

ADVICE NOTE 2 – Technical Guidance for Investigating, Assessing and Remediating Land Contamination

Introduction

This guidance note is provided to landowners, developers, agents and consultants in order to encourage a consistent approach in the investigation, assessment and remediation (clean-up) of land contamination.

Land may be contaminated as a result of current or past uses and activities, including quarrying, industry and the deposit of waste. However, not all contamination poses problems and some may only be of concern if the land is used for a particular purpose (e.g. housing).

Land contamination is principally investigated and remediated through either the planning process or Part IIA of the Environmental Protection Act 1990. This guidance concentrates on the planning process and Part IIA.

Planning

The role of the planning process is to ensure that land is made suitable for its proposed future use.

Planning Policy Statement 23 (PPS23) puts the responsibility on the developer to make sure that a development is safe and suitable for use. If contamination is known or suspected, the Local Planning Authority is likely to require further assessments (such as Phase 2 and Phase 3) to be completed before planning permission is granted or as conditions on any planning permission granted for the site.

For further information and guidance please refer to 'Advice Note 1 – Guidance notes for developments on land which is potentially contaminated or where the proposed end use is sensitive'.

Part IIA

For sites not dealt with through the planning process, Part IIA of the Environmental Protection Act 1990 is used. This legislation places a duty on the Local Authority (LA) to investigate all potentially Contaminated Land within its area, and to secure clean-up if the contamination is deemed to present an unacceptable risk to people, property or the environment. For further information please refer to 'Advice Note 3 – Environmental Protection Act 1990: Part IIA The Contaminated Land Regime' and 'Advice Note 4 - Environmental Protection Act 1990: Part IIA Apportioning Liability for Contaminated Land'.

The Investigation, Assessment and Remediation of Land Contamination

The investigation, assessment and remediation of land contamination can be split into a series of four phases, which are detailed below and presented in the flow chart overleaf (Figure 1). These phases should be followed in order to identify contamination and provide a basis for deciding what actions need to be taken to make a site "suitable for use".

Please note that not every site will require every phase to be carried out.

It is advisable to contact the Council's Environmental Health Department and the Environment Agency (EA) before conducting any site investigation or remedial works. Technical advice and information regarding regulatory requirements will be given and this early liaison should prevent delays and misunderstandings at a later stage.

Phase 1 - Desktop Study, Site Walkover & Initial Risk Assessment

The purpose of Phase 1 is to obtain a good understanding of the site history, setting, current and proposed use. This phase will be used to scope the next phase, the site investigation, and if done effectively will ensure that additional effort and expense is not incurred.

A Phase 1 consists of a desktop study, a site walkover and an initial risk assessment. Competent and qualified persons should carry out all aspects of the works.

Desktop Study

A desktop study is a detailed search of available historical and current records and maps to identify potential on-site and off-site sources of contamination. It should include information on:

- Site location and setting.
- Current land use on and in the vicinity of the site.
- Historical land use on and in the vicinity of the site obtained from various sources including historical maps and directories.
- Types of contamination that may be present.
- Soils and underlying geology.
- Ecology and archaeology.
- Groundwater and surface water.
- Location of licensed and unlicensed waste sites.
- Abstraction and discharge licences.

Site Walkover

A site walkover survey should be undertaken to confirm the information gathered by the desktop study. Observations should be made relating to:

- The site layout, nature and setting (including information on the presence and condition of above-ground fuel tanks, deposits of waste material and the storage of hazardous chemicals).
- The condition of the site and structures.
- Soils and vegetation, in order to identify any potential or actual sources of contamination.

Initial Risk Assessment

After carrying out a detailed desktop study and site walkover survey, a conceptual site model should be developed to establish the likely pathways and receptors that could be affected by potential contamination.

A conceptual model comprises three elements:

- Potential sources of contamination e.g. tanks and nearby landfill sites.
- Potential receptors that may be harmed e.g. residents and ground waters.
- Potential pathways linking the two e.g. direct contact and vapours.

The outcome of Phase 1 should be a report setting out the initial conceptual site model, a technical interpretation of the data that has been gathered with a preliminary risk assessment and recommendations for further site investigation work. This report must be submitted to the Local Authority and the Environment Agency for approval BEFORE proceeding to the next phase.

Phase 2 Site Investigation and Risk Assessment

The purpose of Phase 2 is to obtain all the information necessary for the assessment of risks to people, property and the environment. Competent and qualified persons should carry out all aspects of the works.

