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Contaminated land management guidelines No 1

Reporting on contaminated sites in New Zealand

Ministry for the Environment
Manatū Mō Te Taiao

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Tables

Abbreviations

ARO	assessment of remedial options
CLMG 5	Contaminated land management guidelines No 5 – Site investigation and analysis of soils
CSM	conceptual site model
DSI	detailed site investigation
EGV	environmental guideline value
HAIL	current edition of the Hazardous Activities and Industries List
LIM	land information memorandum
LNAPL	light non-aqueous-phase liquid
MNA	monitored natural attenuation (a remedial strategy or methodology)
NESCS	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
QA	quality assurance
QC	quality control
RAP	remedial action plan
RMA	Resource Management Act 1991
ROR	remedial options report
SCS	soil contaminant standard
SMP	site management plan
SQEP	suitably qualified and experienced practitioner
SVI	site validation investigation
SVR	site validation report
UPSS	underground petroleum storage system

Glossary

Analyte	An element or chemical that is being analysed.
Benchmarking	Broadly assessing and characterising the levels of contamination or other environmental parameters at a site, or part of a site, without necessarily carrying out a risk assessment. Often required for due diligence, lease and environmental indemnity agreements.
Chain of custody	The processes and procedures that must be followed to guarantee the identification and integrity of samples, from collection through reporting of test results. Chain of custody is usually required to ensure the legal evidential integrity of all samples and data will withstand scrutiny in a law court (see **CLMG 5** – 5.2.5).
Exposure area	The spatial area over, or from, which a receptor may be exposed to the contaminants of concern.
Environmental guideline value	Numerical values that represent concentrations of contaminants in environmental media that are protective of environmental receptors.
Guideline value	In this document, 'guideline value' has been used when referring to the contaminant concentration limit against which analytical results are to be compared. Where the objective is to assess and manage contaminants to protect human health, then the contaminant concentration against which analytical results are to be compared will be the appropriate contaminant concentration limits protective of human health. Guideline values for contaminants in soils protective of human health that are regulated by the NESCS are referred to as soil contaminant standards (SCS), which are mandatory when investigations are undertaken under the NESCS.
Hotspot	A localised area of elevated contaminant concentrations relative to the remainder of the site.
QA/QC	Quality assurance and quality control measures or activities. (See CLMG 5 – 4.3)
Quality assurance	All the planned and systematic activities implemented within the quality system that can be demonstrated to provide confidence that a product or service will fulfil requirements for quality. (See CLMG 5 – 4.3)
Quality control	A procedure or set of procedures intended to ensure that a product or service adheres to a defined set of quality criteria that meets the requirements of relevant standards or plans. (See CLMG 5 – 4.3)
Regulatory agency	A regulatory agency is any agency (other than courts, tribunals and other independent appeal bodies) that has any of the following responsibilities for the whole or part of a regulatory system: monitoring, evaluation, performance reporting, policy advice, policy and operational design, legislative design, implementation, administration, providing information; setting standards, licensing

	and approvals, or compliance and enforcement.[1] In the context of these guidelines, city councils, district councils, unitary authorities and regional councils are the most common regulatory agencies.
Remediation	Reducing the risk posed by contamination at a site. Remediation may include removing contamination, reducing contaminant concentrations, interrupting the exposure pathway, or management of the site or activity.
Remediation technology	Technology that pre-processes, processes or post-processes contaminated media or contaminants as part of risk management of contaminated sites.
Rinsate blank	A sample collected after equipment decontamination by running de-ionised water through the sampling equipment and collecting the water. A rinsate blank is tested for any residual contamination, which provides an indication of the potential for cross-contamination between samples resulting from poor decontamination procedures. A rinsate blank is also referred to as an equipment blank.
Sample matrix	The type of sample (eg, water, soil, sediment).
Sample holding time	The period of time that samples of a specific material can be retained between sampling and laboratory analysis before the results are considered unreliable. Sample holding times vary between analytes. Some types of analyses require preservatives to be added to the sample, while others require storage of samples at refrigerated temperatures.
Site validation	An investigation that aims to document the conditions that exist after remedial action has been concluded on a site.
Site walkover	A visit to the site by a SQEP for the purposes of undertaking a visual assessment of site conditions, which is intended to inform the soil contamination investigation
Soil contaminant standard	Environmental guideline values for contaminants in soils protective of human health that are regulated by the NESCS are referred to as soil contaminant standards, which are mandatory when investigations are undertaken under the NESCS.
Soil log	A written record of information describing the types, depth and thicknesses, horizons, structure and other properties of soil, subsoil, rock and/or fill material encountered during the soil investigation. A soil log is also referred to as the stratigraphic log, strat log, geology log, bore log, test pit log or well log. See NZ Geotechnical Society. 2005. Field description of soil and rock: Guideline for the field classification and description of soil and rock for engineering purposes. Wellington: NZ Geotechnical Society Inc.

[1] From, '*Government expectations for good regulatory practice'*, 2017, NZ Treasury, Wellington.

Sustainable remediation	Remediation that is governed by the International Standard ISO 18504:2017 and which involves the elimination and/or control of unacceptable risks in a safe and timely manner while optimising the environmental, social and economic value of the work.
Systematic sampling	Probability-based sampling pattern, where sampling locations are selected at regular intervals throughout the investigation area.
Targeted sampling	Sampling strategy that applies previous site knowledge, and/or uses professional experience and judgement to select the contaminants to be analysed, and selects sampling locations where known, suspected or point source areas of contamination are believed to exist.
Validation strategy	The objectives, methodology, process and actions to assess whether the remedial objectives have been achieved at a site, and which guides the site validation investigation.

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 after this as the NESCS). These guidelines have a regulatory role when reporting for NESCS purposes.

The aim of this guideline is to achieve a nationally consistent approach to contaminated land reporting, which will help landowners, regulators and other interested parties understand or review contaminated land reports and management plans, completed for NESCS purposes. The guidelines also set out the requirements for reporting on contaminated land for contaminated land investigators.

Contaminated land investigations can have a variety of purposes, other than to fulfil the requirements of the NESCS. For some investigations, an owner, occupier or prospective owner or occupier may just want background information on the site, or to benchmark contaminant concentrations with or without a risk assessment.[2] Alternatively, they may wish to establish the feasibility of a proposal.

Many investigations do have a regulatory purpose, for example:

- to apply for a resource consent under the Resource Management Act 1991 (RMA)
- fulfil a condition in a resource consent under the RMA
- satisfy a rule in a regional or district plan (including requirements for an ecological risk assessment which are outside the scope of the NESCS)
- another purpose under another piece of legislation.

Therefore, this guideline is also intended to provide information as recommended good practice for all contaminated land reporting, both regulatory and non-regulatory. The readers of reports and plans written in accordance with these guidelines should be able to:

- understand the report's or plan's purpose including the regulatory context (if any)
- understand the physical characteristics, features and circumstances of the contaminated 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
- assess compliance with any requirements of a regulatory agency, where relevant.

This guideline is designed to be used together with other documents incorporated by reference into the NESCS, in particular, *Contaminated land management guidelines No 5: Site investigation and analysis of soils* (Ministry for the Environment, 2021).

[2] The risk assessment process is described in detail in CLMG No 5. In summary, a risk assessment is the process of evaluating the *source-pathway-receptor* model developed for a site, to determine whether a risk exists to human health or environmental receptors, and if so, to quantify the risk.

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 required for the most complex sites, but instead describe the various types of reports that are commonly required, their specific purposes and uses, and essential and optional contents. These guidelines describe:

- the preliminary site investigation report (PSI)
- the detailed site investigation report (DSI)
- the process of developing a remedial strategy and the assessment of remedial options (ARO)
- 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)
- the routine monitoring report (RMR).

1.3 Use of these guidelines

This guideline is aimed at:

- suitably qualified and experienced practitioners (SQEP) who investigate and report on contaminated land
- regulatory agencies when they review reports prepared for a regulatory purpose
- other stakeholders who use or assess contaminated land reports to guide them in determining whether a report meets its intended purpose.

The SQEP 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 someone with this experience. If the investigation is being carried out to meet a regulatory requirement of the NESCS, a SQEP must certify the PSI or DSI report that is produced, as required by regulation 3 of the NESCS. Guidance on determining who is a SQEP is provided in the NESCS Users' Guide (Ministry for the Environment, 2012).

