

CLC2: Contaminated land planning guidance

Small scale investigation works in garden, landscaped and yard areas: Small residential refurbishments

1. Introduction

This guidance has been written to help developers and consultants discharge the small-scale sampling condition that the Council may apply. It is important that the requirements of the condition and this guidance are adhered to during development. Failure to discharge a planning condition may result in enforcement action, additional expenditure and delay the sale of a property.

“CLC2: Small-scale sampling condition.

No occupation or use of the development shall commence until the actions and information required by parts A-D below are submitted to, and approved in writing by, the local planning authority.

- A. Searches of environmental and historical information (EHI) and a soil sampling and analyses exercise (SAE) are undertaken for any garden, landscaping and/or yard (GLY) area and a corresponding SAE report produced.**
- B. Where mean concentrations of a chemical of concern within the soil over a part of or the whole of a site exceed generic or detailed quantitative risk assessment criteria (RAC), a remediation strategy (RS) is produced.**
- C. Any approved RS shall be fully implemented and a verification report (VR) produced.**
- D. A description and on-site sampling and laboratory analyses of imported soils and fills (ASF) will be provided demonstrating that these materials are suitable for use.**

Where remedial measures are implemented to protect end-users of the development they shall be so maintained. The EHI, SAE, SAE Report, RS, VR and any unexpected contamination identified during the SAE and development shall be addressed in line with the Council’s contaminated land guidance for small scale investigation works in garden, landscaped and yard areas: small residential refurbishments.”

This condition applies to small sensitive uses that have a garden, landscaped area or yard (GLY) where there is no known history of a contaminating use, such as an industry or petrol station. This guidance specifically applies to small residential refurbishments, for example the conversion of:

- Two or more dwellings to a single dwelling;
- A single dwelling to two or more dwellings.

The guidance enables developers to focus the ‘soil sampling and analyses exercise’ (SAE) on a few contaminants that commonly exceed generic assessment criteria (GAC). It also sets out ongoing maintenance considerations which apply even after parts of the condition are discharged. We would recommend that an appropriate environmental professional undertakes the work described below.

This is guidance only and is intended to provide an indication of what will normally enable the Council to make decisions under planning legislation. The approach set out is in line with industry best practice guidance such as the British Standards 10175 (Investigation of potentially contaminated sites) and 5930 (Code of Practice for Ground Investigations).

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It is the responsibility of the developer to ensure that they comply with the requirements of Contaminated Land, Health & Safety, Waste Management, Environmental Damage and the Control of Asbestos Regulations. The responsibility to properly address contaminated land issues, including safe development and secure occupancy, and irrespective of any involvement by this Authority, lies with the owner/developer of the site. Whilst all reasonable care has been taken to ensure the accuracy of the information and data provided within this guidance, the Council accepts no liability for any loss or damage howsoever caused arising from any reliance placed by any other person upon the information and data contained herein.

2. Why SI work is needed?

Most of the Royal Borough of Kensington and Chelsea (RBKC) is covered by Made Ground, which is typically a mixture of soil and demolition, household and industrial sourced waste products. Residential GLYs may also be contaminated by lead paints, lead flashing, asbestos containing materials, the spreading of pot ash and blitz bombing during the Second World War. Burning by residential and commercial properties over hundreds of years and emissions from transport have also contributed to compounds such as lead and polycyclic aromatic hydrocarbons (PAHs) being found across urban areas.

As a result, several contaminants are commonly found elevated above GAC across the borough. These include lead, PAHs and asbestos (see **Box 1**). Occasionally the presence of contaminants in the soil will be at levels that could harm a person regularly coming in to contact with the soil.

Box 1: Contaminants

Lead: A metal that is found naturally in rocks and associated soils. Activities such as mining and smelting, use of sewage sludge, aerial contamination from vehicle exhausts and its use in the construction industry and household products such as flashing and paint, have all resulted in the widespread presence of lead in the soil. It is relatively immobile in soils and often collects at or near to the surface. There are a range of health impacts resulting from lead exposure, with the best-known being lead poisoning and reductions in child IQ. It is also known to result in increases in blood pressure and to effect kidney function.

Polycyclic Aromatic Hydrocarbons (PAHs): PAHs are a large group of hydrocarbon compounds. They are mainly formed as a result of burning and the incomplete combustion of organic materials, for example motor vehicle engines, coal and wood fires, refuse incineration and cigarette smoke. Natural sources include volcanoes and forest fires. PAHs are found in most urban soils in the UK, largely as a result of the historic burning of coal and through the processing and use of petroleum hydrocarbons. Several PAHs are known or suspected human carcinogens.

