	100			-	-	-	-	-	-	-	-	-	4,726	-	-	-	-
Cyclopenta(def)phenanthrenone	ug/kg	100			-	-	-	-	-	-	-	-	-	5,053	-	-	330	-
Dehydroabietic acid	ug/kg	100			-	-	-	47,248	-	-	-	-	-	-	-	-	-	-
D-Homoandrostane, (5.alpha.,13.alpha.)-	ug/kg	100			14,596	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,e)aceanthrylene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	2,408	-	-
Dibenzo(a,i)pyrene	ug/kg	100			-	-	11,644	-	-	-	-	-	-	-	-	978	-	-
Dibenzo[def,mno]chrysene	ug/kg	100			-	-	-	-	-	-	-	-	-	1,950	-	-	-	-
Dibenzofuran, 4-methyl-	ug/kg	100			1,396	-	-	-	-	-	-	-	143	-	-	-	-	-
Dibenzothiophene	ug/kg	100	780,000[#1]		-	-	-	-	-	-	-	499	-	-	-	-	-	-
Dibenzothiophene, 3-methyl-	ug/kg	100			1,830	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenzothiophene, 4,6-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	663	-	-	-	-	-	-
Dicyclohexyl phthalate	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diphenyl sulfide	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
di-p-Tolylacetylene	ug/kg	100			4,840	-	760	-	137	-	-	-	812	-	-	-	-	-
D-Limonene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eicosane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	318
Ferruginol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene, 2-methyl-	ug/kg	100			15,811	-	3,442	-	645	450	1,117	4,204	510	-	-	-	-	-
Fluorene, 2,4a-dihydro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heneicosane	ug/kg	100			-	-	-	5,074	-	454	-	-	-	-	-	-	-	-
Heneicosane, 3-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heptadecane	ug/kg	100			-	-	-	-	-	2,103	-	-	-	-	-	-	-	-
Hexadecane	ug/kg	100			-	1,467	-	-	-	1,311	-	-	-	1,976	-	-	-	-
Hexathiane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indeno[1,2,3-fg]naphthacene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	1,132	-	-
Indole, 5-methyl-2-(4-pyridyl)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Isocil	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
isoledene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Longifolene	ug/kg	100			-	-	-	7,933	-	-	-	-	-	-	-	-	-	-
Methyl dehydroabietate	ug/kg	100			-	-	-	5,678	-	-	-	-	-	-	-	-	-	-
Morpholine, 4-(1-cyclohepten-1-yl)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 1,4,5-trimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	432	-	-	-	-
Naphthalene, 1,4,6-trimethyl-	ug/kg	100			1,026	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 1,6,7-trimethyl-	ug/kg	100			1,373	-	-	-	-	-	-	240	166	503	-	-	136	-
Naphthalene, 1,6-dimethyl-	ug/kg	100			999	-	-	-	-	-	-	251	158	583	-	-	-	-
Naphthalene, 1,7-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	205	-	-	-	-	-
Naphthalene, 2,3,6-trimethyl-	ug/kg	100			973	-	-	-	-	-	-	-	135	257	-	-	-	-
Naphthalene, 2,3-dimethyl-	ug/kg	100			750	-	-	-	-	-	-	-	-	752	-	-	-	-
Naphthalene, 2,6-dimethyl-	ug/kg	100			561	-	-	-	-	-	-	-	-	826	-	-	-	-

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC														
Location				GTCS 1-43		GTCS 1-44		GTCS 1-45		GTCS 1-46		GTCS 1-47		GTCS 1-48		GTCS 1-49	
Date				05/06/2019		05/06/2019		05/06/2019		05/06/2019	05/06/2019	05/06/2019		05/06/2019		05/06/2019	
Sample Type				Normal		Normal		Normal		Normal	Normal	Normal		Normal		Normal	
Field ID				GTCS 1-43A		GTCS 1-44A		GTCS 1-45A		GTCS 1-46A	GTCS 1-46A	GTCS 1-47A		GTCS 1-48A		GTCS 1-49A	
ple_Depth_Range				0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0.1-0.15	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05
Naphthalene, 2,7-dimethyl-	ug/kg	100		-	-	-	-	-	-	-	-	165	379	-	-	-	-
Naphthalene, 2-ethyl-	ug/kg	100		-	-	-	-	-	-	-	-	137	-	-	-	-	-
Naphthalene, 2-phenyl-	ug/kg	100		-	-	-	-	179	-	-	-	-	3,093	-	-	-	-
Naphtho[1,2-b]thiophene	ug/kg	100		-	-	-	-	-	-	-	-	306	1,910	-	-	-	-
Naphtho[2,1,8,7-klmn]xanthene	ug/kg	100		-	-	-	-	-	-	-	-	-	1,664	-	-	-	-
Naphtho[2,1-b]thiophene	ug/kg	100		1,995	-	-	-	-	-	-	-	-	-	-	-	-	-
n-Decanoic acid	ug/kg	100		-	-	-	2,983	-	-	-	-	-	-	-	-	-	-
Neocuproine	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexadecanoic Acid	ug/kg	100		-	-	-	196,284	-	-	-	-	-	-	-	-	-	-
Nonadecane	ug/kg	100		17,081	-	-	-	-	-	-	-	-	-	-	1,174	-	-
n-Pentafluorosulfanyl-S,S-diphenoxysufilimine	ug/kg	100		-	-	-	-	-	-	-	-	-	1,790	-	-	-	-
Octadecane	ug/kg	100		-	484	-	-	-	-	-	-	-	-	-	-	-	-
Octadecane, 1-iodo-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Octadecanoic Acid	ug/kg	100		-	-	-	147,477	-	-	-	-	-	-	-	-	-	-
Octadecanoic acid, butyl ester	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
p-Cymene	ug/kg	4		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Perylene	ug/kg	100		-	-	-	-	-	630	-	3,653	-	4,791	-	-	-	1,132
Phenanthrene, 1-methyl-	ug/kg	100		5,459	-	1,537	-	114	159	-	1,253	229	4,246	573	-	223	116
Phenanthrene, 2,5-dimethyl-	ug/kg	100		-	-	-	-	-	-	-	-	289	-	-	-	-	-
Phenanthrene, 2-methyl-	ug/kg	100		-	-	1,095	-	259	-	392	1,804	634	3,412	1,094	-	351	-
Phenanthrene, 3,6-dimethyl-	ug/kg	100		-	-	-	-	-	-	-	967	379	2,284	-	-	-	-
Phenanthrene, 4-methyl-	ug/kg	100		-	191	862	-	190	196	282	-	-	-	-	-	-	-
Phenol, 2,6-dimethoxy-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol, 2-methoxy-4-(1-propenyl)-, (Z)-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene, 1,3-dimethyl-	ug/kg	100		7,437	-	-	-	-	-	-	-	367	634	-	-	-	-
Pyrene, 1-methyl-	ug/kg	100		7,242	362	2,101	-	317	182	480	1,649	523	5,147	4,236	-	344	264
Pyrene, 2-methyl-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quinoxaline, 6-(3-nitrobenzylidenamino)-	ug/kg	100		-	-	-	-	-	-	-	1,199	-	-	-	-	-	-
Retene	ug/kg	100		-	-	-	-	-	286	-	-	-	-	-	-	-	158
Rubicene-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	2,432
Tetrachloro-o-benzoquinone	ug/kg	100		2,648	-	-	-	-	-	-	763	203	-	-	-	305	-
Tetracosane	ug/kg	100		-	-	-	2,884	-	-	-	-	1,055	-	-	-	-	-
Tetradecanoic acid	ug/kg	100		-	-	-	2,707	-	-	-	-	-	-	-	-	-	-
trans-1,2-Bis(methyldichlorosilyl)ethylene	ug/kg	100		-	-	-	8,137	-	-	-	-	-	-	-	-	-	-
Trichlorovinylsilane	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triphenylene	ug/kg	100		-	1,585	-	-	-	1,155	-	-	-	32,197	-	-	-	-
Triphenylene, 2-methyl-	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-01	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-02	ug/kg	100		-	-	-	4,677	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-03	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-04	ug/kg	100		-	-	-	-	-	-	-	744	-	-	-	-	-	-
GT-SVOC-TIC-05	ug/kg	100		-	-	-	-	-	-	-	-	215	-	2,278	-	-	-
GT-SVOC-TIC-06	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-07	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-08	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-09	ug/kg	100		-	-	-	-	-	-	-	-	-	1,665	-	-	-	-
GT-SVOC-TIC-10	ug/kg	100		-	-	-	-	-	-	-	-	-	3,094	-	-	-	-
GT-SVOC-TIC-11	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-12	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-13	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-14	ug/kg	100		8,803	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-15	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-16	ug/kg	100		-	1,735	-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-17	ug/kg	100		-	-	-	-	-	-	-	1,182	-	-	-	-	-	-
GT-SVOC-TIC-18	ug/kg	100		-	-	-	-	-	-	-	2,064	-	-	-	-	-	-
Benzo(b)naphtho(1,2-d)furan	ug/kg	100		-	-	-	-	-	-	-	-	-	-	-	-	-	-
PAH																	
Acenaphthene	mg/kg	0.01	15,000[#2]	0.39	0.07	<0.05	<0.05	0.06	1.08	0.09	0.23	<0.05	<0.05	<0.05	0.08	0.11	<0.05
Acenaphthylene	mg/kg	0.01	15,000[#2]	0.79	0.41	0.24	0.25	0.32	0.35	0.41	0.7	0.36	0.32	0.36	0.21	0.52	0.27
Anthracene	mg/kg	0.01	74,000[#2]	2.01	0.57	0.25	0.23	0.44	2.22	0.69	1.43	0.46	0.44	0.56	0.39	0.82	0.34
Benz(a)anthracene	mg/kg	0.01	29[#2]	8.55	2.1	1.06	0.95	2.06	6.38	2.36	6.06	1.89	1.9	1.55	1.33	2.18	1.56
Benzo(a) pyrene	mg/kg	0.01	5.7[#2]	8.61	2.75	1.4	1.25	3.13	5.55	3.27	6.93	2.3	2.16	1.78	1.46	2.24	1.43
Benzo(b)fluoranthene	mg/kg	0.01	7.2[#2]	11.28	3.87	1.85	1.64	3.83	7.34	4.47	9.33	2.89	2.85 - 6.397	2.36	1.88	3	1.94
Benzo(b)&(k)fluoranthene	mg/kg	0.01		15.67	5.37	2.57	2.28	5.32	10.2	6.21	12.96	4.01	3.96	3.28	2.61	4.17	2.69
Benzo(g,h,i)perylene	mg/kg	0.01	640[#2]	7.43	2.61	0.99	0.94	2.49	3.7	2.68	5.86	1.55	1.36	1.3	0.93	1.53	1.13
Benzo(k)fluoranthene	mg/kg	0.01	190[#2]	4.39	1.5	0.72	0.64	1.49	2.86	1.74	3.63	1.12	1.11	0.92	0.73	1.17	0.75
Chrysene	mg/kg	0.01	57[#2]	7.76	2.42	1.05	1.09	2.38	5.68	3.01	6.38	1.96	1.92	1.61	1.34	1.98	1.23
Coronene	mg/kg	0.04		1.48	0.67	0.25	0.25	0.43	0.67	0.64	1.28	0.4	0.3	0.28	0.23	0.37	0.27
Dibenz(a,h)anthracene	mg/kg	0.01	0.57[#2]	1.51	0.44	0.2	0.22	0.69	0.96	0.66	1.44	0.38	0.36	0.23	0.23	0.34	0.29
Fluoranthene	mg/kg	0.01	3,100[#2]	13.8	4.29	2.18	1.81	3.63	10.97	5.18	11.38	3.48	3.15	2.93	2.4	4.94	2.09
Fluorene	mg/kg	0.01	9,900[#2]	0.43	0.08	<0.04	<0.04	0.06	0.66	0.09	0.24	0.06	0.06	0.07	0.07	0.18	0.04
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01	82[#2]	7.08	2.44	1.03	0.94	2.67	3.52	2.49	5.28	1.59	1.41	1.33	0.97	1.53	1.13
Naphthalene	mg/kg	0.01	4,900[#2]	<0.027 - 0.61	<0.027 - 0.15	<0.027 - 0.06	<0.027 - 0.07	<0.027 - 0.09	<0.027 - 2.67	<0.027 - 0.15	<0.027 - 0.25	<0.027 - 0.11	<0.027 - 0.13	<0.027 - 0.07	<0.027 - 0.05	<0.027 - 0.2	<0.027 - 0.1
Phenanthrene	mg/kg	0.01	3,100[#2]	5.74	1.38	0.77	0.55	1.27	8.41	1.63	3.94	0.96	1.08	1.3	0.99	3.36	0.8
Pyrene	mg/kg	0.01	7,400[#2]	11.79	3.61	1.91	1.61	3.23	9.26	4.32	9.64	3.16	2.73	2.58	2.08	4.15	1.82
PAH 16 Total	mg/kg	0.6		92.2	28.7	13.7	12.2	27.8	71.6	33.2	72.7	22.3	21	19	15.1	28.3	14.9
PAH 17 Total	mg/kg	0.64		93.65	29.36	13.96	12.44	28.27	72.28	33.88	74	22.67	21.28	19.23	15.37	28.62	15.19
PCB (Dutch 7) congeners																	
PCB 28	ug/kg	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	7	<5	<5
PCB 52	ug/kg	5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	19	22	<5	<5
PCB 101	ug/kg	5		8	<5	<5	<5	<5	<5	<5	<5	<5	<5	22	27	<5	<5
PCB 118	ug/kg	5	120[#1]	4.97 - 8	<5 - 3.48	<5 - 0.516	<5 - 0.725	<5 - 0.989	<5 - 1.21	<5 - 2.33	<5 - 2.79	<5 - 0.856	<5 - 1.06	17.2 - 19	23 - 33.3	<5 - 1.96	<5 - 10.1
PCB 138	ug/kg	5		42	15	<5	<5	<5	<5	8	12	<5	<5	16	11	<5	<5
PCB 153	ug/kg	5		33	11	<5	<5	<5	<5	6	6	<5	<5	13	10	<5	<5
PCB 180	ug/kg	5		59	17	<5	<5	<5	<5	10	23	<5	<5	9	6	<5	<5
Total PCB 7 Congeners	ug/kg	35	200[#5]	150	43	<35	<35	<35	<35	<35	41	<35	<35	98	106	<35	<35