A regulatory agency may use these guidelines to check the contents of a report or plan are appropriate to its purpose when reviewing these documents in a regulatory context. However, any reviewer should be able to call on relevant knowledge, experience and judgement (whether their own or that of another person) when assessing the adequacy of an investigation. This extends to the conclusions and any recommendations made with regard to further investigation, remediation or management of the site.

1.4 Other reporting requirements and guidelines

Depending on the purpose of the report, additional reporting requirements may apply in certain cases, eg, where land is subject to specific planning, building or zoning requirements related to the

actual or likely presence of hazardous contaminants. The appropriate council should be consulted for details.

Other documents which the SQEP 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, 2021) (referred to hereafter as **CLMG 5**)
- Relevant industry-specific contaminated land management guidelines.

Where an activity is subject to the NESCS, SQEPs and reviewers need to have a good understanding of the regulations (available at http://www.legislation.govt.nz). For help with understanding the NESCS, 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 NESCS, and consequently provides part of the regulatory framework under the NESCS 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 NESCS.

There is also a series of older Ministry guidelines developed for investigating and assessing sites subject to activities related to 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 environmental 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*, SQEPs should be familiar with the useful information they contain on site characteristics and investigation methods. These documents are available on our website: www.environment.govt.nz.

2 Investigating and reporting

2.1 General

The aim of any site investigation or assessment is to support a decision-making process that meets the objectives of the investigation and/or assessment (eg, is the piece of land suitable for the proposed activity? Is the risk posed by the contaminant of concern acceptable for the stated purpose of the land?).

Decisions made to comply with the requirements of the NESCS include investigating a site to identify the piece of land, as defined in the NESCS, which may be subject to the NESCS regulations. This will extend to assessing and managing the actual or potential adverse effects of contaminants in soil on human health from regulated activities,[3] where required.

For all contaminated land investigations, whether for the NESCS or other purposes, robust decision-making is achieved by developing and refining a conceptual site model (CSM) which describes the source-pathway-receptor linkages 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).

CLMG 5 (section 3) provides more detailed guidance on developing a CSM.

The NESCS refers to specific types of investigations, plans and reports to comply with NESCS requirements. The types of investigations, plans and reports covered by these guidelines include both NESCS investigations, reports and plans, and those applicable to contaminated land investigations undertaken for other purposes, and include:

- 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 assessment of remedial options (ARO) – a process, rather than a report (refer section 2.5)
- the remedial options report (ROR) – a report about options investigated in the ARO (refer section 2.6)
- the remedial action plan (RAP) (refer section 2.7)
- the site validation report (SVR) (refer section 2.8)
- the ongoing site management plan (OSMP) (refer section 2.9)
- the routine monitoring report (RMR) (refer section 2.10)

Site investigation, assessment and reporting for purposes other than NESCS requirements should follow the processes outlined in these guidelines, which represent good practice.

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

2.1.1 Reporting objectives

Determining what level of reporting is needed requires SQEPs to understand the objectives of the investigation, along with any regulatory requirements, because these will ultimately guide the level of assessment necessary. Section 2.1 of CLMG 5 provides detail about developing investigation objectives.

The most common objectives for site investigations are to:

- determine whether land is a 'piece of land' subject to the NESCS regulations
- assess the potential risk to human health or the environment
- update council's registers with relevant information
- assess regulatory compliance (eg, against the human health requirements of the NESCS).

Other contaminated land investigation objectives may relate to:

- determining feasible development options for a site
- assessing environmental effects for the purposes of resource consent
- benchmarking site conditions as part of due diligence by a landowner, prospective purchaser or occupier
- investigations by regional councils to fulfil their obligation under section 30(1)(ca) of the RMA.

The contaminated site practitioner needs to keep in mind the project's objectives throughout the investigation works. The objectives should inform each phase of the investigation and the subsequent level of reporting required.

2.1.2 Report organisation

A number of different reports may be necessary to cover the process of investigating a site. A summary of the different reports that may be required for contaminated site investigations is provided in sections 2.2 to 2.10. The relationship of these reports to the NESCS regulations is summarised in **table 1** below.

Appendix B provides a separate discussion and example template for reporting required for the removal of underground petroleum storage systems.

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.

Over time, a series of reports may be prepared for a site as more detail is required to adequately characterise and assess it 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. However, each report must adequately summarise and provide enough information for each phase to be easily 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 to ensure the content of the report can be clearly understood.

Table 1: Reporting requirements under the NESCS

Activity type	Consent type	PSI	DSI	Site management plan	Remedial action plan[2]	Site validation report
Determining if NESCS applies to the piece of land	Not usually applicable [1]	✓[3]	✓[4]			
Removing or replacing fuel storage system[5], sampling soil or disturbing soil	Permitted					✓[5]
	Controlled regulations 9(1)–9(2)		✓	✓[6]		
	Restricted discretionary regulation 10		✓	✓[6]	✓	✓[6]
Subdividing or changing use	Permitted regulation 8(4)	✓				
	Controlled regulation 9(3)		✓			
	Restricted discretionary regulation 10		✓	✓[6]	✓	✓[6]

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

(1) Regulation 8(2) may apply, particularly on council-identified Hazardous Activities and Industries List (HAIL) land where intrusive investigations are proposed.

(2) Refers to matters listed in regulation 10(3)(c).

(3) Refers to matters listed in regulation 6(3).

(4) Refers to matters listed in regulation 5(9).

(5) The activity must be done in accordance with the current edition of *Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand* (Ministry for the Environment, Wellington). Refers to matters listed in regulation 8(1) and appendix B, if removing or replacing a fuel storage system.

(6) Requirement for report at discretion of consent authority.

2.1.3 Reporting good practice

When writing reports, the practitioner must bear in mind the report's final audience(s) (remembering they may not be the immediate client) and their level of knowledge about contaminated land. A report that is poorly structured, has information missing, or is hard to read, risks being misunderstood. This could require the report to be clarified through peer review at the client's expense, or result in it being rejected. Good reporting practice, such as the recommendations outlined below, will help avoid this.

- Try to keep sentences short and readable.
- Break long blocks of text into paragraphs and use bulleted and numbered lists where appropriate.
- Provide enough explanatory and contextual information to enable the report to be easily understood.
- Put raw data, and complex or large amounts of supporting information into appendices wherever possible, and provide a summary of the information in the body of the report.

- Adequately summarise findings and conclusions of previous investigations and why the current report is necessary. Draw the 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 included and considered all material facts known to you that might alter or detract from the opinions expressed.
- Explain or elaborate on any information within a report that appears to be contradictory or inconsistent.
- Qualify any part of the investigation or report that you believe might be incomplete or inaccurate.
- If you believe your opinions are not firm, or are based on insufficient research or data, state and qualify the reasons for the uncertainty in the report.

2.1.4 Statement of qualification as a suitably qualified and experienced practitioner

The NESCS requires a SQEP to certify PSI and DSI reports (NESCS regulation 3). This is also good practice for contaminated land investigations for other purposes.

A SQEP that has prepared and/or certified a report for NESCS purposes should provide a statement of their qualification and experience within the report. Refer to appendix C for examples of certifying statements.

2.2 Preliminary site investigation report

2.2.1 Purpose and context of a PSI

A preliminary site investigation (PSI) involves the collection and assessment of information from records detailing previous and current land use. It may include a site inspection and/or interviews and preliminary sampling, in order to understand:

- whether there has been (or there is more likely than not to have been) a potentially contaminating land use
- the nature and source of probable contaminants
- the possible locations of contamination
- known or potential exposure pathways by which identified receptors (refer to CLMG 5, section 3) could be exposed to the contaminants, under current or known proposed future land use
- known or potential human and ecological receptors (refer CLMG 5, section 3) that could be exposed to contaminants.

The main objectives of a PSI are to gather relevant information about a site to determine its history, and actual or potential sources of contamination that will inform a PSI report.

A PSI report should include information gathered during the PSI to:

- report on the site history
- determine the suitability of the site for its current or intended land use
- provide the basis for designing a DSI, if required.

