



# Site contamination

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## Orphaned site contamination management framework

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## Site contamination – Orphaned site contamination management framework

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ISBN: 978-1-876562-68-7

December 2022

### Preferred way to cite this publication

South Australian Environment Protection Authority 2022, *Site contamination – Orphaned site contamination management framework* (OSCM Framework)

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## Abbreviations

ASC NEPM	<i>National Environment Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013)</i>
AWQC	Australian Water Quality Centre
CSM	conceptual site model
EC Policy	<i>Exceptional Circumstances Policy for Management of Orphaned Site Contamination that presents an unmanaged public health risk 2022</i>
EP Act	<i>Environment Protection Act 1993</i>
EP agreement	environment performance agreement, a statutory agreement formed pursuant to section 59 of the EP Act
EPA	South Australian Environment Protection Authority
GAR	Guidelines for the assessment and remediation of site contamination
GENI	General Environmental Information System (EPA database)
GPA	groundwater prohibition area as per section 103S of the EP Act
NEPM	see ASC NEPM
PCA	potentially contaminating activity ( <i>Environment Protection Regulations 2009</i> , regulation 50)
PCE	tetrachloroethene
RDN	regulatory decision notice
S83A	section 83A (of the EP Act)
SMA	special management area as per section 103N of the EP Act
TCE	trichloroethene (or trichloroethylene)
VMS	vapour mitigation system



# Summary

The *Environment Protection Act 1993* (EP Act) and the *Environment Protection Regulations 2009* establish the legislative framework for regulating site contamination in South Australia.

The EP Act assigns liability to persons in relation to site contamination. In some circumstances, there may be no person liable for site contamination. This can occur when the person cannot be reasonably identified or when a person cannot practicably undertake the assessment or remediation that is required by the Environment Protection Authority (EPA). When this occurs, the EPA will classify the sites as ‘orphans’.

The *Orphaned site contamination management framework* (the OSCM Framework) presents the EPA’s approach to managing orphaned site contamination identified in South Australia consistent with the *Exceptional Circumstances Policy for Management of Orphaned Site Contamination that presents an unmanaged public health risk 2022*. This framework has been developed for use by the EPA and has been made available to the public to provide transparency in the process of how orphaned site contamination is prioritised, assessed and, where necessary, remediated in South Australia.

This framework details the following:

- regulatory context
- identification and preliminary risk screening assessment
- detailed assessment
- remediation and mitigation, including vapour mitigation systems and groundwater prohibition areas
- timeframes for further actions.

This framework is used to progress the assessment and/or remediation or mitigation of orphaned site contamination towards a point at which a site does not pose a risk to human health and no further action is considered necessary by the EPA.



**Drilling a groundwater monitoring well**



**Sampling a soil vapour bore**





# 1 Introduction

'Site contamination' is defined in section 5B of the *Environment Protection Act 1993* (EP Act) and is often identified during assessment undertaken as part of the planning approval process associated with the land development or through due diligence assessment. The EP Act establishes the legislative framework for the regulation of site contamination<sup>1</sup>. The *EP Act* determines who has liability for site contamination ('liable person').

Dealing with the legacy of site contamination and managing its impacts is typically a complex and challenging issue. In most cases, the EPA can regulate liable persons to assess and remediate site contamination. In some circumstances, there may be no person liable for site contamination. This can occur when the person cannot be reasonably identified or when a liable person is identifiable but is deemed in law not to have the capacity to carry out or meet the costs of assessment and/or remediation required by the EPA. In such circumstances, the EPA considers this site contamination to be orphaned.

The majority of assessment and/or remediation undertaken by the EPA occurs where historical contamination has moved away from a source site(s) in an industrial setting to a more sensitive residential setting, typically from the migration of impacted groundwater.

There may also be a need to act promptly when site contamination presents a significant and immediate public health risk while work is undertaken to identify if there is a liable person. Where this is the case, the EPA may seek reimbursement for assessment costs and/or may require future stages of work to be undertaken at the expense of the identified liable person.

This framework details the EPA's approach to the management of orphaned site contamination in South Australia, including the prioritisation, assessment and remediation/mitigation process, and scope of stakeholder and community engagement.

The framework for the regulation of site contamination where a responsible person(s) has been identified is detailed in [Site contamination – Regulatory framework](#) (2022).

Figure 1 provides an overview of the orphaned site contamination management process and includes regulatory details.

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<sup>1</sup> Part 10A of the EP Act