Site Investigation

The site investigation should be designed to characterise the nature and extent of contamination where it is present and also areas where it is absent. The proposed site investigation works should be recorded in a Sampling Strategy, which should include the following information:

- The purpose and objectives of the investigation formulated on the basis of the conceptual site model and the information gaps highlighted during Phase 1.
- Overview of the intended sampling – including information on locations, depths, patterns and numbers of sampling

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points and the frequency and duration of sampling or monitoring to be undertaken.

- Sampling and/or monitoring methods to be used.
- The contaminants and parameters that will be assessed.
- The likely number of samples (soil, water or soil gas) that will be taken for subsequent laboratory analysis.
- The laboratory methods that will be used. Please note that independently accredited laboratories and analytical methods should be used (e.g. UKAS or Mcerts).

Ground Gases

There are numerous sources of ground gases derived from both natural and human activities. The most commonly recognised hazards and effects of ground gases are; flammability/risk of explosion, risk to health, odour and effects on vegetation.

Buried organic matter is of particular concern as it has the potential to generate methane and carbon dioxide, which are explosive above certain concentrations. Therefore any site located in the vicinity of a landfill site may be at risk from ground gases. For that reason gas monitoring is required to assess the risk - further information is available in CIRIA C659 (2006) (please note that document C659 is due to be replaced by C665 in Autumn 2007).

BEFORE the commencement of site investigation works, a written sampling strategy should be submitted to the Local Authority and Environment Agency for approval.

Risk Assessment

After approval of the sampling strategy and completion of the works, the conceptual site model developed in Phase 1 should be refined and each significant pollutant linkage should be considered during the risk assessment.

Assessing Risk to Human Health

A tiered approach to estimating risk should be followed involving direct comparison between observed levels of contamination and first Generic Assessment Criteria (GAC) and subsequently Site Specific Assessment Criteria (SSAC).

The CLEA methodology is the authoritative standard for assessing the risk to human health arising from contamination in the UK. The CLEA methodology is supported by a series of Soil Guideline Values (SGVs), which are intended for use as GAC. In the absence of specific SGVs, the risk assessor may use GAC derived from other authoritative, published sources e.g. the Dutch Ministry of Housing and Spatial Planning. However caution must be exercised when using values derived from other sources and justification of their use must be provided.

If contaminant concentrations exceed the SGVs or other GAC, then a more detailed site-specific risk assessment is required. This involves the formulation of SSAC using risk-modelling techniques such as CLEA UK. Please note that all risk-modeling assumptions and uncertainties should be presented and referenced.

Assessing Risk to Controlled Waters

The Environment Agency approach to assessing the risk to controlled waters is set out in R&D Report P20 "Methodology for the Derivation of Remedial Target Values for Soil and Ground Waters". Other methodologies are available, but risk assessors are advised to contact the enforcing authority prior to departing from the P20 methodology.

Further advice is available via the Environment Agency website (www.environment-agency.gov.uk).

Assessing Risk to Other Receptors

These may include risks to property (e.g. buildings or structures) or ecosystems. In situations where such receptors have been identified in pollutant linkages, early consultation with the appropriate enforcing authority is advised.

The outcome of Phase 2 should be a report setting out the work, findings (including laboratory analysis results and risk assessment worksheets) and recommendation as to whether remediation is required to make the site "suitable for use". This report must be submitted to the Local Authority and Environment Agency for approval BEFORE proceeding to the next phase.

Phase 3 – Remediation Strategy and Works

The purpose of Phase 3 is to manage the risks that have been identified and assessed during Phases 1 and 2. Competent and qualified persons should carry out all aspects of the works.

Remediation is required where unacceptable risks to people, property or the environment have been identified and assessed in relation to the current or intended use of the land and its wider environmental setting. Sufficient information and data should have been collected during the previous phases to enable the necessary remedial action to be properly designed and costed.

The proposed remedial works should be recorded in a Remediation Strategy, which should include the following:

- The objectives of the proposed remediation works.
- Type, form and scale of contamination to be remediated.
- Site plans/drawings.
- Phasing of works and approximate timescales.
- Consents and licenses e.g. abstraction licences, discharge consents and waste management licences.
- Details of how the works will be validated to ensure that the remediation objectives have been met.
- Laboratory or other analysis to be undertaken.
- Proposed clean-up standards to be achieved.