Asbestos: Asbestos are silicate minerals made up of long and thin fibrous crystals that can be released into the atmosphere when the material is damaged or worn. It was used extensively in the UK in a range of products, including for fire protection and insulation, up until 1990 when it was banned. It is still present in many buildings and is also found in the soil as a result of the wide use of demolition materials and past building practices. Asbestos is a well-known health hazard and inhaling asbestos fibres can lead to various lung conditions, including asbestosis and cancer.

3. Information needed to satisfy the planning condition

The Planning Authority requires the following work and information to discharge the small scale investigation works condition.

For every application:

- Environmental and historical information
- Soil sampling and analyses exercise

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- Soil sampling and analyses exercise report
- Evidence of contamination found during the development

Where remediation is required:

- Remediation strategy
- Verification report

Where soil or fill is imported on to the site:

- Details of imported soil and fill

The remainder of this guidance sets out what is needed for each of these items and situations where unexpected contamination is found.

Where a satisfactory level of information is provided at the planning application stage the small-scale sampling condition will be adapted to, for example, solely address evidence of contamination found during the development, details of imported soil and fills and where needed, the implementation of a remediation strategy.

4. Environmental and historical information

Before any intrusive site investigation or development work takes place, readily available environmental and historical information (EHI) must be collected to check for possible sources of contamination. This should include:

- An environmental search collating available sources of information such as historical mapping, geology and hydrogeology, statutory registers, records of historical contaminating uses, unexploded ordnance, etc. Several commercially available EHI searches are available;
- Available intrusive site investigation information on and in the vicinity of the site;
- Searches of British Geological Survey 'Onshore Borehole Records' available at <http://www.bgs.ac.uk/data/boreholescans/home.html>;
- [Environmental Search Enquiries](#) with the Pollution Regulatory Team at the RBKC - contact EH-Pollution@rbkc.gov.uk;
- Searches of planning records on RBKC's website - <https://www.rbkc.gov.uk/planning/searches/default.aspx>;
- Anecdotal information from current owners and occupiers of the site.

Searches of the planning records for each address should include:

- A simple or advanced search
- Planning history of individual properties from 1948-2009
- Microfiche records for 1948-1996

Where the EHI identifies more significant past or present uses, a more detailed preliminary risk assessment should be undertaken in line with the [Environment Agency's Land Contamination: Risk Management Guidance](#) and [RBKC's Main Contaminated Land Guidance](#). The EHI should be reported within the soil sampling and analyses report.

5. Soil sampling and analyses exercise

A SAE will typically be required including:

- Trial holes to at least 0.5m below ground level (bgl) set out on a regular grid across the garden (see **Table 1** and **Figure 1**) in areas of both soft and hard landscaping;

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- A description of the soil conditions and any contamination encountered within each trial hole, for example fragments of brick, charcoal, clinker slag, oil, hydrocarbon odours and colourful staining should be identified.
- From each trial hole a surface soil sample (ground level - 0.05m bgl), near surface sample (about 0.1m bgl) and deeper sample (between 0.2m and 0.5m bgl) and a sample of any suspected contamination encountered;
- Analyses of every sample for total lead, PAHs and an asbestos screen. Analyses of 20% of samples for a wider range of metals and inorganic compounds typically analysed for, also including pH, total organic carbon (TOC), moisture content, asbestos screen, metals/inorganic suite (incl. lead), PAHs, speciated TPH (including aliphatic and aromatic fractions) and volatile and semi-volatile organic compounds (VOCs/SVOCs);
- Where evidence of hydrocarbon compounds is found analyses should include speciated TPH (including aliphatic and aromatic fractions) and VOC/SVOC.
- The following additional investigation and analyses should be considered if it is established that the mean concentration of a compound, over the whole or a significant portion of the GLY area, exceeds a GAC:
 - Additional trial holes and targeted analyses
 - Where other contaminants, such as arsenic or cadmium exceed GAC, the re-analyses of other samples for these contaminants
 - Bio-accessibility testing for Lead, PAHs, etc.
 - Use of benzo(a)pyrene as a surrogate marker for PAHs
 - Quantitative asbestos analyses

We recommend that soil samples are retained by the laboratory undertaking the analyses until it is confirmed that no further analyses are needed.

Typically, the soil sampling and analyses exercise (SAE) must be undertaken in both soft and hard landscaped areas, as the work must account for hard landscaping being replaced by soft landscaping in the future. Where it can be demonstrated that it is not feasible to use a GLY area for soft landscaping or planting at ground level (for example due to access restrictions, the small size of an area and being situated over the foundation slab), a soil sampling and analyses exercise may not be needed over part of or the whole of a GLY area. If this may be the case, you should contact the Planning Authority.