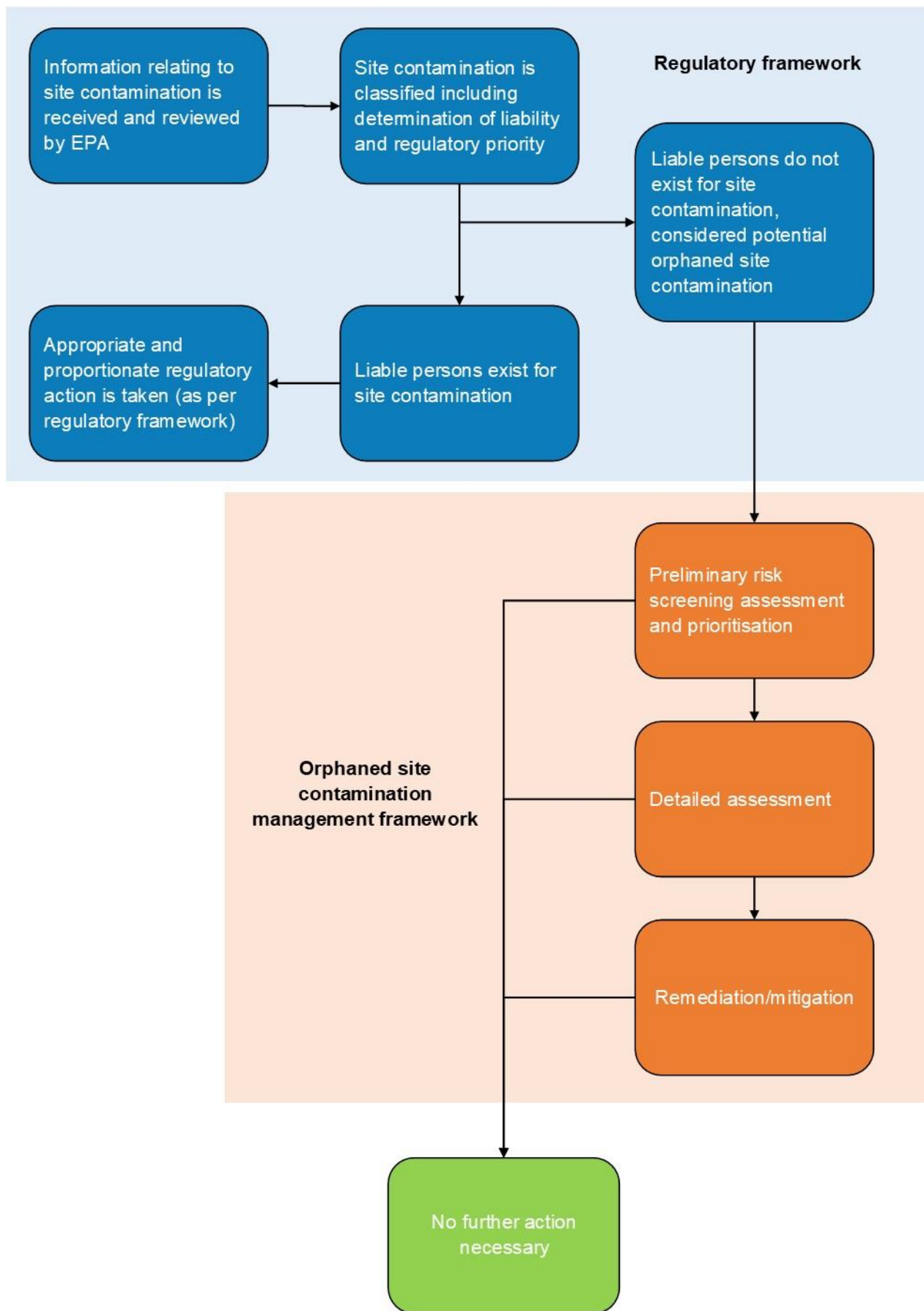


Figure 1 Overview of the orphaned site contamination management and regulatory framework linkages

## 1.1 Objectives

This framework has been developed to detail the approach the EPA applies to the management of sites and site contamination deemed to be orphaned. The framework has been prepared primarily for use by the EPA, however is made available publicly to provide transparency and predictability to interested persons.

The objectives of this framework are to ensure that:

- the highest potential public health risk posed by the orphaned site contamination is addressed as a priority; and
- the process used by the EPA to prioritise the assessment and/or remediation of orphaned site contamination is consistent and transparent.

## 1.2 The EP Act and Exceptional Circumstance Policy

The EP Act establishes the legislative framework for the regulation of site contamination including identifying and regulating appropriate persons liable for the assessment and remediation of site contamination. The EP Act does not specifically address the scenario when no liable person is identified.

While the EP Act does not impose any obligation on the state to undertake action in the absence of a liable person, people affected by orphaned site contamination, in addition to being innocent of the cause of the contamination, may also lack the knowledge, expertise and financial capacity to assess and mitigate the health risk.

For situations where there is an absence of a liable person but the presence of a potential health risk, the South Australia Government endorsed application of the *Exceptional Circumstances Policy for Management of Orphaned Site Contamination that presents an unmanaged public health risk, 2022* (EC Policy). It assumes a case for action by the state in the form of assistance to affected property owners to eliminate or prevent the risk through assessment, remediation<sup>2</sup> and communication of the risk.

The EC policy contains guidance to enable the state, through a process overseen by the Minister for Environment and Water (or their successor), to determine cases in a fair and consistent manner. Funding for orphaned site contamination assessment work is conducted under a fixed annual expenditure cap allocated by the Department of Treasury and Finance, which is considered when prioritising programs.

The EC policy applies to private properties, both residential and commercial, that:

- are affected by site contamination that was unknown at the time the properties were acquired
- have no appropriate person as defined in the EP Act to assign legal liability to for assessment, remediation or mitigation of the site contamination, or the person responsible lacks capacity to meet the costs of assessment, remediation and/or mitigation, or the responsible person would, in the opinion of the Authority, for any reason, be unable to carry out, or meet the costs and expenses of the action required or authorised under the order
- are known or likely to be contaminated by orphaned site contamination to an extent of presenting a public health risk
- require assessment of chemical substances on, or beneath the land or within buildings to assess risk which has arisen from the orphaned site contamination

AND/OR

- require installation of equipment at an individual property as an engineered mitigation solution as a result of the effect of the orphaned site contamination.

This framework has been developed to detail the management of orphaned site contamination consistent with the EC policy.

<sup>2</sup> As defined in Section 3 of the EP Act.

### 1.3 Guidance and goals

Where relevant, the processes in the framework have been developed to be consistent with the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (amended 2013) (ASC NEPM<sup>3</sup>). The ASC NEPM provides a national risk-based approach for the staged or tiered assessment of site contamination in Australia. Information collected at each stage or tier of assessment is used to inform and plan the scope of subsequent work. The framework provides the means for prioritising work and focusing on higher risk site contamination issues using the ASC NEPM's tiered approach. The desired outcome is to provide adequate protection of human health and the environment where contamination has occurred, through the development of an efficient and effective national approach to the assessment of site contamination.

