Ministry for the Environment
Manatū Mō Te Taiao

Contaminated Land Management Guidelines No. 1

Reporting on Contaminated Sites in New Zealand (2016 Revised Draft)

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New Zealand Government

Disclaimer

While every effort has been made to ensure that this guideline is as clear and accurate as possible, the Ministry for the Environment will not be held responsible for any action arising out of its use. This guideline should not be taken as providing a definitive statement for any particular user's circumstances. All users of this guideline should satisfy themselves, and their client(s) concerning the application of this guideline to their situation and in cases where there is uncertainty seek expert advice.

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Abbreviations

CLMG	Contaminated Land Management Guidelines
DSI	detailed site investigation
HAIL	Hazardous Activities and Industry List
LIM	land information memoranda
NES	Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011
OSMP	Ongoing site management plan
PID	Photoionization detector
PSI	preliminary site investigation
RAP	remedial action plan
RMA	Resource Management Act 1991
SMP	site management plan
SQEP	suitably qualified and experienced practitioner
SVR	site validation report
UPSS	underground petroleum storage system

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1 Introduction

1.1 Purpose

Contaminated Land Management Guidelines No. 1: Reporting on Contaminated Sites in New Zealand (the guideline) is incorporated by reference into the *Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011* (referred to hereafter as the NES). This guideline therefore has a regulatory role when reporting for NES purposes. As a consequence, the primary purpose of this document is to provide an overarching framework to guide contaminated land practitioners reporting on and preparing management plans for NES purposes.

The aim is to achieve a nationally-consistent approach which will help landowners, regulators and other interested parties understand or review contaminated land reports and management plans, completed for NES purposes.

This guideline is designed to be used in conjunction with other documents incorporated by reference into the NES, in particular, *Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils* (Ministry for the Environment, 2016).

Contaminated land investigations can have a variety of purposes, other than the requirements of the NES. For some investigations an owner, occupier or prospective owner or occupier may simply want background information on the site, or to benchmark contaminant concentrations with or without a risk assessment[1]. Alternatively, people may wish to establish the feasibility of a proposal. These are not regulatory purposes and quite commonly would not be submitted to a regulatory authority. However, many investigations do have a regulatory purpose, whether to apply for a resource consent under the Resource Management Act 1991 (RMA), fulfil a resource consent condition, satisfy a rule in a regional or district plan (these may include requirements for an ecological risk assessment which are outside the scope of the NES), or for another purpose under another piece of legislation.

This guideline is intended to provide information as recommended good practice which can be applied to all contaminated land reporting, both regulatory and non-regulatory. The readers of reports and plans written in accordance with this guideline should be able to:

- understand the report's or plan's purpose including the regulatory context (if any)
- understand the physical context and circumstances of the site
- understand the stated outcomes of the reports in the context of the site investigation works, or the remedial and management actions undertaken or proposed
- when relevant, assess compliance with regulatory requirements.

1.2 Scope

Contaminated land investigation, remediation and management are typically approached and reported on in a number of stages. Some site investigations require no more than one stage of reporting, while others involve multiple investigation reports, remediation proposals, and management plans. This guideline is not intended to provide all the detail that might be

[1] The risk assessment process is described in detail in Guideline No. 5. In summary, a risk assessment is the process of evaluating the *source-pathway-receptor* model to determine if a risk exists to human health or environmental receptors.

required on the most complex sites, but instead describes the various types of commonly required reports, their specific purposes and uses, and essential and optional contents. This guideline describes:

- the preliminary site investigation report (PSI)
- the detailed site investigation report (DSI)
- the remedial action plan (RAP)
- the site management plan (SMP) to control remediation or development earthworks
- the site validation report (SVR)
- the ongoing site management plan (OSMP) for ongoing management of a site.

1.3 Use of this guideline

This guideline is principally aimed at contaminated land practitioners who undertake the investigation of and reporting on contaminated land and regulatory authorities when they review reports prepared for a regulatory purpose. The overall content of the guideline should also help other stakeholders use or assess contaminated land reports.

The practitioner who is undertaking the reporting should have the relevant experience in the type of investigation being conducted, or should be working under the direction of such a person. If the investigation is being carried out to meet a regulatory requirement of the NES, a suitably qualified and experienced practitioner (SQEP) must certify the PSI or DSI report that is produced. Guidance on determining who is a SQEP is provided in the NES Users' Guide (Ministry for the Environment, 2012).

When reviewing a report or plan in a regulatory context the regulator may use this guideline to check that the contents are appropriate for the report or plan purpose. However, any reviewer must be able to call on relevant experience and judgement in assessing the adequacy of an investigation, its conclusions and any recommendations for further investigation, remediation or management for the particular site circumstances.

1.4 Other reporting requirements and guidelines

Additional reporting requirements may apply in certain cases, depending on the purpose of the report. Where land is subject to specific planning, building or zoning requirements related to the actual or likely presence of hazardous contaminants, additional information may be required. The appropriate council should be consulted for details.

Other documents which the practitioner and reviewer should have a good knowledge of if preparing and reviewing reports, include:

- *Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values* (Ministry for the Environment, 2011a)
- *Contaminated Land Management Guidelines No. 3: Risk Screening System* (Ministry for the Environment, 2004)
- *Contaminated Land Management Guidelines No. 4: Classification and Information Management Protocols* (Ministry for the Environment, 2006a)
- *Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils* (Ministry for the Environment, 2016) (referred to hereafter as Guideline No. 5)

- where the NES is involved, a good understanding of the regulations (available at http://www.legislation.govt.nz). For assistance with understanding the NES, refer to the *Users' Guide: National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health* (Ministry for the Environment, 2012).

If the site involves petroleum hydrocarbons, a good knowledge of the *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand* (Ministry for the Environment, 2011b) is necessary. This document is incorporated by reference into the NES, and consequently provides part of the regulatory framework under the NES for the removal of underground petroleum storage systems, or components of such systems.

When a human health risk assessment is involved it is helpful to understand the derivation and correct application of the soil contaminant standards contained in the *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health* (Ministry for the Environment, 2011d), which is also incorporated by reference into the NES.

There is also a series of older Ministry guidelines developed for the site investigation and assessment of specific industries, including:

- *Guidelines for Assessing and Managing Contaminated Gasworks Sites in New Zealand* (Ministry for the Environment, 1997)
- *Identifying, Investigating and Managing Risks Associated with Former Sheep-dip Sites: A Guide for Local Authorities (*Ministry for the Environment*, 2006b)*
- *Health and Environmental Guidelines for Selected Timber Treatment Chemicals* (Ministry of Health, 1997).

Although the soil guideline values contained in these documents have largely been superseded by the values in the *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health*, practitioners should be familiar with the useful information they contain on site characteristics and investigation methods. These documents are available from the Ministry for the Environment, and are listed on the Ministry's website: http://www.mfe.govt.nz/land/nes-assessing-and-managing-contaminants-soil-protect-human-health/about-nes.

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2 Investigating and reporting

2.1 General

The aim of any site investigation or assessment is to produce a report that can support a decision-making process for the investigation/assessment objectives (eg, is the piece of land suitable for the proposed activity?). Decisions made about the NES are associated with assessing and managing the actual or potential adverse effects of contaminants in soil on human health from regulated activities.[2] Typically this is achieved by developing and refining a conceptual site model (CSM) which describes the source-pathway-receptor linkages that exist at a site. The CSM should identify complete and potential pathways between the known or potential contaminant source(s) and the receptor(s). This is referred to internationally as the *pollutant linkage* or *source–pathway–receptor* model (Department for Environment, Food & Rural Affairs and Environment Agency, 2004), where:

- the source is the contaminant
- a pathway is a means by which a receptor can be exposed to, or potentially affected by, a contaminant
- a receptor is something that could be adversely affected by the contaminant (such as people, a water body, or an ecosystem).

Guideline No. 5 provides guidance on developing a CSM.

The NES includes specific investigation/assessment types to comply with NES-specific requirements. The investigation/assessment types relevant to this guideline are:

- the preliminary site investigation report (PSI) (refer section 2.2)
- the detailed site investigation report (DSI) (refer section 2.3)
- the site management plan (SMP) to control remedial or development earthworks (refer section 2.4)
- the remedial action plan (RAP) (refer section 2.5)
- the site validation report (SVR) (refer section 2.6)
- the ongoing site management plan (OSMP) for ongoing management of a site (refer section 2.7).

Site investigation/assessment for purposes other than NES requirements will generally follow the processes outlined in this guidance.

