



Government of **Western Australia**  
Department of **Health**

# Contaminated sites Ground and surface water Chemical screening guidelines



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## Summary

- The Australian Drinking Water Guidelines (ADWG) health-related and aesthetic guideline values apply for potable water uses. The Department of Health adopts the National Environment Protection (Assessment of Site Contamination) Measure (NEPM) groundwater investigation levels (GILs) for contaminated site assessments.
- For non-potable uses, in most cases guideline adjustments can be made based on a multiple of 10 times the health-related ADWG guideline.
- For the odorous chemicals listed in this document, the ADWG aesthetic guideline will apply to non-potable uses if that value is below the adjusted health-related ADWG guideline.
- A human health risk assessment is recommended for deriving site-specific criteria for persistent, bio-accumulative and toxic substances present above ADWG or GILs.
- A screening level of 0.02 mg/L will apply to methyl tert-butyl ether.
- The Department of Health is to be notified when pesticides are detected in water above the analytical limit of detection/reporting.

# Scope

These guidelines apply to chemicals identified in ground and surface water at known or suspected contaminated sites. They provide support for the public health assessment and management of contamination in accordance with *Contaminated Sites Act 2003*, *Contaminated Sites Regulations 2006* and the associated Contaminated Sites Guidelines published by the Department of Water and Environmental Regulation (DWER).

The approach taken in these guidelines may be applied to the assessment of health risks from pollution or other circumstances where chemicals may be found in water.

## Introduction

Managing chemical contamination is important to protect public health and safety for a variety of water uses.

This document is primarily intended to provide information and advice on the Department of Health's (the department) approach to using chemical water guideline values for the classification, assessment and management of contaminated sites. This approach has been incorporated into the [Contaminated Sites Guidelines](#). The Contaminated Sites Guidelines must be referred to when assessing and remediating contaminated sites within Western Australia.

In assessing risk, consideration is given to both health and amenity, including odour, protection of plant life and corrosion where these requirements are necessary for the proposed end use (e.g. irrigation, cleaning, recreational use).

Potential water uses may include:

- drinking, food preparation, cooking
- bathing, swimming, or filling of swimming pools and wading pools
- irrigation of public or private plantings and gardens, including the growing of edible plants
- flushing toilets and washing vehicles or clothes
- irrigation of lawns such as for playing fields, ovals, golf courses, playgrounds, and other public open spaces
- dust suppression at commercial/industrial facilities and mines or during construction work.

General information on use of groundwater in and around the home is available here: [Bore water](#).

## Reference documents

The National Environment Protection (Assessment of Site Contamination) Measure (NEPM) 1999, amended in 2013, provides a framework for the risk-based assessment of surface and groundwater impacted or potentially impacted by site contamination. It aims to minimise risks to human health and the environment and ensure water quality aligns with its environmental values.

The NEPM includes groundwater investigation levels (GILs), which specify acceptable contaminant levels at the point of use. Exceeding GILs requires further assessment.

Additional national guidelines are referenced within the NEPM and are available for further information, including:

- [Australian Drinking Water Guidelines](#)
- [Groundwater quality protection](#)
- [Guidelines for managing risks in recreational water.](#)

The use of these guidelines in WA is described within the Contaminated Sites Guidelines.

## Potable use

Potable water is defined as water intended primarily for human consumption, either directly from the water supply, or indirectly in beverages, ice, or foods prepared with water. Potable water is used in food preparation (e.g. washing dishes, washing fruit and vegetables).

Potable water is also normally available for daily domestic water uses with complete exposure pathways, such as bathing, showering, filling pools, and washing clothes.

The ADWG apply to potable water uses. See [Bore water](#).

Where the contaminants of concern are not listed in the ADWG, the department may be consulted to identify an acceptable guideline level.

Site-specific guidelines may be established for potable uses following a site-specific assessment that considers the potential adverse effects of the contaminants, amenity issues and exposure from the likely end use.

Where there is any uncertainty, advice should be sought from the department regarding specific contaminants and application of potable or non-potable use guidelines for likely end uses.

## Non-potable use guidelines

Non-potable uses may include irrigation of gardens, parks and reserves, growing vegetables, flushing toilets, or washing vehicles, dust suppression, and the recreational use of surface water.

In general, the department adopts the NEPM GILs and recommends a default screening level for non-potable water uses that is 10 times the corresponding ADWG health-related guideline value.

The approach aligns with the World Health Organization recommendation to use drinking water guidelines when screening for health risks for all uses, while making appropriate allowance for the much lower quantities of water ingested for recreational uses, shorter exposure periods, and non-ingestion exposure routes.

See also:

- [Guidelines on recreational water quality: Volume 1 Coastal and fresh waters](#)
- [Guidelines for safe recreational water environments: Volume 2 Swimming pools and similar environments.](#)

This approach is also consistent with tier 1 or tier 2 contaminated site assessments. However, important exemptions to this approach are outlined below.