The [Guidelines for the assessment and remediation of site contamination](#) or GAR for short (EPA 2019) in conjunction with the [Regulatory framework](#), outline the EPA's expectations for the assessment and remediation of site contamination, as shown below. The assessment and remediation of orphaned site contamination is consistent with the GAR and aims to complete assessment work consistent with Goals 1, 2 and 3, and remediation primarily focusing on Goal 4.

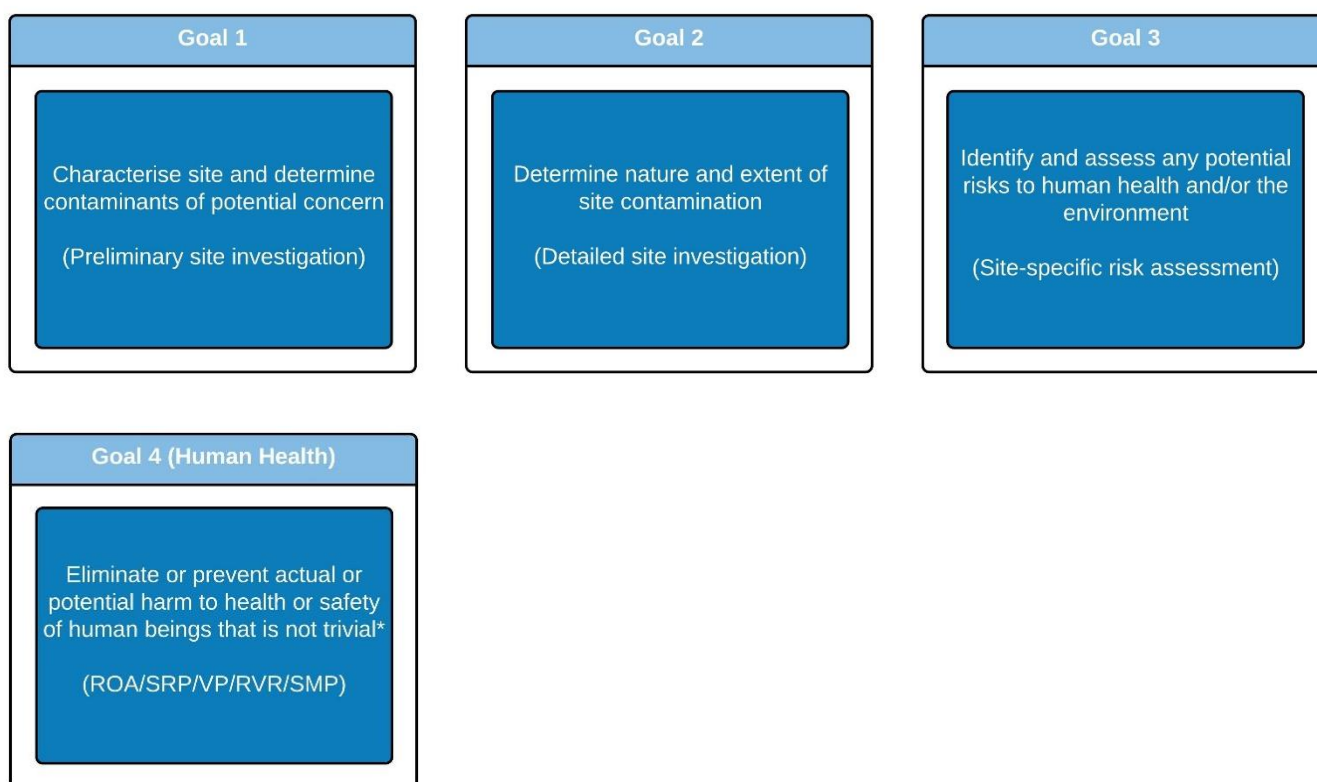


Figure 2 Assessment and remediation goals

### 1.4 Role of SA Health

SA Health provides expert scientific advice to the EPA in relation to public health risks resulting from site contamination where application of the ASC NEPM and existing SA Government guidance is insufficient to inform the health risk.

In addition, SA Health assists the EPA in providing advice to affected individuals and communities on public health matters resulting from site contamination.

### 1.5 Non-derogation

This framework is not legally binding. Information in this document is not intended to derogate from or fetter the powers of the EPA and authorised officers pursuant to section 87 the EP Act and associated regulations. It is intended to be used

<sup>3</sup> <http://www.scew.gov.au/nepms/assessment-site-contamination>

as a guide only and will be suitable for most scenarios, providing a predictable response. However, there will be occasions when the EPA will respond differently to the guidance provided in the framework. On advice from the EPA and on behalf of the state, the Minister will consider and approve (as appropriate) 'special cases' where other measures are deemed necessary.

## **1.6 Review of the framework**

The EPA endeavours to undertake a full review of the framework two years from its date of publication. However, the EPA may alter processes that relate to the framework at any time prior to this time. The latest copy will be made available on the EPA website.

## 2 Orphaned site contamination identification

A site is determined to be 'orphan' when no 'appropriate person' is determined to exist by the EPA for the site contamination identified (consistent with section 103C (3) of the *EP Act*). While a site may be considered orphan, only those with site contamination that poses a significant potential risk to public health will proceed to detailed assessment by the EPA with provision from the State Government Orphan Sites Program Fund.