2.1.1 Reporting objectives

Determining the level of reporting needed requires an understanding of the investigation objectives, along with any regulatory requirements, because they will ultimately guide the level of assessment necessary. Section 2 of Guideline No. 5 provides detail about the development of investigation objectives.

Generally the most common objectives for site investigations are to determine whether there is a potential risk to human health or the environment and/or assess regulatory compliance (eg, against the human health requirements of the NES). Other objectives may relate to the

[2] Refer to the NES for the current list of regulated activities.

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future development of a site, or a landowner or prospective purchaser or occupier wanting to benchmark[3] site conditions for due diligence. The contaminated site practitioner needs to keep the project objectives in mind throughout the investigation works. These will inform each phase of the investigations to be undertaken and the subsequent level of reporting required.

2.1.2 Report organisation

Due to the variability in project objectives, a number of different types of reports may be necessary. A summary of the different reports that may be required for contaminated site investigations is provided in sections 2.2 to 2.7. The relationship of these reports to the regulations of the NES is summarised in table 1. Appendix B provides a separate discussion and example template for reporting associated with the removal of underground petroleum storage systems.

Over time a series of reports may be prepared for a site as more detail is required to adequately characterise and assess a site or to address a regulatory requirement. Where there is a sequence of reports, it is acceptable to append earlier reports to provide the background information, although the body of each report must adequately summarise the information necessary for each phase so it provides enough information to be clearly and readily understood by the reader. However, if a report is intended to be a standalone report (eg, summarising several phases of investigation), background information should be more extensive.

Where the report(s) being prepared will be used for a resource consent application, the information required by section 88 and the Fourth Schedule of the RMA may be included in the report or attached to it. More commonly, the report may form a supporting document to the application or assessment of environmental effects.

Table 1: Reporting requirements under the NES

Activity type	Consent type	PSI	DSI	Site management plan	Remediation action plan(1)	Site validation report
Determining if NES applies to the piece of land	Not applicable	✓(2)	✓(3)			
Removing or replacing fuel storage system(4), or sampling soil, or disturbing soil	Permitted					✓(4)
	Controlled Regulations 9(1)–9(2)		✓	✓(5)		
	Restricted discretionary Regulation 10		✓	✓(5)	✓	✓(5)
Subdividing or changing use	Permitted Regulation 8(4)	✓				
	Controlled Regulation 9(3)		✓			
	Restricted discretionary Regulation 10		✓	✓(5)	✓	✓(5)

[3] 'Benchmarking' is a term applied to the act of collecting and analysing selected samples for the purpose of broadly assessing a site, or part of a site, without necessarily carrying out a risk assessment. It is often required for environmental indemnity agreements.

Note: Report types may be combined (refer appendix A)

(1) Refers to matters listed in Regulation 10(3)(c)

(2) Refers to matters listed in Regulation 6(3)

(3) Refers to matters listed in Regulation 5(9)

(4) Refer to matters listed in Regulation 8(1) if removing or replacing a fuel storage system and Appendix B.

(5) Requirement for report at discretion of consent authority

2.1.3 Reporting good practice

When writing reports the practitioner must bear in mind their final audience(s) and their level of knowledge of contaminated land matters (they may not necessarily be the immediate client). If a report is poorly structured, has information missing or is hard to read, it risks being misunderstood, requiring clarification sought through peer review at the client's cost, or even rejected. Following some simple reporting good practices such as those outlined below will help avoid this.

- Try to keep sentences short, break long blocks of text into paragraphs, and use bulleted and numbered lists where appropriate.
- Provide sufficient explanation and contextual information to enable the report to be easily understood.
- Put complex or large amounts of supporting information into an appendix wherever possible and provide a summary of the information in the body of the report.
- Adequately summarise previous investigations undertaken and why the report sequence arose. Draw the various threads of the earlier reports together to provide the background and context for the current report.
- Avoid unnecessary repetition.
- Identify the data, information, facts and assumptions considered in forming any opinions.
- State the reasons for the opinions expressed.
- State that you have not omitted to consider material facts known to you that might alter or detract from the opinions expressed.
- If you believe that the investigation, or any part of it, might be incomplete or inaccurate without some qualification, state that qualification in the report.
- If you believe that your opinions are not firm or are based on insufficient research or data, or for any other reason, state this in the report.

2.1.4 Statement of qualification as a suitably qualified and experienced practitioner

The NES requires that a suitably qualified and experienced practitioner (SQEP) certify preliminary and detailed site investigation reports. The council has the discretion to decide who it considers is suitably qualified to prepare reports. To help the council decide if someone is a SQEP, a statement of the certifier's qualification as a SQEP is required for preliminary and detailed site investigation reports that are to be used for NES purposes (refer appendix A).

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2.2 Preliminary site investigation report

2.2.1 Purpose and context

A preliminary site investigation (PSI) involves gathering and compiling existing information about the nature and historical use of a site or part of a site so that a preliminary assessment of the site's contamination status can be made.

Generally, environmental samples are not collected and analysed during the PSI phase of works. However, some samples may be taken to provide initial quantitative information to inform the conceptual site model (or to assess future disposal options if the site is to be redeveloped). It should be noted that taking a few samples as part of a PSI may enable confirmation that a site is contaminated, but taking a few samples is **not** capable of demonstrating a site is not contaminated. To undertake a robust risk assessment, a DSI would need to be undertaken.

Under the NES, a PSI is required:

1. to establish whether or not the site is HAIL[4] or has been HAIL (it is more likely than not that an activity or industry described in the HAIL is being or has been undertaken on it) (Regulation 5(7) or 6(3))[5]
2. if the site is HAIL and the activity is a change of use or subdivision, to show the activity is permitted by demonstrating that it is highly unlikely that there will be a risk to human health in the particular circumstances of the site and proposed use or subdivision (Regulation 8(4)).

The NES Users Guide presents a number of examples (including a decision tree) for how the PSI can be used to assess the above situations. Given that the information obtained during any PSI is mainly qualitative, a conservative view of the possibility of risk must be taken. If it is unclear whether a potential human health risk may be present, then a DSI will generally be required to assess the risk.

2.2.2 content

The level of detail and the scope of preliminary site investigations will vary considerably between sites, depending on the amount of historical information available and the overall investigation objectives. The contents of a PSI report prepared for NES purposes are listed in appendix A1 (which covers determining if the NES applies) and appendix A2 (which covers 'subdivision' or 'change in use' consents as permitted activities). Section 3 in Guideline No. 5 provides guidance on adequately addressing the information requirements for a PSI. As general guidance, the amount of historical information required to be reviewed will depend on the quality and certainty of the information. Where there is less certainty, more information may need to be reviewed to build up an adequate weight of evidence.

[4] Refer to *Hazardous Activities and Industries List* (Ministry for the Environment, 2011c).

[5] Regulation 6(2) of the NES describes an alternate method to a PSI to establish whether or not a piece of land is HAIL.

2.3 Detailed site investigation report

2.3.1 Purpose and context

A detailed site investigation (DSI) involves the collection of field data and samples using intrusive (and possibly non-intrusive) techniques to identify, in a statistically robust manner, the nature of the contamination present on a site and delineate its extent.

Under the NES a DSI is required:

1. to establish whether or not the NES applies by demonstrating that any contaminants in or on the piece of land are at, or below, background concentrations (Regulation 5(9)); or
2. to establish if 'removing or replacing fuel storage system', 'sampling soil', 'disturbing soil', 'subdividing', and/or 'changing use' can be undertaken as a controlled activity (Regulation 9) or a restricted discretionary activity (Regulation 10).

2.3.2 Content

The level of detail and scope of a DSI will vary considerably between sites, depending on:

- the purpose of the investigation
- the amount of historical information available
- the conceptual site model (refer section 3 of Guideline No. 5)
- the complexity of the contamination.

The contents of a DSI report prepared for NES purposes are listed in appendices A3: DSI table of contents: Determining if NES applies; A4: DSI table of contents: Controlled activities; and A5: DSI table of contents: Restricted discretionary activities.

Guideline No. 5 provides guidance on adequately addressing the information requirements for a DSI. It is important to note that although Guideline No. 5 is concerned solely with the investigation and analysis of soil, the same general principles apply to the design, carrying out and reporting of investigations of other media such as air, groundwater or surface waters affected by contaminants.

To help readers understand the report, the laboratory results should be tabulated (relevant results only), and, where sufficiently complex, the results should be presented on site diagrams to show the spatial distribution of different contaminations and the degree of contamination.

