



**ENVIRONMENT
AGENCY**

Environment Agency Guidance on Requirements for Land Contamination Reports

July 2005

ENVIRONMENT AGENCY GUIDANCE ON REQUIREMENTS FOR LAND CONTAMINATION REPORTS

Context

Who is this guidance aimed at?

Developers, consultants, local authority planning and environmental protection departments and anyone else involved in the preparation of land contamination reports for submission to the Environment Agency.

What is the aim of this guidance?

To inform the audience of the type of information that the Environment Agency requires in order to assess site investigation and remediation reports submitted for sites that have not, and are not likely to be, determined as contaminated land under Part IIA of the Environmental Protection Act 1990 (EPA90).

What issues does this guidance address?

The main issues of concern to the Environment Agency during the investigation and remediation of land affected by contamination, which are the protection of controlled waters (these include rivers, groundwater, ponds, streams canals, coastal waters and estuaries) and compliance with regulatory regimes enforced by the Environment Agency. If the proposals relate to development on a site designated as a special site under Part IIA of the EPA90, the Environment Agency may consider wider environmental issues and harm to human health when responding to the local planning authority (LPA) on the planning consultation. These issues are outside the scope of this guidance.

Why is this guidance required?

The Environment Agency receives many requests for its advice and comments on site investigation and remediation activities at sites affected by contamination. However, the technical reports submitted with these requests frequently either do not fully address potential pollution risks to controlled waters or do not contain sufficient information to demonstrate how the risks can be mitigated.

As most of the requests that the Environment Agency receives relate to redevelopment schemes, failure to provide adequate reports may result in significant delays in the planning process or planning permission being refused by the LPA. Any site that is not remediated to an appropriate standard may be inspected and subsequently determined by the local authority as contaminated land under Part IIA of the EPA90. The core policies and principles relating to the development of land affected by contamination in England are set out in Planning Policy Statement 23: Planning and Pollution Control.

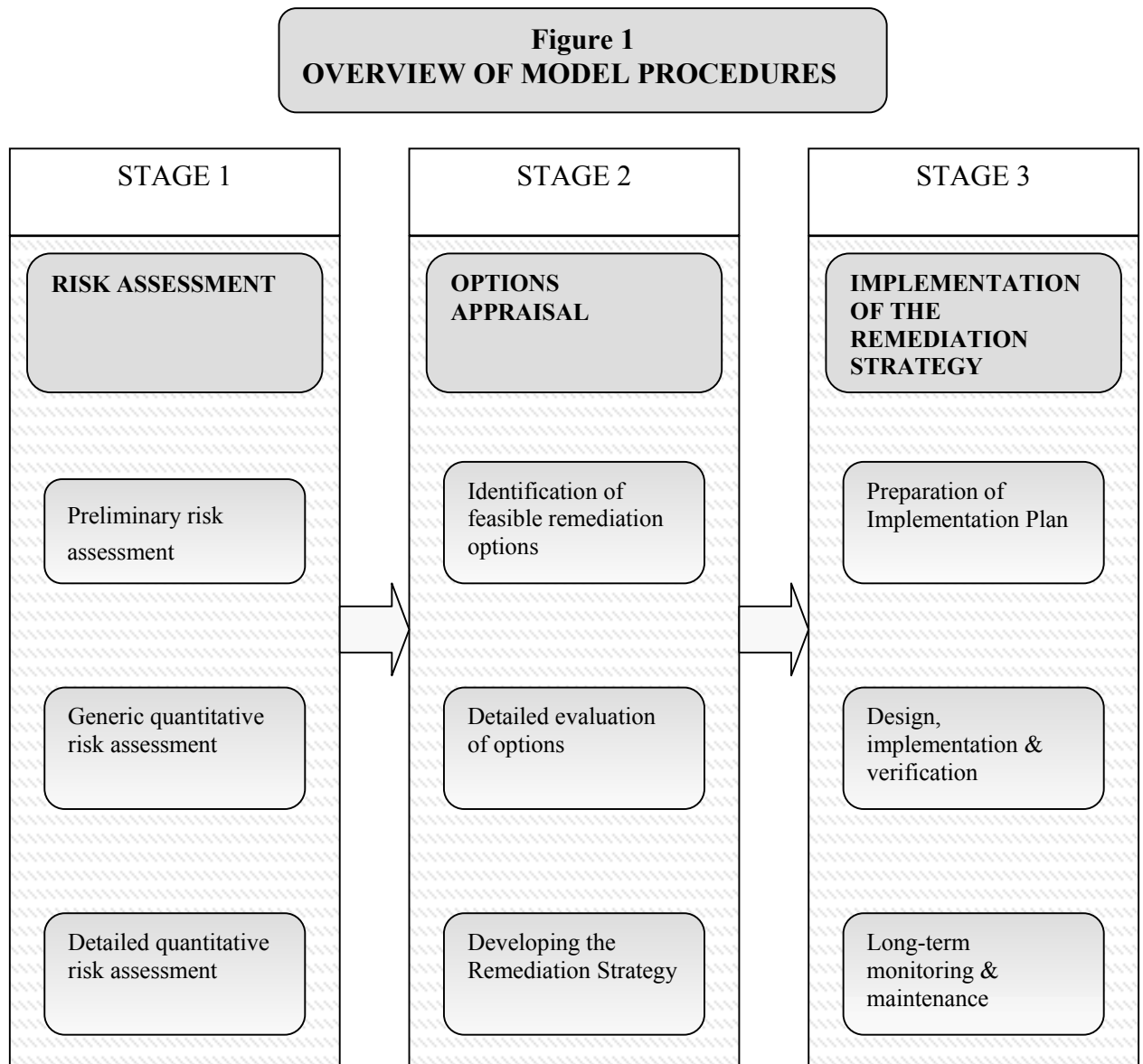
The Environment Agency's role in the remediation of land affected by contamination is explained in Appendix A.