Under the NESCS, a PSI report is required:

- to establish whether it is more likely than not that an activity or industry described in the Hazardous Activities and Industries List (HAIL) is being, or has been, undertaken on the site (regulation 6(3)).
- if the site is or has been subject to HAIL land use and the proposed activity is a change of use or subdivision, to show the activity is permitted by demonstrating it is highly unlikely there will be a risk to human health in the particular circumstances of the site and proposed use or subdivision (regulation 8(4)).

The NESCS Users' Guide presents a number of examples (including a decision tree) for how the PSI can be used to assess the above situations. Given the information obtained during any PSI is mainly qualitative, a precautionary approach to 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 contents of a PSI report prepared for NESCS purposes are listed in:

- appendix A1 determining if the NESCS applies
- appendix A2 determining whether subdivision or change in use are permitted activities.

These appendices are also appropriate for reporting on PSIs undertaken for other purposes.

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

- the investigation objectives and purpose
- the amount and quality of historical information available
- the conceptual site model (refer section 3 of CLMG 5)
- the complexity of the site.

A PSI report should satisfy the investigation objectives and include conclusions based on multiple lines of evidence. Regardless of the scope or scale of the investigation, a PSI report should contain sufficient information on which to make a risk-based decision.

Section 2.2 and section 3.2 in CLMG 5 provide guidance on adequately addressing the information requirements for a PSI.

2.2.3 Sampling as part of a PSI

Preliminary sampling may be undertaken as part of a PSI to provide initial information that will inform the CSM.

Preliminary sampling may confirm the presence of contaminants on a site, but data that does not provide sufficient statistical reliability should not be relied upon to make risk-based decisions unless supported by other lines of evidence.

If samples are taken for a PSI, the appropriate sampling methods, procedures and quality assurance procedures described in CLMG 5 should be adhered to.

2.3 Detailed site investigation report

2.3.1 Purpose and context

A detailed site investigation (DSI) is an investigation that is undertaken to obtain statistically reliable data about the nature, distribution and concentration of contaminants, sufficient to complete a robust risk assessment.

A DSI involves collecting field data and samples using intrusive (and possibly non-intrusive) techniques to identify the nature and extent of contamination that may be present on a site, in a statistically reliable manner. To achieve this, a DSI should be undertaken in accordance with CLMG 5 and reported in accordance with this guideline.

A DSI should result in a conceptual site model (CSM), which is a representation of the site that shows the possible relationships between contaminants, exposure pathways and receptors. A statistically robust CSM is central to quantifying and assessing risk (see CLMG 5 – section 3).

Under the NESCS, a DSI is required:

1. to comply with regulation 3 of the NESCS
2. to establish whether or not the NESCS applies to land described in regulation 5(7)–(8) by demonstrating any contaminants in or on the piece of land are at, or below, background concentrations (regulation 5(9)), or
3. 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).

Regulations 9(2) and 10(3) of the NESCS give the territorial authority discretion over the adequacy of a DSI.

2.3.2 Content

The contents of a DSI report prepared for NESCS purposes are listed in appendices:

- A3: DSI table of contents: determining if NESCS applies
- A4: DSI table of contents: controlled activities
- A5: DSI table of contents: restricted discretionary activities.

These appendices are also appropriate for DSIs undertaken for purposes other than the NESCS.

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

- the purpose of the investigation
- sampling and analysis required
- the amount of historical information available
- the conceptual site model (refer section 3 of CLMG 5)
- the complexity of the contamination.

CLMG 5 addresses the general principles that apply to the investigation of all sample media, such as soil, air, groundwater or surface waters affected by contaminants. While the NESCS is concerned with the investigation of soil for the purpose of protecting human health, CLMG 5 also provides guidance on investigating sites for other purposes.

Relevant results should be extracted from laboratory reports and tabulated to aid interpretation by the audience. Full laboratory results should be appended to the report, and can be referenced where necessary. Where the distribution of contaminants across a site is complex, results should be presented on site diagrams showing the spatial distribution of different contaminants and the degree of contamination, in a manner that will aid interpretation by the audience.

2.4 Site management plan

2.4.1 Purpose and context

Developing a site management plan (SMP) may be a requirement under a district or regional plan or a resource consent, where soil disturbance will take place.

The main purpose of a SMP is to ensure that potential risks from soil disturbance to the following are adequately managed:

- the health of workers[4]
- the on-site environment
- the off-site environment (including the health of neighbouring site users, where relevant).

A SMP is also intended to provide protocols to help manage the unexpected discovery of previously unidentified contamination on a site.

A SMP may be appropriate in circumstances not subject to the NESCS where soil disturbance takes place, to avoid or manage adverse effects from off-site discharges.

Under the NESCS, a SMP may be required for a controlled activity described in R 9. Under R 10, a regulatory authority may exercise its discretion over the approach to remediation and the adequacy of a SMP or SVR, or both.

2.4.2 Content

An SMP for a simple site can be a short, concise document. It may be presented on one or more A3 sheets that can 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 concise document that is suitable for display may be prepared for easier 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 a poster (A3 or larger) or pamphlet-style SMP.

The contents of a SMP may include:

- a brief summary of the work to be carried out with references to other relevant documents (eg, the detailed site investigation (DSI), the remedial action plan (RAP), consent conditions, asbestos removal and or management plans)

[4] The Health and Safety at Work Act 2015 and regulations made under this legislation apply to workplaces and must be complied with. A SMP does not replace proper health and safety systems and procedures, although it can serve to highlight unique or site-specific hazards and risks.

- allocation of responsibilities, most importantly defining who is responsible for implementing and monitoring the controls detailed within the SMP for the entirety of the work it covers
- document control information such as version, date and who the SMP is to be issued to
- a summary of the identified sources associated with the contaminants of concern
- site control procedures, site access, locations and isolation of work areas, transport routes, location of clean areas and site facilities
- health and safety protection measures, such as:
  - site induction procedures
  - requirements for personal protective equipment
  - requirements for personal hygiene
  - first aid and decontamination procedures
- environmental management procedures to control:
  - soil and groundwater during excavation works including siting and managing stockpiles
  - erosion, sediment and dust (typically referencing existing council guidance) with additional measures to take account of the presence of contaminants
  - noise
- monitoring, particularly in the case of airborne particulates such as contaminated dust or asbestos fibres, or discharges from remediation processes
- soil disposal and/or testing requirements
- unexpected discovery protocols if not included in the remedial action plan (RAP)
- a list of main contacts including the site owner and/or manager, primary contractor, emergency services, regulatory agencies and 24/7 emergency contacts
- references or appendices relevant to the proposed works such as DSI reports; asbestos management plans; stormwater, sediment and erosion control plans; and other guidelines.

It is important that all the designs, actions, procedures and controls necessary to control risks on the site are included, or referred to, in the SMP.

For complex sites, it may be necessary to develop an overarching SMP with general controls for the whole site, as well as more specific SMPs providing controls for a particular activity or area, or managing works at specified times eg, if works are being undertaken in a phased manner.

There may be components of a SMP and a RAP (refer **section 2.7**) that cover the same aspects of managing risks at a site. Where this occurs, the controls or requirements in the common components should align, and there should not be any conflicts between the plans.

2.4.3 Combining the SMP and RAP

Where the SMP and RAP are relatively straightforward, the SQEP may combine both into a single plan. When doing so, the SQEP should ensure the resulting document clearly differentiates between SMP and RAP components, and covers all requirements of each. The SQEP should also provide justification for combining the plans as part of the executive summary.

2.5 Assessment of remedial options

An assessment of remedial options (ARO) is a process, rather than a report. The findings of an ARO form the basis for a remedial options report (ROR) – see **section 2.6**.

The intention of an ARO is to help select a remediation methodology or a management strategy that will achieve the site objectives and that warrant more detailed consideration. An ARO also aims to screen out options that are unlikely to achieve these objectives. It adds value by identifying and comparing the available remedial options, with the aim of selecting the most appropriate technology and methodology for the remediation project, as a part of remedial planning.

The ARO is not required under the NESCS, but is an integral part of the remedial planning process and should be considered when remediation is an option for dealing with site contamination.

2.5.1 Purpose and context

The purpose of an ARO is to:

- investigate potentially viable remedial options
- assess the benefits and limitations of each remedial option
- determine the viability of each remedial option
- select a suitable remedial option, or combination of options.