2.4 Site management plan

2.4.1 Purpose and context

The key purpose of a site management plan (SMP) is to ensure that when undertaking works on contaminated sites potential risks to the following are adequately managed:

- the health of workers
- the on-site environment
- the off-site environment (including the health of neighbouring site users, where relevant).

The development of these types of plans is often a requirement of a resource consent, but could also be written for a permitted soil disturbance activity which, depending on the site size, may involve a considerable volume of soil. Such plans frequently detail any requirements

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for off-site disposal, including measures to avoid accidental spillage and actions to be taken in the event accidental spills occur.

There may be considerable overlap between remediation action plans (refer section 2.5) and SMPs. In less complex cases all the requirements of an SMP could be included in a remediation action plan (RAP), while in other cases, some of the normal contents of a RAP could be included in an SMP. It is important that the necessary designs, actions, procedures and controls are covered by one or the other.

Where a separate SMP is written, it commonly references, or may be completely incorporated within, other documents pertinent to the proposed works such as stormwater, sediment and erosion control plans.

2.4.2 Content

An SMP for a simple site can be a short, concise document. Often these documents are presented on one or more A3 sheets able to be displayed on a site noticeboard. More complex sites will usually have a longer, report-style SMP. Even if a report-style SMP is prepared, a shortened displayable document may be prepared for ease of reference by site users.

An example table of contents for a site management plan report is provided in appendix A6 and further explanation is provided below. This example could also be applied to an A3 poster or pamphlet-style SMP.

Typical contents to control minor excavation works will be:

a. a brief summary of the works to be undertaken with references to other relevant documents (eg, the DSI, the RAP, consents)

b. allocation of responsibilities, most importantly defining who is responsible for implementing and monitoring the controls detailed within the SMP for the entirety of the works covered by the SMP

c. document control information, such as version, date, who the SMP is to be issued to

d. a summary of the identified sources associated with the contaminants of concern

e. site control procedures, site access, locations and isolation of work areas, transport routes, location of clean areas, location of site facilities

f. health and safety protection measures, such as:
   - site induction procedures
   - personal protective equipment requirements
   - personal hygiene requirements
   - first aid and decontamination procedures

g. environmental management procedures:
   - to control soil and groundwater during excavation works, including siting and management of stockpiles
   - erosion, sediment and dust control procedures (typically referencing existing council guidance documents), with additional measures to take account of the presence of contaminants
   - noise controls

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h. monitoring, particularly in the case of airborne particulates such as contaminated dust or asbestos fibres, or discharges from remediation processes

i. soil disposal/testing requirements

j. unexpected discovery protocols, if not included in the RAP

k. a list of key contacts, including the site owner/manager, primary contractor, emergency services and regulatory agencies.

For some large or complex projects, it may be necessary to develop an overarching SMP with general controls and site-specific SMPs providing specific controls to manage different areas of the site or if the remediation works are undertaken in a phased manner.

2.5 Remediation action plan

2.5.1 Purpose and context

A remediation action plan (RAP) is used to plan remedial and management works to mitigate the risk posed by contaminants. Before developing a RAP, an analysis of remedial methods may be prepared to determine the most appropriate methodology (or methodologies) for the site. Such an analysis might be part of the RAP, to provide context to the proposed actions, but it might also be prepared as a separate remedial options report.

The purpose of a RAP is to document:

- the goals, objectives and strategies of remedial works
- the proposed remediation or management action to be undertaken on a site
- the associated health, safety and environmental controls at least in summary form (the more complex sites typically have a separate contaminated site management plan)
- the validation testing, monitoring or inspection proposed to demonstrate that the remediation was successful.

A RAP is the common terminology used to describe the matters listed under Regulation 10(3)(c) of the NES. Under the NES a RAP is required to describe:

- the remediation or management methods to address the risk posed by the contaminants to human health
- the timing of the remediation
- the standard of the remediation on completion
- the mitigation methods to address the risk posed by the contaminants to human health
- the mitigation measures for the piece of land, including the frequency and location of monitoring of specified contaminants.

Every contaminated site is unique and so different types and varying degrees of remediation may be carried out. Remedial action therefore has a broad definition to include any action that eliminates or sufficiently reduces the hazard (breaks or sufficiently reduces the source, pathway, receptor linkage). This remedial action may include:

- removing the contaminated soil or reducing the contaminant concentrations in the soil
- interrupting the exposure pathway, including barriers such as soil caps, concrete floors, or paved surfaces to prevent contact with soil, or membranes or ventilation systems protecting against vapour migration

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- removal of receptors or modifying their behaviour.

The removal of receptors is a management action considered in the ongoing site management plan section (section 2.7). Long-term management may be an adjunct to the other remedial methods, to deal with residual risk, or it may be included as part of the RAP.

The type of remediation proposed will depend on:

- the degree and extent of contamination present (as demonstrated in the DSI)
- the purpose of the remediation
- the current or proposed land use, and any redevelopment proposed (earthworks, paving, buildings, final exposed soil)
- available (and economic) remedial techniques.

2.5.2 Content

The scale and scope of a particular RAP will reflect the complexity of the site conditions and the remediation objectives or goals. For example, it may be appropriate in some instances to remove all contaminated soil, or it may be appropriate to simply cap the contamination *in-situ* and manage the remaining soils with an ongoing site management plan (refer section 2.7).

Requirements for the contents of a RAP completed for NES purposes are listed in appendix A7. Owing to the complexity of the remedial options that may be proposed, the author should use some discretion as to how much detail is required in each section of the RAP. It is recommended that when developing a RAP consideration is given to the potential requirement for resource consents other than those specified in the NES (eg, discharge permit).

Regardless of the proposed remediation, all reports should include the following information:

a. the context of the RAP, including the regulatory context as appropriate and a statement of remedial objectives

b. a site description and summary of the previous investigation/s undertaken (preferably with investigation reports appended or as a companion volume)

c. remediation or management goals that ensure the site will achieve the remedial objectives; in the case of a remediation to reduce human health risk, this will include reference to the risk assessment in the DSI and draw on the risk assessment techniques described in Guideline No. 5

d. a detailed remediation method strategy, including actions, procedures and plans to be implemented to achieve the desired remediation goals (ie, what are you going to do?); this may include, as relevant:

   - areas and depths of excavation
   - descriptions of procedures to test excavated areas and, as necessary, carry out additional excavation
   - locations of and methods for soil capping or encapsulation
   - methods of concentration reduction
   - off-site disposal (location, transport plan and any authorisations)
   - soil stockpiles and their management
   - recycling of materials (methods for recovery and recycling)

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- design of and installation methods for engineered barriers
- conceptual design and installation of ventilations systems

e. a mechanism for record keeping (eg, field notes including dates of the works, quantities of soil removed, soil disposal manifests) and development of specific drawings relevant to the remediation (eg, systematic and clear plans, detailed 'as-built plans')

f. a means for assessing the effectiveness of the remediation, which may involve:
   - the development of a statistically robust sampling and analysis plan for soil validation sampling, in the case of soil removal or concentration reduction
   - the requirements for inspection or monitoring, to demonstrate adequate barriers to exposure have been established

g. in the case where soil removal is required:
   - details of the sampling required to satisfy landfill or other disposal location requirements
   - the acceptance criteria for disposal locations
   - rules for determining which disposal option should be used for particular soil when options are available

h. unexpected contamination discovery protocols

i. in simple remediation projects, the environmental and human health safeguards required, or otherwise a reference to a site management plan (SMP) for more complex cases (for long-term management of risks relating to residual contamination on site see next section)

j. explanation of the necessary consents required by regulatory authorities to undertake remediation (and copies of the consents if already granted).

Supporting information should be appended (refer to appendix A7).

2.6 Site validation report

2.6.1 Purpose and context

The purpose of a site validation report (SVR) is to document the site conditions following some form of remediation on a site. In doing so, the SVR should demonstrate that the objectives outlined in the RAP have been achieved and, where contaminant concentration reduction was the aim, that the concentration targets have been met. The SVR may also demonstrate compliance with relevant district/regional rules or an applicable consent. Typically the SVR will be in the form of reporting test results and a risk assessment (a type of DSI) or inspection and monitoring results, or a combination of these. The SVR should also detail any variations from the proposed plan and the consequences of such variations.