In most instances, the EPA considers that orphaned site contamination may pose a public health risk when both of the following apply:

- site contamination is widespread, including extending beyond the source site boundary

AND

- the site contamination is likely to present an exposure risk to nearby land users through typical use of this nearby land.

The EPA may become aware of potential orphaned site contamination via information received through the standard regulatory processes, including but not limited to site contamination audits and section 83A notifications. The [Regulatory framework](#) (2022) details the regulatory review process including liability determination to identify the appropriate person and a preliminary consideration of risk based on the potentially contaminating activities and the actual/potential exposure scenarios.

Where the regulatory review considers there is no liable person for the site contamination, this may identify the site contamination as potentially orphaned. The site will be reviewed via the preliminary risk screening assessment (section 3) to determine whether the site poses a significant public health risk.

### **Liable person for on-site contamination only**

In many cases, a person may be identified as responsible for contamination at the source site, but that person may not have liability for contamination extending off-site. This commonly occurs when the owner of the source site has not undertaken an activity which has contributed to the site contamination and the original polluter cannot be regulated (eg company no longer exists, persons deceased, etc) and the owner was reasonably aware of the contamination or that prescribed activities were undertaken at the site.

In such cases and where off-site contamination poses a significant risk to public health, the off-site contamination will be identified as orphaned. Any contamination at the source site is likely to remain the responsibility of the liable person, who in this instance will be the owner. The site owner may be required to prevent the spread of contamination, including the prevention of the ongoing release and migration of contamination from the source site.

In these cases, EPA may regulate the source site owner and seek information relating to the assessment and remediation of on-site contamination to assist in assessing the off-site (orphaned) contamination.

### 3 Preliminary assessment and prioritisation

Where site contamination is considered to be orphaned, it is necessary to undertake a preliminary risk screening assessment to consider the nature and significance of known or potential risks to public health. This preliminary review is based on available site-specific and local information and can inform the likelihood and potential severity of site contamination at and in the vicinity of the site.

The preliminary risk screening assessment informs the prioritisation of resources to enable the EPA to take an appropriate and proportionate response to the known and potential risks identified in the preliminary risk screening having regard to existing scheduled work programs.

This preliminary risk screening assessment considers chronic exposure risks. If the EPA receives a notification or information of a potential or actual hazardous circumstance<sup>4</sup>, it will engage with the notifier to ensure that risks are being managed in an appropriate and timely manner to protect human health and the environment.

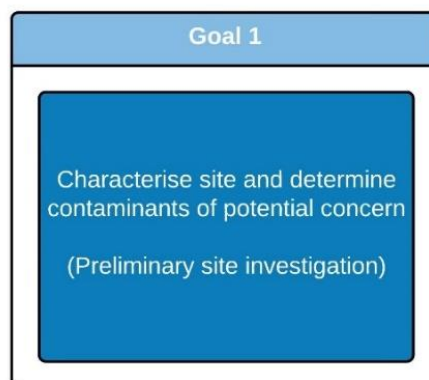
#### 3.1 Preliminary risk screening assessment

The purpose of the preliminary risk screening assessment is to identify whether there are potential risks to public health and whether further assessment of the orphaned site contamination is needed. This preliminary screening also informs the prioritisation of further assessment.

The preliminary risk screening assessment is predominantly desktop and includes review of available information pertaining to:

- Historical land use and potentially contaminating activity information using aerial photographs, ownership records, licencing information.
- Nature and extent of on- and off-site contamination based on soil, soil vapour and groundwater chemical testing results and comparison against relevant published Tier 1 risk screening criteria.
- Current on-site and nearby land use(s).
- Current on-site and nearby users of groundwater (including registered bores).
- Site setting (using hydrogeological information, depth to groundwater, groundwater flow direction).

The preliminary assessment comprises review of available information provided by external persons and held by the EPA and is considered in the development of a conceptual site model (CSM). The CSM will focus on identifying sources of contamination, contaminants of concern, potential for the migration of contamination, receptors at and near the site, and potential exposure pathways. The CSM, along with relevant data gaps and uncertainties, will inform the nature and objectives of any further work (i.e. detailed assessment). This supports meeting assessment Goal 1.



<sup>4</sup> Hazardous circumstances are defined in the GAR

In many cases, orphaned site contamination is off-site from the originating site and therefore the primary risks are associated with migration of contamination and potential exposure to sensitive users (e.g. residents). The two most common potential exposure pathways are:

- Vapour intrusion – inhalation of chemical vapour that has migrated up through soil into a building.
- Groundwater use – ingestion or dermal contact with contaminated groundwater or irrigation of plants with contaminated groundwater.

The preliminary screening risk assessment focuses on understanding the likelihood of these primary risk scenarios to be present at or near the source site.

There may also be circumstances where contaminated soils may also pose a risk to receptors where potentially complete exposure pathways exist. Where this is the case, source–pathway–receptor linkages in relation to existing management controls will also be considered in the preliminary screening risk assessment.

### 3.2 New orphaned site contamination prioritisation

In order to provide appropriate response, a newly identified area affected by orphaned site contamination is prioritised based on the outcomes of the preliminary risk screening assessment into one of three levels:

- Level 1 – high priority assessment requiring accelerated timeframes for action.
- Level 2 – medium priority assessment requiring standard timeframes for action.
- Level 3 – low priority assessment requiring no immediate action.

Table 1 presents scenarios of known or potential soil vapour and groundwater contamination for each priority level. While each site may have particular details relevant to potential exposure risks, these examples illustrate the priority and relevant urgency of further assessment.