An ARO should only be undertaken upon completion of a DSI, once the CSM has shown that contamination present at a site poses an unacceptable risk to a receptor, and that remedial action is necessary to mitigate the risk from contamination.

Clear remedial objectives should form the basis of the ARO.

Remedial options need to be identified and assessed for their appropriateness and suitability.

Anyone assessing remedial options should consider collaborating with a range of stakeholders to help ensure all available options are identified and considered.

The findings of the ARO may be recorded in the form of a remedial options report (ROR) prepared as part of the remedial action plan (RAP) or as a standalone ROR (see **section 2.6**).

An ARO could include small-scale trials to determine the viability of a particular technology and/or methodology. Small-scale trials may need to be undertaken iteratively and the ARO revised as the success or otherwise of the trials becomes known.

An ARO should consider factors that could affect the suitability of each methodology assessed such as:

- long-term objectives;
- legal requirements including environmental, and health and safety;
- stakeholders' views including te ao Māori;
- risks that need to be controlled during remediation;
- reduction in site users' exposure to contaminants to be achieved;
- short-, medium- and long-term adverse effects including noise, disruption, traffic and so on;
- practicability and ongoing maintenance of selected methodology;

- estimates of financial costs for each remedial option including monitoring;
- ISO 18504:2017 Sustainable remediation objectives;
- timeframes and duration including establishment, operation and decommissioning;
- additional benefits beyond simply reducing the risk and presence of contaminants on site.

2.6 Remedial options report

2.6.1 Purpose and context

The remedial options report (ROR) details the findings of the ARO and provides decision-makers with details of benefits and disadvantages of each potential remedial technology or methodology considered for a specific project. It is a useful communication tool, especially when having to justify selecting a specific remedial option over other available options.

A ROR is prepared as part of remedial planning when circumstances favour such an approach. It may be as part of the RAP or as a standalone report, especially for more complex cases. A ROR is not a compulsory report under the NESCS but it may be included to help demonstrate the selection process for the preferred option.

2.6.2 Remedial options report content

The ROR should document matters addressed during the ARO process including:

- long-term objectives
- stakeholders' views, including te ao Māori
- required level of risk reduction to be achieved
- legal requirements including environmental, and health and safety
- additional benefits beyond simply reducing the risk and presence of contaminants on site
- short-, medium- and long-term adverse effects including noise, disruption, traffic and so on
- estimates of financial costs for each remedial option including monitoring
- sustainability of the methodology (risk reduction assessed against environmental, financial and social considerations)
- practicability and ongoing maintenance of selected methodology
- timeframes and duration including establishment, operation and decommissioning
- risks that need to be controlled during remediation
- a summary of the conceptual site model and the drivers for remediation
- a statement of the remedial objectives and environmental guideline values for contaminants of concern
- factors influencing remediation such as travel times and distances, accessibility and other practical matters
- details of the selection process and criteria and weighting, if applicable
- a summary of available remedial technologies and methodologies

- costs, benefits and limitations for each available remedial technology and/or methodology
- additional objectives to be achieved during remediation.

2.7 Remedial action plan

A remedial action plan (RAP) is intended to develop a remediation strategy, and plan remedial and management works to mitigate the risk posed by contaminants, as detailed in the CSM. It is intended to optimise the allocation of available resources to achieve the desired remedial objectives. The RAP should establish clear and measurable remediation objectives and criteria (clean-up levels). It should also set milestones, targets and deadlines that can be applied to the phases of the project.

It is important to establish if there are any limiting factors or additional objectives the remediation should achieve. This may include protecting or restoring sensitive cultural or heritage areas, financial restrictions and available time or sustainability indicators, such as a greenhouse gas emissions cap for the project. These will form part of the requirements against which remediation options are assessed.

Remedial action has a broad definition and may include any action that eliminates or sufficiently reduces the hazard (interrupts or sufficiently reduces existing source, pathway and/or receptor linkages) and includes remedial methodologies and technologies. Because every contaminated site is unique, different remedial methodologies and technologies may be appropriate for a site.

Remedial technology refers to the technological components of a remedial methodology that pre-processes, processes or post-processes contaminated media or contaminants as part of risk management of contaminated sites.

Examples of remedial methodologies and technologies include:

- excavation and disposal
- on-site containment
- bioremediation
- chemical immobilisation and solidification
- non-ionising radiation treatment (eg, UV)
- soil washing
- soil mixing
- thermal desorption
- soil vapour extraction
- *in-situ* air sparging
- *in-situ* chemical oxidation and enhanced *in-situ* chemical oxidation
- pump and treat and skimming systems
- monitored natural attenuation (MNA) and enhanced MNA
- permeable reactive barriers and cut-off walls.

2.7.1 Purpose and context

The purpose of a RAP is to document the:

- selected remediation or management option to be undertaken on a site
- objectives and strategies of the methodology selected during the ARO
- remediation milestones, including deliverables and schedules, to monitor progress
- associated health, safety and environmental controls at least in summary form (more complex sites typically have a separate contaminated site management plan and health and safety plan)
- any validation testing, sampling, monitoring or inspection proposed to demonstrate the success of remediation.

Preparation of a RAP in accordance with these guidelines will help to meet the requirements listed under regulation 10(3)(c) of the NESCS, which includes the following approaches to remediation or ongoing land management:

- 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.

Remedial strategies may include:

- removing contamination
- reducing contaminant concentrations
- interrupting the exposure pathway, including soil, water or gas barriers.

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 exclusion of receptors from contamination is a management action considered in the ongoing site management plan section (section 2.9).

The type of remediation proposed will depend on:

- applicable guideline levels, regulatory limits and remedial objectives that apply to the site
- the degree and extent of contamination present (as demonstrated by the DSI)
- the purpose of the remediation
- the current or proposed land use
- any redevelopment proposed (earthworks, paving, buildings, final exposed soil)
- suitable remedial techniques that offer clear benefits.[5]

[5] Remediation may not always have a distinct financial benefit. In some cases, the cost of the remediation will not be recoverable in financial terms but the benefits of remediating a site need to also consider the potential environmental, cultural and social benefits over the life of the remediated site.

2.7.2 Content of a remedial action plan

The scale and scope of a particular RAP will reflect the complexity of the site setting, including contamination present, the identified risks and the remediation objectives. For example, it may be appropriate in some instances to remove all contaminated soil, or to simply cap the contamination *in-situ* and manage the remaining soils with an ongoing site management plan (refer section 2.9). On complex sites, a combination of several remediation technologies and /or methodologies may be appropriate, and these may change during the course of remediation.

Owing to the complexity of the remedial options that may be proposed, SQEPs should exercise judgement over how much detail is required in each section of the RAP. A SQEP should consider the potential requirement for resource consents other than those specified in the NESCS (eg, discharge permit) when developing a RAP.

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

- the context of the RAP, including the regulatory context as appropriate, and a statement of remedial objectives
- a site description and summary of the previous investigation/s undertaken (preferably with investigation reports appended or as a companion volume)
- remediation or management objectives 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 CLMG 5
- a detailed remediation strategy including methods, actions, procedures and plans to be implemented to achieve the desired remediation objectives (ie, what you are 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)
  - design of, and installation methods for, engineered barriers
  - conceptual design and installation of ventilation systems
  - health and safety controls
- a method for record keeping (eg, field notes including dates of the works, quantities of soil removed, soil disposal manifests) and developing specific drawings relevant to the remediation (eg, systematic and clear plans, detailed ‘as-built plans’)
- a means for assessing the effectiveness of the remediation which may involve:
  - developing a statistically robust sampling and analysis plan for soil validation sampling, in the case of soil removal or concentration reduction

  - stating the requirements for inspection or environmental monitoring to show the adequacy of remediation or management measures
- in the case where soil removal is required:
  - details of the sampling needed to satisfy the requirements of landfill or other disposal locations
  - the acceptance criteria for disposal locations
  - rules for determining which disposal option should be used for particular soil when options are available
- protocols for the discovery of unexpected contamination
- the environmental and human health safeguards required, or a reference to the site management plan
- an explanation of the necessary consents required by regulatory agencies to undertake remediation (and copies of the consents if already granted).