In many situations the RAP will have been prepared as a resource consent requirement, and the SVR will be a follow-up requirement under that consent to demonstrate that the remedial actions have been carried out to plan, or otherwise an appropriate level of remediation has been undertaken. The preparation of an SVR is specifically mentioned in the restricted discretionary provisions of the NES (Regulation 10(3)(d)).

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2.6.2 Content

The scale and contents of an SVR will depend on the nature of the site and the proposed remedial goals. An example table of contents for a site validation report is provided in appendix A8 and further details are provided below. In general, the following information should be included in an SVR:

a. contextual information, including a summary of the project and intended site use, references to the RAP, the DSI and any consents, and the specific requirements of such consents relevant to the validation report

b. a summary of the remedial goals, including soil acceptance or other criteria relevant to the remedial works

c. a summary of remedial/management works undertaken, with any variations from that intended

d. details of the validation works undertaken (scope of work), including any variations from those intended

e. a summary of the validation sampling and/or inspection undertaken (sampling and analysis plan), associated laboratory or inspection results and site plans/photographs clearly showing where sampling was undertaken

f. as necessary, analysis of the testing results, including statistical analysis, to demonstrate that the risk to human health or the environment is as intended or is otherwise acceptable

g. details of any testing undertaken or certifications obtained for engineered-type remediation solutions (eg, for the installation of liners)

h. documentary evidence to show that any disposal of contaminated material off site has been done in accordance with the RAP or SMP, and the requirements of the disposal site and the relevant local authority

i. an assessment of the effectiveness of the remediation against the goals set, and whether long-term management controls or monitoring should be implemented.

Supporting information should be appended (refer to appendix A8).

Typically, but not always, site validation investigations will involve soil sampling (a form of DSI) to demonstrate compliance with the remedial goals. In these instances, the investigation and reporting requirements will follow the same principles outlined for a DSI in Guideline No. 5.

In some instances, remediation targets may not be achieved immediately and several stages of remediation and validation may be necessary.

As necessary, the site validation report should include confirmation that all the requirements of the consenting authority (or authorities) or other regulatory requirements have been met.

2.7 Ongoing site management plan

2.7.1 Purpose and context

The purpose of an ongoing site management plan (OSMP) is to control future activities on sites where contamination has been identified but does not require remedial action (simple management being sufficient), or for sites that have been remediated in some way, but residual contamination requires management.

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An OSMP may arise from an NES or other consenting condition. However, an OSMP is also appropriate for a site where contamination has been discovered but no change of use or any other regulated activity is to occur; the site owner or management simply wants to ensure the contamination remains under control into the future.

Controls in an OSMP are typically to ensure future soil disturbance or disposal work as may be required for maintenance or minor development activities is carried out in such a way as to avoid:

- exposing workers or site occupants to contaminated soil or groundwater
- spreading contaminated soil, groundwater or other contaminated media
- inappropriate disposal of contaminated soil or groundwater.

However, an ongoing site management plan is not generally intended to control future major redevelopment works or soil disturbance, as these would typically be the subject of NES consenting requirements, with associated consent conditions and management plans specific to the works. Departure from the activities managed by the OSMP may require additional consent, a revised SMP and/or a revised OSMP.

In addition to controlling minor future soil disturbance or disposal, an OSMP may specify long-term monitoring of remedial measures such as inspecting and, as necessary, maintaining the condition of barriers or membranes, monitoring vapours in the ground or indoor atmosphere, and monitoring ground or surface water. Monitored natural attenuation of soil or groundwater is a special case where regular monitoring is part of the remediation process.

For an OSMP to be effective, there must be a designated person or organisation responsible for the ongoing implementation of the plan and its controls. Unless there is a body corporate (or similar) overseeing whether the plan is followed, appropriate consideration should be given to the effectiveness of implementation on a residential site, where multiple owners or tenants may be present. For sites where there is some form of overseeing entity (eg, a landlord, corporate owner or occupier, or community organisation), an OSMP can conveniently reside with other site documentation such as maintenance and operations manuals, and health and safety plans.

2.7.2 Content

OSMPs can be presented in a variety of formats, which typically range from a report to an A3 poster or pamphlet-style template. The adopted template and the contents of an OSMP will depend on the extent and nature of the residual contamination, and therefore the scale of risks that need to be managed.

An example table of contents for an OSMP is provided in appendix A9. The author of the OSMP needs to develop the document in a way that is easy to follow for the end user. Regardless of the template adopted, they should include the following site-specific information:

a. contextual information, including the reason for the plan and the nature of the residual contamination, with test results and diagrams as appropriate

b. allocation of responsibilities

c. document control

d. the regulatory context, including NES requirements for soil disturbance and disposal, and any district or regional planning requirements regarding soil disturbance

e. a summary of the identified sources associated with the contaminants of concern

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f. site control procedures, site access, locations and isolation of work areas, transport routes, location of clean areas, location of site facilities

g. health and safety protection measures, such as:
   - site induction procedures
   - personal protective equipment requirements
   - personal hygiene requirements
   - first aid and decontamination procedures

h. environmental management procedures:
   - to control soil and groundwater during excavation works, including siting and management of temporary stockpiles
   - erosion, sediment and dust control procedures (typically referencing existing council guidance documents for small earthworks, with additional measures to take account of the presence of contaminants)
   - noise controls

i. any monitoring required during excavation works

j. soil disposal/testing requirements

k. unexpected discovery protocols

l. a list of key contacts, including the site owner/manager, primary contractor, emergency services, and regulatory agencies.

In the case of OSMPs containing monitoring requirements, the contents will include:

a. monitoring locations, what is to be monitored, monitoring methods and analysis or inspection requirements (the monitoring plan)

b. trigger values or conditions requiring action

c. action to be taken in the event of a non-complying value or condition

d. reporting requirements.

Supporting information should be appended (refer to appendix A9).

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Appendix A: Tables of contents for reports and plans

Purpose and approach

The following tables of contents (TOCs) provide a guide for reporting on contaminated land investigations. They aim to provide greater uniformity of the type of information included in reports, while allowing flexibility on the level of detail provided relative to the investigation objectives (refer section 2.1 of Guideline No. 5) and the complexity and purpose of the investigation. It is not intended to require identical reporting from practitioners or force a certain style.

Because this guideline is incorporated by reference into the NES there is a focus on the NES requirements. Where reporting is being completed for NES purposes, the TOCs in this appendix list the minimum requirements for a report if it is to be completed in accordance with the NES. Where reporting is not being completed for NES purposes, the TOCs provide suggestions for various reporting situations. A suitably qualified and experienced practitioner can guide you on the particular requirements for reports on non-NES investigations.

Regardless of whether the report is being completed for NES purposes or not, an investigation report needs to communicate any uncertainty and levels of confidence in the assessment. It is recommended that a report includes, in a transparent way:

- the information relied upon to make conclusions (eg, laboratory reports);
- the limitations of the investigation (eg, the physical extent of the investigation) and how this may affect the report's conclusion; and
- any assumptions and/or uncertainties used to reach the report's conclusion (e.g. the layout and physical design of the proposed future development on the site) and how these may affect the report's conclusion.

The order in which sections are presented will vary depending on the context. However, the order provided below is recommended as providing a general framework for most situations. Similarly, the headings given are suggested as appropriate for many reports, but should be varied as appropriate.

Examples are provided for the six reports described in section 2; specifically:

- a preliminary site investigation report for:
  - determining if the NES applies
  - a 'subdivision' or 'change in use' as a permitted activity
- a detailed site investigation report for:
  - determining if the NES applies
  - controlled activities
  - restricted discretionary activities
- a site management plan
- a remediation action plan
- a site validation report
- an ongoing management plan.

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A1: PSI table of contents: Determining if the NES applies

Content	Required	Required if relied on[6]	CLMG 5 section
1. Introduction			
• investigation objectives	☐		2.1
• site identification (site name, address, legal description; site boundaries; a map reference and geographic co-ordinates)	☐		3.2.1
• proposed site use		☐	3.2.2
2. Site description			
• environmental setting		☐	3.2.3
• site layout	☐		3.2.4
• current site uses	☐		3.2.5
• surrounding uses	☐		3.2.6
• geophysical surveys		☐	5.4
• site inspection		☐	3.2.8
3. Historical site use			3.2.7
• summary of site history gained from:	☐		
- review of existing investigation reports		☐	
- review of council information		☐	
- review of aerial photographs		☐	
- interviews		☐	
- review of other historical Information		☐	
5. Risk assessment			3
• evaluate the probability that pursuant to Regulation 6 (3):	☐		
- *an activity or industry described in the HAIL is, or is not, being undertaken on the piece of land, or*			
- *an activity or industry described in the HAIL has, or has not, been undertaken on the piece of land, or*			
- *the likelihood of an activity or industry described in the HAIL being undertaken, or having been undertaken, on the piece of land*			
• description of the limitations of the data collected, and the assumptions and uncertainties inherent in the data and models used	☐		
6. Conclusions	☐		
7. Recommendations (if relevant to report purpose)		☐	
8. Report limitations	☐		
9. SQEP certification of report	☐		
10. References	☐		
Appendices: relevant supporting information	☐		

[6] Any evidence relied upon to form an opinion/conclusion must be included in report.