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC	Location	GTCS 1-43		GTCS 1-44		GTCS 1-45		GTCS 1-46		GTCS 1-47		GTCS 1-48		GTCS 1-49	
				Date	05/06/2019		05/06/2019		05/06/2019		05/06/2019	05/06/2019	05/06/2019		05/06/2019		05/06/2019	
				Sample Type	Normal		Normal		Normal		Normal	Normal	Normal		Normal		Normal	
				Field ID	GTCS 1-43A		GTCS 1-44A		GTCS 1-45A		GTCS 1-46A	GTCS 1-46A	GTCS 1-47A		GTCS 1-48A		GTCS 1-49A	
				ple_Depth_Range	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0.1-0.15	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05
PCB (WHO12) 12 congeners																		
Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	ug/kg	Various	38[#1]		0.477	0.218	0.0501	0.0674	0.0386	0.0396	0.162	0.256	0.0354	0.0419	1.87	5.24	0.0708	0.0932
Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	ug/kg	Various	12[#1]		0.0155	0.00622	0.00123	0.00229	0.000682	0.000936	0.00648	0.0102	0.00124	0.000818	0.0856	0.223	0.00206	0.00296
Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	ug/kg	Various	120[#1]		2.64	1.57	0.267	0.359	0.452	0.543	1.17	1.33	0.383	0.446	11.2	22.3	0.898	4.31
Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	ug/kg	Various	120[#1]		0.0512	0.029	0.00641	0.00381	0.0113	0.0095	0.0234	0.0684	0.00655	0.00721	0.379	0.938	0.0247	0.195
Pentachlorobiphenyl, 2,3',4,4',5- (PCB-118)	ug/kg	Various	120[#1]		4.97	3.48	0.516	0.725	0.989	1.21	2.33	2.79	0.856	1.06	17.2	33.3	1.96	10.1
Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	ug/kg	Various	120[#1]		0.222	0.0811	0.0241	0.026	0.0216	0.0283	0.0785	0.138	0.0214	0.0289	0.66	0.843	0.0428	0.179
Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	ug/kg	Various	0.036[#1]		0.0497	0.04	0.00176	0.00758	0.00612	0.00603	0.0317	0.0247	0.00629	0.00785	0.0856	0.169	0.0114	0.0168
Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	ug/kg	Various	120[#1]		1.6	0.941	0.15	0.177	0.219	0.238	0.635	0.593	0.181	0.226	1.54	2	0.307	1.51
Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	ug/kg	Various	120[#1]		1.12	0.417	0.0492	0.0585	0.065	0.0722	0.305	0.508	0.0688	0.0783	0.529	0.579	0.0923	0.34
Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	ug/kg	Various	120[#1]		1.83	0.646	0.0744	0.0897	0.0876	0.105	0.379	0.605	0.0934	0.118	0.773	0.823	0.126	0.504
Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	ug/kg	Various	0.12[#1]		0.0115	0.00343	0.000884	0.000256	0.00125	0.0011	<0.000469	0.00675	0.0014	0.00103	0.00147	0.00152	0.000557	0.00176
Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	ug/kg	Various	130[#1]		0.62	0.207	0.0156	0.0193	0.0177	0.0211	0.129	0.296	0.0246	0.0306	0.136	0.109	0.0291	0.0636
Chlorinated Dioxins and Furans																		
2378-TCDF	ng/kg	Various			29.9	14.5	2.55	3.05	8.32	8.78	15.7	27.4	7.08	6.83	3.51	<0.427	5.41	3.63
12378-PeCDD	ng/kg	Various			8.54	2.12	0.859	<0.676	1.36	0.761	3.55	9.28	1.03	1.15	0.58	<0.631	1.41	1.25
123478-HxCDD	ng/kg	Various			7.76	3.82	1.29	1.08	0.726	1.15	3.91	9.25	1.26	1.41	1.91	0.868	1.63	1.89
123678-HxCDD	ng/kg	Various			30.1	13.6	2.47	3.07	3.82	4.02	12.2	29.7	5.02	6.51	11	8.82	7.43	6.1
123789 HxCDD	ng/kg	Various			16.7	6.96	1.67	1.66	2.06	2.15	7.74	14.3	0.996	2.3	3.54	4.79	3.99	2.96
1234678-HpCDD	ng/kg	Various			557	232	39.6	68	52	60.5	224	478	162	212	356	278	92.4	86.7
OCDD	ng/kg	Various			5,300	1,840	331	483	443	449	1,820	4,310	1,690	1,940	4,280	2,920	700	624
OCDF	ng/kg	Various			476	167	16.2	20.4	28	29.4	222	451	131	135	187	141	67.7	47.9
2378-TCDD	ng/kg	Various			2.36	<0.291	<0.339	<0.204	<0.206	<0.171	<0.618	2.3	<0.228	<0.149	<0.236	<0.398	<0.428	<0.442
12378-PeCDF	ng/kg	Various			17.4	5.52	<0.32	4.18	6.3	5.13	6.46	19.4	6.25	5.09	4.56	3.63	3.38	2.99
23478-PeCDF	ng/kg	Various			29.7	15.6	2.91	3.33	7.5	7.52	14	33.5	6.15	4.71	4.59	2.97	7.1	5.07
123478-HxCDF	ng/kg	Various			23.5	11	3.22	3.55	9.66	9.16	13	32.1	8.78	5.56	6.72	4.33	6.58	4.67
123678-HxCDF	ng/kg	Various			16.5	10.8	2.54	2.47	4.6	5.49	<0.595	20.8	3.98	3.57	3.29	3.27	5.43	3.65
234678-HxCDF	ng/kg	Various			18.1	13.1	2.3	3.27	4.09	2.74	<0.56	25	3.53	4.45	4.29	3.46	5.5	4.33
123789-HxCDF	ng/kg	Various			2.49	1.79	0.314	<0.443	0.876	<0.465	<603	2.01	<0.265	<0.517	0.901	0.545	1.02	0.51
1234678-HpCDF	ng/kg	Various			396	170	16.3	25.6	24.9	29.3	155	346	53.7	73.4	86.1	59.9	54.8	41.2
1234789-HpCDF	ng/kg	Various			16.9	8.46	1.04	<0.724	2.58	3.36	6.2	14.2	4	4.25	6.86	5.49	2.19	1.31
Brominated Dioxins and Furans																		
2378-TBDD	ng/kg	Various			<0.71	<0.47	<0.75	<0.5	<0.74	<0.55	<0.85	<0.82	<0.7	<0.58	<0.75	<0.6	<0.72	<0.6
12378-PBDD	ng/kg	Various			<0.75	<0.52	<0.78	<0.53	<0.8	<0.53	<0.83	<0.83	<0.77	<0.55	<0.8	<0.57	<0.77	<0.59
123478-HxBDD	ng/kg	Various			<0.68	<0.54	<0.66	<0.55	<0.69	<0.57	<0.82	<0.82	<0.68	<0.6	<0.77	<0.59	<0.74	<0.57
123678-HxBDD	ng/kg	Various			<0.63	<0.59	<0.65	<0.6	<0.7	<0.61	<0.82	<0.84	<0.7	0.63	<0.69	0.6	<0.69	<0.6
123789-HxBDD	ng/kg	Various			<0.7	<0.48	<0.7	<0.53	<0.74	<0.55	<0.84	<0.84	<0.7	0.61	<0.73	0.67	<0.7	<0.54
1234678-HpBDD	ng/kg	Various			1.81	<0.6	<0.71	<0.61	<0.73	0.63	0.97	1.78	<0.81	0.92	0.92	0.77	<0.8	<0.6
OBDD	ng/kg	Various			<0.84	<0.81	<0.8	<0.8	<0.81	<0.78	<0.83	<0.85	<0.8	<0.8	<0.8	<0.78	<0.74	<0.79
2378-TBDF	ng/kg	Various			17.5	0.98	1.01	2.51	2.55	3.01	11.14	19.67	3.76	8.93	6.23	7.14	2.09	3.18
12378-PBDF	ng/kg	Various			8.34	1	0.87	0.98	1.36	1.25	7.91	14.53	1.77	4.56	4.18	4.12	1.36	2.29
23478-PBDF	ng/kg	Various			4.91	<0.5	1.19	0.78	1.7	1.1	4.23	8.19	1.19	2.33	2.18	2.09	0.81	1.58
123478-HxBDF	ng/kg	Various			6.12	<0.55	0.9	0.6	0.75	0.75	2.55	5.71	1.39	1.54	1.69	1.33	1.29	0.89
123678-HxBDF	ng/kg	Various			3	<0.49	1.46	0.52	1.99	0.68	2.71	4.4	3.01	1.29	1.44	1.4	0.8	0.65
234678-HxBDF	ng/kg	Various			<0.74	<0.46	<0.78	<0.49	<0.8	0.47	1.12	2.57	0.74	0.91	0.9	1.06	<0.77	0.62
123789-HxBDF	ng/kg	Various			1.29	<0.44	<0.72	<0.45	<0.75	<0.48	<0.85	1.15	<0.76	0.56	<0.78	<0.57	<0.8	<0.57
1234678-HpBDF	ng/kg	Various			2.27	<0.48	<0.68	<0.5	<0.69	<0.53	<0.82	<0.84	<0.67	0.5	<0.7	0.5	<0.75	<0.53
1234789-HpBDF	ng/kg	Various			3.16	<0.55	<0.73	<0.56	<0.72	<0.6	1.33	3.09	<0.7	<0.58	<0.79	<0.6	<0.79	<0.66
OBDF	ng/kg	Various			1.11	<0.65	<0.82	<0.68	<0.8	<0.7	<0.85	1.22	<0.77	<0.7	<0.82	<0.72	<0.81	<0.72
Organophosphorous flame retardants																		
Triphenylphosphate	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tris(1-chloro-2-propyl)phosphate	mg/kg	Various	630[#1]		<0.5	<0.15	<0.15	<0.15	<0.15	<0.5	<0.15	<0.5	<0.15	<0.15	<0.15	<0.1	<0.15	<0.15
Tris(2-ethylhexyl) phosphate	mg/kg	0.1	170[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Brominated flame retardents (PBDEs)																		
2,2",4-tribromodiphenyl ether (BDE-17)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,4"-tribromodiphenyl ether (BDE-28)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4"-tetrabromodiphenyl ether (BDE-47)	mg/kg	0.1	6.3[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,3",4,4"-tetrabromodiphenyl ether (BDE-66)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",3,4,4"-pentabromodiphenyl ether (BDE-85)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",5-pentabromodiphenyl ether (BDE-99)	mg/kg	0.1	6.3[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",6-pentabromodiphenyl ether (BDE-100)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",3,4,4",5"-hexabromodiphenyl ether(BDE-13	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",5,5"-hexabromodiphenyl ether(BDE-15	mg/kg	0.1	13[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",5,6"-hexabromodiphenyl ether(BDE-15	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2,3,4,4,5,6-heptabromodiphenyl ether (BDE-18	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Polybrominated biphenyls (PBBs)																		
2,2-dibromobiphenyl (PBB 4)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4,4-dibromobiphenyl (PBB 15)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,2,5-tribromobiphenyl (PBB 18)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tetrabromobiphenyl (3,3,5,5-) (PBB 80)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexabromobiphenyl (PBB 153)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrabromobisphenol A																		
tetrabromobisphenol A	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexabromocyclododecane (HBCDD)																		
Hexabromocyclododecane (HBCDD)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isocyanates																		
Isocyanic Acid	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Methyl Isocyanate	ug/kg	250	4,600[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Ethyl Isocyanate	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Propyl Isocyanate	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Phenyl Isocyanate	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Hexamethylene diisocyanate	ug/kg	250	3,100[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
2,4-Toluene diisocyanate	ug/kg	250	6,400[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
2,6-Toluene diisocyanate	ug/kg	250	5,300[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Isophorone Diisocyanate	ug/kg	500			<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500
4,4-Methylene-bis(phenyl-isocyanate)	ug/kg	250	850,000,000[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Cyanides																		
Cyanide (Free)	mg/kg	0.5	20[#5]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide Total	mg/kg	0.5	78[#1]		4.9	1.2	0.6	0.8	<0.5	1	1.9	10.5	1	1	3.6	2.1	<0.5	<0.5
Thiocyanate	mg/kg	0.6	20[#5]		<0.6	0.8	<0.6	<0.6	0.6	0.9	0.9	<0.6	0.7	1	<0.6	1	<0.6	<0.6
Asbestos																		