Supporting information should be appended to the RAP.

Requirements for the contents of a RAP are listed in appendix A7.

2.8 Site validation report

2.8.1 Purpose and context

A site validation report (SVR) is a report that documents the results and findings of a detailed site investigation (DSI) undertaken to validate that the remedial objectives outlined in the RAP have been achieved.

The specific type of DSI undertaken for site validation is a site validation investigation (SVI).

A SVR documents the post-remediation conditions at a site and, where appropriate, statistically demonstrates compliance with the appropriate guideline values. The SVR should provide statistically reliable data, on which risk-based decisions can be made.

A SVR should be based on the results of testing, sampling and inspection. It should verify whether the remedial works were undertaken as set out in the RAP. The SVR should address any variations from the RAP and the consequences of such variations. It should result in a revised CSM and risk assessment.

Sample collection, testing, inspection, laboratory analysis and data interpretation for SVIs follow the same principles for DSIs as set out in section 4 to section 7 of CLMG 5.

Under the NESCS, R 10(3)(d) gives the territorial authority discretion to consider the adequacy of a SVR when assessing an application under this regulation.

2.8.2 Content

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

- 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
- a summary of the remedial strategy and objectives including soil acceptance or other criteria relevant to the remedial works
- a summary of remedial/management works undertaken with any variations from that intended
- details of the validation works undertaken (scope of work) including any variations from those intended
- a summary of the validation testing, sampling and/or inspection undertaken (sampling and analysis plan); associated laboratory testing, sampling and/or inspection results; and site plans and/or photographs clearly showing where testing/sampling/inspection were undertaken
- analysis of the testing/sampling/inspection results, including statistical analysis, to demonstrate the risk to human health or the environment is as intended or otherwise acceptable
- details of any testing/sampling/inspection undertaken or certifications obtained for engineered-type remediation solutions (eg, for the installation of liners)
- documentary evidence to show any disposal of contaminated material off site has been carried out in accordance with the RAP or SMP, and that the requirements of the disposal site and the relevant local authority have been met
- an assessment of the effectiveness of the remediation against the remedial objectives and whether long-term management controls (in the form of an OSMP, see section 2.9) should be implemented.

SVIs that involve sampling to demonstrate compliance with the remedial objectives are a form of DSI. Investigation and reporting requirements for SVIs that require sampling will follow the same principles outlined for a DSI in **CLMG 5**.

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

A SVR should, where applicable, include confirmation that all the requirements of the consenting authority (or authorities) or other regulatory requirements have been met.

Supporting information should be appended to the SVR.

Requirements for the contents of a SVR are listed in appendix A8.

2.9 Ongoing site management plan

2.9.1 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 ongoing monitoring and management.

An OSMP may arise from an NESCS 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 occupier simply wants to ensure exposure to the contamination remains acceptable into the future.

Controls in an OSMP are typically to ensure future soil disturbance or disposal work 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.

Departure from the activities managed by the OSMP may require additional consent, an activity-specific SMP and/or a revised OSMP. Examples of activity-specific SMPs include earthworks plans or stormwater management plans.

As well as controlling minor future soil disturbance or disposal, an OSMP may specify long-term monitoring of remedial measures such as:

- inspecting and maintaining the condition of barriers or membranes
- monitoring vapours in the ground or indoor atmosphere
- 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 more detail, see section 2.10 Routine monitoring report.

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. Where multiple owners or tenants may be present, unless there is a body corporate (or similar) ensuring the plan is followed, consideration should be given to the effectiveness of implementing an OSMP on a residential site. For sites where there is some form of overseeing entity (eg, a landlord, body corporate, corporate owner or occupier, or community organisation), an OSMP can conveniently reside with other site documentation such as lease agreements, maintenance and operations manuals, and health and safety plans.

An OSMP cannot effectively consider all possible eventualities. Generally, it is not intended to control future major redevelopment works, changes in site use or soil disturbance. These would typically be the subject of NESCS consenting requirements and management plans specific to the works.

2.9.2 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 contents of an OSMP will depend on the extent and nature of the residual contamination and the risks that need to be managed.

The scope of possible activities covered by an OSMP should be realistic. Rather than accommodating for all possible future activities, it may be appropriate to emphasise the need for specific plans and risk re-assessment in the event of major earthworks, change of use and redevelopment activities.

An example table of contents for an OSMP is provided in appendix A9. The person preparing the OSMP should develop the document in a way that is easy for non-expert end users to understand and follow. An OSMP should include the following site-specific information, where relevant:

- contextual information including the reason for the plan and the nature of the residual contamination with test results, maps, as-built plans and diagrams, as appropriate

- a description of the activities covered
- allocation of responsibilities
- document control information
- the regulatory context, including NESCS requirements for soil disturbance and disposal, and any local government planning requirements for soil disturbance
- a summary of the identified sources associated with the contaminants of concern
- site control procedures, site access, locations and isolation of work areas, transport routes, location of clean areas and site facilities
- health and safety protection measures, such as:
  - site induction procedures
  - requirements for personal protective equipment
  - requirements for personal hygiene
  - procedures for first aid and decontamination
- environmental management procedures to control:
  - soil and groundwater during excavation works, including siting and managing temporary stockpiles
  - erosion, sediment and dust (typically referencing existing council guidance documents for small earthworks, with additional measures to take account of the presence of contaminants)
  - noise
- any monitoring required during excavation works
- soil disposal and/or testing requirements
- protocols for unexpected discovery
- a list of main contacts including the site owner and/or manager, primary contractor, emergency services and regulatory agencies.

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

- monitoring locations, what is to be monitored, frequency of monitoring, monitoring methods and analysis or inspection requirements (the monitoring plan)
- trigger values or conditions requiring action
- action to be taken in the event of a non-complying value or condition
- reporting requirements (see section 2.10 Routine monitoring report).

Supporting information should be appended to the OSMP.

Requirements for the contents of an OSMP are listed in appendix A9.

2.10 Routine monitoring report (RMR)

2.10.1 Purpose and context

An ongoing site management plan (OSMP) may require regular routine monitoring of environmental parameters including soil, sediment, surface water, groundwater or soil gas and vapour sampling, among others. The routine monitoring report (RMR) provides a means to develop a template for reporting on the results of ongoing monitoring, without the need to provide a DSI for each monitoring event.

The RMR is intended to provide a consenting authority, landowner, occupier or other interested party with a report template that meets their requirements in an acceptable and repeatable format.

It is important the RMR is tailored to the specific situation to ensure it fulfils the needs of all parties involved in monitoring and evaluating results to determine compliance with relevant objectives, milestones and/or resource consent conditions.

It may be useful to discuss any proposed monitoring requirements with the SQEP during the development of the RMR template. This will help ensure the objectives of routine monitoring can be met, and that the proposed monitoring will provide sufficient data to meet the monitoring objectives.

The RMR is not a compulsory report under the NESCS, but may be compulsory when required by a regulatory agency to comply with other legislation or a condition of a consent.

Where a RMR is required as a condition of consent, or under another piece of legislation, the SQEP should provide information on the compliance status of the activity that is being monitored.

2.10.2 Content

A template RMR should be developed in consultation with relevant regulatory agencies, the SQEP and all affected parties before the start of routine monitoring. The RMR should include relevant information such as:

- a summary of the site history and works completed to date
- a summary of the objectives and strategies of the methodology selected in the ARO
- relevant remedial objectives
- monitoring methodology and any variation from the methodology during fieldwork
- chain of custody information for all samples collected
- details of the laboratory analyses carried out
- summary of laboratory results
- quality assurance and quality control (QA/QC) information
- comparison with previous results
- a statement of compliance with relevant legislative requirements or resource consent conditions
- discussion with regard to trends and significance of any findings
- any updates to the CSM required as a result of findings

- a description of monitoring or other work planned in future
- appended laboratory results of the monitoring.

A table of contents for a RMR is included in appendix A10.

2.10.3 Presentation of results

The RMR should be concise without losing essential information. Laboratory results, chain of custody sheets, field sheets and other relevant information should be appended to the report.

