Checklist of reporting requirements for contaminated sites

This checklist is taken from the *Contaminated Land Management Guidelines No.1 – Reporting on Contaminated Sites in New Zealand (Revised 2011)*. Please refer to this document for further details on the use and application of the checklist.

This checklist should be included as a coversheet for all contaminated site investigations.

How to use the checklist:

The checklist links with stages 1 through 5 of reporting, discussed in Chapter 2. The aim is to provide a logical and sequential list ensuring that each section of a report covers the required data. The listings are indicative and not directive – include additional relevant topics and headings where site details or contaminant issues warrant this.

The first column lists report headings to be included and principal subjects to be covered under each heading. The other columns refer to the principal reporting stages of contaminated site studies, using the following abbreviations:

PSI	preliminary site investigation report
SIR	detailed site investigation report
RAP	site remedial action plan
SVR	site validation report
MMP	ongoing monitoring and management plan.

The following abbreviations indicate the information requirements:

R	the corresponding heading and details are required
A	readily available information should be included
S	a summary of this section's details will be adequate if detailed information has been included in an available referenced report
N	include only if no further site investigation is to be undertaken
X	not applicable and may be omitted.

Summary contaminated sites report checklist					
Indicate the reports contained in this document	☐	☐	☐	☐	☐
Report section(s) and information to be presented	**PSI**	**SIR**	**RAP**	**SVR**	**MMP**
Executive summary	R ☐	R ☐	R ☐	R ☐	R ☐
Scope of work	R ☐	R ☐	R ☐	R ☐	R ☐
Site identification	R ☐	R ☐	R ☐	R ☐	R ☐
Site history	R ☐	S ☐	S ☐	S ☐	S ☐
Site condition and surrounding environment	R ☐	S ☐	S ☐	S ☐	S ☐
Geology and hydrology	A ☐	R ☐	S ☐	S ☐	S ☐
Sampling and analysis plan and sampling methodology	A ☐	R ☐	X	R ☐	R ☐
Field quality assurance and quality control (QA/QC)	N ☐	R ☐	X	R ☐	S ☐
Laboratory QA/QC	N ☐	R ☐	X	R ☐	X
QA/QC data evaluation	N ☐	R ☐	X	R ☐	X
Basis for guideline values	R ☐	R ☐	R ☐	R ☐	R ☐
Results	A ☐	R ☐	R ☐	R ☐	S ☐
Site characterisation	R ☐	R ☐	R ☐	R ☐	R ☐
Remedial actions	X	X	R ☐	S ☐	S ☐
Validation	X	X	X	R ☐	S ☐
Site management plan	X	X	R ☐	S ☐	S ☐
Ongoing site monitoring	X	X	X	N ☐	R ☐
Conclusions and recommendations	R ☐	R ☐	R ☐	R ☐	R ☐

Minimum information requirements for each of the five stages

Report section(s) and information to be included	PSI	SIR	RAP	SVR	MMP
Executive summary • Background • Objectives of the investigation stage(s) being reported • Scope of work to be, or which has been, undertaken • Summary of conclusions and recommendations	**R**	**R**	**R**	**R**	**R**
Scope of work • A clear statement of the scope of work to be, or which has been, undertaken	**R**	**R**	**R**	**R**	**R**
Site identification • Street number, street name, suburb and town/city • Legal description with lot, deposited plan and certificate of title number(s) • Geographic co-ordinates as per NZ Map Series 260 when dealing with a small part of a larger site • Current site plan with scale bar showing north direction, local water drainage and other locally significant features on-site and immediately off-site. The plan should also show the historical location of structures that may have affected the distribution of contamination (eg, buildings, underground storage tanks, treatment baths, etc) • Locality map	**R**	**R**	**R**	**R**	**R**

Report section(s) and information to be included	PSI	SIR	RAP	SVR	MMP
Site history • Chronological list of site ownership and uses (including the relevant HAIL[1] codes for those uses) indicating information gaps, unoccupied periods and, if relevant, proposed uses • An outline of those contaminants commonly associated with each land use based on Contaminated Land Management Guidelines Schedule B, ANZSIC (1993) codes and AS4482.1/2 (1997 and 1999), and/or from site-specific information • Zoning – previous, present and, if relevant, proposed, with summary of reasons for changes to zoning that have occurred • Details of relevant building and related permits, licences, resource consents, approvals and trade waste agreements with records of compliance • Local usage of ground and surface water resources, including presence, rate and location of abstractions (current and historical) • Site layout plans showing present and past industrial processes • Sewer and services plans identifying active and abandoned services • Historical uses of adjacent land • Relevant complaint history • Local knowledge of site by staff and residents – present and former • Summary of literature relating to the site, including newspaper articles • Review of aerial and site photography with date and location (including direction of photography) indicated on site maps • Description of manufacturing processes • Inventory of materials and waste products associated with site use and their on-site storage and/or disposal locations • Details and locations of current and former underground and aboveground storage tanks with details of integrity testing • Product spill and loss history • Recorded discharges to land, water and air (authorised and unauthorised) • On-site and off-site disposal locations • Contaminant source areas and pathways on-site and off-site • Integrity assessment (assessment of the accuracy of the information)	**R**	**S**	**S**	**S**	**S**
Site condition and surrounding environment • Topography, means of measurement and site map • Condition of buildings and roadways • Presence of drums, wastes and fill materials • Odours • Visual or quantified details of surface water quality • Flood potential described or mapped • Conditions at site boundary such as type and condition of fencing, soil stability, erosion, and storm water discharge • Visible signs of contamination such as identifiable waste products, discoloration or staining of soil, bare soil patches – on-site and at site boundary • Visible signs of plant stress • Details of any relevant local sensitive environment – rivers, lakes, creeks, wetlands, local habitat areas, endangered flora and fauna	**R**	**S**	**S**	**S**	**S**

[1] Hazardous Activities and Industries List (Ministry for the Environment, 2011).

Geology and hydrology • Background groundwater and surface water quality • Summary of local meteorology • Detailed map and description of location, design and construction of on-site wells, boreholes and pits • Site borehole logs / test pit logs showing stratigraphy using a recognised classification system and depth to groundwater table • Reported range of water table depths below ground surface • Description and location of springs and wells in the vicinity • Location, depth and extent of imported and locally derived fill • Direction(s) and rate of groundwater flow including, where applicable, groundwater levels surveyed to a common datum • Direction(s) of surface water run-off and identification of ponding areas • Preferential flow paths (surface and groundwater)	**A**	**R**	**S**	**S**	**S**
Sampling and analysis plan and sampling methodology • Sampling and analysis data quality objectives • Rationale for the selection of: – sampling pattern, locations and depths (as shown on site maps) – sampling density, including estimated size of the residual hotspots that may remain undetected and statistical confidence in the estimate – which samples are/were submitted for analysis and which samples are/were not analysed – the analytes for each sample and the analytical methods used • Detailed description of the sampling methods including: – sampling devices and equipment type – sampling containers and the type of seal used – sample preservation methods and reference to recognised protocols eg, APHA (1988) or US EPA SW846 (1992) – sample handling procedures – equipment decontamination procedures • Detailed description of any field-screening protocols, methods and equipment, and their calibration	**A**	**R**	**X**	**R**	**R**
Field quality assurance and quality control (QA/QC) • Details of the sampling team, identifying unique initials for each member • Statement of intended duplicate and blank frequency • Records for each sample collected, including date, time and location, samplers' initials, duplicate/blank location and type, analyses to be performed, site observations and weather conditions • Chain of custody, identifying for each sample: sampler, nature of the sample, collection date, analyses to be performed, sample preservation method, departure time from site, dispatch courier used • Background sample, field blank, trip blank, and rinsate sample results and laboratory-prepared trip spike results for volatile analytes • Decontamination procedures carried out between sampling events • Sample-splitting techniques and field instrument calibrations (where used)	**N**	**R**	**X**	**R**	**S**

Laboratory QA/QC • Signed laboratory receipt of signed chain of custody form identifying date/time of receipt and identity of samples included in shipment • Record of holding times where not consistent with method specifications • Analytical methods used by laboratory and laboratory accreditation for analytical methods used • Inter-laboratory comparisons for analytical methods used (where available) • Description of spikes and surrogates used, with percent recoveries • Instrument, method detection and practical quantification limits • Standard solution, reference sample and check sample (including daily) results • Laboratory duplicate, blank and standard results	**N**	**R**	**X**	**R**	**X**
QA/QC data evaluation • Evaluation of all field and laboratory QA/QC information listed above against the stated data quality objectives, including a discussion of: – documentation and data completeness – data representativeness – precision and accuracy for both sampling and analysis for each analyte in each environmental matrix informing data users of the reliability, unreliability or qualitative value of the data • Data comparability checks, which should include bias assessment arising from various sources, including: – collection and analysis of samples by different personnel – collection and analysis by the same personnel using the same methods but at different times (including seasonal for long-running projects) – use of different sampling or analytical methodologies from those stipulated in guideline documents – spatial and temporal changes (because of environmental dynamics) • Relative percent differences for inter- and intra-laboratory duplicates	**N**	**R**	**X**	**R**	**X**
Basis for guideline values • Table listing all selected guideline values, with references • Demonstration that selection of guideline values is consistent with the principles of *Contaminated Land Management Guidelines No. 2: Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011) (Ministry for the Environment, 2003)* or the *Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health (Ministry for the Environment, 2011)* • Assumptions and limitations of guideline values used	**R**	**R**	**R**	**R**	**R**
Results • Summary of previous results (where applicable) • Site plan(s) showing all samples and sampling locations, giving sample identification numbers and sample depth • Summary of all results in tabular form: – identifying essential details such as sample identification numbers and sample depth – showing comparison with relevant guideline values – highlighting every result exceeding the guideline values • A summary table of results containing the following statistics: minimum, maximum, arithmetic average and 95% upper confidence limit on the arithmetic average for each analyte • Site plan showing the extent of soil and/or groundwater contamination exceeding the relevant guideline values for the medium, location and sample depth	**A**	**R**	**R**	**R**	**S**

Site characterisation • Assessment of the type of all environmental contamination, particularly in soil and groundwater • Assessment of the extent of soil and groundwater contamination, including identifiable off-site contamination that may cause environmental effects • Assessment of the potential for chemical degradation or interaction products • Assessment of possible exposure routes and risk to exposed populations (human and ecological risk)	**R**	**R**	**R**	**R**	**R**
Remedial actions • Remediation goal(s) • Discussion of the remedial options available, including the status quo, identifying the means of risk reduction proposed in each • Rationale for selection of the recommended remedial option • Discussion of the extent of remediation required to achieve the remedial goal(s) • Identification of regulatory requirements such as permits, licences and approvals • Pre-remediation site management plan (eg, fencing, warning signs, stormwater diversion, etc) • Names and phone numbers of appropriate personnel to contact during remediation • Demonstration of the disposal route for any material to be disposed off-site • Remediation schedule, including proposed hours of operation • Proposed testing to validate the site during and on completion of the remedial activities • Contingency plan if remedial strategy fails to reach the remediation goals • Staged progress reporting (for long-running projects)	**X**	**X**	**R**	**S**	**S**
Site management plan • Operational remediation site management plan including (where applicable): – community relations – stormwater and soil management – noise and odour control – dust control (including wheel wash) – contingency plans to respond to site incidents to obviate potential effects on the surrounding environment and community – proposed long-term site management – occupational safety and health issues and measures	**X**	**X**	**R**	**S**	**S**
Validation • Rationale and justification for the validation strategy, including: – clean-up criteria selected – statistically based decision-making methodology – validation sampling and analysis plan • Details of statistical analysis of validation results and evaluation against the clean-up criteria • Verification of compliance with regulatory requirements set by all relevant local authorities • Documentation demonstrating that any material moved off-site has been received at point of disposal	**X**	**X**	**X**	**R**	**S**

Ongoing site monitoring • Proposed ongoing site monitoring requirements (if any), including monitoring locations, parameters and frequency • Results of monitoring analyses, including all relevant QA/QC requirements stated above • Ongoing site or plant maintenance (eg, containment cap integrity, etc) or contingency plans • Details of those responsible for the maintenance/ monitoring programme(s) • Details to be included in the annual MMP report, including: – any changes to site owner or occupier – any changes to activities undertaken on-site – any changes to the physical layout of the site – any incidents where the management plan has had to be implemented (subsurface works, site development, etc)	**X**	**X**	**X**	**N**	**R**
Conclusions and recommendations • Brief summary of all relevant findings • Assumptions used in making conclusions • Extent of uncertainties in the results • Where remedial action has been taken, a list summarising the activities and the physical changes to the site • A clear statement that the consultant considers the site to be suitable for the current and, where applicable, the proposed use • A statement detailing all limitations and constraints on the use of the site (where applicable) • Recommendations for further work, if appropriate	**R**	**R**	**R**	**R**	**R**