How should this guidance be used?

This guidance is intended to reflect good practice. However, failure to submit information to the standard referred to in the checklists provided in Appendix B may result in reports being rejected or in requests for further information from the Environment Agency or the local authority.

Introduction

This guidance follows the risk-based framework adopted in the Model Procedures for the Management of Land Contamination (Environment Agency 2004). An overview of the framework is shown in Figure 1.



There are a number of questions that need to be answered in order to satisfy the Environment Agency that a site no longer presents an unacceptable risk of pollution to controlled waters. These questions, together with the corresponding key activity stages from the Model Procedures and checklists from Appendix B, are shown in Figure 2.

Figure 2
QUESTIONS THAT NEED TO BE ANSWERED TO SATISFY THE AGENCY'S REQUIREMENTS
WITH CORRESPONDING KEY ACTIVITY STAGES FROM THE MODEL PROCEDURES

QUESTION	KEY ACTIVITY STAGES
<p>Are contaminants suspected at the site and is there a potential risk of pollution to controlled waters?</p> <p>Yes</p> <p>No</p> <p>Environment Agency agrees that no further Agency involvement is required on contamination issues</p>	<p>1. RISK ASSESSMENT Preliminary Risk Assessment (CHECKLIST 1)</p>
<p>Have contaminants been identified at the site and potentially unacceptable risks to controlled waters confirmed?</p> <p>Yes</p> <p>No</p> <p>Environment Agency agrees that no further Agency involvement is required on contamination issues</p>	<p>1. RISK ASSESSMENT</p> <ul style="list-style-type: none"> - Generic Quantitative Risk Assessment - Detailed Quantitative Risk Assessment may also be required - (This stage includes main Site Investigation phase) (CHECKLIST 2)
<p>Can the site be remediated to the extent that all potentially unacceptable risks to controlled waters are completely removed?</p> <p>Yes</p> <p>No</p> <p>Agree alternative risk reduction or risk control actions with the Environment Agency</p> <p>Consult Environment Agency if advice is required on need for Agency regulated permits, licences etc.</p>	<p>2. OPTIONS APPRAISAL</p> <ul style="list-style-type: none"> - Identification of Feasible Remediation Options - Detailed Evaluation of Options - Developing the Remediation Strategy (CHECKLIST 3)
<p>Has the site been remediated to an acceptable standard?</p> <p>Yes</p> <p>No</p> <p>Environment Agency will advise the local authority (LA) that the site presents an unacceptable risk of pollution to controlled waters. LA will decide if the site should be determined as Part IIA contaminated land.</p>	<p>3. IMPLEMENTATION OF THE REMEDIATION STRATEGY</p> <ul style="list-style-type: none"> - Preparation of Implementation Plan (CHECKLIST 4) - Design & Implementation (CHECKLIST 5) (CHECKLIST 6)
<p>Agency agrees that the site no longer appears to present an unacceptable risk of pollution to controlled waters as appropriate risk management action has been taken to reduce or control the risk and site remediation is therefore complete.</p>	<p>3. IMPLEMENTATION OF THE REMEDIATION STRATEGY</p> <ul style="list-style-type: none"> - Verification (CHECKLIST 7) - Long-term Monitoring & Maintenance (CHECKLIST 8)

A brief description of each key activity stage (refer to the Model Procedures for further details) is provided below and checklists to help determine if the Environment Agency's reporting requirements have been met at each stage are provided in Appendix B.

STAGE 1- RISK ASSESSMENT

Risk assessment is an iterative process, which should be carried out within a tiered framework. Hence it may become necessary to revise assumptions made in the early stages of the assessment, as more information becomes available about the site (see Box 1).

Box 1 RISK ASSESSMENT	
Each tier of the risk assessment process should follow these four basic steps:	
1) Hazard Identification-	establishing contaminant sources
2) Hazard Assessment-	analysing the potential for unacceptable risks (what pathways and receptors could be present, what pollutant linkages could result and what the effects could be)
3) Risk Estimation-	predicting the magnitude and probability of the possible consequences (what degree of harm or pollution might result to what receptors and how likely it is) that may arise as a result of a hazard
4) Risk Evaluation-	deciding whether a risk is unacceptable

PRELIMINARY RISK ASSESSMENT

The purpose of the preliminary risk assessment is to develop an outline conceptual model (see Box 2) and establish whether or not there are any potentially unacceptable risks arising from contamination at the site. For the purposes of this guidance, the Environment Agency is concerned with the identification of potential risks to controlled waters.