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC															
				Location	GTCS 1-43		GTCS 1-44		GTCS 1-45		GTCS 1-46		GTCS 1-47		GTCS 1-48		GTCS 1-49	
				Date	05/06/2019		05/06/2019		05/06/2019		05/06/2019	05/06/2019	05/06/2019		05/06/2019		05/06/2019	
				Sample Type	Normal		Normal		Normal		Normal	Normal	Normal		Normal		Normal	
				Field ID	GTCS 1-43A		GTCS 1-44A		GTCS 1-45A		GTCS 1-46A	GTCS 1-46A	GTCS 1-47A		GTCS 1-48A		GTCS 1-49A	
				ple_Depth_Range	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0.1-0.15	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05
Asbestos Level	None				1	1	0	0	0	0	0	1	0	1	0	0	1	1
Asbestos Containing Material	None				0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asbestos Containing Material (2)	None				0	-	-	-	-	-	-	0	-	-	-	-	0	-
Asbestos Containing Material (3)	None				-	-	-	-	-	-	-	-	-	-	-	-	0	-
Asbestos fibres	None				1	1	0	0	0	0	0	1	0	1	0	0	1	1
Asbestos Fibres (2)	None				1	-	-	-	-	-	-	1	-	-	-	-	1	-
Asbestos Fibres (3)	None				-	-	-	-	-	-	-	-	-	-	-	-	1	-
Asbestos Type	None				1	1	0	0	0	0	0	1	0	1	0	0	1	1
Asbestos Type 2	None				1	-	-	-	-	-	-	1	-	-	-	-	1	-
Asbestos Type 3	None				-	-	-	-	-	-	-	-	-	-	-	-	1	-
General Description (Bulk Analysis)	None				1	1	1	1	1	1	1	1	1	1	1	1	1	1
Potentially Respirable Fibres per gram	f/g	0			99,523	66,027	-	-	-	-	-	0	-	0	-	-	67,482	0
SVF / MMMF																		
Synthetic/MMMF	None				0	0	0	0	0	0	0	0	0	0	1	1	0	0
Asbestos Quantification																		
Asbestos Gravimetric & PCOM Total	mass %	0.001			0.001	<0.001	-	-	-	-	-	0.002	-	<0.001	-	-	<0.001	<0.001
Asbestos PCOM Quantification (Fibres)	mass %	0.001			<0.001	<0.001	-	-	-	-	-	<0.001	-	<0.001	-	-	<0.001	<0.001
Total ACM Gravimetric Quantification (% Asb)	mass %	0.001			<0.001	<0.001	-	-	-	-	-	<0.001	-	<0.001	-	-	<0.001	<0.001
Total Detailed Gravimetric Quantification (% Asb	mass %	0.001			0.001	<0.001	-	-	-	-	-	0.002	-	<0.001	-	-	<0.001	<0.001
Asbestos Quantification - Total - %	mass %	0.001			0.001	<0.001	-	-	-	-	-	0.002	-	<0.001	-	-	<0.001	<0.001
Total Organic Carbon																		
TOC	percent	0.02			4.8	4.83	3.68	4.1	1.36	3.76	4.85	5.12	4.71	4.52	2.34	6.8	3.79	3.74
Inorganics																		
pH (Lab)	pH units	0.01			7.93	7.57	7.82	7.7	7.72	7.6	7.84	8.05	8.17	7.99	7.8	7.64	8.06	7.79
Other																		
Natural Moisture Content	percent	0.1			13.3	13.1	13.7	15.5	7.3	10.5	16.2	13.2	20.3	15.4	16.9	13.9	8.4	8.2
ESdat Calculated																		
Cresols Total	ug/kg	20	5,400,000[#3]		76	<20	<20	<20	<20	<20	<20	<20	<20	313	<20	<20	<20	<20
Benzo(a)pyrene (surrogate marker for PAH mixt	mg/kg	0.01	10[#6]		8.61	2.75	1.4	1.25	3.13	5.55	3.27	6.93	2.3	2.16	1.78	1.46	2.24	1.43
Xylene Total	ug/kg	8	42,000,000[#2]		18	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Trichlorobenzene (total)	ug/kg	14	2200[#5]		<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
AECOM Calculated																		
Sum of PCDD/F +PCB12	ng/kg	Various	8700[#4]		20610	10165	1596	2173	2527	2908	8399	12518	3784	4480	39446	69988	4547	18171
PCDD/F+PBDD/F+PCB12 Hazard Index	-	-	1		0.57	0.24	0.05	0.06	0.1	0.09	0.25	0.57	0.11	0.12	0.25	0.34	0.11	0.11
WHO2005 TEQ (PCDD/F + PBDD/F + PCB)	ng/kg	Various			56.596	23.699	5.002	5.469	9.939	9.166	24.28	57.252	10.894	12.474	23.039	29.304	11.034	10.462

Comments
#1 USEPA RSL (May 2019)
#2 LQM/CIEH S4ULs 2015 (Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3516. All rights reserved).
#3 EIC/AGS/CL:AIRE 2010
#4 EA SGV 2009
#5 Dutch IV 2013
#6 Defra C4SL 2014

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
 - : Not analysed
Field_D: Field Duplicate
HH: Human Health

Key
XXX Exceedance of HH Soil. Public Open Space (residential). Sandy Loam. TOC >=1.45 to <3.48%

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC													
				Location	GTCS 1-50		GTCS 1-51		GTCS 1-52	GTCS 1-53	GTCS 1-54	GTCS 1-55	GTCS 1-56	GTCS 1-57	GTCS 1-58	GTCS 1-59
				Date	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Field ID	GTCS 1-50A	GTCS 1-50A	GTCS 1-51A	GTCS 1-51A	GTCS 1-52A	GTCS 1-53A	GTCS 1-54A	GTCS 1-55A	GTCS 1-56A	GTCS 1-57A	GTCS 1-58A	GTCS 1-59A
				ple_Depth_Range	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
Metals																
Aluminium	mg/kg	50	77,000[#1]		13,020	9,700 - 10,759	11,880	8,884 - 10,088	9,573 - 12,353	12,500	11,350	9,007 - 11,780	11,210	12,190	10,730	6,998 - 15,028
Arsenic	mg/kg	0.5	79[#6]		13.7	14.1 - 16.3	15.2	17.6	16.1 - 18	16.1	12.4	14.3 - 16.8	18.9	17.1	23.1	14.6 - 16.5
Barium	mg/kg	1	1,300[#3]		183	157 - 185	177	149 - 175	177 - 191	194	158	134 - 179	172	170	96	102 - 173
Beryllium	mg/kg	0.5	2.2[#2]		1.1	0.9	1.1	1.1 - 1.2	1 - 1.1	1.2	1	0.9 - 1.1	1.3	1.1	1	0.7 - 1.8
Boron	mg/kg	0.1	21,000[#2]		3	1.9 - 2.1	1.9	1.3 - 1.6	1.8 - 2	2.1	1.7	1.7 - 1.8	1.9	2.5	1.3	4.4 - 6.9
Cadmium	mg/kg	0.1	220[#6]		3.6	4 - 5.3	0.6	0.5	0.5 - 0.7	0.7	0.7	0.6 - 1	0.8	1.4	0.7	0.6 - 0.7
Chromium (Trivalent)	mg/kg	0.5	1,500[#2]		153.1	43.2 - 47.2	145.3	26.6 - 26.8	27.6 - 30.2	202.6	268.8	26.2 - 31.3	132.2	129	121.6	22.2 - 33.1
Chromium (hexavalent)	mg/kg	0.3	21[#6]		<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3
Chromium (III+VI)	mg/kg	0.5	either CrIII or CrVI[#2]		153.1	43.2 - 47.2	145.3	26.6 - 26.8	27.6 - 30.2	202.6	268.8	26.2 - 31.3	132.2	129	121.6	22.2 - 33.1
Copper	mg/kg	1	12,000[#2]		81	80 - 85	59	46 - 48	43 - 52	56	50	46 - 62	54	57	28	41 - 48
Lead	mg/kg	5	630[#6]		222	193 - 195	331	298 - 334	319 - 422	330	287	476 - 484	274	263	102	128
Mercury	mg/kg	0.1	120[#2]		1.5	0.4 - 1.5	0.8	0.1 - 0.7	0.3 - 0.7	0.7	0.6	0.4 - 0.8	0.6	0.8	0.1	<0.1 - 0.1
Nickel	mg/kg	0.7	230[#2]		28.1	23.9 - 24.7	25.9	20.8 - 22.2	21.1 - 24.7	28.5	28.9	19.3 - 23.7	29.5	25.1	27.9	17.5 - 23.4
Selenium	mg/kg	1	1,100[#2]		1	<1 - 1	1	<1	<1 - 1	<1	1	<1 - 1	1	1	2	1 - 2
Vanadium	mg/kg	1	2,000[#2]		53	43	55	46 - 49	47 - 52	58	54	43 - 52	56	53	49	36 - 57
Zinc	mg/kg	5	81,000[#2]		332	285 - 329	221	191 - 204	182 - 242	223	190	186 - 244	207	227	152	189 - 296
VOCs																
1,1,1,2-tetrachloroethane	ug/kg	5	1,400,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,1-trichloroethane	ug/kg	5	140,000,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,1,2,2-tetrachloroethane	ug/kg	3	140,000,000[#2]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,1,2-trichloroethane	ug/kg	4	1,800[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,1-dichloroethane	ug/kg	6	4,100[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1,1-dichloroethene	ug/kg	6	410[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1,1-dichloropropene	ug/kg	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,2,3-trichlorobenzene	ug/kg	7	1,800,000[#2]		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
1,2,3-trichloropropane	ug/kg	4	5.1[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,2,4-trimethylbenzene	ug/kg	6	990[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
1,2-dibromo-3-chloropropane	ug/kg	4	5.3[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,2-dibromoethane	ug/kg	3	36[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,2-dichloroethane	ug/kg	5	29,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
1,2-dichloropropane	ug/kg	4	42[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,3,5-trimethylbenzene	ug/kg	3	270,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
1,3-dichloropropane	ug/kg	4	1,600,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
2,2-dichloropropane	ug/kg	4			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
2-chlorotoluene	ug/kg	3	1,600,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
4-chlorotoluene	ug/kg	3	1,600,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Benzene	ug/kg	5	140,000[#6]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Bromobenzene	ug/kg	2	2,100[#3]		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Bromochloromethane	ug/kg	4	150,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Bromodichloromethane	ug/kg	4	290[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Bromoform	ug/kg	4	11,000[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Bromomethane	ug/kg	1	6,800[#1]		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
3-Methyl butanal	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	ug/kg	4	56[#2]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chlorobenzene	ug/kg	4	13,000,000[#2]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Chlorodibromomethane	ug/kg	5	8,300[#1]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloroethane	ug/kg	6	11,000[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
Chloroform	ug/kg	5	2,500,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Chloromethane	ug/kg	3	9.9[#3]		11	<3	4	<3	4	4	3	3	4	3	5	9
cis-1,2-dichloroethene	ug/kg	7	200[#3]		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
cis-1,3-dichloropropene	ug/kg	4			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Dibromomethane	ug/kg	4	24,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Dichlorodifluoromethane	ug/kg	2	87,000[#1]		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Dichloromethane	ug/kg	30	2,800[#3]		<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	<30	41
Ethylbenzene	ug/kg	3	24,000,000[#2]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Eucalyptol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Isopropylbenzene	ug/kg	3	28,000[#3]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Methyl Methacrylate	ug/kg	100	4,400,000[#1]		-	-	-	-	-	-	-	-	-	-	-	-
MTBE	ug/kg	6	120,000[#3]		<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6	<6
n-butylbenzene	ug/kg	4	3,900,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
n-propylbenzene	ug/kg	4	97,000[#3]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
sec-butylbenzene	ug/kg	4	7,800,000[#1]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Styrene	ug/kg	3	78,000[#3]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
tert-butylbenzene	ug/kg	5	7,800,000[#1]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Tetrachloroethene	ug/kg	3	1,400,000[#2]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Toluene	ug/kg	3	56,000,000[#2]		<3	<3	6	<3	4	5	5	3	<3	<3	<3	<3
trans-1,2-dichloroethene	ug/kg	3	350[#3]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
trans-1,3-dichloropropene	ug/kg	3			<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Trichloroethene	ug/kg	5	120,000[#2]		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
Trichlorofluoromethane	ug/kg	3	23,000,000[#1]		<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3	<3
Undecane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Xylene (m & p)	ug/kg	4			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Xylene (o)	ug/kg	4	se Xylenes Total		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Vinyl chloride	ug/kg	2	3,500[#2]		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
VOC TICs	None				0	0	0	0	0	0	0	0	0	0	0	0
Trihalomethanes	ug/kg				<18	<18	<18	<18	<18	<18	<18	<18	<18	<18	<18	<18
SVOCs																
Dibenzo[a,e]pyrene	ug/kg	100	42[#1]		-	-	-	-	-	-	-	-	-	-	-	-
2-methylnaphthalene	ug/kg	10	240,000[#1]		31	37	54	239	52	56	58	69	57	48	18	28
4-bromophenyl phenyl ether	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chlorophenyl phenyl ether	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Azobenzene	ug/kg	10	5,600[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bis(2-chloroethoxy) methane	ug/kg	10	190,000[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Bis(2-chloroethyl)ether	ug/kg	10	230[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbazole	ug/kg	10			112	51	68	3,554	73	182	166	133	109	93	49	97
Dibenzofuran	ug/kg	10	73,000[#1]		53	26	33	1,027	34	78	66	63	41	49	23	32
Hexachlorobutadiene	ug/kg	4	25,000[#2]		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hexachlorocyclopentadiene	ug/kg	10	1,800[#1]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Hexachloroethane	ug/kg	10	540[#3]		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Anilines																