RMRs allow for consent authorities or other end-users to determine how they would like the results of routine monitoring to be presented. SQEPs should, wherever possible, present data in the form of charts, maps and plans, which rapidly communicate the results of monitoring. These should be supported by more detailed information included as appendices. A well-written RMR will help the reader to interpret complex data rapidly and efficiently, without the need to spend a lot of time reviewing highly technical information.

The SQEP can set up a template RMR as part of the OSMP development by negotiation and agreement with the relevant regulatory agency or agencies. The template may include:

- a brief summary of the site and conditions to be monitored
- the monitoring schedule
- remedial targets, relevant guideline values or other contaminant limits
- descriptions of the locations of sampling points or wells
- visual representation of results on maps, plans, charts or figures.

Such a template will help ensure consistency and sufficiency of reporting for routine monitoring events. If, at any stage, the RMR is found to be lacking or excessive, the relevant parties can negotiate to change the template for future monitoring events to a more suitable format.

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 **CLMG 5**) and its complexity and purpose. It is not the intention to require identical reporting from practitioners or force a certain style.

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

Regardless of whether a report is being completed for NESCS purposes or not, an investigation report needs to communicate any uncertainty and levels of confidence in the assessment. It is recommended the 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
- any assumptions and/or uncertainties used to reach the report's conclusion (eg, the layout and physical design of the proposed future development on the site) and how these may affect that 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 10 reports and/or plans described in section 2. Specifically:

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

A1: PSI Table of contents: Determining if the NESCS 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 coordinates)	☐		3.3.1
• proposed site use		☐	3.3.2
2. Site description			
• environmental setting		☐	3.3.3
• site layout	☐		3.3.4
• current site uses	☐		3.3.5
• surrounding land uses	☐		3.3.6
• geophysical surveys		☐	5.1
• site inspection		☐	3.3.8
3. Historical site use			
• summary of site history gained from:	☐		3.3.7
– review of existing investigation reports		☐	
– review of council information		☐	
– review of aerial photographs		☐	
– interviews		☐	
– review of other historical Information		☐	
• preliminary sampling (if carried out)		☐	3.3.9
– description (including diagram)			
– justification for sample location and analyte selection			
– results			
– comparison of results to guidelines			
4. Risk assessment			3.3.11
• 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*			

6 Any evidence relied upon to form an opinion/conclusion must be included in report, including sampling.

Content	Required	Required if relied on[6]	CLMG 5 section
• evaluate the probability that pursuant to regulation 6 (3): – *the likelihood that the soil is contaminated as a result of activity or industry occurring*	☐		2.2
• description of the limitations of the data collected and the assumptions and uncertainties inherent in the data and models used	☐		7.3.1
5. Conclusions	☐		
6. Recommendations (if relevant to report purpose)		☐	
7. Report limitations	☐		2.1.2
8. SQEP certification of report (refer appendix C)	☐		1.2
9. References	☐		
Appendices: relevant supporting information	☐		

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	☐	

[7] Any evidence relied upon to form an opinion/conclusion must be included in the 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 coordinates)	☐		3.3.1
• proposed site use.	☐		3.3.2
2. Site description			
• environmental setting	☐		3.3.3
• site layout	☐		3.3.4
• current site uses	☐		3.3.5
• surrounding land uses	☐		3.3.6
• geophysical surveys		☐	5.1
• site inspection.		☐	3.3.8
3. Historical site use			
• summary of site history gained from	☐		3.3.7
– review of existing investigation reports		☐	
– review of council information		☐	
– review of aerial photographs		☐	
– interviews		☐	
– review of other historical information		☐	
• preliminary sampling (if carried out)		☐	3.3.9
– description (including diagram)			
– justification for sample location and analyte selection			
– results			
– comparison of results to guidelines.			
4. Risk assessment			3.3.11
• conceptual site model	☐		
• evaluation of the probability that contamination exists on the site	☐		
• identification and characterisation of potential pathways and receptors for each exposure area across the site (eg, assessment of geology, hydrogeology, building construction, site use)	☐		
• likelihood that contamination poses a risk to identified receptors including potential receptors	☐		

[8] Any evidence relied upon to form an opinion and/or conclusion must be included in the report including sampling. If sampling is relied upon, then headings 3, 4 and 5 of table A4 apply.

Content	Required	Required if relied on[8]	CLMG 5 section
• magnitude of the risk to receptors, 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) • 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.**	☐ ☐	☐	3.3.11, 7.3.2
5. Conclusions	☐		
6. Recommendations (if relevant to report purpose)		☐	
7. Report limitations	☐		
8. SQEP certification of report (refer appendix C)	☐		1.2
9. 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)		☐
Calibration information for any field screening instruments used		☐
Other supporting information		☐
Statement of qualification of the author and, if not the author, the certifying SQEP	☐	1.2

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

A3: DSI table of contents: Determining if NESCS applies

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

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 coordinates)	☐		3.3.1
• proposed site use.		☐	3.3.2
2. Site description			
• environmental setting	☐		3.3.3
• site layout	☐		3.3.4
• current site uses	☐		3.3.5
• surrounding uses	☐		3.3.6
• geophysical surveys		☐	5.1
• site inspection.		☐	3.3.8
3. Historical site use (sufficient to plan investigation)			
• summary of site history gained from	☐		3.3.7
– review of existing investigation reports		☐	
– review of council information		☐	
– review of aerial photographs		☐	
– interviews		☐	
– review of other historical Information		☐	
• preliminary sampling (if carried out)	☐		3.3.9
– 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 and/or analyte selection	☐		4.2.1
• background concentration level (if relevant), contaminant standard and/or environmental 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 (eg, hotspot size, statistical reliability)	☐		4.2.4

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).

Content	Required	Required if relied on[10]	CLMG 5 section
• sample depth	☐		4.2.5
• composite sampling including number of sub-samples per sample		☐	4.2.6
• background sampling methodology		☐	4.2.7
• field sampling technique(s)	☐		4.3, 5.2
• field screening techniques		☐	5.4
• 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	☐		6.2
• field observations (eg, staining, odour, soil characteristics)	☐		5.2.1
• evaluation of analytical laboratory results with comparison to background concentration levels (if relevant), contaminant standards and/or environmental guideline values	☐		7
• evaluation of field screening results with comparison to background concentration levels (if relevant), contaminant standards and/or environmental guideline values		☐	7
• results of field and laboratory sample quality assurance and/or quality control	☐		6.5 & 7.1
• statistical analysis of results.		☐	
6. Disposal of soil			
• transport, disposal, and tracking of soil and other materials taken away in the course of the activity.		☐	
7. Risk assessment			3.3.11
• conceptual site model	☐		3
• evaluation of the probability that contamination exists on the site	☐		
• characterisation of the source through adequate delineation of contamination horizontally and vertically and assessment of contaminant concentrations	☐		
• identification and characterisation of potential pathways and receptors for each exposure area across the site (eg, assessment of geology, hydrogeology, building construction, site use)	☐		
• likelihood that contamination poses a risk to identified receptors including potential receptors	☐		
• evaluation of the level of any identified risk to human health pursuant to regulation 5(9)	☐		
– *does a detailed site investigation exist that demonstrates that any contaminants in or on the piece of land are at, or below, background concentrations?*			
• evaluation of the magnitude of any identified risk to other receptors (eg, ecological)		☐	
• limitations, assumptions and uncertainties in data and models used.	☐		

Content	Required	Required if relied on[10]	CLMG 5 section
8. Discussion		☐	
9. Conclusions	☐		
10. Recommendations (if relevant to report purpose)		☐	
11. Report limitations	☐		
12. SQEP certification of report (refer appendix C)	☐		1.2
13. References	☐		
Appendices: relevant supporting information	☐		

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 sampling results		☐
Laboratory reports and chain of custody documentation	☐	
Calibration information for any field screening instruments used		☐
Statistical calculations eg, ProUCL inputs and outputs		☐
Soil cuttings and purge water disposal documentation		☐
Statement of qualification as an SQEP	☐	

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 soil sampling 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 coordinates)	☐		3.3.1
• proposed site use.	☐		3.3.2
2. Site description			
• environmental setting	☐		3.3.3
• site layout	☐		3.3.4
• current site uses	☐		3.2.5
• surrounding land uses	☐		3.3.6
• geophysical surveys		☐	5.1
• site inspection.		☐	3.3.8
3. Historical site use (sufficient to plan investigation)			
• summary of site history gained from	☐		3.3.7
– review of existing investigation reports		☐	
– review of council information		☐	
– review of aerial photographs		☐	
– interviews		☐	
– review of other historical Information		☐	
• preliminary sampling (if carried out)		☐	3.3.9
– 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 and/or analyte selection	☐		4.2.1
• media to be sampled (link to CSM and objectives)	☐		3
• background concentration level (if relevant), contaminant standard and/or environmental guideline value calculation[14] or selection[15]	☐		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

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

[14] Refer to *Methodology for deriving standards for contaminants in soil to protect human health (Ministry for the Environment*, 2011d).