**Table 1** Prioritisation of new orphan sites

New orphan site priority	Scenarios		Approximate timeframe for further action <sup>5</sup>
	Vapour intrusion	Groundwater use	
<b>High priority</b> Likely significant unacceptable risk to public health warranting accelerated action timeframe	<ul style="list-style-type: none"> <li>• Sensitive land use<sup>6</sup> adjacent or nearby, and:               <ul style="list-style-type: none"> <li>– indoor air concentrations measured &gt;10x above safe levels</li> </ul>               OR               <ul style="list-style-type: none"> <li>– VIRA<sup>7</sup> <u>predicted</u> indoor air concentrations &gt;100x above safe levels</li> </ul>               OR               <ul style="list-style-type: none"> <li>– soil vapour concentrations measured &gt;100x interim HIL A or HSL A</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Sensitive land use adjacent or nearby and/or shallow domestic or town-water supply bores nearby, and:               <ul style="list-style-type: none"> <li>– salinity potentially within potable limit</li> </ul>               AND               <ul style="list-style-type: none"> <li>– groundwater concentrations measured &gt;10x drinking water guidelines</li> </ul> </li> <li>• Evidence of acute groundwater exposure risk.</li> </ul>	Further actions undertaken within one month

<sup>5</sup> Further actions following the preliminary risk screening assessment may include (but not limited to) notifying affected property owners and/or commencing the process to engage a consultant to undertake detailed assessment

<sup>6</sup> Sensitive land use is defined by the EP Act (s3) to be residential, pre-school (which includes a nursery, kindergarten or child-care centre) or primary school

<sup>7</sup> Site-specific vapour intrusion risk assessment



New orphan site priority	Scenarios		Approximate timeframe for further action <sup>5</sup>
	Vapour intrusion	Groundwater use	
	<p>OR</p> <ul style="list-style-type: none"> <li>– groundwater concentrations (with respect to vapour) measured &gt;100x HSL A.</li> </ul> <ul style="list-style-type: none"> <li>• Evidence of an acute soil vapour exposure risk.</li> </ul>		
<p><b>Medium priority</b></p> <p>Potential unacceptable risk to public health warranting standard action timeframe</p>	<ul style="list-style-type: none"> <li>• Indoor air concentrations measured above safe levels (but less than 10x) relevant for on-site or nearby land use.</li> <li>• VIRA <u>predicted</u> indoor air concentrations above safe levels (but less than 100x) relevant for on-site or nearby land use.</li> <li>• Soil vapour concentrations measured &gt; interim HILs or HSLs (but less than 100x) relevant for on-site or nearby land use.</li> <li>• Groundwater concentrations measured &gt; interim HILs or HSLs (but less than 100x – with respect to vapour intrusion) relevant for onsite or nearby land use.</li> <li>• Evidence of soil vapour contamination that may pose a risk to nearby land users.</li> </ul>	<ul style="list-style-type: none"> <li>• Sensitive land use adjacent or nearby and/or shallow domestic or town-water supply bores nearby, and: <ul style="list-style-type: none"> <li>– salinity within potable or irrigation limit</li> </ul> </li> </ul> <p>AND</p> <ul style="list-style-type: none"> <li>– groundwater concentrations measured &gt; drinking water guidelines (but less than 10x).</li> </ul> <ul style="list-style-type: none"> <li>• Evidence of groundwater contamination that may pose a risk to nearby groundwater users.</li> </ul>	Further actions undertaken within three months
<p><b>Low priority</b></p> <p>Unlikely or no current unacceptable risk to public health. No immediate action required</p>	<ul style="list-style-type: none"> <li>• Elevated indoor air or soil vapour concentrations but no nearby receptor identified.</li> <li>• Indoor air or soil vapour concentrations measured below safe levels or interim HILs/HSLs.</li> </ul>	<ul style="list-style-type: none"> <li>• Evidence of groundwater contamination but no nearby receptor identified.</li> <li>• Groundwater concentrations measured below levels relevant for environmental value.</li> </ul>	None specified <sup>8</sup>

HSL Health Screening Level presented in ASC NEPM

HIL Health Investigation Level presented in ASC NEPM

<sup>8</sup> No orphan site assessment work to be undertaken. Further information may lead to reconsideration of priority.

### 3.3 Community consultation

Areas of orphaned site contamination identified as high or medium priority will likely proceed to assessment. For such sites, the EPA will issue a community update prior to undertaking work, including the following information:

- What the EPA understands about the source site, or in the absence of a suspected source site, the trigger for work (eg notification of the existence of site contamination under section 83A of the EP Act)
- What work the EPA will be undertaking to assess the potential risks
- When and where this work will be undertaken
- When the results of the assessment will be available
- Directions on how to find out more information and EPA contact details.

The community will be made aware of the commencement of assessment by the EPA via a fact sheet delivered by regular post to absent landowners or letterbox drop to owner/occupiers. The update will also be distributed via email to local council representatives including the Mayor and Ward Councillors, Australian Water Quality Centre (AQWC), SA Health, local businesses, Housing SA or similar housing organisations that own properties within the area. For properties affected by road restrictions required as part of an assessment, a notification will usually be provided within two weeks of on-ground work commencing.

As part of the consultation face to face engagement may be offered in the form of an information session.

Following completion of the assessment the community will be updated on the findings and next steps.

Community updates are supported by the Community Engagement Officer and information is generally available on the [EPA](#) and [Engage EPA](#) websites.

### 3.4 Property level engagement

Where broader assessment indicates property level assessment is necessary to consider risk to occupants, the EPA will engage directly with property owners and occupiers. This may include offering to test soil vapour or indoor air on the property. Owner/occupier engagement will typically include door-knocking of the property to discuss the testing proposed and the actions depending on outcomes of the testing. Where the owner lives elsewhere (e.g. the property is rented), the EPA will send notices to the owner's address and simultaneously inform the tenant/occupier of the testing that is being offered to the owner.