The main activity at this stage is the collection of information required to identify all possible pollutant linkages at the site and prepare the outline conceptual model. This stage is often referred to as the 'desk study', although a site walkover survey may also be undertaken to verify data and obtain additional information such as anecdotal evidence from employees.

What happens next at the site will depend on the outcome of the preliminary risk assessment. Further action will be required if there are any gaps in information or potentially unacceptable risks are identified at the site. In some cases there may be sufficient information to be able to move straight to an appraisal of remediation

options. Alternatively, the Environment Agency may accept that no further action is required if the applicant is able to demonstrate that the site does not present an unacceptable risk of pollution to controlled waters.

Box 2 CONCEPTUAL MODEL
<p>The conceptual model is a representation of the understanding of the site and the surrounding environment including the geology, groundwater, surface water bodies, potential contamination, processes (e.g. volatilisation, leaching) acting on substances present and contaminant migration pathways. It should describe all potential pollutant linkages at the site, taking into account the current and proposed uses of the site.</p> <p>The conceptual model can be expressed in a visual, written or tabular format or, preferably, a combination of all three. The use of vertical cross-sections is recommended.</p> <p>For the purposes of this guidance, the conceptual model should concentrate on pollutant linkages that have controlled water features as the receptor.</p>

QUANTITATIVE RISK ASSESSMENT (INCLUDING SITE INVESTIGATION)

The purpose of the quantitative risk assessment is to:

- refine and update the conceptual model
- confirm pollutant linkages
- evaluate potentially unacceptable risks
- provide the basis for the Options Appraisal when unacceptable risks are identified at the site.

This stage should be undertaken when the preliminary risk assessment identifies potentially unacceptable risks at the site. In the context of this guidance, the Environment Agency is concerned with risks to controlled waters. It is anticipated that quantitative risk assessment will be required in most cases where contamination is known to be present or is suspected at the site, as a high degree of confidence in the preliminary risk assessment findings is usually required to demonstrate that any other outcome is acceptable.

Further information on the presence and extent of contaminants, pathways and receptors and other site characteristics required for the quantitative risk assessment may be gathered through intrusive site investigations. When commissioning laboratories and reporting on the results of chemical analyses, soils testing should be undertaken in accordance with the MCERTS performance standard (see Box 3).

The conceptual model should be refined and pollutant linkages confirmed as a result of the site investigations. The risks associated with those linkages should then be evaluated using either generic or site-specific assessment criteria, or a combination of both. The recommended approach for assessing risks to controlled waters (see Box 4)

is that a target concentration (see Box 5) is set for an appropriate compliance point and site derived concentrations should not exceed that concentration.

Box 3
MCERTS

The Environment Agency has established the Monitoring Certification Scheme (MCERTS) to improve the quality of monitoring data. The MCERTS Performance Standard for Laboratories Undertaking Chemical Testing of Soil provides an application of the European and international standard, BS EN ISO/IEC 17025:2000, specifically for the chemical testing of soil.

Accreditation to the MCERTS performance standard for soils is required where laboratory soil test results are submitted to the Environment Agency for regulatory purposes. The Environment Agency strongly encourages the use of the MCERTS standard where reports are submitted on a voluntary basis or for planning purposes, including site investigation, verification of remediation and long-term monitoring activities.

Further details on MCERTS are available on the Environment Agency's website.

Box 4
REMEDIAL TARGETS METHODOLOGY

The Environment Agency recommends that risk assessments for pollution of controlled waters from ground contamination should be undertaken in accordance with the tiered framework set out in the Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources (R&D P20 Environment Agency, 1999).

Box 5
SELECTION OF TARGET CONCENTRATIONS

When undertaking a risk assessment to determine if pollution of controlled waters has occurred, or is likely to occur, site derived values are usually compared to a target concentration set for an appropriate compliance point. The target concentration is normally set at a relevant water quality standard, the choice of which should be based on the following hierarchy:

- 1) Natural background levels
- 2) UK water quality standards
- 3) Water quality standards set by the European Commission.

For some contaminants no relevant standards may exist. In these cases separate toxicological or ecotoxicological risk assessment may be required to derive an appropriate target concentration.

Reference may be made to other international water quality standards or reports produced by authoritative organisations if their use can be justified in the UK context.

STAGE 2- OPTIONS APPRAISAL

The aim of the Options Appraisal stage is to establish which remediation option, or combination of options, provides the best approach to remediating all pollutant linkages that present an unacceptable risk at the site. The Environment Agency's main concerns at this stage will be to ensure that:

- remediation criteria selected for the site are protective of controlled waters
- appropriate remediation options have been selected for each relevant pollutant linkage (see Box 6)
- the Remediation Strategy addresses all relevant pollutant linkages
- the requirement for waste management licences, environmental permits, discharge consents etc. is taken into account at an early stage when deciding how to remediate the site.

Box 6 RELEVANT POLLUTANT LINKAGE
A relevant pollutant linkage is one that has been identified during the risk assessment stage as representing unacceptable risks to human health or the environment. For the purposes of this guidance, relevant pollutant linkages are taken to be only those that represent an unacceptable risk of pollution to controlled waters.