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Supporting information	Required	Required if relied on[7]
Figures		☐
Land titles		☐
Historical site information relied upon (if not included in report body)	☐	
Site photographs (if site inspection carried out)		☐
Other supporting information		☐
Statement of qualification as a SQEP	☐	

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[7] Any evidence relied upon to form an opinion/conclusion must be included in report.

A2: PSI table of contents: 'Subdivision' or 'change in use' as a permitted activity

Content	Required	Required if relied on[8]	CLMG 5 section
1. Introduction			
• investigation objectives	☐		2.1
• site identification (site name, address, legal description; site boundaries; a map reference and geographic co-ordinates)	☐		3.2.1
• proposed site use	☐		3.2.2
2. Site description			
• environmental setting	☐		3.2.3
• site layout	☐		3.2.4
• current site uses	☐		3.2.5
• surrounding uses	☐		3.2.6
• geophysical surveys		☐	5.4
• site inspection		☐	3.2.8
3. Historical site use			
• summary of site history gained from	☐		3.2.7
- review of existing investigation reports		☐	
- review of council information		☐	
- review of aerial photographs		☐	
- interviews		☐	
- review of other historical Information		☐	
• preliminary sampling (if carried out)		☐	3.2.9
- description (including diagram)			
- results			
- comparison of results to guidelines			
4. Risk assessment			3
• conceptual site model	☐		
• evaluate the probability that contamination exists on the site	☐		
• characterise the source through adequate delineation of contamination horizontally and vertically, and assessment of contaminant concentrations	☐		
• identify and characterise potential pathways and receptors for each exposure area through relevant site properties (eg, assessment of geology, hydrogeology, building construction, site use)	☐		
• determine the likelihood that the contamination poses a risk to identified receptors, including potential receptors	☐		
• evaluate the magnitude of that risk pursuant to Regulation 8(4)(b): – *is it highly unlikely that there will be a risk to human health if the activity is done to the piece of land?*	☐		
• evaluate the magnitude of any identified risk to other receptors (eg,. ecological)		☐	

[8] Any evidence relied upon to form an opinion/conclusion must be included in report.

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Content	Required	Required if relied on[8]	CLMG 5 section
• describe the limitations of the data collected, and the assumptions and uncertainties inherent in the data and models used **'Note: If the Regulation 8(4)(b) 'highly unlikely' test cannot be achieved, then the activity is not permitted and a DSI (refer appendix A3) or alternate consent type is required.**	☐		
7. Conclusions	☐		
8. Recommendations (if relevant to report purpose)		☐	
9. Report limitations	☐		
10. SQEP certification of report	☐		
11. References	☐		
Appendices: relevant supporting information	☐		

Supporting information	Required	Required if relied on[9]
Figures (including site plan – Regulation 8(4)(c))	☐	
Conceptual site model (if not included in report body)	☐	
Land titles		☐
Site photographs (if site inspection carried out)		☐
Laboratory reports and chain of custody documentation (if sampling carried out)		☐
Other supporting information		☐
Statement of qualification as a SQEP	☐	

[9] Any evidence relied upon to form an opinion/conclusion must be included in report.

A3: DSI table of contents: Determining if NES applies

Content	Required	Required if relied on[10]	CLMG 5 section
1. Introduction			
• investigation objectives	☐		2.1
• site identification (site name, address, legal description; site boundaries; a map reference and geographic co-ordinates)	☐		3.2.1
• proposed site use		☐	3.2.2
2. Site description			
• environmental setting	☐		3.2.3
• site layout	☐		3.2.4
• current site uses	☐		3.2.5
• surrounding uses	☐		3.2.6
• geophysical surveys		☐	5.4
• site inspection		☐	3.2.8
3. Historical site use (sufficient to plan investigation)			
• summary of site history gained from	☐		3.2.7
- review of existing investigation reports		☐	
- review of council information		☐	
- review of aerial photographs		☐	
- interviews		☐	
- review of other historical Information		☐	
• preliminary sampling (if carried out)		☐	3.2.9
- description (including diagram)			
- results			
- comparison of results to guidelines			
4. Sampling and analysis plan (could be appended if complex)			4.2
• media to be sampled	☐		4.2
• contaminants of potential concern / analyte selection	☐		4.2.1
• background concentration level (if relevant), contaminant standard and/or guideline value selection[11]	☐		4.2.2 & 4.2.7
• sampling design (eg, targeted or systematic sampling)	☐		4.2.3
• number of samples, including justification for number selected and potential limitations of methodology adopted in the context of investigation objectives	☐		4.2.4
• sample depth	☐		4.2.5
• composite sampling		☐	4.2.6
• background sampling methodology		☐	4.2.7
• sampling technique(s)	☐		4.2.8

[10] Any evidence relied upon to form an opinion/conclusion must be included in report.

[11] Refer to *Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values* (Ministry for the Environment, 2011a).

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Content	Required	Required if relied on[10]	CLMG 5 section
• field screening techniques		☐	5.3
• quality assurance and quality control	☐		4.3
5. Sampling results			
• summary of works undertaken, with rationale for any departure from, or addition to, sampling and analysis plan	☐		
• field observations (eg, staining, odour, soil characteristics)	☐		5.1.1
• evaluation of analytical laboratory results with comparison to background concentration levels (if relevant), contaminant standards and/or guideline values	☐		7
• evaluation of field screening results with comparison to background concentration levels (if relevant), contaminant standards and/or guideline values		☐	
• results of field and laboratory sample quality assurance/quality control	☐		
• statistical analysis of results		☐	
6. Disposal of soil			
• the transport, disposal, and tracking of soil and other materials taken away in the course of the activity		☐	
7. Risk assessment			
• conceptual site model	☐		3
• evaluate the probability that contamination exists on the site	☐		
• characterise the source through adequate delineation of contamination horizontally and vertically, and assessment of contaminant concentrations	☐		
• identify and characterise potential pathways and receptors for each exposure area through relevant site properties (eg, assessment of geology, hydrogeology, building construction, site use)	☐		
• determine the likelihood that the contamination poses a risk to identified receptors, including potential receptors	☐		
• evaluate the magnitude of any identified risk to human health pursuant to Regulation 5(9)	☐		
– *is it demonstrated that any contaminants in or on the piece of land are at, or below, background concentrations*			
• evaluate the magnitude of any identified risk to other receptors (eg, ecological)		☐	
• describe the limitations of the data collected, and the assumptions and uncertainties inherent in the data and models used	☐		
8. Discussion		☐	
9. Conclusions	☐		
10. Recommendations (if relevant to report purpose)		☐	
11. Report limitations	☐		
12. SQEP certification of report	☐		
13. References	☐		
Appendices: relevant supporting information	☐		

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Supporting information	Required	Required if relied on[12]
Figures		☐
Conceptual site model (if not included in report body)	☐	
Land titles		☐
Historical site information relied upon	☐	
Previous reports (or relevant sections thereof)		☐
Site photographs		☐
Geological logs		☐
Field sheets		☐
Sampling and analysis plan (if not included in body)	☐	
Summary tables of soil sampling results		☐
Laboratory reports and chain of custody documentation	☐	
Statistical calculations eg, ProUCL outputs		☐
Soil cuttings and purge water disposal documentation		☐
Statement of qualification as a SQEP	☐	

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[12] Any evidence relied upon to form an opinion/conclusion must be included in report.

A4: DSI table of contents: Controlled activities

Note: Regulation 8(2) outlines the requirements for a DSI to be a permitted activity.