A Remediation Strategy should be submitted to the Local Authority and Environment Agency for approval BEFORE undertaking any remedial works. Once the appropriate Local Authority/Environment Agency has approved the Remediation Strategy remedial works can commence

Phase 4 – Validation of Remedial Works

The purpose of Phase 4 is to provide evidence to show that the remedial works have been carried out in accordance with the agreed Remediation Strategy. This proof may take various forms, for example:

- Results of soil, gas or water sampling.
- Certificates of conformity of installation.
- Duty of Care waste disposal documentation.
- Verification of the installation of gas protection measures into buildings.

Information should be provided on completion of the remedial work, or in stages subject to the nature of the works that are required and the manner by which the works can be validated. The results of the remediation works should be recorded in a Validation Report, which should include the following:

- Reference to the earlier reports and a summary.
- A summary of the risks that have been managed.
- The validation information detailed in the Remediation Strategy.
- Details and justifications of any changes from the original Remediation Strategy.
- Confirmation that the remediation objectives have been met.

The outcome of Phase 4 will be the completed remedial works and a supporting Validation Report, which should be submitted to the Local Authority and Environment Agency for approval. When the Local Authority/Environment Agency is satisfied that the remediation requirements have been achieved, it will confirm its decision in writing.

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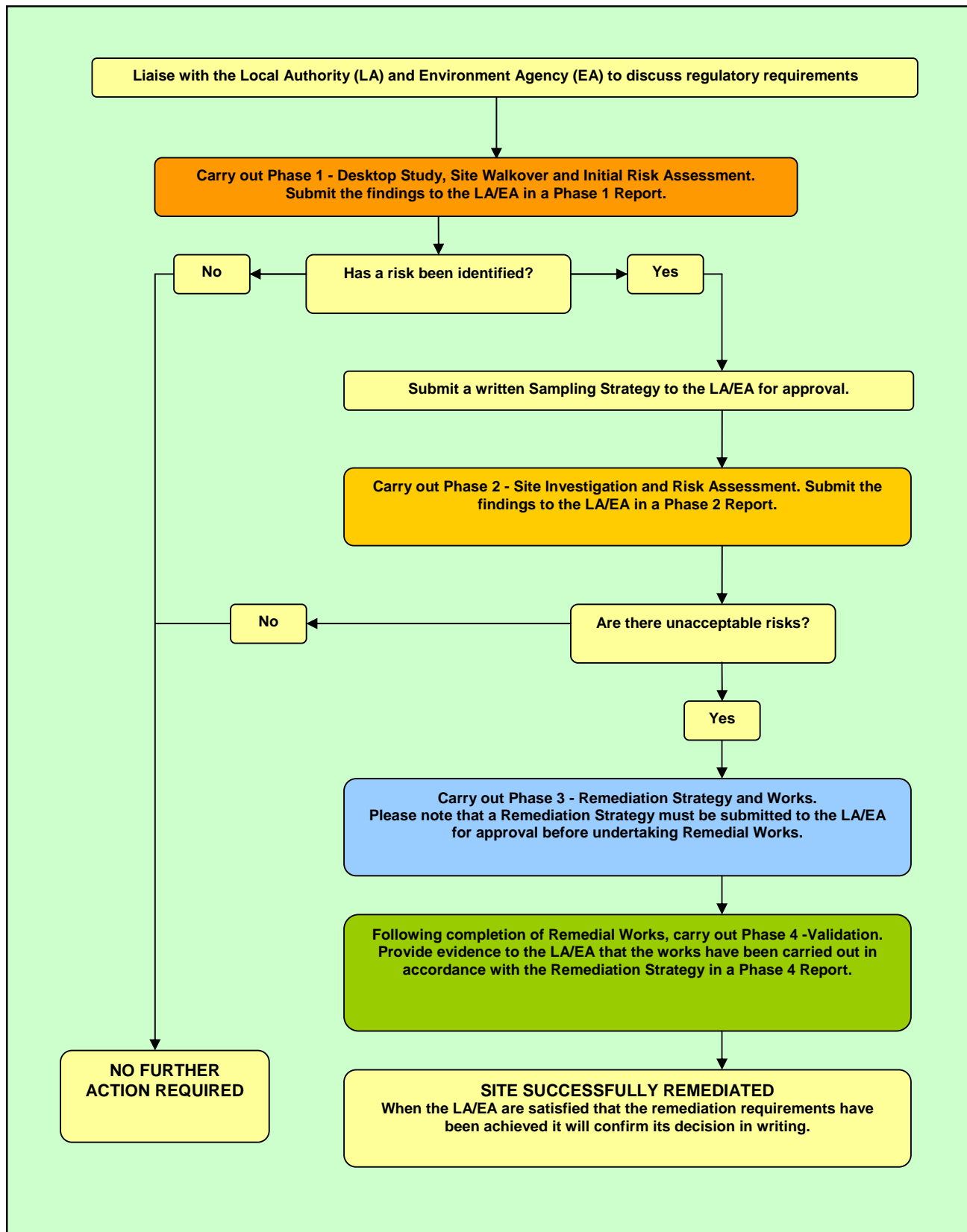