IDENTIFICATION OF FEASIBLE REMEDIATION OPTIONS

Site-specific remediation objectives should be identified and remediation criteria for measuring compliance against these objectives should be derived at this stage. The Environment Agency recommends that remediation criteria for controlled waters should be derived in accordance with the Remedial Targets Methodology (see Box 4). A short-list of feasible remediation options, i.e. options that are capable of achieving the remediation criteria derived for the site given site-specific constraints, should then be identified and be taken forward for detailed evaluation.

DETAILED EVALUATION OF OPTIONS

A review of the short-listed remediation options should be undertaken to determine which are the most appropriate for addressing each relevant pollutant linkage. Detailed information on the technical attributes of each option will be required for the review and evaluation criteria will need to be developed for assessing the relative merits of each option. Proposals for combining options should be included where more than one option is required.

An assessment of likely regulatory requirements and feasibility of obtaining the appropriate environmental licences, permits etc. within the required timescale should form part of the evaluation. The evaluation should also take account of Best Practicable Environmental Option (see Box 7), cost benefit, environmental outcomes and appropriate timescales for remediation.

<p>Box 7 BEST PRACTICABLE ENVIRONMENTAL OPTION (BPEO)</p>
<p>The BPEO procedure establishes the waste management option, or mix of options, that provides the most benefit or the least damage to the environment, at acceptable cost, in the long-term as well as the short-term.</p>

DEVELOPING THE REMEDIATION STRATEGY

The Remediation Strategy sets out how the remediation options selected for each relevant pollutant linkage, or combination of options, will be put into place at the site. It should provide a clear picture of how relevant pollutant linkages will be remediated and the remedial works verified. Practical issues such as zoning and phasing of remediation and proposals for obtaining the appropriate environmental licences, permits etc. should be addressed within the Remediation Strategy.

STAGE 3- IMPLEMENTATION OF THE REMEDIATION STRATEGY

The main aims of the implementation stage are to ensure that the remedial works deliver the site remediation criteria without causing harm to the environment and that there is an accurate and permanent record of the works.

PREPARATION OF IMPLEMENTATION PLAN

The Implementation Plan translates the Remediation Strategy into a clear set of remediation activities for the site. It should set out all aspects of the design, preparation, implementation, verification and long-term monitoring and maintenance of the remediation. The Implementation Plan should be capable of demonstrating to the Environment Agency that:

- site remediation criteria derived for relevant pollutant linkages will be achieved
- appropriate environmental permits, licences etc. have been, or will be, obtained
- the remediation activities will be protective of controlled waters
- measures will be taken to mitigate potential impacts on controlled waters that may arise if there are significant variations from the Remediation Strategy.

DESIGN, IMPLEMENTATION AND VERIFICATION

The detailed designs for the remediation activities are unlikely to be of direct interest to the Environment Agency. The Environment Agency's main concern at this stage will be that to ensure that the site remediation is completed in accordance with the Remediation Strategy.

Once the detailed remediation design is complete, a **Verification Plan** should be prepared detailing the data gathering requirements necessary to demonstrate that the remediation meets the site remediation criteria.

A **Monitoring and Maintenance Plan** will also be required if the remediation is to include permanent structures that require maintenance or if there will be a need for monitoring to demonstrate the continuing effectiveness of the site remediation following substantial completion of the site works.

Once the site remediation is complete, a **Verification Report** will be required to demonstrate that the agreed site remediation criteria have been achieved. This report should provide a full record of all remediation activities carried out at the site and data collected in accordance with the requirements of the Verification Plan. In some cases the Environment Agency may require reports on the verification works to be phased in order to monitor progress. This would be an additional reporting requirement and would not replace the need for a final completed version of the report.

Details of all groundwater and surface water monitoring undertaken prior to, during and post-completion of the site works should be submitted to the Environment Agency at appropriate stages within the reporting process.

LONG-TERM MONITORING AND MAINTENANCE

Long-term monitoring and/ or maintenance will only be necessary if a Monitoring and Maintenance Plan was prepared for the site. **Maintenance Reports** will not be of direct interest to the Environment Agency, unless they can be related to exceptional results in the long-term monitoring programme. However, the Environment Agency may need to review **Monitoring Reports** until the end point for the long-term site-monitoring programme has been achieved.