The ability of the EPA to undertake site-specific property testing is at the discretion of the owner and consent must be provided by the owner in writing. Consent from the owner includes acknowledging that:

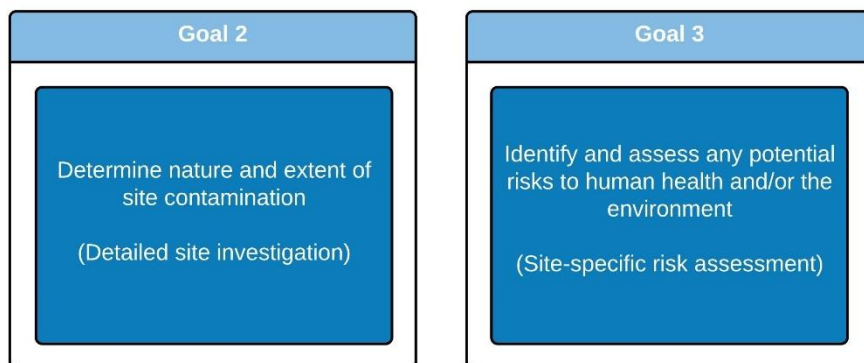
- The work proposed for the property is described and detailed in this consent request. The information collected as part of this program of work will be made available in the EPA Public Register as part of an Environmental Assessment Report, regardless of the findings.
- The EPA is also required to flag an environmental interest on the certificate of title with Lands Services SA. When a request is made under Section 7 of Land and Business (Sale and Conveyancing) Act 1994, Land Services SA will prepare a Property Interest Report. The purpose of a statement under section 7 of the Land and Business (Sale and Conveyancing) Act 1994 is to provide information to perspective purchasers of certain particulars concerning the land to be acquired, including environmental interests.
- Where there is a record against the title relating to an environmental interest, it will indicate that further information can be obtained by the EPA. The EPA will then produce a separate report, mailed directly to the person making the request (generally a real estate agent or conveyancer).
- It answers "yes" or "no" to 37 questions relating to areas of environmental interest contained in the Land and Business (Sale and Conveyancing) Regulations 2010.
- For the purpose of this assessment, the following question within the 'Particulars Relating to Environment Protection' in the regulations will be marked "yes" and will read:

- 4 (c) a copy of a report of an environmental assessment (whether prepared by the EPA or some other person or body and whether or not required under legislation) that forms part of the information required to be recorded in the public register.
- This information will be incorporated into the property sale contract and Form 1 document at the time of sale and is required to be disclosed to prospective purchasers of this property.
- The vendor of this property will also have an obligation to answer a series of questions in relation to the property when the property is sold. In particular the vendor will be required to answer 'yes' to the following question within the 'Particulars Relating to Environment Protection' in the regulations:
  - 2 (5) is the vendor aware of an environmental assessment of the land or part of the land ever having been carried out or commenced (whether or not completed)?
- Potential buyers can contact the EPA for further information regarding the response and will be provided with available reports and information for your property.

## 4 Detailed assessment and mitigation

### 4.1 Detailed assessment

Based on the preliminary risk screening assessment, the EPA will commission a detailed assessment of priority sites by a site contamination consultant, including a review by a certified site contamination practitioner. The detailed assessment is intended to address Goals 2 and 3.



#### 4.1.1 Within public spaces

In most cases, the initial detailed assessment will include intrusive investigation within streets and public spaces in the vicinity of the suspected source site to assess risk to offsite receptors. This work is typically staged focusing on addressing specific objectives and refining the conceptual site model (CSM). The outcomes of each stage of assessment (including identifying remaining data gaps or uncertainties) will inform the need for, and objectives of, subsequent stages.

The EPA will maintain an active community engagement program during this period to inform stakeholders of the findings of each stage of assessment and any subsequent stages to be undertaken.

The results of the assessment will inform a final public health assessment to be undertaken by the EPA. The assessment of the health risk and the determination of the appropriate response will be informed by the risk profile of the substance identified.

#### 4.1.2 At private properties

Where detailed assessment work in public spaces indicates a potential risk to nearby occupants or groundwater users, the EPA may seek to undertake assessment on specific properties to better understand the risk to those occupants or groundwater users. This may include, but is not limited to, testing of groundwater, soil vapour, subfloor air and indoor air.

This work would be subject to informed consent from affected owners and all work is voluntary (see [section 3.4](#)).

At all times owners have the discretion to decline testing or vapour mitigation of their property. Where offers of testing are declined or are not responded to, the owner will be contacted in writing to confirm the declined offer. This letter will be kept on file at EPA in relation to property.

### 4.2 Remediation and mitigation

Based on the findings of the detailed assessment, it may become apparent that the orphaned site contamination poses an unacceptable risk to nearby occupants or groundwater users and that remediation is required. According to the EP Act, remediation includes to treat, contain, remove or manage chemical substances. While in some cases it may be possible to treat or remove the source, in many instances of historical orphaned site contamination which typically span decades, the most practicable approach to addressing the risk will be to manage chemical substances through mitigating risk at the exposure point. Management actions and mitigation measures may include, but not be limited to:

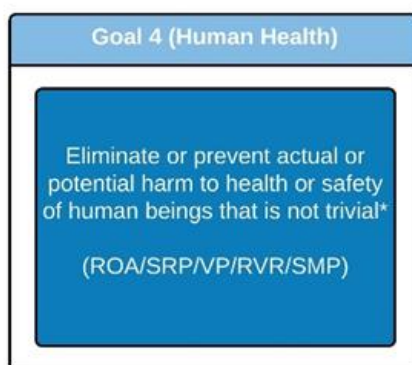
- advising groundwater well owners not to use their bore water for any purpose while the EPA conducts assessment
- advising home-owners to improve ventilation between indoor air sampling events

- establishing a groundwater prohibition area<sup>9</sup> (GPA) to prohibit or restrict the taking of groundwater
- installing a vapour mitigation system (VMS) in buildings to reduce vapours to safe levels
- declaring a special management area<sup>10</sup> (SMA) to prompt consideration of site contamination as part of future property sales or land redevelopment.