Details of the minimum number of trial holes typically required for different sized gardens is provided in **Table 1**. These values are based on officer experience of the number of samples typically required to make reliable decisions on the distribution of contamination within gardens and are consistent with the guidance set out within BS10175.

The size of a garden should be defined by the useable external areas of the property (for example front and rear gardens and patios and courtyard areas), excluding areas that may not be used as a GLY.

Table 1: Number of investigation positions required for different sized gardens*

Size of garden**	No trial holes	Total samples	Total Lead, PAHs and asbestos	pH, TOC, Metals/inorganics suite (incl. lead), PAHs, asbestos, speciated TPH (including aliphatic and aromatic fractions), VOC/SVOCs) ***
=/ <5m ²	3	9	7	2
>5m ² -25m ²	6	18	14	4
>25 m ² -100m ²	9	27	22	5
>100m ²	1 additional trial hole and three samples for each 25m ² of garden or agree with RBKC****			

* The developer should not be limited by this guidance and so may decide to undertake a greater number of trial holes and range of analyses to provide greater confidence.

** Does not apply to situations where the area cannot be used for anything other than hard-surfacing.

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*** Broadly 20% of total number of samples taken.

****For example, 100m², 120m², 125m² and 130m² gardens would require 9, 10, 10 and 11 trial holes respectively.

Given the shallow depth of the trial holes, hand dug pits may be used to obtain the required soil samples relatively quickly. Depths of up to 1.0m bgl or more may be reached using a post hole digger and a probing bar to break out any obstructions. Where there is hardstanding (for example concrete or paving) it may be necessary to break or core through this to obtain soil samples. Taking samples beneath hardstanding is necessary where future residents may remove it, exposing them to soil in these areas. General advice on obtaining soil samples is included within **Box 2**.

Box 2: Taking soil samples

- Sampling should be undertaken using nitrile work gloves or a stainless-steel trowel.
- Between samples the sampling glove or stainless-steel trowel should be washed using distilled or deionised water to prevent cross contamination.
- The size of sample and type of containers should be as specified by the laboratory analysing the soil.
- Once taken samples should be placed in a cooled cool box and delivered to a laboratory ideally within 24 hours, keeping the samples cooled at all times.
- The laboratory must be UKAS and MCERTs accredited for each of the contaminants to be analysed.
- Where there is evidence of other contaminants within the soil they should also be analysed – speak to your laboratory about the sampling requirements for other contaminants.

It is essential that appropriate health and safety precautions are taken in line with Health & Safety at Work Regulations. This will usually include wearing gloves, observing good hygiene and taking standard precautions when digging in the ground. It is important to ensure that you do not damage services while undertaking investigation works.

6. Soil sampling and analyses report

The SAE Report must include:

- Background information: A description of the current and recent use of the development site, the proposed development, environmental and historical information, a plan of the site and photographs.
- Soil sampling and analyses results: A summary of the information collected during the exercise, details of any observations of any soil contamination and tables summarising the results of analyses, including the range and calculated mean for each contaminant at different depths (i.e. surface, 0.1m bgl and between 0.2m bgl-0.5m bgl) and for all of the results. Summary tables should be provided for the whole site and for specific areas that appear to be uncharacteristic of the site as a whole. Attached to the report a plan showing the location of the sampling points, logs describing the ground conditions, details of each sample taken and the laboratory analyses certificates.
- Assessment: The mean chemical analyses result of each contaminant may be compared to GAC, including those within **Table 2**. Other commonly used GAC include DEFRA Soil Guideline Values and Category 4 Screening Levels and the LQM/CIEH Suitable 4 Use Levels. Any individual samples or localised areas with higher contaminant concentrations should be identified. An assessment of whether any of the contaminants tested exceed GAC over a part of or the whole of a GLY area is required.
- Recommendations: Normally if no GAC are exceeded the recommendation will be that the site is suitable for the intended use. If contaminants exceed GAC over the whole or part of a site,

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recommendations for further investigations and detailed quantitative risk assessment and/or mitigation measures must be provided.

Table 2: Soil screening criteria

Contaminant	Typical generic screening criteria used	Normal background concentration for urban areas	Additional comments
Lead	200 mg/kg ¹	820 mg/kg ²	Consideration could be given to the use of background concentrations, provided it can be demonstrated that, at such concentrations, there are no unacceptable risks to human health.
Benzo(a)pyrene	5 mg/kg ¹	3.6 mg/kg ²	
Asbestos	<0.001 %w/w or none detected ³	Not available	Where asbestos containing materials are to remain on site, an appropriate risk assessment must be provided.