[15] Refer to *Contaminated land management guidelines No 2: Hierarchy and application in New Zealand of environmental guideline value**s*** (Ministry for the Environment, 2011a).

Content	Required	Required if relied on[13]	CLMG 5 section
• sample depth	☐		4.2.5
• composite sampling including number of sub-samples per sample		☐	4.2.6
• background sampling methodology		☐	4.2.7
• field sampling techniques	☐		4.2.8
• field screening techniques		☐	5.4
• 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)	☐		5.2.1
• evaluation of analytical laboratory results with comparison to background concentration levels (if relevant), contaminant standards and/or environmental guideline values	☐		7
• evaluation of field screening results with comparison to background concentration levels (if relevant), contaminant standards and/or environmental guideline values		☐	
• results of field and laboratory sample quality assurance and/or 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 contamination exists on the site	☐		3.3.11
• 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 the contamination poses a risk to identified receptors including potential receptors	☐		
• evaluate the level of that risk pursuant to regulation 9(1)(b) and/or regulation 9(3)(b)	☐		
– *it is demonstrated that soil contamination does not exceed the applicable standard in regulation 7*			
• propose any requirement for management methods to mitigate identified risks (as necessary)		☐	
• evaluate the magnitude of any identified risk to other receptors (eg, ecological)		☐	

Content	Required	Required if relied on[13]	CLMG 5 section
• 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)(ii) • description of how proposed activity must be reported on – regulation 9(2)(b)(iii).		☐ ☐ ☐	
9. Discussion		☐	
10. Conclusions	☐		
11. Recommendations (if relevant to report purpose)		☐	
12. Report limitations	☐		
13. SQEP certification of report (refer appendix C)	☐		
14. References	☐		
Appendices: relevant supporting information	☐		

Supporting information	Required	Required if relied on[16]
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 sampling results		☐
Laboratory reports and chain of custody documentation	☐	
Calibration information for any field screening instruments used		☐
Statistical calculations eg, ProUCL inputs and outputs		☐

16 Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

Soil cuttings and purge water disposal documentation		☐
Site management plan (refer appendix A6)		☐
Statement of qualification as an SQEP	☐	

A5: DSI table of contents: restricted discretionary activities

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

Content	Required	Required if relied on[17]	CLMG 5 section
1. Introduction			
• investigation objectives	☐		2.1
• site identification (site name, address, legal description, site boundaries, a map reference and geographic coordinates)	☐		3.3.1
• proposed site use.	☐		3.3.2
2. Site description			
• environmental setting	☐		3.3.3
• site layout	☐		3.3.4
• current site uses	☐		3.3.5
• surrounding land uses	☐		3.3.6
• geophysical surveys		☐	5.1
• site inspection.		☐	3.3.8
3. Historical site use (sufficient to plan investigation)			
• summary of site history gained from	☐		3.3.7
– review of existing investigation reports		☐	
– review of council information		☐	
– review of aerial photographs		☐	
– interviews		☐	
– review of other historical information		☐	
• preliminary sampling (if carried out)		☐	3.3.9
– 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 and/or analyte selection	☐		4.2.1
• media to be sampled (link to CSM and objectives)	☐		3

[17] Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

Content	Required	Required if relied on[17]	CLMG 5 section
• background concentration level (if relevant), contaminant standard and/or environmental guideline value calculation[18] or selection[19]	☐		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 including number of sub-samples per sample		☐	4.2.6
• background sampling methodology		☐	4.2.7
• sampling techniques	☐		4.2.8
• field screening techniques		☐	5.4
• 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)	☐		5.2.1
• evaluation of analytical laboratory results with comparison to background concentration levels (if relevant), contaminant standards and/or environmental guideline values	☐		7
• evaluation of field screening results with comparison to background concentration levels (if relevant), contaminant standards and/or environmental 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 contamination exists on the site	☐		3.3.11
• characterise the source through adequate delineation of contamination horizontally and vertically and assessment of contaminant concentrations		☐	

[18] Refer to *Methodology for deriving standards for contaminants in soil to protect human health* (Ministry for the Environment, 2011d).

[19] Refer to *Contaminated land management guidelines No 2: Hierarchy and application in New Zealand of environmental guideline values* (Ministry for the Environment, 2011a).

Content	Required	Required if relied on[17]	CLMG 5 section
• 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 the contamination poses a risk to identified receptors including potential receptors • evaluate the magnitude of that risk pursuant to regulation 10(2)(b): – *the report on the detailed site investigation must state that the soil contamination exceeds the applicable standard in regulation 7* 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 (eg, 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 the DSI should not be accepted for the purposes of determining compliance with NESCS regulation 10(2). This would then result in the application defaulting to a discretionary consent.	☐	☐	
8. Discussion		☐	
9. Conclusions	☐		
10. Recommendations (if relevant to report purpose)		☐	
11. Report limitations	☐		
12. SQEP certification of report (refer appendix C)	☐		
13. References	☐		
Appendices: relevant supporting information	☐		

Supporting information	Required	Required if relied on[20]
Figures		☐
Conceptual site model (if not included in report body)	☐	

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

Supporting information	Required	Required if relied on[20]
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 sampling results		☐
Laboratory reports and chain of custody documentation	☐	
Calibration information for any field screening instruments used		☐
Statistical calculations eg, ProUCL inputs and outputs		☐
Soil cuttings and purge water disposal documentation		☐
Remedial 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 an SQEP	☐	

A6: Site management plan table of contents

Content	Required	Required if relied on[21]
1. Introduction • description of the site and report purpose.	☐	
2. Responsibilities and document control information	☐	
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 and so on.	☐	
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[22]
Figures, plans, drawings	☐	
Conceptual site model (if not included in plan body)		☐
Previous reports (or relevant sections thereof)		☐
Statement(s) of qualification as an SQEP		☐

21 Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

22 Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

A7: Remedial action plan table of contents

Content	Required	Required if relied on[23]
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 contamination • remediation strategy, objectives and milestones • summary of remedial options/ROR.	☐ ☐ ☐	
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 and/or controls to address the risk posed by the contaminants to the environment and/or human health during the remedial works (including health and safety of workers, and environmental controls) • proposed contamination management measures, 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 site validation strategy and methods to demonstrate the degree to which remedial objectives have been met.	☐ ☐	
6. Unexpected contamination discovery protocols	☐	
7. References	☐	
Appendices: relevant supporting information	☐	

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

Supporting information	Required	Required if relied on[24]
Figures	☐	
Conceptual site model (if not included in plan body)	☐	
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 an SQEP		☐
Assessment of remedial options (ARO)		☐

[24] 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[25]
1. Introduction		
• description of the client, site, report purpose.	☐	
2. Site description		
• summary of site contamination	☐	
• summary of remediation strategy and objectives	☐	
• 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 (see section 2.8.2) eg, validation testing, sampling, inspection and analysis plan and/or intended tasks)	☐	
• description of validation works undertaken and any variations to the validation strategy	☐	
• presentation of validation testing/sampling/inspection results and comparison of results with background concentration level (if relevant), contaminant standard and/or environmental guideline value, or other standards as appropriate	☐	
• description of completed management works (if any)		☐
• validation testing/sampling/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 objectives were met		
7. Report limitations	☐	

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

Supporting information	Required	Required if relied on[26]
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		☐
Calibration information for any field screening instruments used		☐
Statistical calculations eg, ProUCL inputs and outputs		☐
Soil disposal documentation		☐
(Proposed) ongoing site management plan (refer appendix A9) – regulation 10(3)(c)		☐
Statement(s) of qualification as an SQEP		☐

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

A9: Ongoing site management plan table of contents

Content	Required	Required if relied on[27]
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 information	☐	
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 and/or plan • contingency requirements • reporting requirements • schedule to update and/or review the monitoring requirements.	 	☐ ☐ ☐ ☐
6. Report limitations	☐	

Supporting information	Required	Required if relied on[28]
Figures, plans, drawings	☐	
Site photographs		☐
Detailed monitoring or inspection requirements		☐
Previous reports		☐
Consents or permits		☐
Statement(s) of qualification as an SQEP		☐

27 Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

28 Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

A10: Routine monitoring report

The routine monitoring report (RMR) is intended to be customisable to the needs of the regulatory authority or a landowner, occupier or any other interested and/or affected party, according to their needs. The most important aspect is to ensure the requirements of the users of the RMR are agreed before the start of routine monitoring. Changes can still be made by agreement between the various parties after the start of routine monitoring, if the need arises. The checklist below includes only the critical information required, leaving the balance as required or if relied upon, or if required by the agreement.