Content	Required	Required if relied on[13]	CLMG 5 section
1. Introduction			
• investigation objectives	☐		2.1
• site identification (site name, address, legal description; site boundaries; a map reference and geographic co-ordinates)	☐		3.2.1
• proposed site use	☐		3.2.2
2. Site description			
• environmental setting	☐		3.2.3
• site layout	☐		3.2.4
• current site uses	☐		3.2.5
• surrounding uses	☐		3.2.6
• geophysical surveys		☐	5.4
• site inspection		☐	3.2.8
3. Historical site use (sufficient to plan investigation)			
• summary of site history gained from	☐		3.2.7
- review of existing investigation reports		☐	
- review of council information		☐	
- review of aerial photographs		☐	
- interviews		☐	
- review of other historical Information		☐	
• preliminary sampling (if carried out)		☐	3.2.9
- description (including diagram)			
- results			
- comparison of results to guidelines			
4. Sampling and analysis plan (could be appended if complex)	☐		4.2
• contaminants of potential concern / analyte selection	☐		4.2.1
• media to be sampled (link to CSM and objectives)	☐		3
• background concentration level (if relevant), contaminant standard and/or guideline value selection[14]	☐		4.2.2 & 4.2.7
• sampling design (eg, targeted or systematic sampling)	☐		4.2.3
• number of samples, including justification for number selected and potential limitations of methodology adopted in the context of investigation objectives	☐		4.2.4
• sample depth	☐		4.2.5
• composite sampling		☐	4.2.6
• background sampling methodology		☐	4.2.7
• sampling technique	☐		4.2.8

[13] Any evidence relied upon to form an opinion/conclusion must be included in report.

[14] Refer to *Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values* (Ministry for the Environment, 2011a).

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Content	Required	Required if relied on[13]	CLMG 5 section
• field screening techniques		☐	5.3
• quality assurance and quality control	☐		4.3
5. Sampling results			
• summary of works undertaken, with rationale for any departure from, or addition to, sampling and analysis plan	☐		
• field observations (eg, staining, odour, soil characteristics)	☐		5.1.1
• evaluation of analytical laboratory results with comparison to background concentration levels (if relevant), contaminant standards and/or guideline values	☐		7
• evaluation of field screening results with comparison to background concentration levels (if relevant), contaminant standards and/or guideline values		☐	
• results of field and laboratory sample quality assurance/quality control	☐		
• statistical analysis of results		☐	
6. Disposal of soil			
• the transport, disposal and tracking of soil and other materials taken away in the course of the activity		☐	
7. Risk assessment			
• conceptual site model	☐		3
• evaluate the probability that contamination exists on the site	☐		3.2.11
• characterise the source through adequate delineation of contamination horizontally and vertically, and assessment of contaminant concentrations	☐		
• identify and characterise potential pathways and receptors for each exposure area through relevant site properties (eg, assessment of geology, hydrogeology, building construction, site use)	☐		
• determine the likelihood that the contamination poses a risk to identified receptors, including potential receptors	☐		
• evaluate the magnitude of that risk, pursuant to Regulation 9(1)(b) and/or Regulation 9(3)(b) – *is it demonstrated that soil contamination does not exceed the applicable standard*	☐		
• propose any requirement for management methods to mitigate identified risks (as necessary)		☐	
• evaluate the magnitude of any identified risk to other receptors (eg, ecological)		☐	
• describe the limitations of the data collected, and the assumptions and uncertainties inherent in the data and models used	☐		
Note: If soil contamination exceeds applicable standard, a controlled activity consent cannot be issued.			
8. Management of proposed activity (may not be part of the DSI)			
• description of how proposed activity must be managed, which may include a site management plan (refer appendix A6) – Regulation 9(2)(b)(i)		☐	
• description of how activity must be monitored – Regulation 9(2)(b)(il)		☐	
• description of how proposed activity must be reported on – Regulation 9(2)(b)(iii)		☐	

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Content	Required	Required if relied on[13]	CLMG 5 section
9. Discussion		☐	
10. Conclusions	☐		
11. Recommendations (if relevant to report purpose)		☐	
12. Report limitations	☐		
13. SQEP certification of report	☐		
14. References	☐		
Appendices: relevant supporting information	☐		

Supporting information	Required	Required if relied on[15]
Figures		☐
Conceptual site model (if not included in report body)	☐	
Land titles		☐
Historical site information relied upon	☐	
Previous reports (or relevant sections thereof)		☐
Site photographs		☐
Geological logs		☐
Field sheets		☐
Sampling and analysis plan (if not included in body)	☐	
Summary tables of soil sampling results		☐
Laboratory reports and chain of custody documentation	☐	
Statistical calculations eg, ProUCL outputs		☐
Soil cuttings and purge water disposal documentation		☐
Site management plan (refer appendix A6)		☐
Statement of qualification as a SQEP	☐	

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[15] Any evidence relied upon to form an opinion/conclusion must be included in report.

A5: DSI table of contents: Restricted discretionary activities

Note: Regulation 8(2) outlines the requirements for a DSI to be a permitted activity.

Content	Required	Required if relied on[16]	CLMG 5 section
1. Introduction			
• investigation objectives	☐		2.1
• site identification (site name, address, legal description; site boundaries; a map reference and geographic co-ordinates)	☐		3.2.1
• proposed site use	☐		3.2.2
2. Site description			
• environmental setting	☐		3.2.3
• site layout	☐		3.2.4
• current site uses	☐		3.2.5
• surrounding uses	☐		3.2.6
• geophysical surveys		☐	5.4
• site inspection		☐	3.2.8
3. Historical site use (sufficient to plan investigation)			
• summary of site history gained from	☐		3.2.7
- review of existing investigation reports		☐	
- review of council information		☐	
- review of aerial photographs		☐	
- interviews		☐	
- review of other historical Information		☐	
• preliminary sampling (if carried out)		☐	3.2.9
- description (including diagram)			
- results			
- comparison of results to guidelines			
4. Sampling and analysis plan (could be appended if complex)	☐		4.2
• contaminants of potential concern / analyte selection	☐		4.2.1
• media to be sampled (link to CSM and objectives)	☐		3
• background concentration level (if relevant), contaminant standard and/or guideline value selection[17]	☐		4.2.2 & 4.2.7
• sampling design (eg, targeted or systematic sampling)	☐		4.2.3
• number of samples, including justification for number selected and potential limitations of methodology adopted in the context of investigation objectives	☐		4.2.4
• sample depth	☐		4.2.5
• composite sampling		☐	4.2.6
• background sampling methodology		☐	4.2.7

[16] Any evidence relied upon to form an opinion/conclusion must be included in report.

[17] Refer to *Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values* (Ministry for the Environment, 2011a).

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Content	Required	Required if relied on[16]	CLMG 5 section
• sampling technique	☐		4.2.8
• field screening techniques		☐	5.3
• quality assurance and quality control	☐		5.4
5. Sampling results			
• summary of works undertaken, with rationale for any departure from, or addition to, sampling and analysis plan	☐		
• field observations (eg, staining, odour, soil characteristics)	☐		5.1.1
• evaluation of analytical laboratory results with comparison to background concentration levels (if relevant), contaminant standards and/or guideline values	☐		7
• evaluation of field screening results with comparison to background concentration levels (if relevant), contaminant standards and/or guideline values		☐	
• results of field and laboratory sample quality assurance/quality control	☐		
• statistical analysis of results		☐	
6. Disposal documentation			
• the transport, disposal and tracking of soil and other materials taken away in the course of the activity – Regulation 10(3))(e)		☐	
7. Risk assessment			
• conceptual site model	☐		3
• evaluate the probability that contamination exists on the site	☐		3.2.11
• characterise the source through adequate delineation of contamination horizontally and vertically, and assessment of contaminant concentrations		☐	
• identify and characterise potential pathways and receptors for each exposure area through relevant site properties (eg, assessment of geology, hydrogeology, building construction, site use)	☐		
• determine the likelihood that the contamination poses a risk to identified receptors, including potential receptors	☐		
• evaluate the magnitude of that risk pursuant to Regulation 10(2)(b) – *soil contamination exceeds the applicable standard* pursuant to Regulation 10(3)(b) – *recommendation on the suitability of the piece of land for the proposed activity, given the amount and kind of soil contamination*	☐		
• describe any requirements for management methods to mitigate identified risks (as necessary)		☐	
• evaluate the magnitude of any identified risk to other receptors (e.g. ecological)		☐	
• describe the limitations of the data collected, and the assumptions and uncertainties inherent in the data and models used **Note: If insufficient information exists to assess risk, then a restricted discretionary consent cannot be issued.**	☐		
8. Discussion		☐	

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Content	Required	Required if relied on[16]	CLMG 5 section
9. Conclusions	☐		
10. Recommendations (if relevant to report purpose)		☐	
11. Report limitations	☐		
12. SQEP certification of report	☐		
13. References	☐		
Appendices: relevant supporting information	☐		

Supporting information	Required	Required if relied on[18]
Figures		☐
Conceptual site model (if not included in report body)	☐	
Land titles		☐
Historical site information relied upon	☐	
Previous reports (or relevant sections thereof)		☐
Site photographs		☐
Geological logs		☐
Field sheets		☐
Sampling and analysis plan (if not included in body)	☐	
Summary tables of soil sampling results		☐
Laboratory reports and chain of custody documentation	☐	
Statistical calculations eg, ProUCL outputs		☐
Soil cuttings and purge water disposal documentation		☐
Remediation action plan (refer appendix A7) – Regulation 10(3)(c)		☐
Site validation report (refer appendix A8) – Regulation 10(3)(d)		☐
Ongoing site management plan (refer appendix A9) – Regulation 10(3)(c)		☐
Statement of qualification as a SQEP	☐	

[18] Any evidence relied upon to form an opinion/conclusion must be included in report.