Useful References

Guidance

- British Standards Institution (2001) Investigation of Potentially Contaminated Sites, Code of Practice, BS: 10175.
- Construction Industry Research and Information Association (1995-1998) Special Publications 101-112, Remedial Treatment for Contaminated Land, Volumes I to XII.
- Department of the Environment (1997) A Quality Approach for Contaminated Land Consultancy, Environmental Industries Commission in Association with the Laboratory of the Government Chemist (CLR 12).
- Department of the Environment (1994) CLR Report No.4: Sampling Strategies for Contaminated Land.
- Department of the Environment (1994) Industry Profiles
- Department of the Environment, Food and Rural Affairs and Environment Agency (2002) Potential Contaminants for the Assessment of Land (CLR 8)
- Department of the Environment, Transport and the Regions (2000) Guidelines for Environmental Risk Assessment & Management, Revised Departmental Guidance.
- Environment Agency (2004) Environment Agency Policy Number 307_03 on Chemical Test Data on Contaminated Soils -Qualification Requirements.
- Environment Agency (2004) Model Procedures for the Management of Land Contamination (CLR 11).
- Environment Agency (2003) Environment Agency Policy Number 230_03 on Provision of Agency Advice and Involvement with the Voluntary Remediation of Historically Contaminated Sites.
- Environment Agency (2003) Guidance on the Application of Waste Management Licensing to Remediation.
- Environment Agency (2002) Environment Agency Technical Advice to Third Parties on Pollution of Controlled Waters for Part IIA EPA 1990.
- Environment Agency (2000) Guidance on the Selection of Non-Intrusive Techniques for Groundwater Pollution Studies, R&D Technical Report P404.
- Environment Agency (2000) Technical Aspects of Site Investigation (Volumes I and II) R&D Technical Report P5-065/TR.
- Environment Agency (2000) Secondary Model Procedure for the Development of Appropriate Soil Sampling Strategies for Land Contamination, R&D Technical Report P5 066/TR.
- Environment Agency and National House Building Council (2000) Guidance for the Safe Development of Housing on Land Affected by Contamination, R&D Publication 66.
- Environment Agency (1999) Methodology for the Derivation of Remedial targets for Soil and Groundwater to Protect Water Resources, R&D Technical Report P20.
- Environment Agency (1999) Guidelines and Protocols for Investigation to Assess Site Specific Groundwater Vulnerability, R&D Technical Report P308.
- Environment Agency (1998) Review of LNAPL Monitoring Techniques, R&D P148.

- National Assembly for Wales (2002) Planning Policy Wales: Chapter 13 Minimising and Managing Environmental Risks and Pollution.
- Office of the Deputy Prime Minister (2004) Planning Policy Statement 23: Planning and Pollution Control.
- WRc (1995) Soil Water and Groundwater Sampling.

The Model Procedures for the Management of Land Contamination (CLR 11) contain a comprehensive list of references on a wider range of issues than are addressed in this guidance.

Websites

- These websites contain many useful references:
- British Standards Online at www.bsi-global.com
- Construction Industry and Research and Information Association contaminated land website at www.contaminated-land.org
- DEFRA website at www.defra.gov.uk
- Environment Agency website at www.environment-agency.gov.uk

APPENDIX A

The Environment Agency's Role in the Remediation of Land Affected by Contamination

The Environment Agency aims to influence the remediation of land affected by contamination where this is being undertaken either through the Town and Country Planning regime or on a voluntary basis. The Environment Agency considers that sites have been brought back into beneficial use when it agrees that remediation has been undertaken and verified as complete, or where risks have been assessed and no further remedial action is required. Applicants are therefore encouraged to submit Verification Reports to demonstrate that remediation schemes have been completed.

The Environment Agency can agree that a site appears to no longer present an unacceptable risk of pollution to controlled waters, based on the information supplied by the applicant. However, it cannot 'sign-off' remediation schemes at sites affected by contamination. Where development is proposed, the developer is responsible for ensuring that development is safe and suitable for use for the purpose for which it is intended.

The main statutory and non-statutory drivers for the Environment Agency's involvement with the remediation of land affected by contamination are set out below.

1) Town and Country Planning

The Environment Agency is a consultee in England and Wales under the Town and Country Planning regime on matters for which it has regulatory responsibility, including the protection of controlled waters, flood defence and waste management issues. LPA's are advised in national planning policy to consult the Environment Agency when considering proposals for development on land that may be affected by contamination.

The Environment Agency may make recommendations to the LPA for site investigation, risk assessment and remedial works required to address contamination before development commences. The LPA may consult the Environment Agency on work required to discharge planning conditions. There could be other issues that the Environment Agency may advise the LPA on for contaminated sites, e.g. flood defence, water resources, ecology, that are not addressed here.

The responsibility for granting planning permission and ensuring compliance with planning conditions and obligations lies with the LPA. The Environment Agency may use its role as a planning consultee to provide the LPA with advice but it cannot take on the regulatory role of the LPA.

2) Part IIA

The local authority is the primary enforcing authority for the Part IIA EPA90 Contaminated Land regime. The Environment Agency's role under Part IIA is to provide the local authority with advice and guidance and act as the enforcing authority for any contaminated land that is subsequently designated as a special site under the Contaminated Land Regulations (England) 2000/ (Wales) 2001. The Environment Agency will also inspect potential special sites when requested by the local authority. The specific activities that the Environment Agency must undertake when supporting local authorities in regulating contaminated land, or acting as the enforcing authority for special sites, are described in DETR Contaminated Land Circular 02/2000.

When development is proposed on contaminated land, the development proposals will need to take account of the contents of the contaminated land determination and any remediation notices, statements or declarations issued for the site. If the proposals relate to development on a special site, the Environment Agency may consider wider environmental issues and harm to human health when responding to the LPA on the planning consultation.

3) Voluntary Remediation

The Environment Agency receives many requests from third parties for advice and comments on sites where it appears that remediation is being undertaken on a voluntary basis, i.e. before any involvement with the LPA or outside of any statutory regime. The Environment Agency is not obliged to provide site-specific advice for every site that it is consulted on and will therefore concentrate its resources on those sites that it considers present the greatest pollution risk to controlled waters. Voluntary schemes are more likely to be considered by the Environment Agency if they are submitted with reports that meet the reporting requirements set out in this guidance.