Content	Required	Required if relied on[29]
1. Introduction		
• description of the client, site identification details, report purpose, regulatory context (including any relevant resource consent conditions which exist for the site or any non-regulatory monitoring objectives)	☐	
• brief summary of site history and works completed to date **or** reference to previous report with this information.		☐
2. Responsibilities and document control information	☐	
3. Summary of monitoring event		
• details of monitoring event including date, monitoring undertaken, sampling methods, field observations and any conditions relevant to the monitoring event	☐	
• details of limiting conditions if any required monitoring could not be undertaken		☐
• QA/QC information.		☐
4. Statement of compliance with resource consent (regulatory RMR)		
• summary of resource consent conditions	☐	
• details of any non-compliant results (for resource consents) or trigger level exceedances and any actions undertaken in response	☐	
• details of previous monitoring event non-compliances, if any.	☐	
5. Statement of compliance with guideline values (non-regulatory RMR)		
• summary of compliance with site objectives and/or target environmental guideline values.		☐
6 Discussion of results		
• summary of monitoring results		☐
• plan or map showing monitoring locations and current round of results for each site		☐
• discussion of outliers and/or anomalies		☐
• significance of results		☐
• discussion of trends		☐
• discussion of changes to the CSM		☐

[29] Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

Content	Required	Required if relied on[29]
• discussion of changes to risk.		☐
7. Summary of future work		
• date and scope of next routine monitoring	☐	
8. Appendices		
• field sheets		☐
• copy of laboratory results		☐
• summary of historical monitoring results tabulated for each location		☐
• trend analysis, including calculation details, graphs, etc		☐
• tabulated results for each monitoring location		☐
• chain of custody details, if applicable.		☐

Supporting information	Required	Required if relied on[30]
Figures, plans, drawings		☐
Site photographs		☐
Detailed monitoring or inspection requirements		☐
Calibration information for any field screening instruments used		☐
Statistical calculations eg, ProUCL inputs and outputs		☐
Consents or permits		☐
Statement(s) of qualification as an SQEP		☐

30 Any evidence relied upon to form an opinion and/or conclusion must be included in the report.

Appendix B: Underground petroleum storage system removal

Removal of an underground petroleum storage system (UPSS) is a regulated activity under the NESCS. One of the requirements for the activity to be a permitted activity under regulation 8(1) is that it must be carried out in accordance with the current edition of: *Guidelines for assessing and managing petroleum hydrocarbon contaminated sites in New Zealand* (Wellington, Ministry for the Environment) (regulation 8(1)(a)).

The reporting requirements outlined in section 2 of this guideline is not necessarily appropriate for such reports. These types of investigations are typically focused on assessing the immediate vicinity of the UPSS and usually don't involve investigating the wider site.

This section provides an example checklist-style report template (amended from an original template developed by URS New Zealand Ltd, Wellington). This can be adopted in whole or adapted to be a combination checklist and narrative style 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 a fuel storage system' prepared for NESCS 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*.

This table was kindly provided by URS. Minor updates have been made to the table by AECOM who have kindly authorised its continued use.

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 and/or 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:			
Undertaken under NESCS consent or PA?		NESCS consent number:	
Number of tank pits:		Number of tanks removed:	

Removed/replaced tank information (add rows as required)								
Tank/ pit ID	Capacity (*litres*)	Contents (*product*)	Remove and/or replace	Age (*yr*)	Material	Holed (*yes/no*)	Condition	Pit construction and/or condition
Additional comments:								

Removed/replaced components (add rows as required)						
Component	Contents (*product*)	Remove and/or 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 Describe:	☐ Gently sloping	☐ Flat
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 Describe:	☐ < 100 metres (*show on plan*)	
Surface water use:		☐ Recreation ☐ Aquaculture ☐ Not utilised Describe:	☐ Drinking ☐ Industry ☐ Not known	☐ Irrigation ☐ Shipping

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 encountered?	☐ No	☐ Yes	Depth (*m bgl*)
Was sheen or LNAPL visible?	☐ No	☐ Yes	If yes, describe and reference photo
Have on-site wells been checked for LNAPL?	☐ No ☐ No wells present	☐ Yes	If yes, describe:
Have on-site wells been sampled?	☐ No ☐ No wells present	☐ Yes	If yes, describe:

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, 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 ☐ Industrial/commercial ☐ Residential ☐ Agricultural ☐ Other
Future site use:	☐ Petroleum use ☐ Industrial/commercial ☐ Residential ☐ Agricultural

	☐ Other
Adjoining land use:	☐ Petroleum use ☐ Industrial/commercial ☐ Residential ☐ Agricultural ☐ Other
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).*

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	☐ ☐ ☐ ☐ ☐ ☐ ☐	☐ ☐ ☐ ☐ ☐ ☐ ☐

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:

Appendix C: Examples of report certifying statements

The following certifying statements are intended as a guide only, and any person using them is responsible for ensuring their own compliance with the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, and should obtain independent legal advice before using these statements.

National Environmental Standard for assessing and managing contaminants in soil to protect human health
PRELIMINARY SITE INVESTIGATION CERTIFYING STATEMENT

I *(Name of SQEP) of (Complete company details) c*ertify that:

1. this preliminary site investigation meets the requirements of the Resource Management (National Environmental Standard for assessing and managing contaminants in soil to protect human health) Regulations 2011 because it has been:
    a. done by a suitably qualified and experienced practitioner, and
    b. reported on in accordance with the current edition of Contaminated land management guidelines No 1 – Reporting on contaminated sites in New Zealand, and
    c. the report is certified by a suitably qualified and experienced practitioner.

For activities under R8(4) of the NESCS this preliminary site investigation concludes it is highly unlikely that there will be a risk to human health if the activity is done to the piece of land.

The activity to be undertaken as defined in R 5(5) and R5(6) is described:

a. on page(s) …… of this preliminary site investigation; or
b. in the document ……

Evidence of the qualifications and experience of the suitably qualified and experienced practitioner(s) who have done this investigation and have certified this report is appended to the preliminary site investigation report.

Signed and dated: ……

Example 2: National Environmental Standard for assessing and managing contaminants in soil to protect human health

DETAILED SITE INVESTIGATION CERTIFYING STATEMENT

I *(Name of SQEP) of (Complete company details)* certify that:

1. this detailed site investigation meets the requirements of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (the NESCS) because it has been:
    a. done by a suitably qualified and experienced practitioner, and
    b. done in accordance with the current edition of *Contaminated land management guidelines No 5 – Site investigation and analysis of soils*, and
    c. reported on in accordance with the current edition of *Contaminated land management guidelines No 1 – Reporting on contaminated sites in New Zealand*, and
    d. the report is certified by a suitably qualified and experienced practitioner.

2. This detailed site investigation concludes that: *[delete whichever does not apply]*
    a. [For activities under R9 of the NESCS] does not exceed the applicable standard in Regulation 7 of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations
    b. [For activities under R10 of the NESCS] does exceed the applicable standard in Regulation 7 of the Resource Management (National Environmental Standard for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations

Evidence of the qualifications and experience of the suitably qualified and experienced practitioner(s) who have done this investigation and certified this report is appended to this detailed site investigation report.

Signed and dated: ……

References

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