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC													
				Location	GTCS 1-50		GTCS 1-51		GTCS 1-52	GTCS 1-53	GTCS 1-54	GTCS 1-55	GTCS 1-56	GTCS 1-57	GTCS 1-58	GTCS 1-59
				Date	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Field ID	GTCS 1-50A	GTCS 1-50A	GTCS 1-51A	GTCS 1-51A	GTCS 1-52A	GTCS 1-53A	GTCS 1-54A	GTCS 1-55A	GTCS 1-56A	GTCS 1-57A	GTCS 1-58A	GTCS 1-59A
				ple_Depth_Range	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
2-nitroaniline	ug/kg	10	630,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
3-nitroaniline	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chloroaniline	ug/kg	10	2,700#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-nitroaniline	ug/kg	10	27,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Amino Aliphatics																
N-nitrosodi-n-propylamine	ug/kg	10	78#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Explosives																
2,4-Dinitrotoluene	ug/kg	10	170,000#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,6-dinitrotoluene	ug/kg	10	84,000#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Nitrobenzene	ug/kg	10	5,100#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Phenolics																
2,4-dimethylphenol	ug/kg	10	410,000#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-chloronaphthalene	ug/kg	10	9,300#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-methylphenol	ug/kg	10	e Cresols Total#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-nitrophenol	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-chloro-3-methylphenol	ug/kg	10	6,300,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-methylphenol	ug/kg	10	e Cresols Total#3		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-nitrophenol	ug/kg	10			<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Phenol	ug/kg	10	690,000#2		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Halogenated Phenols																
2,4,5-trichlorophenol	ug/kg	10	6,300,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4,6-trichlorophenol	ug/kg	10	49,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2,4-dichlorophenol	ug/kg	10	190,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-chlorophenol	ug/kg	10	390,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Pentachlorophenol	ug/kg	10	60,000#2		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Halogenated Benzenes																
1,2,4-trichlorobenzene	ug/kg	7	17,000,000#2		<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7	<7
1,2-dichlorobenzene	ug/kg	4	95,000,000#2		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,3-dichlorobenzene	ug/kg	4	300,000#2		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
1,4-dichlorobenzene	ug/kg	4	17,000,000#2		<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Hexachlorobenzene	ug/kg	10	16,000#2		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC - Phthalates																
Bis(2-ethylhexyl) phthalate	ug/kg	100	2,800,000#3		370	350	402	282	428	395	2,080	322	313	945	473	844
Butyl benzyl phthalate	ug/kg	100	44,000,000#3		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Diethylphthalate	ug/kg	100	3,500,000#3		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Dimethyl phthalate	ug/kg	100	16,400#5		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
Di-n-butyl phthalate	ug/kg	100	450,000#3		532	688	<100	<100	<100	<100	<100	<100	<100	195	<100	<100
Di-n-octyl phthalate	ug/kg	100	3,400,000#3		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
SVOC - Solvents																
Isophorone	ug/kg	10	570,000#1		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
SVOC TIC																
SVOC TICs	None				-	-	-	-	-	-	-	-	-	-	-	-
.alpha.-Phellandrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
.alpha.-Pinene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
.beta.-Guaiene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
[1,1-Biphenyl]-4-carboxaldehyde	ug/kg	100			-	-	-	2,731	-	-	-	-	-	-	-	-
1(2Aminobenzylidene)1234-tetrahydroacridineN	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1,1-Biphenyl, 2,3,3,4-tetrachloro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	156	-
1,1-Biphenyl, 2,3,3,5-tetrachloro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	449	-
1,1-Biphenyl, 2,3,4,6-tetrachloro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	177	-
1,2,4,8-Tetramethylbicyclo[6.3.0]undeca-2,4-die	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1,2,9,10-Dibenzopyrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1,5,5-Trimethyl-6-methylene-cyclohexene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1,6-Dimethylphenazine	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
10,18-Bisnorabieta-5,7,9(10),11,13-pentaene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
10,18-Bisnorabieta-8,11,13-triene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
10s,11s-Himachala-3(12),4-diene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
11H-Benzo[a]carbazole	ug/kg	100			-	-	-	4,042	-	-	-	-	-	-	-	-
11H-Benzo[a]fluoren-11-one	ug/kg	100			-	-	-	8,528	-	539	259	-	-	-	-	-
11H-Benzo[a]fluoren-11-one, 10-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
11H-Benzo[a]fluorene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
11H-Benzo(b)fluorene	ug/kg	100			-	-	-	-	-	534	-	-	-	-	-	403
11H-Indeno(1,2-b)quinoline	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
13-Docosenamide, (Z)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
13-Isopropylpodocarpen-12-ol-20-al	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1H-Cyclopropa[l]phenanthrene,1a,9b-dihydro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1H-Inden-1-one, 2,3-dihydro-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1-Methyldibenzothiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1-Naphthalenecarboxylic acid, 2-benzoyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2-(2H-Benzotriazol-2-yl)-5-methylphenol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2-(Acetoxymethyl)-3-(methoxycarbonyl)biphenyle	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2,3,3,,5,6-Pentachloro-1,1-biphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	475	-
2,3,3,6-Tetrachloro-1,1-biphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	259	-
2,3,4,6-Tetrachloro-1,1-biphenyl	ug/kg	100			-	-	-	-	-	-	-	-	-	-	262	-
2,4,6-Cycloheptatrien-1-one, 2-phenyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2,6-Dimethyldibenzothiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2,9-Dimethyl-2,3,4,5,6,7hexahydro-1H-2-benzaz	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2-Bromo-4,5-dimethoxycinnamic acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2Chloro2methyl1oxa2sila-1,2-dihydronaphthalen	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
2-Methylchrysene	ug/kg	100			-	-	-	-	-	-	512	-	-	362	-	-
2-Propenal, 3-(4-hydroxy-3-methoxyphenyl)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
3,3-Dimethylbiphenyl	ug/kg	100			-	-	-	857	-	-	-	-	-	-	-	-
3,4:8,9-Dibenzopyrene	ug/kg	100			-	-	-	-	8,787	-	-	-	-	-	-	-
3,4-Dichlorobenzonitrile	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
3,5-Dimethoxy-4-hydroxycinnamaldehyde	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
3-Bromo-5-ethoxy-4-hydroxybenzaldehyde	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
4,4-Bis(tetrahydrothiopyran)	ug/kg	100			-	-	-	-	-	804	511	-	-	-	-	-
4H-Cyclopenta[def]phenanthrene	ug/kg	100			-	-	-	18,172	-	-	-	433	-	-	-	-
6H-Benz[de]anthracen-6-one	ug/kg	100			-	-	-	1,490	-	-	-	-	-	-	-	-
7H-Benz(de)anthracen-7-one	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
8,9-Dihydro-7H-cyclopenta[a]pyrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC	**Location**	GTCS 1-50		GTCS 1-51		GTCS 1-52	GTCS 1-53	GTCS 1-54	GTCS 1-55	GTCS 1-56	GTCS 1-57	GTCS 1-58	GTCS 1-59
				Date	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Field ID	GTCS 1-50A	GTCS 1-50A	GTCS 1-51A	GTCS 1-51A	GTCS 1-52A	GTCS 1-53A	GTCS 1-54A	GTCS 1-55A	GTCS 1-56A	GTCS 1-57A	GTCS 1-58A	GTCS 1-59A
				ple_Depth_Range	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
9,10-Anthracenedione	ug/kg	100	14.000[#1]		-	-	-	-	-	-	-	-	-	-	-	-
9,10-Anthracenedione, 2-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
9,10-Bis(bromomethyl)anthracene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
9,10-Dimethylanthracene	ug/kg	100			-	-	-	7,707	-	-	-	-	-	-	-	-
9-Anthracenecarbonitrile	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
9H-Cyclopenta[a]pyrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
9H-Fluoren-9-ol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
9H-Fluoren-9-one	ug/kg	100			-	-	-	3,761	-	-	-	-	-	-	-	-
9H-Fluorene, 1-methyl-	ug/kg	100			-	-	-	1,940	-	-	-	-	-	-	-	-
9H-Fluorene, 2-methyl-	ug/kg	100			-	-	-	1,333	-	-	-	-	-	-	-	-
9H-Fluorene, 9-methyl-	ug/kg	100			-	-	-	2,473	-	-	-	-	-	-	-	-
Abietic acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Alloaromadendrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Anthra(1,2-b)thiophene	ug/kg	100			-	-	-	3,334	-	-	531	-	-	-	-	-
Anthra(2,3-b)thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Anthracene, 1-methyl-	ug/kg	100			-	-	-	-	-	576	-	-	-	-	-	169
Anthracene, 2-ethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Anthracene, 2-methyl-	ug/kg	100			-	-	-	7,713	-	-	-	-	-	233	-	-
Aromandendrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benz(A)anthracene-7,12-dione	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benz(a)anthracene-7-carbonitrile	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benz[a]anthracene, 12-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benz[a]anthracene, 1-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benz[a]anthracene, 7-methyl-	ug/kg	100			-	-	-	9,215	-	762	-	-	-	-	-	-
Benz[j]aceanthrylene, 3-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzaldehyde, 4-hydroxy-3,5-dimethoxy-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzenamine, 2,4,6-tribromo-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzene, (4,5,5-trimethyl-1,3-cyclopentadien-1-y	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1,1-Sulfonylbis (4-chlorobenzene)	ug/kg	100	51.000[#1]		-	-	-	-	-	-	-	-	-	-	-	-
Benzenesulfonamide, 4-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b]naphtho[1,2-d]furan	ug/kg	100			-	-	-	4,079	-	-	-	-	-	-	-	-
Benzo(c)carbazole	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b]naphtho[1,2-d]thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo[b]naphtho[2,1-d]thiophene	ug/kg	100			-	-	-	7,544	-	727	-	443	296	-	-	-
Benzo[b]naphtho[2,3-d]furan	ug/kg	100			-	-	-	6,072	-	469	258	-	-	-	-	-
Benzo[b]naphtho[2,3-d]thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	289	-	-
Benzo[b]triphenylene	ug/kg	100			-	-	-	9,355	-	-	-	-	-	-	-	-
Benzo[c]cinnoline	ug/kg	100			-	-	-	5,569	-	-	-	-	-	-	-	-
Benzo[c]phenanthrene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo(e)pyrene	ug/kg	100			1,393	1,113	23,694	24,414	1,368	2,719	1,974	1,822	1,542	1,655	500	1,048
Benzo[ghi]fluoranthene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo[h]quinoline, 2,4-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo[kl]xanthene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzoic acid, hexyl ester	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
1,1-Biphenyl	ug/kg	100	500.000[#3]		-	-	-	-	-	-	-	-	-	-	-	-
Biphenylene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Butylated Hydroxytoluene	ug/kg	100	150.000[#1]		-	-	-	-	-	-	-	-	-	-	-	-
Camphor (TIC)	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Chrysene, 1-methyl-	ug/kg	100			-	-	-	-	-	-	-	410	403	-	-	-
Chrysene, 5-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Chrysene, 6-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Cyclopenta(cd)pyrene, 3,4-dihydro-	ug/kg	100			-	-	-	8,621	-	-	-	-	-	-	-	-
Cyclopenta(def)phenanthrenone	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Dehydroabietic acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
D-Homoandrostane, (5.alpha.,13.alpha.)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,e)aceanthrylene	ug/kg	100			-	-	-	-	8,583	-	-	-	-	-	-	-
Dibenzo(a,i)pyrene	ug/kg	100			-	-	-	-	3,176	-	125	-	-	-	-	-
Dibenzo[def,mno]chrysene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Dibenzofuran, 4-methyl-	ug/kg	100			-	-	-	2,768	-	-	-	-	-	-	-	-
Dibenzothiophene	ug/kg	100	780.000[#1]		-	-	-	-	-	-	-	-	-	-	-	-
Dibenzothiophene, 3-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Dibenzothiophene, 4,6-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Dicyclohexyl phthalate	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Diphenyl sulfide	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
di-p-Tolylacetylene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
D-Limonene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Eicosane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Ferruginol	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene, 2-methyl-	ug/kg	100			509	-	4,271	-	-	1,173	-	576	585	647	-	-
Fluorene, 2,4a-dihydro-	ug/kg	100			-	-	-	2,428	-	-	-	-	-	-	-	-
Heneicosane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Heneicosane, 3-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Heptadecane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Hexadecane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Hexathiane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Indene	ug/kg	100			-	-	-	1,445	-	-	-	-	-	-	-	-
Indeno[1,2,3-fg]naphthacene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Indole, 5-methyl-2-(4-pyridyl)-	ug/kg	100			-	-	-	-	-	-	226	-	-	-	-	-
Isocil	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
isoledene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Longifolene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Methyl dehydroabietate	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Morpholine, 4-(1-cyclohepten-1-yl)-	ug/kg	100			-	-	-	6,083	-	-	-	-	-	-	-	-
Naphthalene, 1,4,5-trimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 1,4,6-trimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 1,6,7-trimethyl-	ug/kg	100			-	-	-	2,037	-	-	-	-	-	-	-	-
Naphthalene, 1,6-dimethyl-	ug/kg	100			-	-	-	1,297	-	-	-	-	-	-	-	-
Naphthalene, 1,7-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 2,3,6-trimethyl-	ug/kg	100			-	-	-	1,231	-	-	-	-	-	-	-	-
Naphthalene, 2,3-dimethyl-	ug/kg	100			-	-	-	1,506	-	-	-	-	-	-	-	-
Naphthalene, 2,6-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC													
				Location	GTCS 1-50		GTCS 1-51		GTCS 1-52	GTCS 1-53	GTCS 1-54	GTCS 1-55	GTCS 1-56	GTCS 1-57	GTCS 1-58	GTCS 1-59
				Date	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Field ID	GTCS 1-50A	GTCS 1-50A	GTCS 1-51A	GTCS 1-51A	GTCS 1-52A	GTCS 1-53A	GTCS 1-54A	GTCS 1-55A	GTCS 1-56A	GTCS 1-57A	GTCS 1-58A	GTCS 1-59A
				ple_Depth_Range	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
Naphthalene, 2,7-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 2-ethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene, 2-phenyl-	ug/kg	100			-	-	-	7,408	-	-	-	-	-	-	-	-
Naphtho[1,2-b]thiophene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphtho[2,1,8,7-klmn]xanthene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Naphtho[2,1-b]thiophene	ug/kg	100			-	-	-	4,450	-	-	-	-	-	-	-	-
n-Decanoic acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Neocuproine	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Hexadecanoic Acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Nonadecane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
n-Pentafluorosulfanyl-S,S-diphenoxysufilimine	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Octadecane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Octadecane, 1-iodo-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Octadecanoic Acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Octadecanoic acid, butyl ester	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
p-Cymene	ug/kg	4			<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4	<4
Perylene	ug/kg	100			-	-	-	12,492	-	-	-	-	-	-	-	-
Phenanthrene, 1-methyl-	ug/kg	100			-	-	-	15,948	-	521	-	-	-	-	-	120
Phenanthrene, 2,5-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene, 2-methyl-	ug/kg	100			-	135	-	7,956	-	434	384	278	230	-	-	-
Phenanthrene, 3,6-dimethyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene, 4-methyl-	ug/kg	100			273	-	-	-	-	-	233	212	171	173	-	-
Phenol, 2,6-dimethoxy-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Phenol, 2,6-dimethoxy-4-(2-propenyl)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Phenol, 2-methoxy-4-(1-propenyl)-, (Z)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Pyrene, 1,3-dimethyl-	ug/kg	100			-	-	-	1,499	-	-	-	-	-	-	-	-
Pyrene, 1-methyl-	ug/kg	100			201	-	-	19,565	-	613	656	386	-	-	-	-
Pyrene, 2-methyl-	ug/kg	100			-	-	-	-	-	353	-	-	-	-	-	-
Quinoxaline, 6-(3-nitrobenzylidenamino)-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Retene	ug/kg	100			312	-	-	-	-	-	-	-	-	-	-	-
Rubicene-	ug/kg	100			-	-	-	-	-	722	-	-	-	-	-	-
Tetrachloro-o-benzoquinone	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Tetracosane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Tetradecanoic acid	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Bis(methyldichlorosilyl)ethylene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Trichlorovinylsilane	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Triphenylene	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Triphenylene, 2-methyl-	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-01	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-02	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-03	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-04	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-05	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-06	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-07	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-08	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-09	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-10	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-11	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-12	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-13	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-14	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-15	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-16	ug/kg	100			-	-	-	-	-	1,946	-	-	819	-	-	-
GT-SVOC-TIC-17	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
GT-SVOC-TIC-18	ug/kg	100			-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)naphtho(1,2-d)furan	ug/kg	100			-	-	-	4,079	-	-	-	-	-	-	-	-
PAH																
Acenaphthene	mg/kg	0.01	15.000[#2]		<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Acenaphthylene	mg/kg	0.01	15.000[#2]		0.15	0.14	0.12	0.15	0.14	0.5	0.19	0.23	0.19	0.24	0.1	0.09
Anthracene	mg/kg	0.01	74.000[#2]		0.15	0.2	0.17	0.26	0.18	0.71	0.2	0.28	0.33	0.28	0.1	0.09
Benz(a)anthracene	mg/kg	0.01	29[#2]		1.15	1.13	1.02	1.44	1.09	4.14	1.38	1.76	1.61	1.72	0.74	0.71
Benzo(a) pyrene	mg/kg	0.01	5.7[#2]		1.25	1.3	1.29	1.66	1.29	4.54	1.53	2.08	1.8	2.17	0.78	0.78
Benzo(b)fluoranthene	mg/kg	0.01	7.2[#2]		1.76	1.81	1.71	2.23	1.78	6.03	2.09	2.97	2.47	2.9	1.09	1.09
Benzo(b)&(k)fluoranthene	mg/kg	0.01			2.45	2.51	2.38	3.1	2.47	8.37	2.9	4.13	3.43	4.03	1.51	1.52
Benzo(g,h,i)perylene	mg/kg	0.01	640[#2]		0.99	0.98	0.95	1.15	0.92	2.74	1.19	1.51	1.26	1.55	0.54	0.58
Benzo(k)fluoranthene	mg/kg	0.01	190[#2]		0.69	0.7	0.67	0.87	0.69	2.34	0.81	1.16	0.96	1.13	0.42	0.43
Chrysene	mg/kg	0.01	57[#2]		1.11	1.23	1.05	1.58	1.15	3.9	1.36	1.86	1.59	1.82	0.74	0.68
Coronene	mg/kg	0.04			0.26	0.24	0.22	0.25	0.21	0.64	0.27	0.34	0.27	0.34	0.12	0.13
Dibenz(a,h)anthracene	mg/kg	0.01	0.57[#2]		0.21	0.15	0.16	0.27	0.15	0.74	0.27	0.38	0.22	0.37	0.14	0.1
Fluoranthene	mg/kg	0.01	3.100[#2]		1.78	2.07	2.11	2.81	2.09	8.48	2.49	3.34	3.38	3.23	1.35	1.1
Fluorene	mg/kg	0.01	9.900[#2]		<0.04	0.04	<0.04	0.05	<0.04	0.09	<0.04	<0.04	0.05	0.04	<0.04	<0.04
Indeno(1,2,3-c,d)pyrene	mg/kg	0.01	82[#2]		0.89	0.91	0.89	1.03	0.88	2.77	1.1	1.47	1.18	1.52	0.52	0.56
Naphthalene	mg/kg	0.01	4.900[#2]		<0.027 - 0.06	<0.027 - 0.06	<0.027 - 0.09	<0.027 - 0.1	<0.027 - 0.08	<0.027 - 0.15	<0.027 - 0.13	<0.027 - 0.09	<0.027 - 0.09	<0.027 - 0.09	<0.027	<0.027
Phenanthrene	mg/kg	0.01	3.100[#2]		0.49	0.73	0.77	0.98	0.67	2.37	0.74	1.03	1.15	1.01	0.26	0.3
Pyrene	mg/kg	0.01	7.400[#2]		1.53	1.71	1.85	2.44	1.84	7.57	2.21	2.93	2.81	2.83	1.19	0.99
PAH 16 Total	mg/kg	0.6			12.2	13.2	12.9	17	13	47.1	15.7	21.1	19.1	20.9	8	7.5
PAH 17 Total	mg/kg	0.64			12.47	13.4	13.07	17.27	13.16	47.71	15.96	21.43	19.36	21.24	8.09	7.63
PCB (Dutch 7) congeners																
PCB 28	ug/kg	5			<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	43	9
PCB 52	ug/kg	5			<5	<5	<5	<5	14	<5	<5	<5	<5	<5	100	29
PCB 101	ug/kg	5			<5	7	<5	<5	16	<5	<5	<5	<5	<5	86	25
PCB 118	ug/kg	5	120[#1]		<5 - 3.92	2.53 - 6	7 - 8.2	<5 - 5.59	24 - 33.1	<5 - 2.71	<5 - 1.12	<5 - 0.863	<5 - 2.26	<5 - 5.75	115 - 154	31 - 52.4
PCB 138	ug/kg	5			7	12	<5	<5	9	<5	<5	<5	<5	<5	30	9
PCB 153	ug/kg	5			<5	9	<5	<5	7	<5	<5	<5	<5	<5	25	8
PCB 180	ug/kg	5			<5	7	<5	<5	<5	<5	<5	<5	<5	<5	8	<5
Total PCB 7 Congeners	ug/kg	35	200[#5]		<35	41	<35	<35	70	<35	<35	<35	<35	<35	407	111