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A6: Site management plan table of contents

Content	Required	Required if relied on[19]
1. Introduction • description of the site, report purpose	☐	
2. Responsibilities and document control	☐	
3. Summary of proposed works	☐	
3. Summary of actual or expected contaminant conditions • description of the contaminants of concern, location and extent and potential risks	☐	
5. Site control procedures • access/egress, location of pertinent facilities, transport routes etc	☐	
6. Health and safety protection measures • personal protective equipment (PPE), soil handling requirements and restrictions, personal hygiene • any specific monitoring requirements	☐	
7. Environmental management procedures • controls to be put in place to manage environmental issues • any specific monitoring requirements	☐ ☐	
8. Unexpected contamination discovery protocols	☐	
9. Soil testing and disposal requirements	☐	

Supporting information	Required	Required if relied on[20]
Figures, plans, drawings	☐	
Conceptual site model (if not included in plan body)		☐
Previous reports (or relevant sections thereof)		☐
Statement(s) of qualification as a SQEP		☐

[19] Any evidence relied upon to form an opinion/conclusion must be included in report.

[20] Any evidence relied upon to form an opinion/conclusion must be included in report.

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A7: Remediation action plan table of contents

Content	Required	Required if relied on[21]
1. Introduction		
• description of the site, report purpose, regulatory context (including references to consents if already granted)	☐	
2. Site description		
• site layout	☐	
• summary of previous investigations	☐	
3. Scope and purpose of remediation		
• summary of site contamination requiring remediation	☐	
• remediation goals, strategy and objectives	☐	
4. Remediation method(s)		
• proposed remediation method(s) to address the risk posed by the contaminants to the environment and / or human health	☐	
• proposed timing of the remediation (schedule of works)	☐	
• proposed mitigation methods / controls to address the risk posed by the contaminants to the environment and/or human health during the remedial works (eg, sediment and erosion controls, siting of stockpiles, PPE to be worn)	☐	
• proposed management measures for the piece of land (eg,. capping / coverage of impacted soils, exclusion from risk areas), including the frequency and location of monitoring of specified contaminants	☐	
• proposed remediation activity record keeping	☐	
5. Standard of remediation		
• proposed standard of the remediation on completion	☐	
• proposed method to demonstrate achievement of remediation objectives (validation strategy) eg, through soil validation sampling, site inspections, provision of soil disposal records, etc.	☐	
6. Unexpected contamination discovery protocols	☐	
7. References	☐	
Appendices: relevant supporting information	☐	

Supporting information	Required	Required if relied on[22]

[21] Any evidence relied upon to form an opinion/conclusion must be included in report.

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Supporting information	Required	Required if relied on[22]
Figures	☐	
Conceptual site model (if not included in plan body)	☐	
Remedial options assessment		☐
Drawings of proposed work (eg, earthworks, containment cells, barrier systems and ventilation systems (as relevant))		☐
Subdivision plans		☐
Engineering specifications		☐
Previous reports (or relevant sections thereof)		☐
Consents or permits (if already granted)		☐
Examples of soil transport and disposal manifests		☐
Site management plan (refer appendix A6) – regulation 10(3)(d)		☐
Proposed ongoing site management plan (refer appendix A9) – regulation 10(3)(c)		☐
Statement(s) of qualification as a SQEP		☐

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[22] Any evidence relied upon to form an opinion/conclusion must be included in report.

A8: Site validation report table of contents

Content	Required	Required if relied on[23]
1. Introduction		
• description of the client, site, report purpose	☐	
2. Site description		
• summary of site contamination	☐	
• summary of remediation strategy and goals	☐	
• summary of applicable consent or permit conditions	☐	
3. Summary of remediation / management works		
• description of remediation / management works undertaken	☐	☐
• description of variations to planned works		
4. Disposal documentation		
• the transport, disposal, and tracking of soil and other materials taken away in the course of the activity – Regulation 10(3))(e)		☐
5. Validation works		
• description of validation strategy (eg, validation sampling and analysis plan and/or intended validation inspection / confirmation tasks)	☐	
• description of validation works undertaken and any variations to the validation strategy	☐	
• presentation of validation sampling results and comparison of results with background concentration level (if relevant), contaminant standard and/or guideline value		☐
• description of completed management works (if any)		☐
• validation inspection		☐
• updated risk assessment		☐
• update to ongoing site management plan		☐
• consent compliance measures		☐
• confirmation that all the requirements of the consenting authority(ies) or other regulatory requirements have been met		☐
6. Conclusions on remediation effectiveness	☐	
• summary of whether remediation goals were met		
7. Report limitations	☐	

[23] Any evidence relied upon to form an opinion/conclusion must be included in report.

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Supporting information	Required	Required if relied on[24]
Figures, plans, drawings	☐	
Conceptual site model (if not included in report body)	☐	
Site photographs	☐	
Sampling and analysis plan (if not included in body of report)		☐
Analytical results tables		☐
Laboratory reports and chain of custody documentation		☐
Previous investigation results		☐
Consents or permits		☐
Statistical calculations (if relied on)		☐
Soil disposal documentation		☐
(Proposed) ongoing site management plan (refer appendix A9) – regulation 10(3)(c)		☐
Statement(s) of qualification as a SQEP		☐

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[24] Any evidence relied upon to form an opinion/conclusion must be included in report.

A9: Ongoing management plan table of contents

Content	Required	Required if relied on[25]
1. Introduction • description of the client, site identification details, report purpose, regulatory context (including any relevant resource consents which exist for the site)	☐	
2. Responsibilities and document control	☐	
3. Summary of contaminant conditions • description of the contaminants of concern, location and extent, and potential risks (as described in the CSM)	☐	
4. Management structure and procedures • summary of management strategy • description of site management structure(s) • summary of site control procedures • health and safety protection measures • environmental management procedures	☐ ☐ ☐ ☐	☐
5. Monitoring requirements • summary of proposed monitoring methodology/plan • contingency requirements • reporting requirements • schedule to update / review the monitoring requirements		☐ ☐ ☐ ☐
6. Report limitations	☐	

Supporting information	Required	Required if relied on[26]
Figures, plans, drawings	☐	
Site photographs		☐
Detailed monitoring or inspection requirements	☐	
Previous reports		☐
Consents or permits		☐
Statement(s) of qualification as a SQEP		☐

[25] Any evidence relied upon to form an opinion/conclusion must be included in report.

[26] Any evidence relied upon to form an opinion/conclusion must be included in report.

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Appendix B: Underground petroleum storage system removal

Removal of an underground petroleum storage system (UPSS) is a regulated activity under the NES and must be reported in accordance with this guideline. The reporting requirements outlined in section 2 are not necessarily appropriate for such reports. These types of investigations are typically focused on assessing the immediate vicinity of the UPSS and often do not involve investigating the wider site.

The NES requires (Regulation 8(1)(a)) that UPSS removals carried out as a permitted activity be done in accordance with the current edition of: *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand.*

This section provides an example checklist-style report template (amended from an original developed by URS New Zealand Ltd, Wellington), which can be adopted in whole or adapted to be a combination checklist and narrative style of report. Using the example template will provide a report that includes the recommended items for a detailed site investigation report associated with 'removing or replacing fuel storage system' prepared for NES purposes. The information required by the template is considered to represent a minimum reporting requirement for these types of investigations.