Although the Environment Agency is committed to supporting voluntary remediation, it must ensure that its involvement with remediation schemes is in line with the requirements of the appropriate legislation. Hence, if a site should be addressed under the Town and Country Planning regime, the Environment Agency will advise the LPA under the planning consultation process. If the planning regime does not apply and the local authority is of the opinion that the site may meet the definition of contaminated land in Part IIA of the EPA90, the Environment Agency will refer the inquirer to the local authority in the first instance for further advice. This will enable the local authority to consider the site under its inspection strategy and decide if it should inspect the site as potentially contaminated land.

The Environment Agency is an open and transparent organisation with a responsibility to provide information under the Freedom of Information Act 2000 and the associated Environmental Information Regulations 2004. It does not intend, therefore, to withhold from the public information that it receives on voluntary remediation schemes.

4) Regulation of Remediation Activities

Remediation activities at contaminated sites are subject to various legislative controls. The Environment Agency can advise third parties on the need for environmental permits, authorisations, licences or consents for regulatory regimes where it is the enforcing authority. Notably, remediation activities on contaminated site may fall within the definition of a waste disposal or recovery operation and hence become subject to the requirements of the Waste Management Licensing regime.

APPENDIX B

Reporting Requirements

Checklists provided in this Appendix

MODEL PROCEDURES KEY ACTIVITY STAGE	CHECKLIST	REPORTING REQUIREMENTS FOR:
1. Risk Assessment	Checklist 1	Preliminary Risk Assessment
	Checklist 2	Quantitative Risk Assessment (including Site Investigation)
2. Options Appraisal	Checklist 3	Combined Options Appraisal
3. Implementation of the Remediation Strategy	Checklist 4	Implementation Plan
	Checklist 5	Verification Plan
	Checklist 6	Monitoring & Maintenance Plan
	Checklist 7	Verification Report
	Checklist 8	Monitoring Reports

The Environment Agency recommends that the checklists are completed, signed, dated and submitted to the Environment Agency together with the relevant reports, in order to demonstrate that the reports have been checked recently and by an appropriately qualified person. Evidence of professional qualifications and experience may be requested.

General Comments

A preliminary risk assessment must be submitted as a minimum in all cases. The reporting stages that should then be completed for each site will depend on the outcome of the preliminary risk assessment and progression through the questions posed in Figure 2.

The local authority should be consulted concerning its own requirements and risks to receptors other than controlled waters. Guidance on these and other issues, e.g. management considerations, that are not of direct concern to the Environment Agency and hence not addressed in the following checklists, is provided in the Model Procedures.

The reporting requirements provided in the checklists represent good practice but are not exhaustive. Depending on site-specific factors, further work and reporting may be required. Comment boxes are provided beneath the checklists for additional comments and explanation for failure to meet any of the reporting requirements, e.g. because they are not applicable in the individual circumstances at a site.

All reports should be prepared by suitably qualified professionals and should contain evidence of their credentials. The reports should be submitted in hard copy and if possible, a CD-ROM or disk containing complete reports and CAD plans should also be supplied.

Combining Reports

Repetition can be minimised if reports are combined or cross-referenced properly. In particular, the site investigation and quantitative risk assessment reports should be combined or submitted together, as the Environment Agency will not assess the site investigation report without a risk assessment to explain the significance of the investigation findings. Both factual and interpretative reports should be supplied.

Reporting requirements for all three elements of the Options Appraisal are combined in to one checklist as it is anticipated that they will be included in one submission to the Environment Agency in most cases. If the Remediation Strategy is submitted separately, it should clearly cross-reference or summarise the findings of the earlier Options Appraisal reports.

The Verification and Monitoring and Maintenance Plans may be submitted as part of, or appendices to, the Implementation Plan.

CHECKLIST 1

Preliminary risk assessment reporting requirements:	
Contents:	Provided?
Report objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site area in hectares	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of site and surroundings	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of desk study researches undertaken	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Information on past and current activities at the site	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of intended future use of the site	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Unique references for all relevant planning applications or permissions at the site	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Historical Ordnance Survey maps* and site plans* and if available, aerial photographs	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Environmental setting including: <ul style="list-style-type: none"> • superficial deposits and solid geology • hydrology • hydrogeology (including the interaction between all relevant shallow and deep groundwaters and how they flow to potential receptors) • location and status of relevant surface water and groundwater receptors, including all abstracted uses and natural discharge such as springs, river baseflow and wetlands. 	Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/>
Information on site drainage and other man- made potential pollutant pathways, e.g. underground services	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Identification of potential contaminants of concern and source areas	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Consultations with the local authority	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Consultations with the Environment Agency	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Consultations with other appropriate bodies	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Review and summary of previous reports, with report references	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Outline conceptual model with nature and location of controlled waters receptors clearly identified	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of possible pollutant linkages for controlled waters	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Identification of potentially unacceptable risks to controlled waters, including criteria used to identify those risks	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Discussion of uncertainties and gaps in information	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description and justification of next steps proposed at the site, e.g. carry out site investigation and quantitative risk assessment	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans and historical maps extracts must be large scale, to scale, with a north point, and clearly show the site boundary.	