The EPA will also actively engage with affected residents and owners to inform them of the need for these management actions or mitigation measures.

Property owners with a VMS installed at their property will also need to agree to an environment performance agreement<sup>11</sup> (EP Agreement). This establishes the responsibility to the owner (and all future owners) to maintain and operate the VMS.

This process seeks to address Goal 4 (remediation).



## 4.3 Timeframes

### 4.3.1 Vapour intrusion risk

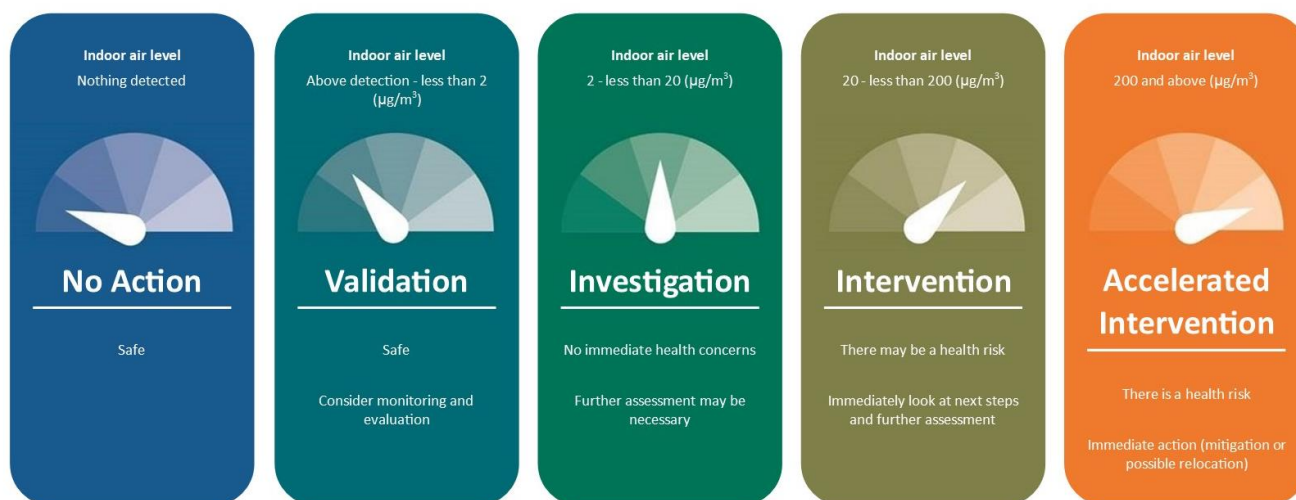
In 2014, the South Australian Government developed *Indoor air action levels for TCE* (Figure 3). Such indoor air action levels are yet to be developed for other volatile compounds. Guidance and screening levels are provided in ASC NEPM in relation to some other volatile compounds. Action levels may be developed in the future for other volatile contaminants based on advice from SA Health.

For TCE, an indoor air concentration of less than 2 µg/m<sup>3</sup> is considered to be a safe level and an acceptable risk in a sensitive land use setting. TCE concentrations greater than 2 µg/m<sup>3</sup> may have adverse health impacts on occupants over a lifetime of exposure. Each indoor air action level does not necessarily relate to a direct increase in risk (with exception of the 2 µg/m<sup>3</sup> limit) but rather provide a scaling of risk, and relative increases in indoor air concentrations should accompany proportionate and timely action.

<sup>9</sup> As per section 103S of the EP Act

<sup>10</sup> As per section 103N of the EP Act

<sup>11</sup> As per section 60 of the EP Act



**Figure 3 Indoor air action levels for TCE**

Each action level demarcates an increased urgency to undertake further assessment and/or mitigation work. Where indoor air concentrations are measured within specified action levels, the EPA will adopt the response timeframes indicated in Table 2 below. The indicative response timeframes presented in Table 2 are subject to access to the property.

For volatile contaminants that do not have action levels consistent with those in Figure 3, the timeframes from Table 3 should be considered.

During the course of a detailed assessment of vapour intrusion risk, computer modelling may be undertaken to predict potential indoor air concentrations based on subsurface measurements (e.g. soil vapour or groundwater sampling). Whilst these predicted indoor air concentrations provide valuable information regarding potential indoor air concentrations and risk to receptors, when modelled correctly there should be an appropriate level of conservatism incorporated and this is considered in the action timeframes for predicted indoor air concentrations presented in Table 2.

Any action relating to activities on a private property (whether assessment or mitigation) requires owner's informed consent prior to the activity commencing.