It is not appropriate for this example report template to be used where additional investigation is carried out beyond the immediate vicinity of the UPSS. The template is also not appropriate for reporting a Tier 2 investigation carried out when the UPSS removal discovers impacts in excess of the Tier 1 criteria contained in *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand*.

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Example report template for the removal and replacement of petroleum underground storage tanks and underground equipment (underground petroleum storage system (UPSS))

Checklist	
☐ Company information	☐ Site plan and locality diagram
☐ Site information	☐ Bore/pit logs
☐ Contaminant information	☐ Analytical result sheets / chain of custody
☐ Interpretation	☐ Photographs

Company information			
Product supplier name:			
Company representative/agent:			
Date(s) on-site:			
Ownership of UPSS:	☐ Company	☐ Operator	☐ Third party
Owner's details (trading name and postal address):			
Current site use:	☐ Service station ☐ Truck stop	☐ Workshop ☐ Other (describe)	☐ Commercial
Reason for removal:	☐ Replacement of partial UPSS	☐ Replacement of complete UPSS	☐ Complete UPSS removal (no replacement - fuel storage / dispensing no longer required)
	☐ Partial UPSS removal (no replacement)	☐ Transfer	
	☐ Other		

Site information				
Name:				
Address:				
Legal description:				
City/district council:				
City/district council zoning	Site:			
	Adjacent:			
Other HAIL activities undertaken on site:				
Date council notified:				
Number of tank pits:		Number of tanks removed:		

Removed/replaced tank information (add rows as required)

Tank/ pit ID	Capacity (*litres*)	Contents (*product*)	Remove/ replace	Age (*yr*)	Material	Holed (*yes/no*)	Condition	Pit construction/ condition

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Additional comments:

Removed/replaced components (add rows as required)						
Component	Contents (*product*)	Remove/ replace	Age (*yr*)	Material	Holed (*yes/no*)	Condition
eg, dispenser						

Site environment				
Neighbouring land uses *(indicate on attached site plan)*	North	☐ Industrial/commercial	☐ Residential	☐ Agricultural
		☐ Other		
	South	☐ Industrial/commercial	☐ Residential	☐ Agricultural
		☐ Other		
	East	☐ Industrial/commercial	☐ Residential	☐ Agricultural
		☐ Other		
	West	☐ Industrial/commercial	☐ Residential	☐ Agricultural
		☐ Other		
Topography:		☐ Sloping	☐ Gently sloping	☐ Flat
		Describe:		
Surface covering (*show on plan*):		☐ Unsealed	☐ Mixed seal/gravel	☐ Sealed
Surface drainage/run-off (*show on plan*):		☐ Drains	☐ Soak holes	☐ Interceptor
Underground services (*show on plan*):		☐ Present	☐ Distant	☐ Absent
Could services affect migration?		☐ Yes (to what extent?)		☐ No
Nearest surface water body:		☐ > 100 metres	☐ < 100 metres (*show on plan*)	
		Describe:		
Surface water use:		☐ Recreation	☐ Drinking	☐ Irrigation
		☐ Aquaculture	☐ Industry	☐ Shipping
		☐ Not utilised	☐ Not known	
		Describe:		

Site soil type log (*lithology if known*): Include anomalous or unusual soil characteristics	Depth (*m*)	Description (*eg, brown silty clay*) (following NZ Geotechnical Society. 2005. *Field Description of Soil and Rock*)

Was groundwater	☐ No	☐ Yes	Depth (*m bgl*)

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encountered?	
Was sheen or free product visible?	☐ No ☐ Yes If yes, describe and reference photo
Have on-site wells been sampled?	☐ No ☐ Yes If yes, describe: ☐ None present
Have on-site wells been checked for separate phase?	☐ No ☐ Yes If yes, describe: ☐ None present

Off-site wells (check with regional/unitary council):

Describe below (add rows below as necessary or append separate list):

Well number	Distance from site (*m*)	Direction from site	Depth (*m*)	Use

Local groundwater flow direction (*if more than one aquifer, comment on each aquifer individually*):	

Contaminant information

Hydrocarbon impact assessment

Location	Visual inspection		PID reading		Samples taken		Evidence of contamination (*staining, odour, etc*)	Justification for why no samples taken
	Yes	No	Yes	No	Yes	No		
Tank pit walls	☐	☐	☐	☐	☐	☐		
Pit bedding material/backfill	☐	☐	☐	☐	☐	☐		
Under pumps	☐	☐	☐	☐	☐	☐		
Dispensing lines	☐	☐	☐	☐	☐	☐		
Remote fills	☐	☐	☐	☐	☐	☐		
Fill lines	☐	☐	☐	☐	☐	☐		
Vent lines	☐	☐	☐	☐	☐	☐		
Other (*services, etc*)	☐	☐	☐	☐	☐	☐		
Surface soils (*show on plan*)	☐	☐	☐	☐	☐	☐		

Vegetation/soil removal

Site and near-site vegetation condition:	☐ Good ☐ Poor Describe:
Was impacted soil/bedding removed from site?	☐ Yes ☐ No
If yes, how much, where on the site did it come from,	

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and where was it disposed?	

Sampling[1] (*locations shown on plan*) (*ensure sample numbers are the same as those represented on site plan*)								
Sample number	Date sampled	Location	Depth (*m*)	Soil type	Odour? Yes	Odour? No	Remaining/ removed	PID reading (ppm)
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		
					☐	☐		

Interpretation					
Current site use:	☐ Petroleum use ☐ Other	☐ Industrial/commercial	☐ Residential	☐ Agricultural	
Future site use:	☐ Petroleum use ☐ Other	☐ Industrial/commercial	☐ Residential	☐ Agricultural	
Adjoining land use:	☐ Petroleum use ☐ Other	☐ Industrial/commercial	☐ Residential	☐ Agricultural	
Groundwater use:	☐ Potable	☐ Irrigation	☐ Stock	☐ Not used	☐ Not known
Soil type: * *Considered for groundwater inhalation risk only*	☐ SAND, sandy loams, silty sands ☐ SANDY SILT, silt, silty loam, clay sand ☐ SILTY CLAY, clay loam, sandy clay ☐ CLAY		☐ PUMICE ☐ GRAVELS* ☐ FRACTURED BASALT* ☐ PEAT/ORGANIC SOIL		
Depth to contamination:	☐ < 1 metre	☐ 1–4 metres	☐ > 4 metres		
Depth to groundwater:	☐ 2 metres	☐ 4 metres	☐ 8 metres	☐ Unknown	

1. Sampling to be undertaken in accordance with Ministry for the Environment *Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand (revised 2011).*

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Human health exposure pathways			
Land use	Pathway	Complete	Incomplete
Current site use ☐ Petroleum use ☐ Industrial/commercial ☐ Residential ☐ Agricultural ☐ Other (describe)	Soil ingestion Dermal absorption Maintenance/excavation worker Inhalation of vapour from soil Inhalation of vapour from water Groundwater usage Produce ingestion Other (describe)	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
Future site use ☐ Petroleum use ☐ Industrial/commercial ☐ Residential ☐ Agricultural ☐ Other (describe)	Soil ingestion Dermal absorption Maintenance/excavation worker Inhalation of vapour from soil Inhalation of vapour from water Groundwater usage Produce ingestion Other (describe)	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐
Adjoining site use ☐ Petroleum use ☐ Industrial/commercial ☐ Residential ☐ Agricultural ☐ Other	Soil ingestion Dermal absorption Maintenance/excavation worker Inhalation of vapour from soil Inhalation of vapour from water Groundwater usage Produce ingestion	☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐

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Ecological risk assessment			
	Significantly impacted	Limited impact	Not impacted
Ecological receptors:	☐	☐	☐
Describe all likely receptors:			

Aesthetic issues				
	Significantly impacted	Limited impact	Not impacted	Description of impact (*if applicable*)
Odour	☐	☐	☐	
Soil structure	☐	☐	☐	
Visual	☐	☐	☐	
Vegetation	☐	☐	☐	

Summary of risks to human health and the environment

Comments

Supporting Information
Any evidence relied upon to form an opinion/conclusion must be attached to report including but not limited to: • figures, plans, drawings • conceptual site model (if not included in report body) • site photographs • analytical results tables • laboratory reports and chain of custody documentation • previous investigation results • consents or permits • statistical calculations • soil disposal documentation • proposed ongoing site management plan (refer appendix A9) – regulation 10(3)(c)

Report prepared by:	Name:	Signed:	Date:
Authorised by:	Name:	Signed:	Date:
Certified by:	Name:	Signed:	Date:

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