CHECKLIST 2

Quantitative risk assessment (including site investigation) reporting requirements:	
Contents:	Provided?
Report objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Review and summary of previous reports, with report references	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Outline conceptual model with nature and location of controlled water features clearly identified	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Results of preliminary risk assessment	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of any preparatory enabling works e.g. moving mounds of waste, breaking out concrete	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site investigation:	
Investigation objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Summary of work done	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site investigation strategy, including: <ul style="list-style-type: none"> • rationale for investigation • methods used for forming exploratory holes e.g. boreholes, trial pits, window samples • details of any borehole sampling undertaken • methods used for collecting, preserving and transporting samples to the analytical laboratory 	Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site sampling strategy, including: <ul style="list-style-type: none"> • rationale for strategy • description and explanation of monitoring programmes for groundwater and, if encountered, surface waters (upstream and downstream conditions should be represented) • monitoring and sampling locations, depths (metres below ground and AOD) and frequencies 	Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/>
Analytical strategy, including: <ul style="list-style-type: none"> • rationale for selection of analytical parameters • selection of samples for leachability testing • description of chemical analyses, in accordance with the MCERTS performance standard for soils • quality assurance and quality control requirements for laboratory analyses 	Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/>
Plan showing monitoring and sample point locations*	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of in- situ tests and geotechnical tests required to provide data for quantitative risk assessment	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of site works and on- site observations	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Measures undertaken to prevent pollution of controlled waters as a consequence of site investigation methods used	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Presentation and interpretation of investigation results, including: <ul style="list-style-type: none"> • description of ground conditions encountered at the site, including groundwater regime and surface water features • cross-sections showing site strata and shallow and deep groundwater levels • summary tables of chemical analyses, site monitoring and geotechnical test 	Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/> Yes <input type="checkbox"/> /No <input type="checkbox"/>

results	
• description of type, nature and spatial distribution of contamination, with plans where appropriate*	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• evaluation of site investigation results against the outline conceptual model	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Annexes containing:	
• exploratory hole logs including grid co-ordinates and ground elevation (logged by suitably qualified professionals)	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• construction details for monitoring boreholes or other type of monitoring installation e.g. response zone, method of sealing borehole annulus	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• monitoring results	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• groundwater levels	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• description of samples submitted for analysis	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• laboratory analytical reports, completed in accordance with the MCERTS performance standard for soils	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• chain of custody records	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Quantitative risk assessment:	
Risk assessment objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of proposed development	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Conceptual model, revised following site investigation, with nature and location of controlled waters receptors clearly identified	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Rationale for the chosen risk assessment approach and explanation for why it is valid for the site.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Discussion of relevant exposure scenarios	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Assessment criteria selected for the site, with justification for all criteria used	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of model, if used, and:	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• input parameters	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• safety factors	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• assumptions	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• any sensitivity analysis undertaken	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Calculation worksheets provided	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Constraints and limitations relating to data quality and risk assessment method	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Identification of pollutant linkages that present an unacceptable risk of pollution to controlled waters	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Discussion of uncertainties and their impact on the outcome of the risk assessment	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Results of risk estimation if detailed quantitative risk assessment is undertaken	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Evaluation of unacceptable risks to controlled waters taking into account both the current use of the site and details of the proposed development, e.g. foundation design, surface drainage and foul water disposal	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of evaluation method and criteria used	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description and justification of next steps proposed at the site, e.g. carry out Options Appraisal for pollutant linkages that present an unacceptable risk of pollution to controlled waters	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans must be large scale, to scale, with a north point, and clearly show the site boundary.	

CHECKLIST 3

Combined options appraisal reporting requirements:	
Contents:	Provided?
Report objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Review and summary of previous reports, with report references	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Summary of relevant pollutant linkages that require remediation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Statement and explanation of remediation objectives, i.e. what the remediation needs to achieve, for each relevant pollutant linkage	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Statement of remediation criteria against which compliance with remediation objectives for each relevant pollutant linkage can be measured	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Statement of overall site remediation criteria (these should always be protective of controlled waters) where they differ from the criteria derived for relevant pollutant linkages.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Identification of feasible remediation options:	
Summary of feasible remediation options identified for each relevant pollutant linkage, including general characteristics of those options and methods used for collecting information on them	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Short-list of feasible remediation options to be taken forward for more detailed consideration, including:	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• an assessment of their suitability for use at the site	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• reasons for selecting options on the short-list and rejecting others	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Detailed evaluation of remediation options:	
Evaluation of short-listed remediation options, including explanation of evaluation criteria used	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Identification of the most appropriate option for each relevant pollutant linkage and justification for its selection	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Reasons for rejecting other remediation options on the short-list	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Justification for any proposals to combine remediation options	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Remediation Strategy:	
Description of the Remediation Strategy, including:	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• technical and scientific basis of the strategy	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• requirement for preparatory works	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• effectiveness of combining remediation options, where required	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• proposed site zoning and phasing of remediation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• verification of remediation and monitoring requirements	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• constraints and limitations to remediation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• timescales required for remediation options to become fully effective	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• assessment of requirements for environmental permits, licences etc.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• expected durability of the proposed remediation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• measures to prevent pollution of controlled waters being caused by remediation activities at the site	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Justification for any changes required under the Remediation Strategy to remediation criteria derived for relevant pollutant linkages	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Summary of alternative remediation strategies considered	Yes <input type="checkbox"/> /No <input type="checkbox"/>

Justification for selection of the preferred Remediation Strategy	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of how the Remediation Strategy will deliver remediation criteria derived for all relevant pollutant linkages	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans must be large scale, to scale, with a north point, and clearly show the site boundary.	