Figure 1. The investigation, assessment and remediation of land contamination

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Contacts

Local Authorities

Babergh District Council	contaminated.land@babergh.gov.uk	01473 822801
Forest Heath District Council	envhealth@forest-heath.gov.uk	01638 719000
Ipswich Borough Council	pollution@ipswich.gov.uk	01473 432000
Mid-Suffolk District Council	envcontrol@midsuffolk.gov.uk	01449 720711
St Edmundsbury Borough Council	env.health@stedsb.gov.uk	01284 763233
Suffolk Coastal District Council	environmental.protection@suffolkcoastal.gov.uk	01394 383789
Waveney District Council	environment@waveney.gov.uk	01502 562111

Environment Agency

Central Area & Eastern Area	enquiries@environment-agency.gov.uk	08708 506506
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References and Further Reading

A list of reference material and further reading is presented below. Parties involved in site investigation and remediation are encouraged to have regards to their contents and make use of the sources of information during their work. The list is not exhaustive and is current at the time of publishing this document. Further advice is available from the contacts listed above.

- British Standards Institution (2001). BS 10175:2001: Investigation of Potentially Contaminated Sites – Code of Practice. BSI, London.
- British Standards Institution (1999). BS 5930:1999: Code of Practice for Site Investigations. BSI, London.
- CIRIA (2006). C659: Assessing Risks Posed by Hazardous Ground Gases to Buildings. CIRIA, London.
- DEFRA (2006). Circular 01/2006. Environmental Protection Act 1990: Part 2A. DEFRA, London. Internet site: www.defra.gov.uk.
- DEFRA and the Environment Agency (2004). CLR11: Model Procedures for the Management of Land Contamination. Environment Agency, Bristol. Internet site: www.environment-agency.gov.uk.
- DEFRA and the Environment Agency (2002). CLR 7-10: Contaminated Land Research Reports. Environment Agency, Bristol.
- DEFRA and the Environment Agency (2002 onwards). Toxicological (TOX) Reports and Soil Guideline Value (SGV) Reports - Various. Environment Agency, Bristol.
- Department of the Environment (1995). DoE Industry Profiles. Available from <http://www.environment-agency.gov.uk/subjects/landquality/113813/?version=1&lang=e>.
- Environment Agency (2005). UK Approach to Evaluating Human Health Risk from Petroleum Hydrocarbons in Soils: Science Report P5-080/TR3. Environment Agency, Bristol.
- Environment Agency (2000). Technical Aspects of Site Investigation: R & D Technical Report P5-065/TR – 2 Volumes. Environment Agency, Bristol.
- Environment Agency. R&D Report P20. Methodology for the Derivation of Remedial Target Values for Soil and Ground Waters. Environment Agency, Bristol.
- Office of the Deputy Prime Minister (2004). Planning Policy Statement 23: Planning and Pollution Control (PPS23). Annex 2: Development on Land Affected by Contamination. ODPM, London.
- The Suffolk Environmental Protection Group – Contaminated Land Sub Group (SEPG-CL) - Topsoil Guidance May 2007
- The Building Regulations 2000 (2004 Edition). Approved Document C: Site Preparation and Resistance to Contaminants and Moisture. ODPM, London.

Disclaimer

This Note is intended to serve as an informative and helpful source of advice. However, readers must note that legislation, guidance and practical methods are inevitably subject to change. This note should therefore be read in conjunction with prevailing legislation and guidance, as amended, whether mentioned here or not. Where legislation and documents are summarised this is for general advice and convenience, and must not be relied upon as a comprehensive or authoritative interpretation. Ultimately it is the responsibility of the person/company involved in the development or assessment of potentially contaminated land to apply up to date working practices to determine the contamination status of a site and the remediation requirements.

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