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
Grenfell Investigation into Potential Land Contamination Impacts
Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC	Location	GTCS 1-50		GTCS 1-51		GTCS 1-52	GTCS 1-53	GTCS 1-54	GTCS 1-55	GTCS 1-56	GTCS 1-57	GTCS 1-58	GTCS 1-59
				Date	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Field ID	GTCS 1-50A	GTCS 1-50A	GTCS 1-51A	GTCS 1-51A	GTCS 1-52A	GTCS 1-53A	GTCS 1-54A	GTCS 1-55A	GTCS 1-56A	GTCS 1-57A	GTCS 1-58A	GTCS 1-59A
				ple_Depth_Range	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
PCB (WHO12) 12 congeners																
Tetrachlorobiphenyl, 3,3,4,4- (PCB 77)	ug/kg	Various	38[#1]		0.174	0.282	0.977	0.437	3.29	0.227	0.069	0.0557	0.222	0.594	0.595	0.579
Tetrachlorobiphenyl, 3,4,4,5- (PCB 81)	ug/kg	Various	12[#1]		0.00534	0.00854	0.0446	0.0227	0.14	0.0086	0.00323	0.00221	0.0102	0.0254	0.0253	0.0242
Pentachlorobiphenyl, 2,3,3,4,4- (PCB 105)	ug/kg	Various	120[#1]		2	1.39	5.17	3.61	21.5	1.63	0.536	0.405	1.35	3.42	103	34.9
Pentachlorobiphenyl, 2,3,4,4,5- (PCB 114)	ug/kg	Various	120[#1]		0.0301	0.0358	0.14	0.111	0.787	0.047	0.0151	0.0106	0.045	0.11	4.53	1.21
Pentachlorobiphenyl, 2,3',4,4',5- (PCB-118)	ug/kg	Various	120[#1]		3.92	2.53	8.2	5.59	33.1	2.71	1.12	0.863	2.26	5.75	154	52.4
Pentachlorobiphenyl, 2,3,4,4,5- (PCB 123)	ug/kg	Various	120[#1]		0.162	0.12	0.311	0.211	1.04	0.0983	0.0304	0.0227	0.0897	0.221	6	1.65
Pentachlorobiphenyl, 3,3,4,4,5- (PCB 126)	ug/kg	Various	0.036[#1]		0.017	0.023	0.0462	0.0208	0.12	0.0154	0.00859	0.00329	0.0114	0.0352	0.0313	0.0276
Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 156)	ug/kg	Various	120[#1]		0.803	0.595	0.496	0.329	1.49	0.233	0.21	0.161	0.239	0.59	6.27	2.27
Hexachlorobiphenyl, 2,3,3,4,4,5- (PCB 157)	ug/kg	Various	120[#1]		0.255	0.233	0.137	0.101	0.398	0.0804	0.0608	0.051	0.0727	0.183	1.62	0.589
Hexachlorobiphenyl, 2,3,4,4,5,5- (PCB 167)	ug/kg	Various	120[#1]		0.388	0.339	0.195	0.136	0.552	0.105	0.0897	0.073	0.101	0.244	2.07	0.757
Hexachlorobiphenyl, 3,3,4,4,5,5- (PCB 169)	ug/kg	Various	0.12[#1]		<0.000665	0.000701	0.00288	<0.000298	0.00102	<0.000352	0.0013	0.0008	0.000306	0.000518	0.00174	0.000736
Heptachlorobiphenyl, 2,3,3,4,4,5,5- (PCB 189)	ug/kg	Various	130[#1]		0.0725	0.0718	0.0263	0.0207	0.0515	0.0189	0.0209	0.0191	0.0202	0.0431	0.173	0.0718
Chlorinated Dioxins and Furans																
2378-TCDF	ng/kg	Various			<0.806	4.1	8.64	<1.34	<2.86	<1.395	4.75	3.39	5.45	<0.591	5.07	5.88
12378-PeCDD	ng/kg	Various			<0.894	2.02	0.929	<0.599	<0.639	<0.719	1.41	1.09	0.71	<0.548	0.63	<0.581
123478-HxCDD	ng/kg	Various			<1.972	3.22	1.25	<0.887	<0.888	<0.81	0.717	1.28	0.976	1.68	0.537	<0.712
123678-HxCDD	ng/kg	Various			13.8	13.9	6.06	<0.9	<0.932	2.04	2.96	3.85	2.55	3.16	4.99	3.95
123789 HxCDD	ng/kg	Various			5.43	7.15	3.85	<0.927	<0.96	<0.849	2.8	<0.577	1.95	1.96	2.57	1.25
1234678-HpCDD	ng/kg	Various			403	542	88.9	61.4	72.5	79.1	80.1	73.7	74.7	126	116	118
OCDD	ng/kg	Various			3,390	4,500	562	439	568	480	655	557	612	1,140	1,110	1,060
OCDF	ng/kg	Various			134	214	44.6	31.2	29.5	26.6	39.1	36.8	40.3	63.8	58	58.1
2378-TCDD	ng/kg	Various			<0.363	<0.538	<0.729	<0.407	<0.459	<0.302	<0.316	<0.36	<0.3	<0.335	<0.282	<0.31
12378-PeCDF	ng/kg	Various			<0.574	2.78	7.1	4.81	2.34	4.79	4.25	3.94	1.66	5.52	3.89	5.49
23478-PeCDF	ng/kg	Various			<0.641	4.08	10.4	<0.759	<0.796	<0.689	6.05	<0.451	4.84	4.68	3.56	5.7
123478-HxCDF	ng/kg	Various			3.26	7.3	14.1	3.85	<0.72	4.14	8.12	7.4	7.22	8.09	7.19	8.38
123678-HxCDF	ng/kg	Various			4.69	4.77	11.3	<0.774	<0.723	<0.74	5.01	4.06	4.51	4.26	3.89	3.95
234678-HxCDF	ng/kg	Various			2.12	6.77	9.98	<0.751	<0.579	<0.59	5.1	5.04	3.78	2.57	4.09	1.69
123789-HxCDF	ng/kg	Various			<1.024	<0.523	0.954	<0.891	<0.827	<0.719	0.712	0.648	<0.325	0.819	0.918	0.672
1234678-HpCDF	ng/kg	Various			111	93.9	52.8	30.6	44.3	39.6	33.9	29.4	28.3	40	35.9	36.8
1234789-HpCDF	ng/kg	Various			4.73	6.1	5.05	3.21	<1.373	<1.369	2.95	1.68	2.12	3.7	3.59	2.74
Brominated Dioxins and Furans																
2378-TBDD	ng/kg	Various			<0.79	<0.8	<0.83	<0.8	<0.83	<0.78	<0.8	<0.82	<0.84	<0.85	<0.83	<0.82
12378-PBDD	ng/kg	Various			<0.8	<0.8	<0.82	<0.82	<0.82	<0.8	<0.8	<0.8	<0.8	<0.82	<0.82	<0.82
123478-HxBDD	ng/kg	Various			<0.77	<0.76	<0.83	<0.8	<0.83	<0.83	<0.81	<0.84	<0.84	<0.84	<0.83	<0.84
123678-HxBDD	ng/kg	Various			<0.74	<0.77	<0.84	<0.84	<0.84	<0.81	<0.81	<0.83	<0.83	<0.85	<0.85	<0.85
123789-HxBDD	ng/kg	Various			<0.82	<0.8	<0.82	<0.83	<0.83	<0.83	<0.8	<0.8	<0.81	<0.81	<0.83	<0.84
1234678-HpBDD	ng/kg	Various			<0.84	<0.8	<0.8	<0.8	<0.81	<0.82	<0.84	<0.85	<0.85	<0.83	<0.83	<0.83
OBDD	ng/kg	Various			<0.82	<0.82	<0.8	<0.82	<0.82	<0.84	<0.85	<0.85	<0.83	<0.85	<0.84	<0.81
2378-TBDF	ng/kg	Various			5.17	6.94	4.87	1.97	1.65	1.33	2.76	2.33	3.03	3.5	3.06	2.84
12378-PBDF	ng/kg	Various			3.57	4.33	3.3	1.28	1.09	1.26	1.98	1.41	2.09	2.36	1.85	2.13
23478-PBDF	ng/kg	Various			1.96	2.28	1.78	0.83	1	1.1	2.2	0.88	1.26	1.09	1.68	1.77
123478-HxBDF	ng/kg	Various			1.55	1.19	1.55	<0.77	0.8	0.97	2.34	0.75	1.04	1.74	2.22	1.48
123678-HxBDF	ng/kg	Various			1.73	2.04	1.41	<0.77	<0.77	<0.8	0.91	0.86	1.66	1.3	1.19	1.87
234678-HxBDF	ng/kg	Various			<0.8	0.97	<0.8	<0.8	<0.83	<0.83	<0.79	<0.8	<0.85	<0.85	<0.84	0.86
123789-HxBDF	ng/kg	Various			<0.8	<0.8	<0.8	<0.81	<0.81	<0.8	<0.8	<0.8	<0.83	<0.84	<0.84	<0.83
1234678-HpBDF	ng/kg	Various			1.03	1.55	0.98	<0.78	<0.82	<0.82	<0.82	<0.84	<0.84	<0.84	<0.83	<0.83
1234789-HpBDF	ng/kg	Various			<0.77	<0.77	<0.77	<0.79	<0.8	<0.79	<0.83	<0.83	<0.83	<0.85	<0.84	<0.81
OBDF	ng/kg	Various			<0.8	<0.79	<0.81	<0.81	<0.83	<0.83	<0.84	<0.85	<0.85	<0.85	<0.83	<0.82
Organophosphorous flame retardants																
Triphenylphosphate	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Tris(1-chloro-2-propyl)phosphate	mg/kg	Various	630[#1]		<0.15	<0.15	<0.15	<0.5	<0.15	<0.15	<0.15	<0.15	<0.15	<0.2	<0.1	<0.2
Tris(2-ethylhexyl) phosphate	mg/kg	0.1	170[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Brominated flame retardents (PBDEs)																
2,2",4-tribromodiphenyl ether (BDE-17)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,4,4"-tribromodiphenyl ether (BDE-28)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4"-tetrabromodiphenyl ether (BDE-47)	mg/kg	0.1	6.3[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,3",4,4"-tetrabromodiphenyl ether (BDE-66)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",3,4,4"-pentabromodiphenyl ether (BDE-85)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",5-pentabromodiphenyl ether (BDE-99)	mg/kg	0.1	6.3[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",6-pentabromodiphenyl ether (BDE-100)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",3,4,4",5"-hexabromodiphenyl ether(BDE-13	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",5,5"-hexabromodiphenyl ether(BDE-15	mg/kg	0.1	13[#1]		<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2",4,4",5,6"-hexabromodiphenyl ether(BDE-15	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
2,2,3,4,4,5,6-heptabromodiphenyl ether (BDE-1	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Polybrominated biphenyls (PBBs)																
2,2-dibromobiphenyl (PBB 4)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
4,4-dibromobiphenyl (PBB 15)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2,2,5-tribromobiphenyl (PBB 18)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
tetrabromobiphenyl (3,3,5,5-) (PBB 80)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexabromobiphenyl (PBB 153)	mg/kg	0.5	0.018[#1]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrabromobisphenol A																
tetrabromobisphenol A	mg/kg	0.5			<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Hexabromocyclododecane (HBCDD)																
Hexabromocyclododecane (HBCDD)	mg/kg	0.1			<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Isocyanates																
Isocyanic Acid	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Methyl Isocyanate	ug/kg	250	4,600[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Ethyl Isocyanate	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Propyl Isocyanate	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Phenyl Isocyanate	ug/kg	250			<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Hexamethylene diisocyanate	ug/kg	250	3,100[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
2,4-Toluene diisocyanate	ug/kg	250	6,400[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
2,6-Toluene diisocyanate	ug/kg	250	5,300[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Isophorone Diisocyanate	ug/kg	500			<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500	<500
4,4-Methylene-bis(phenyl-isocyanate)	ug/kg	250	850,000,000[#1]		<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250	<250
Cyanides																
Cyanide (Free)	mg/kg	0.5	20[#5]		<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide Total	mg/kg	0.5	78[#1]		0.9	1.1	<0.5	<0.5	0.7	<0.5	<0.5	<0.5	<0.5	0.7	<0.5	<0.5
Thiocyanate	mg/kg	0.6	20[#5]		0.9	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	1.6
Asbestos																

Table A
Stage 1 Pilot Study Soil Sample Analytical Results
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Royal Borough of Kensington and Chelsea

	Units	Method Detection Limit	GAC_HH_POS_RES_SLOAM_1.45-3.48%TOC	Location	GTCS 1-50		GTCS 1-51		GTCS 1-52	GTCS 1-53	GTCS 1-54	GTCS 1-55	GTCS 1-56	GTCS 1-57	GTCS 1-58	GTCS 1-59
				Date	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019	06/06/2019
				Sample Type	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
				Field ID	GTCS 1-50A	GTCS 1-50A	GTCS 1-51A	GTCS 1-51A	GTCS 1-52A	GTCS 1-53A	GTCS 1-54A	GTCS 1-55A	GTCS 1-56A	GTCS 1-57A	GTCS 1-58A	GTCS 1-59A
	Units			**ple_Depth_Range**	0-0.05	0.1-0.15	0-0.05	0.1-0.15	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05	0-0.05
Asbestos Level	None				0	1	0	1	1	0	0	1	0	0	0	1
Asbestos Containing Material	None				0	0	0	0	0	0	0	0	0	0	0	1
Asbestos Containing Material (2)	None				-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Containing Material (3)	None				-	-	-	-	-	-	-	-	-	-	-	-
Asbestos fibres	None				0	1	0	1	1	0	0	1	0	0	0	1
Asbestos Fibres (2)	None				-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Fibres (3)	None				-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Type	None				0	1	0	1	1	0	0	1	0	0	0	1
Asbestos Type 2	None				-	-	-	-	-	-	-	-	-	-	-	-
Asbestos Type 3	None				-	-	-	-	-	-	-	-	-	-	-	-
General Description (Bulk Analysis)	None				1	1	1	1	1	1	1	1	1	1	1	1
Potentially Respirable Fibres per gram	f/g	0			-	0	-	0	0	-	-	0	-	-	-	0
SVF / MMMF																
Synthetic/MMMF	None				1	1	0	0	0	0	0	0	0	0	0	0
Asbestos Quantification																
Asbestos Gravimetric & PCOM Total	mass %	0.001			-	<0.001	-	<0.001	<0.001	-	-	<0.001	-	-	-	0.083
Asbestos PCOM Quantification (Fibres)	mass %	0.001			-	<0.001	-	<0.001	<0.001	-	-	<0.001	-	-	-	<0.001
Total ACM Gravimetric Quantification (% Asb)	mass %	0.001			-	<0.001	-	<0.001	<0.001	-	-	<0.001	-	-	-	<0.001
Total Detailed Gravimetric Quantification (% Asb	mass %	0.001			-	<0.001	-	<0.001	<0.001	-	-	<0.001	-	-	-	0.083
Asbestos Quantification - Total - %	mass %	0.001			-	<0.001	-	<0.001	<0.001	-	-	<0.001	-	-	-	0.083
Total Organic Carbon																
TOC	percent	0.02			4.15	2.4	3.81	2.63	3.64	4.03	3.67	3.68	3.42	3.88	2.31	5.86
Inorganics																
pH (Lab)	pH units	0.01			7.64	7.84	7.44	7.76	7.42	7.74	7.38	7.6	7.53	7.46	7.08	7.49
Other																
Natural Moisture Content	percent	0.1			12.4	10.1	11	8.5	9.9	8.3	9.8	10.3	8.9	9.5	7.3	11.4
ESdat Calculated																
Cresols Total	ug/kg	20	5,400,000[#3]		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
Benzo(a)pyrene (surrogate marker for PAH mixt	mg/kg	0.01	10[#6]		1.25	1.3	1.29	1.66	1.29	4.54	1.53	2.08	1.8	2.17	0.78	0.78
Xylene Total	ug/kg	8	42,000,000[#2]		<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8	<8
Trichlorobenzene (total)	ug/kg	14	2200[#5]		<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14	<14
AECOM Calculated																
Sum of PCDD/F +PCB12	ng/kg	Various	8700[#4]		11930	11069	16597	11187	63213	5834	3038	2414	5232	12644	279697	95814
PCDD/F+PBDD/F+PCB12 Hazard Index	-	-	1		0.12	0.2	0.19	0.05	0.2	0.05	0.1	0.06	0.09	0.12	0.23	0.15
WHO2005 TEQ (PCDD/F + PBDD/F + PCB)	ng/kg	Various			12.671	20.335	18.208	4.54	16.163	4.411	10.035	6.108	8.415	10.852	19.426	13.323

Comments
#1 USEPA RSL (May 2019)
#2 LQM/CIEH S4ULs 2015 (Copyright Land Quality Management Limited reproduced with permission;
Publication Number S4UL3516. All rights reserved).
#3 EIC/AGS/CL:AIRE 2010
#4 EA SGV 2009
#5 Dutch IV 2013
#6 Defra C4SL 2014

GAC: Generic Assessment Criteria
(blank): No assessment criteria available
- : Not analysed
Field_D: Field Duplicate
HH: Human Health

Key
XXX	Exceedance of HH Soil. Public Open Space (residential). Sandy Loam. TOC >=1.45 t

Appendix TN17-B - ProUCL statistical output

UCL Statistics for Uncensored Full Data Sets

User Selected Options

Date/Time of Computation	ProUCL 5.130/07/2019 17:22:25
From File	BaP_pilot_rawdata.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

BaP_shallow

General Statistics

Total Number of Observations	9	Number of Distinct Observations	8
		Number of Missing Observations	0
Minimum	1.25	Mean	2.268
Maximum	5.55	Median	1.46
SD	1.432	Std. Error of Mean	0.477
Coefficient of Variation	0.631	Skewness	1.769

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.766	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.269	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	3.155	95% Adjusted-CLT UCL (Chen-1995)	3.354
		95% Modified-t UCL (Johnson-1978)	3.202

Gamma GOF Test

A-D Test Statistic	0.695	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.287	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.281	Data Not Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	3.753	k star (bias corrected MLE)	2.576
Theta hat (MLE)	0.604	Theta star (bias corrected MLE)	0.88
nu hat (MLE)	67.56	nu star (bias corrected)	46.37
MLE Mean (bias corrected)	2.268	MLE Sd (bias corrected)	1.413
		Approximate Chi Square Value (0.05)	31.75
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	29.22

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	3.312	95% Adjusted Gamma UCL (use when n<50)	3.599

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.85	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.271	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.223	Mean of logged Data	0.68
Maximum of Logged Data	1.714	SD of logged Data	0.529

Assuming Lognormal Distribution

95% H-UCL	3.471	90% Chebyshev (MVUE) UCL	3.428

95% Chebyshev (MVUE) UCL	3.971	97.5% Chebyshev (MVUE) UCL	4.724
99% Chebyshev (MVUE) UCL	6.203		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	3.053	95% Jackknife UCL	3.155
95% Standard Bootstrap UCL	3.003	95% Bootstrap-t UCL	4.121
95% Hall's Bootstrap UCL	5.412	95% Percentile Bootstrap UCL	3.061
95% BCA Bootstrap UCL	3.339		
90% Chebyshev(Mean, Sd) UCL	3.7	95% Chebyshev(Mean, Sd) UCL	4.348
97.5% Chebyshev(Mean, Sd) UCL	5.249	99% Chebyshev(Mean, Sd) UCL	7.017

Suggested UCL to Use

95% Student's-t UCL	3.155

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BaP_deeper

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	1.3	Mean	3.261
Maximum	8.61	Median	2.24
SD	2.649	Std. Error of Mean	0.883
Coefficient of Variation	0.812	Skewness	1.549

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.738	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.308	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	4.903	95% Adjusted-CLT UCL (Chen-1995)	5.201
		95% Modified-t UCL (Johnson-1978)	4.979

Gamma GOF Test

A-D Test Statistic	0.78	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.729	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.275	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.309	k star (bias corrected MLE)	1.613
Theta hat (MLE)	1.412	Theta star (bias corrected MLE)	2.021
nu hat (MLE)	41.56	nu star (bias corrected)	29.04
MLE Mean (bias corrected)	3.261	MLE Sd (bias corrected)	2.567
		Approximate Chi Square Value (0.05)	17.74
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	15.91

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	5.338	95% Adjusted Gamma UCL (use when n<50)	5.954

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.864	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.235	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	0.262	Mean of logged Data	0.95
Maximum of Logged Data	2.153	SD of logged Data	0.678

Assuming Lognormal Distribution

95% H-UCL	6.039	90% Chebyshev (MVUE) UCL	5.35
95% Chebyshev (MVUE) UCL	6.342	97.5% Chebyshev (MVUE) UCL	7.719
99% Chebyshev (MVUE) UCL	10.42		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	4.713	95% Jackknife UCL	4.903
95% Standard Bootstrap UCL	4.575	95% Bootstrap-t UCL	9.341
95% Hall's Bootstrap UCL	13.5	95% Percentile Bootstrap UCL	4.717
95% BCA Bootstrap UCL	5.116		
90% Chebyshev(Mean, Sd) UCL	5.91	95% Chebyshev(Mean, Sd) UCL	7.109
97.5% Chebyshev(Mean, Sd) UCL	8.775	99% Chebyshev(Mean, Sd) UCL	12.05

Suggested UCL to Use

95% Adjusted Gamma UCL	5.954

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BaP_cluster

General Statistics

Total Number of Observations	9	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.78	Mean	1.807
Maximum	4.54	Median	1.53
SD	1.14	Std. Error of Mean	0.38
Coefficient of Variation	0.631	Skewness	1.956

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.792	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.264	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	2.513	95% Adjusted-CLT UCL (Chen-1995)	2.696
		95% Modified-t UCL (Johnson-1978)	2.555

Gamma GOF Test

A-D Test Statistic	0.379	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.185	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	3.68	k star (bias corrected MLE)	2.527
Theta hat (MLE)	0.491	Theta star (bias corrected MLE)	0.715
nu hat (MLE)	66.23	nu star (bias corrected)	45.49
MLE Mean (bias corrected)	1.807	MLE Sd (bias corrected)	1.136
		Approximate Chi Square Value (0.05)	31.02
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	28.52
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	2.65	95% Adjusted Gamma UCL (use when n<50)	2.882
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.936	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	-0.248	Mean of logged Data	0.449
Maximum of Logged Data	1.513	SD of logged Data	0.546
Assuming Lognormal Distribution			
95% H-UCL	2.843	90% Chebyshev (MVUE) UCL	2.779
95% Chebyshev (MVUE) UCL	3.228	97.5% Chebyshev (MVUE) UCL	3.852
99% Chebyshev (MVUE) UCL	5.077		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	2.432	95% Jackknife UCL	2.513
95% Standard Bootstrap UCL	2.393	95% Bootstrap-t UCL	3.073
95% Hall's Bootstrap UCL	5.171	95% Percentile Bootstrap UCL	2.461
95% BCA Bootstrap UCL	2.662		
90% Chebyshev(Mean, Sd) UCL	2.947	95% Chebyshev(Mean, Sd) UCL	3.463
97.5% Chebyshev(Mean, Sd) UCL	4.18	99% Chebyshev(Mean, Sd) UCL	5.588
Suggested UCL to Use			
95% Student's-t UCL	2.513		

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Outlier Tests for Selected Uncensored Variables

User Selected Options
Date/Time of Computation ProUCL 5.130/07/2019 17:26:00
From File BaP_pilot_rawdata.xls
Full Precision OFF

Dixon's Outlier Test for BaP_shallow

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 5.55 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.530

For 10% significance level, 5.55 is an outlier.
For 5% significance level, 5.55 is an outlier.
For 1% significance level, 5.55 is not an outlier.