Signed by:

Name & position:

Date:

Comments:

CHECKLIST 4

Implementation Plan reporting requirements:	
Contents:	Provided?
Report objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Review and summary of previous reports, with references	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of ground conditions at the site, including controlled water features	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Remediation objectives for each relevant pollutant linkage	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Remediation criteria for relevant pollutant linkages	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Overall site remediation criteria	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Remediation methodology, i.e. what is to be done by way of remediation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Phasing of the remediation works and approximate timescales for each phase	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site preparation and operational constraints	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site procedures for managing the remediation works in a manner that will not cause pollution of controlled waters	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Discussion of permitting requirements and proposals for obtaining the appropriate permits, e.g:	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• PPC permit	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• waste management site licence	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• exemption from waste management licensing	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• mobile plant licence	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• abstraction licence or consent	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• discharge consent	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• Groundwater Regulations authorisation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• flood defence consent	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• other permits	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of how any variations from the Implementation Plan that have the potential to impact on controlled waters (including any areas of unexpected contamination encountered) will be dealt with during the site works.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Construction details of proposed monitoring boreholes	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Cross-reference to the Verification Plan and, if required, Monitoring and Maintenance Plan for the site.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Plans* showing:	
• areas to be remediated	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• proposed locations and phasing of remediation works	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• areas to be used for stockpiling segregated contaminated and clean, site-derived and imported materials	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• location of areas to be remediated in relation to any proposed development	Yes <input type="checkbox"/> /No <input type="checkbox"/>
• proposed monitoring locations	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans must be large scale, to scale, with a north point, and clearly show the site boundary.	

CHECKLIST 6

Monitoring and Maintenance Plan reporting requirements:	
Contents:	Provided?
Report objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Scope and explanation of site monitoring (this is taken to include sampling for ease of reference) and/ or maintenance work required following completion of site works	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Statement and justification of end- point for the site monitoring programme	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Proposed monitoring assessment criteria and reasons for their selection	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Measures for ensuring that the required monitoring and/ or maintenance is undertaken	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Schedule of maintenance activities required to ensure that measures undertaken to remediate relevant pollutant linkages continue to be effective	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Schedule of monitoring required	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Construction details of monitoring boreholes or other type of monitoring installation	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Method of collecting, preserving and transporting samples to the analytical laboratory	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Type and suitability of monitoring equipment to be used	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Plans showing proposed monitoring point locations*	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of chemical analyses required, to be undertaken in accordance with the MCERTS performance standard for soils	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Laboratory quality assurance and control requirements	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans must be large scale, to scale, with a north point, and clearly show the site boundary.	

Signed by:

Name & position:

Date:

Comments:

CHECKLIST 7

Verification Report requirements:	
Contents:	Provided?
Verification work objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Review and summary of previous reports, with references	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of relevant pollutant linkages addressed	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of remedial works undertaken	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of and justification for any variations from the Verification Plan	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Results of verification, validation and performance testing specified in the Verification Plan and any subsequent variations	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Provision of laboratory analytical reports, completed in accordance with the MCERTS performance standard for soils.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Plans* showing remediated areas, indicating any variations from those shown in the Implementation Plan	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of permits, licences, authorisations and consents obtained for the site and evidence of compliance with them	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of reinstatement works, including methodology for decommissioning groundwater monitoring boreholes	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Description of the final condition of the site at completion	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Assessment of the potential impact of the site at final condition on controlled waters when put to the proposed end-use	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Details of any permanent installations required as part of the remedial works, that are to be left in place post- completion of site works	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Confirmation of post-completion monitoring and/ or maintenance requirements	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans must be large scale, to scale, with a north point, and clearly show the site boundary.	

CHECKLIST 8

Monitoring Report requirements:	
Contents:	Provided?
Report objectives	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site location map and National Grid Reference	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Site layout plans *	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Scope of site monitoring (this is taken to include sampling for ease of reference) and sampling activities required to ensure that remediation of relevant pollutant linkages continues to be effective and controlled waters continue to be protected	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Plans* showing monitoring point locations	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Schedule of monitoring activities undertaken since the previous report	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Schedule and results of chemical analyses	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Laboratory analytical reports, completed in accordance with the MCERTS performance standard for soils.	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Assessment of on-going compliance with remediation criteria	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Report on actions taken in response to exceptional monitoring results	Yes <input type="checkbox"/> /No <input type="checkbox"/>
Recommendations for future monitoring, including any variations required from the monitoring programme provided in the Monitoring and Maintenance Plan	Yes <input type="checkbox"/> /No <input type="checkbox"/>
* All plans must be large scale, to scale, with a north point, and clearly show the site boundary.	

Signed by:

Name & position:

Date:

Comments: