[Council Name]

UPSS Inspection and Monitoring Plan

A Risk-based approach to manage

‘Appropriate Regulatory Authority’ responsibilities under the UPSS Regulation

Developed by: [Council Name]

Version: [XXMMMMYYYY]

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# About this Inspection and Monitoring Plan

A UPSS Inspection and Monitoring Plan (‘UPSS Plan’) has been developed by Council in collaboration with the RAMJO and REROC Council Regional Capacity Building (‘CRCB’) project on Contaminated Land. This Plan sets out a risk-based approach for Council to identify, assess and manage its ‘appropriate regulatory authority’ (‘ARA’) functions under the *Protection of the Environment Operations* (*Underground Petroleum Storage Systems) Regulation 2019* (‘UPSS Regulation’).

These functions seek Council to ensure UPSS infrastructure are designed, installed, operated and maintained in accordance with the Australian Standard (AS-4897-2008)and the *Guidelines for Implementing the Protection of the Environment Operations (Underground Petroleum Storage Systems) Regulation 2019* (EPA 2020) (‘UPSS Guidelines 2020’), and that UPSS infrastructure is operated and maintained to minimize pollution, thereby minimize the risk of harm to human health and the environment. These ARA responsibilities pertain to specific Council business processes, namely the:

* Statutory planning process for new or ‘significantly modified’ UPSS infrastructure,
* Inspection and monitoring process to ensure UPSS infrastructure maintain compliance with the UPSS Regulation, and
* Data and information management processes including Council’s planning information system, registers and mapping system.

The UPSS Plan outlines a process and complimentary procedures for a risk-based approach to guide and navigate Council through its ARA functions. While it is acknowledged ARA responsibilities are not explicitly defined by the UPSS Regulation, Councils are required to ensure the objectives and outcomes of the UPSS Regulation are met and maintained in relation to design and installation of UPSS infrastructure, and that UPSS sites comply with loss monitoring, leak detection and decommissioning requirements.

The risk-based approach set out in the UPSS Plan has the sole objective to assist Council to manage the risk of harm to human health and to the environment in the operation and maintenance of UPSS infrastructure. Hence this UPSS Plan is complimentary to other CRCB resources that provide guidance to Council on ARA functions relating to the design and installation of UPSS infrastructure.

# Objectives

The intent of the UPSS Plan is to provide a one-stop shop for Council on its ARA functions under the UPSS Regulation. Hence the objectives of the UPSS Plan are to:

* Provide guidance to Council on its ARA responsibilities relating to UPSS infrastructure,
* Outline procedures and provide tools to enable a risk-based approach in managing ARA responsibilities,
* Enable Council to derive and assess the level of risk UPSS infrastructure has on human health and the environment,
* Enable Council to prioritise effort and resources in its business processes to ensure UPSS infrastructure maintains compliance to the UPSS Regulation,
* Inform Council decisions on a service delivery model to monitor compliance of UPSS infrastructure,
* Provide a basis on which to improve compliance of UPSS sites through education and behavioural change, and
* Maintain an ‘outcomes focus’ regarding minimizing the risk of harm to human health and the environment.

# Inspection and Monitoring – Risk-Based Approach

A risk-based approach to inspection and monitoring of UPSS infrastructure follows key concepts of environmental management aligned to contaminated land management and pollution control practices.

The risk ranking process has been developed to provide a risk ranking score for operational UPSS infrastructure identified from the data sources available to Council. This information and data are set out in **Table 1** and the following sections.

The Risk Matrix utilizes a standard qualitative risk management process and estimates a risk ranking by considering:

* The **likelihood** that a UPSS infrastructure may cause pollution / contamination.
* The **consequences** if UPSS infrastructure were to leak, what is the potential harm from the pollution / contamination? What would be harmed when you consider sensitive receptors? Where are there potential complete exposure pathways between a UPSS source and human and/or ecological receptors?

The **Risk Ranking** brings the likelihood and consequence scores together to provide a Risk Ranking of Very High, High, Medium or Low risk.

# Site-Specific UPSS Details

A current and accurate location of all UPSS infrastructure sites is the base level of information required for a Council UPSS Register. The RAMJO and REROC CRCB project has provided Council with a base UPSS Register with Council tasked with the update and maintenance of this Register.

## UPSS Site Register

A UPSS Register must be maintained by Council. This is good practice data and information management which can guide and inform Council decision-making processes related to land use and land-use change, and provide a repository for Council’s inspection and monitoring of UPSS infrastructure.

The RAMJO-REROC CRCB project has provided Council with a UPSS Register. This Register includes over 30 fields which require information on (*inter-alia*):

* Site owner and NAR (Civica Authority parameter),
* Site operating name (e.g. Shell Leeton) and NAR,
* Site operator contact details and NAR,
* Name and contact details of the ‘person responsible’ for the UPSS infrastructure,
* Whether the site is operational (‘active’) or inactive (‘abandoned’, decommissioned),
* Number and age of UPSS tanks,
* Whether the site has
  + a ‘Fuel System Operational Plan’ (FSOP),
  + monthly reports on implementation of loss monitoring procedure,
  + 6 monthly reports on sampling and testing of groundwater (leak detection procedure), and
  + exemption under the UPSS Regulation.
* Overall risk rating for the site (limited to operational sites),
* Whether UPSS tanks have been decommissioned in-situ or removed, or whether they have been abandoned,
* Whether the site has been remediated and a Validation Report provided to Council,
* Whether the site has been subject to POEO Notices and/or Contaminated Land Management Act management orders,
* Corresponding Record ID in Council’s Contaminated Land Site Register (CLSR).

## UPSS Site locations

The RAMJO-REROC CRCB project acknowledged identifying past and current UPSS is a key challenge for councils. Hence this data was drawn from a variety of sources including:

* The September 2019 NSW Environment Protection Authority (EPA) hand-over package to Council which included a list of service station sites that responded to the EPA iteration of the Environmental Compliance Self Evaluation Survey (ECSES),
* NSW Fair Trading ‘FuelCheck’ database that provided a list of registered operational service station sites ([Fuel Check website](https://www.fuelcheck.nsw.gov.au/app)[[1]](#footnote-2)),
* SafeWork NSW database that provided a list of active and non-active sites licenced under Schedule 11 of the Work Health and Safety Regulation 2011 (‘WHS Regulation’) for UPSS infrastructure, and includes non-service station sites,
* Council’s electronic document and record management system (EDRMS) in relation to Development Applications for new or ‘significantly modified’ UPSS infrastructure,
* Information obtained from responses to Council’s iteration of the ECSES sent to service station operators.

The UPSS Compliance SOP (**Appendix 1**) contains a template ECSES and cover letter for Council to use in subsequent iterations of the ECSES. It is proposed the ECSES is issued every 2 years to ensure sites maintain compliance with the UPSS Regulation.

The UPSS Register provided to Council in 2022 is a baseline list of UPSS sites. Council must update and maintain this list by:

* Create a new or a revised record for a ‘new’ or ‘significantly modifed’ UPSS infrastructure, with this process triggered by a Development Application,
* Every 2 years
  + Send an email to NSW Fair Trading (FuelCheck) to obtain a list of current operational service station sites,
  + Send an email to SafeWork NSW to obtain a list of active or inactive sites licenced under Schedule 11 of the WHS Regulation for UPSS infrastructure,
  + Check the NSW EPA website (list of notified sites’) to identify sites subject to an investigation of site contamination,
  + Check the NSW EPA website (‘contaminated land record’) to identify new or the status of management orders issued under the Contaminated Land Management Act.

## UPSS Site Categorisation

The operational status of UPSS infrastructure is an important site parameter in the context of Council’s inspection and monitoring services.

A site can be defined as:

* ‘Active’ which means UPSS infrastructure is operational,
* Temporary closure which means the site no longer operates its UPSS infrastructure, but this infrastructure may be recommissioned in the future,
* ‘Inactive’ which means the status of UPSS infrastructure is either ‘abandoned’, decommissioned in-situ or is of ‘unknown’ status.

Active UPSS infrastructure are regulated by the UPSS Regulation. There is some ambiguity in the interpretation of what constitutes ‘inactive’ UPSS infrastructure, but good practice is to assume infrastructure remains ‘active’ until the UPSS infrastructure has been decommissioned.

There is also some ambiguity in the WHS Regulation on the temporary closure of UPSS infrastructure. The WHS Regulation stipulates UPSS infrastructure must be decommissioned if it has not been in operation for 2 years. There is increasing evidence in RAMJO and REROC where temporarily closed UPSS infrastructure is never recommissioned. ‘Abandoned’ UPSS infrastructure is a significant ARA issue for Council in minimizing the risk of harm to human health and the environment.

The status of UPSS infrastructure is a significant parameter for Council managing risk and liabilities in land use and land-use planning business processes. This risk is not limited to service station sites hence the UPSS Register includes non-service station sites and/or sites that are regulated by the EPA under the UPSS Regulation. The Register currently does not include UPSS infrastructure on Commonwealth land or land used by the Commonwealth.

This information is presented in Table 1.

**Table 1 UPSS Site Status Categories**

|  | **Sub-category** | **Relevant operational information** |
| --- | --- | --- |
| **Active** | Commissioned and operating.  DA consent provided | * DA approval date * Relevant DA conditions (e.g., site audit statement) * Responsible person (Fuel System Operation Plan (FSOP)) * 24-hour contact (emergency) (FSOP) |
| Modification (removal or replacement) | * Notification date * Report to be received by Council regarding the UPSS modification (removal or replacement) no later than 60 days after tank removal or replacement. If remediation of the site is required, no later than 60 days after the remediation is complete   [UPSS Reg, Part 5, s.24] |
| Pollution incident notification – leak notification form | * Notification date * As set out in the ‘leak notification form’ approved by Council * Section 5.7 of the *POEO Act 1997* requires notification of pollution incidents in the manner prescribed in the *UPSS Regulation*   [UPSS Reg, Part 5, s.25] |
| Exempt site | * Exempt from (detail the exact(s) section of *UPSS Regulation*) * Exemption approval date * Exemption start date * Exemption expiry date * The date and length of time the UPSS infrastructure site has been granted exemption from any provisions of the *UPSS Regulation*   [UPSS Reg, Part 7, s.29] |
| **New site** | Development Application, in progress | * Location * DA status |
| **Decommissioning** | Removal or Abandonment  Remediation (if required) | * Notification date * 30 days prior to decommissioning or removal, unless it is urgent and unforeseen in which case, notification is as soon as reasonably practicable after the decision is made to decommission * Contamination Assessment Report received date * No later than 60 days after; the site is decommissioned; or after remediation is complete * Contamination Status * Duly Qualified Person (Environmental Consultant) Contaminated land assessment (site suitability etc) and adequacy of UPSS decommissioning process   [UPSS Reg, Part 5, s.23] |
| **Other UPSS infrastructure** | Other UPSS Sites, and  Former UPSS Site | * UPSS infrastructure regulated by the EPA (including Council UPSS infrastructure) Commonwealth UPSS infrastructure, and * Legacy UPSS infrastructure |

# Estimating the LIKELIHOOD that UPSS infrastructure may fail/leak

A risk-based approach for Councils in managing its ARA responsibilities has two elements, namely the ‘cause’ and the ‘effect’. This section outlines a process for Council to identify and assess causal factors, and to then identify mitigation measures to manage these factors.

In relation to the ‘cause’, Council should consider three factors:

* **Compliance** to the regulatory requirements (*UPSS Regulation and UPSS Guideline 2020)*,
* The **Condition** of the UPSS infrastructure (determined by the age of the UPSS (tanks)), and
* The UPSS Site-Specific **Environmental Settings**.

## Compliance Status

A low level of compliance to the UPSS Regulation can be seen as an indicator that UPSS infrastructure is more likely to cause pollution and contamination. The challenge for Council is to identify the compliance baseline and to review this baseline periodically. **Table 2** presents the Compliance Status categories

**Table 2 UPSS Compliance Status Categories and Ranking**

| **Compliance Status Category** | **Likelihood of leakage potential** | **Definition** |
| --- | --- | --- |
| **Compliant** | Low | Complies with the requirements of the *UPSS Regulation* |
| **Partially compliant** | Medium | Partially complies with the requirement of the *UPSS Regulation* and plans have been committed to by the ‘person responsible’ to make site improvements to make the site compliant with the *Regulation*. |
| **Non-compliant** | High | The site in not compliant with the **UPSS Regulation**. Site improvements are required and/or the Person Responsible is not willing to commit to improvements. |
| **Unknown** | Assume High | The compliance status of the site is unknown. No information has been made available to Council to understand the compliance status of the UPSS Site. |
| **Exempt** | As determined in the UPSS exemption SOP (Low) | The UPSS Site currently has an exemption regarding some or all of the *UPSS Regulation*. |
| **Council is not the ARA** | As determined by the ARA | * Council owned or managed UPSS infrastructure (EPA is the ARA), * UPSS infrastructure owned/managed by Public Authorities (EPA is the ARA), * Council is not the ARA for UPSS Sites on Commonwealth property. |

## Determine and update a UPSS Infrastructure Compliance Status

The baseline compliance status of a site with UPSS infrastructure has been determined by:

* Reviewing the handover information from the NSW EPA (September 2019), including the EPA iteration of the Environmental Compliance Self-Evaluation Survey,
* Reviewing responses to the Council iteration of the Environmental Compliance Self Evaluation Survey,
* Desktop review of the ***Fuel System Operation Plan*** (FSOP), utilising the UPSS Site Inspection Checklist (**UPSS Compliance SOP - Appendix 1**), and
* Completing a **UPSS Site Inspection - (UPSS Compliance SOP - Appendix 1).**

As a side matter, all information garnered above is included in the UPSS Register provided to Council in 2022, including outcomes of inspections.