2. Observation Value 1.25 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.000

For 10% significance level, 1.25 is not an outlier.
For 5% significance level, 1.25 is not an outlier.
For 1% significance level, 1.25 is not an outlier.

Dixon's Outlier Test for BaP_deeper

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 8.61 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.233

For 10% significance level, 8.61 is not an outlier.
For 5% significance level, 8.61 is not an outlier.
For 1% significance level, 8.61 is not an outlier.

2. Observation Value 1.3 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.018

For 10% significance level, 1.3 is not an outlier.
For 5% significance level, 1.3 is not an outlier.

For 1% significance level, 1.3 is not an outlier.

Dixon's Outlier Test for BaP_cluster

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 4.54 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.630

For 10% significance level, 4.54 is an outlier.
For 5% significance level, 4.54 is an outlier.
For 1% significance level, 4.54 is not an outlier.

2. Observation Value 0.78 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.000

For 10% significance level, 0.78 is not an outlier.
For 5% significance level, 0.78 is not an outlier.
For 1% significance level, 0.78 is not an outlier.

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.130/07/2019 17:37:43
From File	Pb_pilot_rawdata.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Lead_shallow

General Statistics			
Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	137	Mean	325.1
Maximum	578	Median	298
SD	148.3	Std. Error of Mean	49.45
Coefficient of Variation	0.456	Skewness	0.941

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test			
Shapiro Wilk Test Statistic	0.875	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.262	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			
Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	417.1	95% Adjusted-CLT UCL (Chen-1995)	423
		95% Modified-t UCL (Johnson-1978)	419.6
Gamma GOF Test			
A-D Test Statistic	0.377	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.205	Kolmogorov-Smirnov Gamma GOF Test	
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	5.767	k star (bias corrected MLE)	3.919
Theta hat (MLE)	56.38	Theta star (bias corrected MLE)	82.97
nu hat (MLE)	103.8	nu star (bias corrected)	70.53
MLE Mean (bias corrected)	325.1	MLE Sd (bias corrected)	164.2
		Approximate Chi Square Value (0.05)	52.2
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	48.89
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	439.3	95% Adjusted Gamma UCL (use when n<50)	469.1
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.945	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.183	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	4.92	Mean of logged Data	5.695
Maximum of Logged Data	6.36	SD of logged Data	0.449
Assuming Lognormal Distribution			
95% H-UCL	465	90% Chebyshev (MVUE) UCL	472.5

95% Chebyshev (MVUE) UCL	539.4	97.5% Chebyshev (MVUE) UCL	632.2
99% Chebyshev (MVUE) UCL	814.4		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	406.4	95% Jackknife UCL	417.1
95% Standard Bootstrap UCL	401	95% Bootstrap-t UCL	486
95% Hall's Bootstrap UCL	1088	95% Percentile Bootstrap UCL	403
95% BCA Bootstrap UCL	410.8		
90% Chebyshev(Mean, Sd) UCL	473.4	95% Chebyshev(Mean, Sd) UCL	540.6
97.5% Chebyshev(Mean, Sd) UCL	633.9	99% Chebyshev(Mean, Sd) UCL	817.1

Suggested UCL to Use

95% Student's-t UCL	417.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Lead_deeper

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	111	Mean	313
Maximum	757	Median	298
SD	204.4	Std. Error of Mean	68.15
Coefficient of Variation	0.653	Skewness	1.318

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.882	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.166	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	439.7	95% Adjusted-CLT UCL (Chen-1995)	457.1
		95% Modified-t UCL (Johnson-1978)	444.7

Gamma GOF Test

A-D Test Statistic	0.238	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.727	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.157	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.281	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	2.912	k star (bias corrected MLE)	2.016
Theta hat (MLE)	107.5	Theta star (bias corrected MLE)	155.3
nu hat (MLE)	52.42	nu star (bias corrected)	36.28
MLE Mean (bias corrected)	313	MLE Sd (bias corrected)	220.5
		Approximate Chi Square Value (0.05)	23.5
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	21.35

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	483.3	95% Adjusted Gamma UCL (use when n<50)	531.9

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.957	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.137	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.71	Mean of logged Data	5.565
Maximum of Logged Data	6.629	SD of logged Data	0.643

Assuming Lognormal Distribution

95% H-UCL	569	90% Chebyshev (MVUE) UCL	517.9
95% Chebyshev (MVUE) UCL	610.9	97.5% Chebyshev (MVUE) UCL	739.9
99% Chebyshev (MVUE) UCL	993.4		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	425.1	95% Jackknife UCL	439.7
95% Standard Bootstrap UCL	419.7	95% Bootstrap-t UCL	490.5
95% Hall's Bootstrap UCL	565	95% Percentile Bootstrap UCL	431.1
95% BCA Bootstrap UCL	462		
90% Chebyshev(Mean, Sd) UCL	517.4	95% Chebyshev(Mean, Sd) UCL	610.1
97.5% Chebyshev(Mean, Sd) UCL	738.6	99% Chebyshev(Mean, Sd) UCL	991.1

Suggested UCL to Use

95% Student's-t UCL	439.7

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Lead_cluster

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	102	Mean	279.8
Maximum	484	Median	287
SD	113.7	Std. Error of Mean	37.9
Coefficient of Variation	0.406	Skewness	-0.0307

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.919	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.219	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	350.2	95% Adjusted-CLT UCL (Chen-1995)	341.7
		95% Modified-t UCL (Johnson-1978)	350.2

Gamma GOF Test

A-D Test Statistic	0.633	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.277	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	5.546	k star (bias corrected MLE)	3.771
Theta hat (MLE)	50.45	Theta star (bias corrected MLE)	74.18
nu hat (MLE)	99.83	nu star (bias corrected)	67.88
MLE Mean (bias corrected)	279.8	MLE Sd (bias corrected)	144.1
		Approximate Chi Square Value (0.05)	49.92
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	46.69

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	380.5	95% Adjusted Gamma UCL (use when n<50)	406.8

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.303	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data Not Lognormal at 5% Significance Level

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	4.625	Mean of logged Data	5.541
Maximum of Logged Data	6.182	SD of logged Data	0.491

Assuming Lognormal Distribution

95% H-UCL	423	90% Chebyshev (MVUE) UCL	424.7
95% Chebyshev (MVUE) UCL	488.6	97.5% Chebyshev (MVUE) UCL	577.4
99% Chebyshev (MVUE) UCL	751.8		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	342.1	95% Jackknife UCL	350.2
95% Standard Bootstrap UCL	338.5	95% Bootstrap-t UCL	342.9
95% Hall's Bootstrap UCL	352	95% Percentile Bootstrap UCL	340.6
95% BCA Bootstrap UCL	339.6		
90% Chebyshev(Mean, Sd) UCL	393.5	95% Chebyshev(Mean, Sd) UCL	445
97.5% Chebyshev(Mean, Sd) UCL	516.4	99% Chebyshev(Mean, Sd) UCL	656.8

Suggested UCL to Use

95% Student's-t UCL	350.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Outlier Tests for Selected Uncensored Variables

User Selected Options	
Date/Time of Computation	ProUCL 5.130/07/2019 17:36:47
From File	Pb_pilot_rawdata.xls
Full Precision	OFF

Dixon's Outlier Test for Lead_shallow

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 578 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.070

For 10% significance level, 578 is not an outlier.
For 5% significance level, 578 is not an outlier.
For 1% significance level, 578 is not an outlier.

2. Observation Value 137 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.204

For 10% significance level, 137 is not an outlier.
For 5% significance level, 137 is not an outlier.
For 1% significance level, 137 is not an outlier.

Dixon's Outlier Test for Lead_deeper

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 757 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.481

For 10% significance level, 757 is an outlier.
For 5% significance level, 757 is not an outlier.
For 1% significance level, 757 is not an outlier.

2. Observation Value 111 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.012

For 10% significance level, 111 is not an outlier.
For 5% significance level, 111 is not an outlier.

For 1% significance level, 111 is not an outlier.

Dixon's Outlier Test for Lead_cluster

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 484 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.430

For 10% significance level, 484 is not an outlier.
For 5% significance level, 484 is not an outlier.
For 1% significance level, 484 is not an outlier.

2. Observation Value 102 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.114

For 10% significance level, 102 is not an outlier.
For 5% significance level, 102 is not an outlier.
For 1% significance level, 102 is not an outlier.

UCL Statistics for Uncensored Full Data Sets

User Selected Options	
Date/Time of Computation	ProUCL 5.130/07/2019 17:46:08
From File	Dioxins_pilot_rawdata.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

Dioxin WHO TEQ_shallow samples

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	5.5	Mean	16.21
Maximum	29.3	Median	12.7
SD	8.058	Std. Error of Mean	2.686
Coefficient of Variation	0.497	Skewness	0.413

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.937	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.224	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	21.21	95% Adjusted-CLT UCL (Chen-1995)	21.02
		95% Modified-t UCL (Johnson-1978)	21.27

Gamma GOF Test

A-D Test Statistic	0.263	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.724	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	4.274	k star (bias corrected MLE)	2.924
Theta hat (MLE)	3.793	Theta star (bias corrected MLE)	5.545
nu hat (MLE)	76.94	nu star (bias corrected)	52.62
MLE Mean (bias corrected)	16.21	MLE Sd (bias corrected)	9.481
		Approximate Chi Square Value (0.05)	36.96
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	34.21

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	23.08	95% Adjusted Gamma UCL (use when n<50)	24.94

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.955	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.156	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.705	Mean of logged Data	2.664
Maximum of Logged Data	3.378	SD of logged Data	0.541

Assuming Lognormal Distribution

95% H-UCL	25.81	90% Chebyshev (MVUE) UCL	25.31

95% Chebyshev (MVUE) UCL	29.38	97.5% Chebyshev (MVUE) UCL	35.02
99% Chebyshev (MVUE) UCL	46.11		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	20.63	95% Jackknife UCL	21.21
95% Standard Bootstrap UCL	20.32	95% Bootstrap-t UCL	21.67
95% Hall's Bootstrap UCL	20.66	95% Percentile Bootstrap UCL	20.67
95% BCA Bootstrap UCL	20.4		
90% Chebyshev(Mean, Sd) UCL	24.27	95% Chebyshev(Mean, Sd) UCL	27.92
97.5% Chebyshev(Mean, Sd) UCL	32.98	99% Chebyshev(Mean, Sd) UCL	42.93

Suggested UCL to Use

95% Student's-t UCL	21.21

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dioxin WHO TEQ_deeper samples

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	4.5	Mean	22.06
Maximum	57.3	Median	11
SD	20.72	Std. Error of Mean	6.905
Coefficient of Variation	0.939	Skewness	1.267

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.767	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.26	Lilliefors GOF Test
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level

Data appear Approximate Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	34.9	95% Adjusted-CLT UCL (Chen-1995)	36.53
		95% Modified-t UCL (Johnson-1978)	35.38

Gamma GOF Test

A-D Test Statistic	0.5	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.735	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.234	Kolmogorov-Smirnov Gamma GOF Test
5% K-S Critical Value	0.284	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.46	k star (bias corrected MLE)	1.048
Theta hat (MLE)	15.1	Theta star (bias corrected MLE)	21.05
nu hat (MLE)	26.29	nu star (bias corrected)	18.86
MLE Mean (bias corrected)	22.06	MLE Sd (bias corrected)	21.55
		Approximate Chi Square Value (0.05)	10.01
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	8.688

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	41.53	95% Adjusted Gamma UCL (use when n<50)	47.88

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.919	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.189	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.504	Mean of logged Data	2.714
Maximum of Logged Data	4.048	SD of logged Data	0.926

Assuming Lognormal Distribution

95% H-UCL	63.43	90% Chebyshev (MVUE) UCL	42.65
95% Chebyshev (MVUE) UCL	52.1	97.5% Chebyshev (MVUE) UCL	65.21
99% Chebyshev (MVUE) UCL	90.97		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	33.41	95% Jackknife UCL	34.9
95% Standard Bootstrap UCL	32.85	95% Bootstrap-t UCL	54.25
95% Hall's Bootstrap UCL	104.2	95% Percentile Bootstrap UCL	33.19
95% BCA Bootstrap UCL	36.67		
90% Chebyshev(Mean, Sd) UCL	42.77	95% Chebyshev(Mean, Sd) UCL	52.15
97.5% Chebyshev(Mean, Sd) UCL	65.18	99% Chebyshev(Mean, Sd) UCL	90.76

Suggested UCL to Use

95% Student's-t UCL	34.9

When a data set follows an approximate (e.g., normal) distribution passing one of the GOF test
When applicable, it is suggested to use a UCL based upon a distribution (e.g., gamma) passing both GOF tests in ProUCL

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Dioxin WHO TEQ_cluster samples

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
		Number of Missing Observations	0
Minimum	4.4	Mean	11.88
Maximum	19.4	Median	10.9
SD	5.281	Std. Error of Mean	1.76
Coefficient of Variation	0.445	Skewness	0.111

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.1

Normal GOF Test

Shapiro Wilk Test Statistic	0.957	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.129	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	15.15	95% Adjusted-CLT UCL (Chen-1995)	14.84
		95% Modified-t UCL (Johnson-1978)	15.16

Gamma GOF Test

A-D Test Statistic	0.204	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.723	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.144	Kolmogorov-Smirnov Gamma GOF Test	

5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics			
k hat (MLE)	5.036	k star (bias corrected MLE)	3.431
Theta hat (MLE)	2.359	Theta star (bias corrected MLE)	3.462
nu hat (MLE)	90.64	nu star (bias corrected)	61.76
MLE Mean (bias corrected)	11.88	MLE Sd (bias corrected)	6.412
		Approximate Chi Square Value (0.05)	44.69
Adjusted Level of Significance	0.0231	Adjusted Chi Square Value	41.64
Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	16.42	95% Adjusted Gamma UCL (use when n<50)	17.62
Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.947	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.829	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.127	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.274	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			
Lognormal Statistics			
Minimum of Logged Data	1.482	Mean of logged Data	2.372
Maximum of Logged Data	2.965	SD of logged Data	0.503
Assuming Lognormal Distribution			
95% H-UCL	18.09	90% Chebyshev (MVUE) UCL	18.1
95% Chebyshev (MVUE) UCL	20.86	97.5% Chebyshev (MVUE) UCL	24.71
99% Chebyshev (MVUE) UCL	32.26		
Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			
Nonparametric Distribution Free UCLs			
95% CLT UCL	14.77	95% Jackknife UCL	15.15
95% Standard Bootstrap UCL	14.55	95% Bootstrap-t UCL	15.4
95% Hall's Bootstrap UCL	14.5	95% Percentile Bootstrap UCL	14.41
95% BCA Bootstrap UCL	14.63		
90% Chebyshev(Mean, Sd) UCL	17.16	95% Chebyshev(Mean, Sd) UCL	19.55
97.5% Chebyshev(Mean, Sd) UCL	22.87	99% Chebyshev(Mean, Sd) UCL	29.39
Suggested UCL to Use			
95% Student's-t UCL	15.15		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Outlier Tests for Selected Uncensored Variables

User Selected Options
Date/Time of Computation ProUCL 5.130/07/2019 17:45:11
From File Dioxins_pilot_rawdata.xls
Full Precision OFF

Dixon's Outlier Test for Dioxin WHO TEQ_shallow samples

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 29.3 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.249

For 10% significance level, 29.3 is not an outlier.
For 5% significance level, 29.3 is not an outlier.
For 1% significance level, 29.3 is not an outlier.

2. Observation Value 5.5 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.197

For 10% significance level, 5.5 is not an outlier.
For 5% significance level, 5.5 is not an outlier.
For 1% significance level, 5.5 is not an outlier.

Dixon's Outlier Test for Dioxin WHO TEQ_deeper samples

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 57.3 is a Potential Outlier (Upper Tail)?

Test Statistic: 0.013

For 10% significance level, 57.3 is not an outlier.
For 5% significance level, 57.3 is not an outlier.
For 1% significance level, 57.3 is not an outlier.

2. Observation Value 4.5 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.010

For 10% significance level, 4.5 is not an outlier.
For 5% significance level, 4.5 is not an outlier.

For 1% significance level, 4.5 is not an outlier.

Dixon's Outlier Test for Dioxin WHO TEQ_cluster samples

Number of Observations = 9
10% critical value: 0.441
5% critical value: 0.512
1% critical value: 0.635

1. Observation Value 19.4 is a Potential Outlier (Upper Tail)?

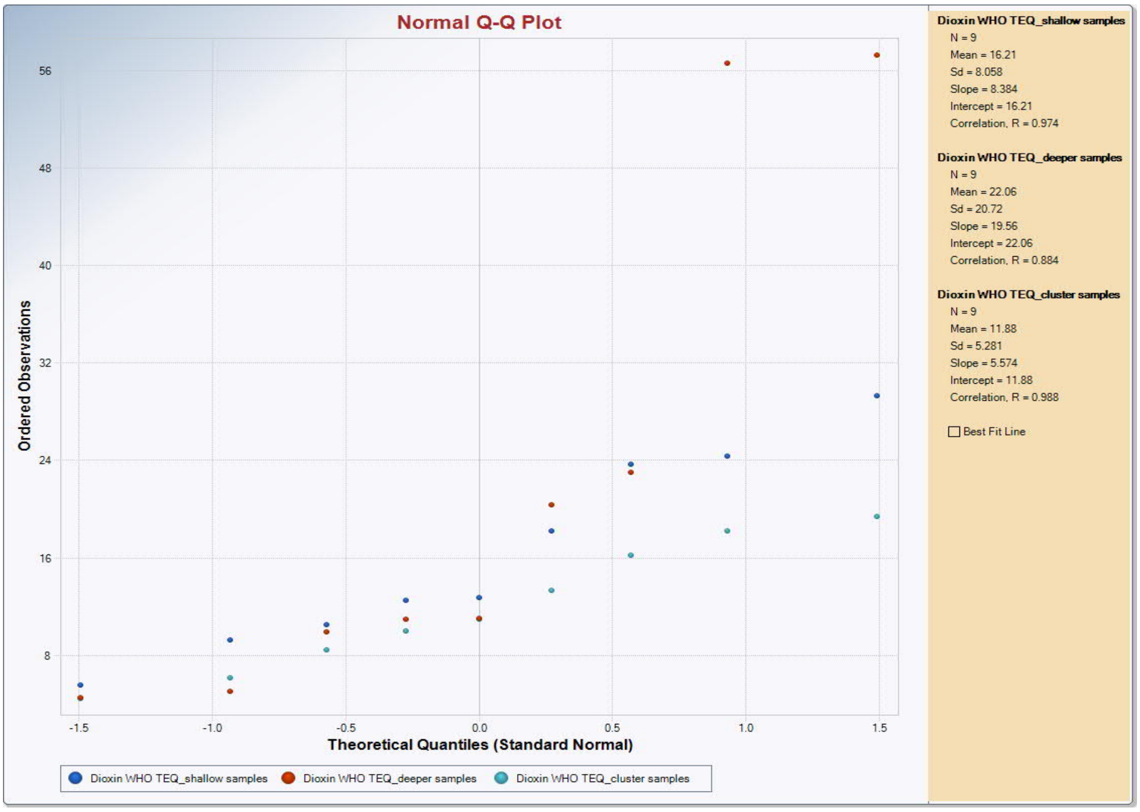
Test Statistic: 0.090

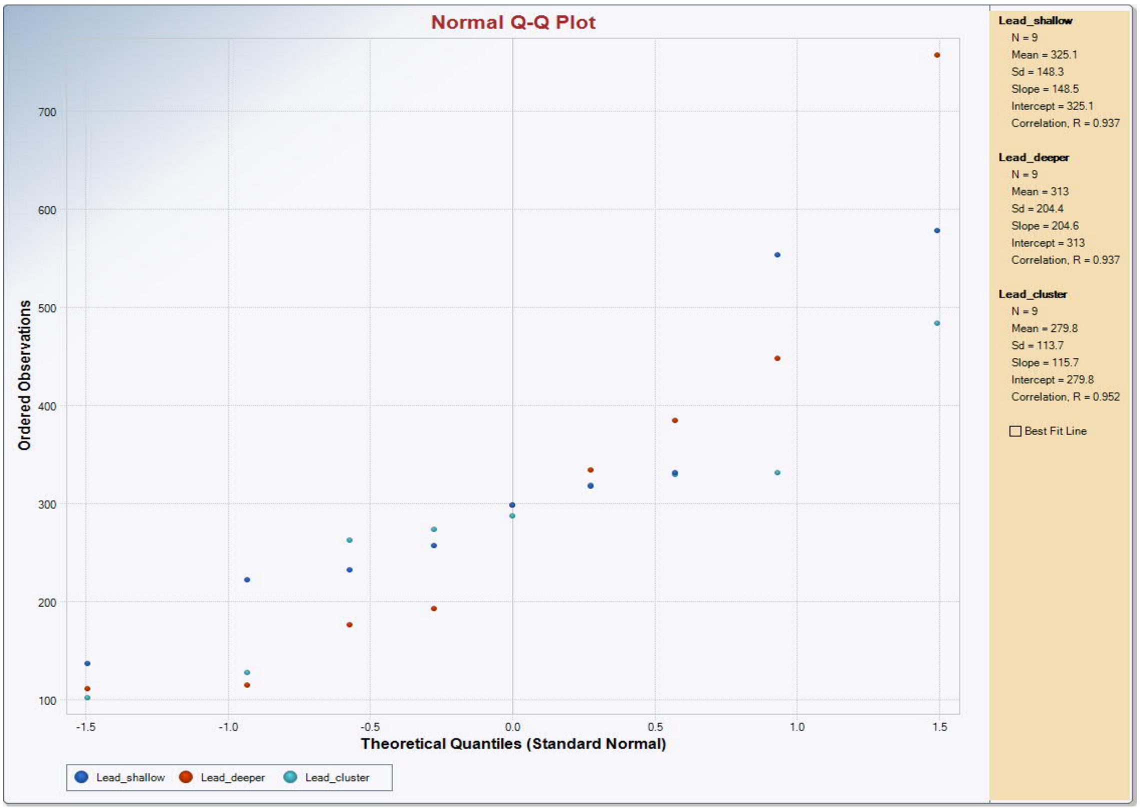
For 10% significance level, 19.4 is not an outlier.
For 5% significance level, 19.4 is not an outlier.
For 1% significance level, 19.4 is not an outlier.

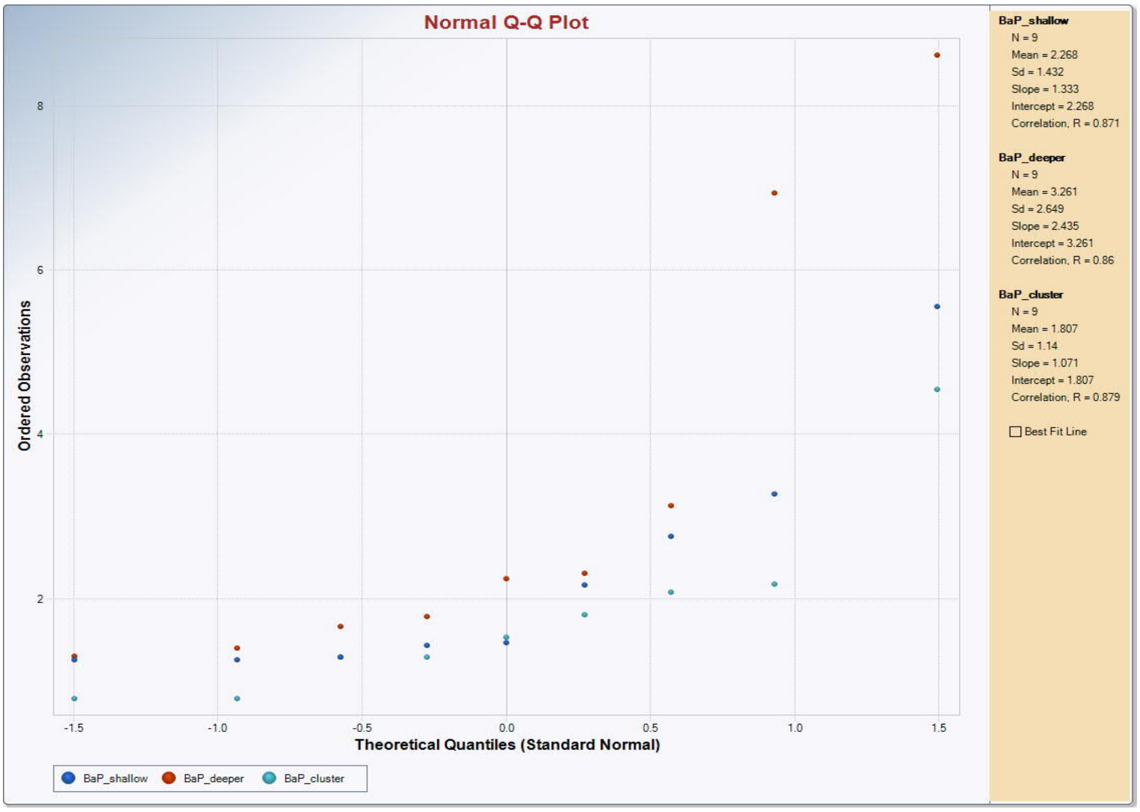
2. Observation Value 4.4 is a Potential Outlier (Lower Tail)?

Test Statistic: 0.123

For 10% significance level, 4.4 is not an outlier.
For 5% significance level, 4.4 is not an outlier.
For 1% significance level, 4.4 is not an outlier.


Normal Q-Q Plot
Ordered Observations
Theoretical Quantiles (Standard Normal)
Dioxin WHO TEQ_shallow samples
Dioxin WHO TEQ_deeper samples
Dioxin WHO TEQ_cluster samples
Dioxin WHO TEQ_shallow samples
N = 9
Mean = 16.21
Sd = 8.058
Slope = 8.384
Intercept = 16.21
Correlation, R = 0.974
Dioxin WHO TEQ_deeper samples
N = 9
Mean = 22.06
Sd = 20.72
Slope = 19.56
Intercept = 22.06
Correlation, R = 0.884
Dioxin WHO TEQ_cluster samples
N = 9
Mean = 11.88
Sd = 5.281
Slope = 5.574
Intercept = 11.88
Correlation, R = 0.988
Best Fit Line


Normal Q-Q Plot
Ordered Observations
Theoretical Quantiles (Standard Normal)
Lead_shallow
Lead_deeper
Lead_cluster
Lead_shallow
N = 9
Mean = 325.1
Sd = 148.3
Slope = 148.5
Intercept = 325.1
Correlation, R = 0.937
Lead_deeper
N = 9
Mean = 313
Sd = 204.4
Slope = 204.6
Intercept = 313
Correlation, R = 0.937
Lead_cluster
N = 9
Mean = 279.8
Sd = 113.7
Slope = 115.7
Intercept = 279.8
Correlation, R = 0.952
Best Fit Line


Normal Q-Q Plot
Ordered Observations
Theoretical Quantiles (Standard Normal)
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
2
4
6
8
BaP_shallow
BaP_deeper
BaP_cluster
BaP_shallow
N = 9
Mean = 2.268
Sd = 1.432
Slope = 1.333
Intercept = 2.268
Correlation, R = 0.871
BaP_deeper
N = 9
Mean = 3.261
Sd = 2.649
Slope = 2.435
Intercept = 3.261
Correlation, R = 0.86
BaP_cluster
N = 9
Mean = 1.807
Sd = 1.14
Slope = 1.071
Intercept = 1.807
Correlation, R = 0.879
Best Fit Line