### Odorous chemicals

Odour may be a detrimental effect for many non-potable water uses. For these substances the aesthetic value based on odour would apply as a default screening value where it is lower than the unadjusted health-related guideline or there is no such guideline. Examples include:

- chlorobenzene
- 1,2-diclorobenzene
- 1,3-diclorobenzene
- 1,4-diclorobenzene
- ethylbenzene
- hydrogen sulphide
- monochloramine
- styrene
- toluene
- 1,2,3 trichlorobenzene
- 1,2,4 trichlorobenzene
- 1,3,5 trichlorobenzene
- xylenes.

### Chemicals with no health guideline level

In circumstances where a chemical does not have an ADWG health-related guideline value but has been provided with an aesthetic guideline, the aesthetic guideline will be directly applied. The ADWG aesthetic guideline value will not be routinely adjusted as aesthetic issues have the potential to affect the proposed non-potable end use (e.g. corrosive effects, sedimentation, unpleasant taste) and site-specific management is likely to be required.

Where the assessment and management process indicate that risks to human health or the environment are insignificant or adequately managed, the department may, in consultation with DWER, approve a site-specific level, including adjusted aesthetic values.

## Pools and stored water systems

It is important to consider the impact of contaminants on pool and water system chemistry and microbial growth. Contaminated water can introduce chemicals or nutrients that promote conditions for microbial growth, increasing health risks associated with exposure to waterborne pathogens.

## Persistent, bio-accumulative, and toxic pollutants

A site-specific health risk assessment, as described in Schedule B4 of the NEPM, is recommended for persistent, bio-accumulative and toxic environmental pollutants that exceed ADWG or GILs.

Some example chemicals in this category include per and polyfluoroalkyl substances (PFAS), dioxins and polycyclic aromatic hydrocarbons.

The following information is required for both qualitative and quantitative assessments:

### 1. Contextualise the uses and exposure by defining the specific uses and exposure pathways, which may include:

- drinking and cooking
- showering and bathing
- laundering clothes
- cleaning
- filling pools or spas
- irrigation of edible plants
- irrigation of inedible plants, lawns, and ornamental gardens.

### 2. Describe or quantify the total estimated exposure

Exposure factors may be based on knowledge of the site and the known receptors or can be based on [enHealth guidance – Australian exposure factor guide | Australian Government Department of Health and Aged Care](#).

It may be appropriate to specifically state uses that are excluded (e.g. livestock or recreational purposes) to refine the assessment scope and provide clarity for future use considerations.

### 3. Understand the chemical properties and toxicity

- Identify applicable acute and chronic health reference values, such as acute reference dose or tolerable daily intake.
- Review any toxicity assessments and how they compare to the exposure scenario, for example:
  - absorption, distribution, metabolism, and excretion of the chemical
  - bio-accumulation and steady state concentrations in the body
  - half-life in the body.

#### 4. Characterise human health risks

Evaluate human health risks based on the available information. Acknowledge any limitations or data gaps. Provide an updated conceptual site model.

#### 5. Adapt guideline values for the specific uses

Use data to derive site-specific criteria for the identified site-specific uses and receptor exposure factors.

#### 6. Develop remediation and management plans

If risks exceed acceptable levels, develop a remediation action plan outlining feasible options for remediation of the site or treatment of the water.

Options may include:

- providing access to alternative water sources
- limiting water uses
- methods for water treatment
- using controlled application methods to minimise exposure (e.g. drip irrigation over spraying)
- controlling surface water runoff.

Any control measures will need to include a management plan for monitoring and reviewing their effectiveness over time.

#### 7. Undertake effective risk communication

Clearly communicate findings and management measures to stakeholders, ensuring transparency about the risks and practical steps taken to mitigate exposure. Avoid technical jargon to ensure accessibility.

### Methyl tert-butyl ether (MTBE)

MTBE is not currently listed in the ADWG. An interim screening level of 0.02 mg/L will apply to MTBE, which is based on the threshold that odour can be detected.

### Pesticides

The Australian Pesticides and Veterinary Medicines Authority (APVMA) is responsible for the assessment and registration of pesticides and labelling prior to sale and use in Australia. The use of pesticides within WA is subject to regulation (*Health [Pesticides] Regulations 2011*). Used correctly and in accordance with label and material safety data sheet directions, pesticides will not normally be detected above their analytical limits.

Any detection of pesticides in surface or groundwater suggests inappropriate use, illegal disposal, spills, or dumping. Whenever pesticides are detected, the department may require an investigation to ensure regulatory controls are in place, beyond the *Contaminated Sites Act 2003* requirements. Therefore, the department must be notified of any measurable levels of pesticides in water (above analytical limits of detection).

The ADWG provides guideline values for pesticides in drinking water. The term 'pesticides' includes agricultural chemicals such as insecticides, herbicides, nematicides, rodenticides, and miticides.

The department recommends a non-potable use guideline of 10 times the ADWG health-related guideline value for pesticides.

In WA, the department has derived health-related guideline values, in the same manner as those included within the ADWG, for the following pesticides. The derived values have been multiplied by a factor of 10 to provide the non-potable use guideline values below.

Pesticide	Non-potable use guideline (mg/L)
Bifenthrin	0.35
Fluazifop-p-butyl	0.10
Flumetsulam	35.00
Flutriafol	0.30
Quizalofop-p-ethyl	0.40
Tebuconazole	1.00
Triadimenol	2.00

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