1. DEFRA's Category 4 screening criteria.

2. British Geological Survey normal background concentrations for urban areas.

3. Industry standard based on levels of detection for a standard asbestos screen.

7. Remediation strategy

Where the soil sampling and analyses report identifies that remediation work is needed, a remediation strategy (RS) must be provided to and approved by the planning authority. The RS must set out how soil contamination will be addressed so that the development is suitable for use and will normally include one or more of the following measures:

- Further soil sampling and analyses and detailed quantitative risk assessment;
- Raising the level of the garden to an agreed depth by importing clean soil and/or fill;
- Removal of contaminated soil to an agreed depth and replacement with clean imported soil and/or fill, or;
- Application of additives to improve the soil condition.

Other methods of remediation are also available but are typically less cost effective for small scale developments and so not considered further here. The RS must be developed broadly in line with the [Environment Agency's Land Contamination: Risk Management Guidance](#). Further borough specific guidance may also be available within the [Main Contaminated Land Guidance](#).

8. Verification report

Once a RS is fully implemented a verification report (VR) must be provided to and approved by the planning authority. The remediation strategy must:

- Provide the evidence required by the RS to demonstrate that each of the remedial actions has been successfully implemented.
- Identify what ongoing maintenance is needed and any limitations with the use of any physical measures.

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The requirement to “Identify ongoing maintenance” will normally include to maintain the integrity of a soil cover system to prevent future occupiers coming in to contact with potentially contaminated soil, for example by:

- Ensuring that the depth and quality of clean soil cover is maintained for the duration of the use.
- Identifying potential contamination that may be encountered by future occupiers and maintenance workers when digging beneath the cover system.

The VR must be produced broadly in line with the [Environment Agency’s Land Contamination: Risk Management Guidance](#). Further borough specific guidance may also be available within the [Main Contaminated Land Guidance](#).

9. Imported soil and fills

Sampling and analyses are not required for:

- Fills and aggregates from a virgin quarried source;
- Coarse aggregates (for example crushed brick and concrete) without any fines portion which are visually uncontaminated.

To verify soils, non-virgin fills and aggregates and the fine portion of coarser aggregates, the following information must be provided.

- A description including any certificates of analyses provided by the materials provider;
- The certificates for the laboratory analyses of samples of imported soils and fills taken on site, and;
- An assessment against relevant criteria (for example DEFRA Soil Guideline Values and Category 4 Screening Levels and the LQM/CIEH Suitable 4 Use Levels) confirming that the material is suitable for use.

The description of the material should include details of any inclusions and visual or olfactory evidence of contamination, for example fragments of asbestos, charcoal, clinker slag, oil, colourful staining and hydrocarbon or chemical odours. Imported soils and fills not judged to be suitable for their intended use due to the presence (visual and olfactory) of contaminants should be replaced.

Where sampling and analyses is required, for each material type and source, one sample should be taken per 50m³ of imported material (see **Box 2**). Where there is more than 10m³ of an imported soil or fill, a minimum of 3 samples should be taken. Where there is evidence of contamination in the soil a greater number of samples may need to be analysed. Imported soils and fills should be sampled and analysed for a full range of analyses (for example as listed in the far-right column of **Table 1**). Where GAC are exceeded the soils should normally be removed from site. Normal background concentrations may not be used to assess the quality and suitability for use of imported fills and soils.

Details of imported soils and fills may be included within a VR.

10. Action and evidence relating to unexpected contamination

Where unexpected contamination is encountered the following actions must be taken by the developer:

- All development shall cease in the affected area;
- The Planning Authority and Pollution Regulatory Team must be contacted within 2 working days, or sooner if the contamination poses a significant risk to health;
- Any additional or unforeseen contamination shall be dealt with as agreed with the Contaminated Land Officer, and;

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- Where development has ceased in the affected area, it shall only recommence upon written notification of the Planning Authority or Contaminated Land Officer.

Examples of unexpected contaminated land include soils stained by oil/fuel, uncharacteristically coloured liquids/soils or groundwater, debris such as asbestos and pungent or pleasant odours arising from the soil or groundwater.

For every development, upon completion of all groundworks, the onsite manager/builder must provide a clear and unambiguous written and signed statement to the Planning Authority identifying whether any significant unexpected contamination was encountered during the development. Where significant unexpected contamination was encountered, full details of the contamination and how it was dealt with must be provided. Where a VR is to be produced for a development, this information may be included within the VR.

Figure 1 Illustrations of investigation grids

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The following layouts provide a simple illustration of some of the do's and don'ts when designing a trial hole investigation. The garden is 170m² in area and so requires 12 investigation locations.

- Avoids patio at bottom of garden
- Avoids plant beds at side of garden
- Targets all (soft and hard) areas of the garden with evenly spaced trial holes
- Only targets top half of garden
- Only targets bare soil in plant beds

Red X marks are placed below the first, second, fourth, and fifth diagrams, while a green checkmark is placed below the third diagram.