**Table 2** Prioritisation of actions following detailed vapour intrusion assessment

Action level	Predicted <sup>12</sup> indoor air concentration		Measured <sup>13</sup> indoor air concentration	
	Approximate action timeframe*	Typical action(s)	Approximate action timeframe*	Typical action(s)
<b>Accelerated intervention</b>	Action within three months	<ul style="list-style-type: none"> <li>Offer property level assessment to affected property owners.</li> <li>Engage a site contamination consultant to undertake property assessment.</li> </ul>	Action within one month	<ul style="list-style-type: none"> <li>Communicate mitigation options and next steps to owner/occupant.</li> <li>Offer owner/occupant temporary mitigation options or relocation.</li> <li>Engage a site contamination consultant to undertake further assessment.</li> </ul>
			Action within six months	Mitigate vapour intrusion
<b>Intervention</b>	Action within six months	<ul style="list-style-type: none"> <li>Offer property level testing to affected property owners.</li> <li>Engage a site contamination consultant to undertake property assessment.</li> </ul>	Action within three months	<ul style="list-style-type: none"> <li>Communicate mitigation options to owner/occupant.</li> <li>Engage a site contamination consultant to undertake further assessment.</li> </ul>
			Action within 12 months	Mitigate vapour intrusion
<b>Investigation</b>	Action within 12 months	Engage a site contamination consultant to undertake further assessment	Action within six months	<ul style="list-style-type: none"> <li>Communicate next steps to owner/occupant.</li> <li>Engage a site contamination consultant to undertake further assessment.</li> </ul>
			Action within 24 months	Mitigate vapour intrusion
<b>Validation</b>	None specified	–	None specified	–
<b>No action</b>	None specified	–	None specified	–

\* Subject to access to the property

<sup>12</sup> Typically based upon site-specific vapour intrusion risk assessment

<sup>13</sup> Based on actual measured indoor air concentrations using reliable sampling methodology

### 4.3.2 Groundwater risk

Following detailed assessment of groundwater, the EPA will undertake relevant actions in accordance with the approximate timeframes indicated in Table 3. The typical actions will vary depending on site-specific circumstances and may include those listed below.

**Table 3** Prioritisation of actions following detailed groundwater assessment

Priority	Groundwater assessment outcomes <sup>14</sup>	Approximate timeframes	Typical further action(s)
<b>High priority</b> Likely unacceptable risk to public health warranting accelerated timeframe action	<ul style="list-style-type: none"> <li>• Shallow domestic or town-water supply bores nearby or sensitive land use nearby, and:               <ul style="list-style-type: none"> <li>– Salinity potentially within potable limit</li> </ul> </li> <li>AND</li> <li>– Groundwater concentrations measured &gt;10x drinking water guidelines.</li> </ul> <ul style="list-style-type: none"> <li>• Evidence of acute groundwater exposure risk.</li> </ul>	Further actions undertaken within one month	<ul style="list-style-type: none"> <li>• Notify affected property owners not to access groundwater for any purpose.</li> <li>• Engage a site contamination consultant to undertake further testing.</li> </ul>
<b>Medium priority</b> Potential unacceptable risk to public health warranting standard timeframe action	<ul style="list-style-type: none"> <li>• Shallow domestic or town-water supply bores nearby or sensitive land use nearby, and:               <ul style="list-style-type: none"> <li>– Salinity potentially within potable limit</li> </ul> </li> <li>AND</li> <li>– Groundwater concentrations measured &gt; drinking water guidelines.</li> </ul> <ul style="list-style-type: none"> <li>• Evidence of groundwater contamination that may pose a risk to nearby groundwater users or receptors.</li> </ul>	Further actions undertaken within three months	<ul style="list-style-type: none"> <li>• Notify affected property owners not to access groundwater for any purpose.</li> <li>• Engage a site contamination consultant to undertake further testing to inform a potential GPA.</li> </ul>
<b>Low priority</b> Unlikely or no current unacceptable risk to public health. No immediate action required	<ul style="list-style-type: none"> <li>• Evidence of groundwater contamination but no identified receptor.</li> <li>• Groundwater concentrations measured below levels relevant for environmental values.</li> </ul>	None specified	–

<sup>14</sup> Reference to guidance provided in GAR regarding applicable drinking water guidelines



### **4.3.3 Other exposure risks**

In some cases, other potential exposure risks may be identified as part of detailed assessment. These may include risks from direct contact with contaminated soil or inhalation of contaminated dust. In such cases, the priority, follow-up actions and approximate timeframes will be broadly consistent with those indicated in Table 3.

## 5 Cessation of EPA assessment and site closure

Orphaned site contamination assessment continues in a staged manner to refine the CSM until either:

- the risk(s) to public health has been characterised and is not considered to pose an unacceptable risk

OR

- appropriate measures have been established to remediate exposure to receptors and no unacceptable risk remains.

Once either of the above (or a combination of both) has been achieved for an entire EPA assessment area, the EPA will prepare a report on the orphan site project. This will include summaries of the following:

- Events leading to the EPA became aware of the site contamination.
- Preliminary risk screening assessment and initial prioritisation.
- Each stage of detailed assessment, including reference to relevant consultant reports, objectives, scope of work, key findings, data gaps and prioritisation.
- Implementation of mitigation measures such as vapour mitigation systems and groundwater prohibition areas.
- Each stage of community, owner and stakeholder engagement including the properties flagged.
- Expenditure on each stage of work.

The summary report will be published on the [EPA](#) and [Engage EPA](#) websites.

In the event new information is provided to the EPA in relation to a completed orphaned site contamination assessment, the EPA will consider the significance of this new information in the context of the assessment work previously completed. Where necessary, the EPA may undertake supplementary orphaned site contamination assessment.

## 6 References

*National Environment Protection (Assessment of Site Contamination) Measure 1999* (as amended 2013)

*Environment Protection Act 1993*

*Environment Protection Regulations 2009*

EPA 2019, *Guidelines for the assessment and remediation of site contamination*, Environment Protection Authority, Adelaide.

EPA 2022, *Site contamination – Regulatory framework*, Environment Protection Authority, Adelaide.

*Exceptional Circumstances Policy for Management of Orphaned Site Contamination that presents an unmanaged public health risk 2022*

SA Government 2014, *Indoor air action levels for TCE*.