The **coverage** and **frequency** of inspections is to be determined by Council predicated on outcomes of the risk-based approach included in Appendix 3 of this UPSS Plan. Some directions on the coverage and frequency of these inspections include:

* UPSS site with overall risk rating of ‘very high’ or ‘high’ – annual inspection until the risk rating is reduced to medium or lower, and
* UPSS site with overall risk rating of ‘medium’ or ‘low’ – send the Environmental Compliance and Self Evaluation Survey every 2 years, and request evidence of:
  + Reports on monthly loss monitoring procedures for the previous 6 months,
  + Reports on the sampling and testing of groundwater for the previous year.

## UPSS Infrastructure condition

The condition of the UPSS Infrastructure (age and type) is a potential indicator of the likelihood that a UPSS tank may leak. Steel tanks corrode and have a limited lifetime. Modern (after 2008) fiberglass tanks are constructed to a higher standard of durability with respect to underground conditions and are much less likely to leak over their lifetime.

Use the age and tank type to determine the likelihood ranking according to Table 3.

**Table 3 UPSS Infrastructure Ranking**

| **Indicator** | **Likelihood of leaking/failure ranking** |
| --- | --- |
| Tanks are steel and older than 20 years (engineered life expectancy) | **HIGH** |
| Tank age unknown - Site was commissioned prior to 2008 | **HIGH** |
| Site was previously an independent sole trader service station in operation at or after 2008 | **MEDIUM** |
| Site was commissioned after 2008 and was not in operation prior to 2008.  Tanks should have:   * Non-corrodible tanks (fibreglass) and piping * Secondary containment of tanks and piping (double walled) * Overfill protection devices * Leak detection for tanks and piping | **LOW** |
| UPSS/tank age and time of commissioning is unknown.  Until evidence is produced that confirms the UPSS type and age, default to a HIGH ranking | **HIGH** |

## Determining the UPSS Infrastructure Ranking – tank type and age

The UPSS infrastructure age (years) and type (steel, fiberglass, lined, walled etc.) may be detailed in the:

* Responses to the ‘**Environmental Compliance Self Evaluation Survey**’ sent by Council to UPSS owners in 2021,
* **Fuel System Operation Plan** – request from the Person Responsible for the UPSS Site (template letter is held in the UPSS Compliance SOP (Appendix 1),
* Contaminated Land Management site assessments – may be held on file in Council records,
* Development Applications (Statement of Environmental Effects),
* SafeWork NSW data

Note: the *UPSS Regulation* requires UPSS infrastructure to comply with Australian Standard - ***AS-4897-2008*** *The design, installation and operation of underground petroleum storage systems.* The Council Development Application would have required documentary evidence of compliance.

## UPSS Site-Specific Environmental Site Conditions – likelihood

Harsh underground environmental conditions can influence the likelihood of a UPSS to corrode. Under harsh hydrogeological conditions the timespan of a steel tank failure may be much shorter than otherwise.

The environmental conditions set out in **Table 4** can be used to estimate the likelihood of a UPSS leak due to harsh underground conditions, and to score the overall likelihood.

**Table 4: Environmental Site Conditions- Likelihood Ranking**

| **Environmental Conditions** | **Source** | **Likelihood Scores** |
| --- | --- | --- |
| The site has concrete hardstand covering the UPSS tanks and the hardstand is in good condition. | Google maps / street view and ground-truthed during a site inspection | No – **High**  Partial – **Medium**  Yes - **Low** |
| Site is likely to be predominantly Sand geology | NSW Geological Maps ([link](https://resourcesandgeoscience.nsw.gov.au/miners-and-explorers/geoscience-information/products-and-data/maps/geological-maps)[[2]](#footnote-3))  Soil Landscape Sheets (link[[3]](#footnote-4))  Often this information has already been summarised in an Environmental Site Assessment for (ESA) for the site. | **High** |
| Site is likely to be predominantly Silt geology | **Medium** |
| Site is likely to be predominantly Clay geology | **Low** |
| Site is likely to:   * have acidic soil (potential for acid sulfate soil) * not have acidic soil | Acid sulfate soils can be identified using DPIE maps ([link](https://datasets.seed.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c)[[4]](#footnote-5)). | * **High** * **Low** |
| Site is on a ridge line, steep slope  Site slopes  Site is flat | Topographical maps, Site inspection, ESA reports. | **High**  **Medium**  **Low** |
| If a UPSS is on a site with shallow groundwater, it is more likely to be in contact with some or all of the UPSS (harsher conditions). | ESA reports, this may be difficult/misleading from DPIE – Water websites ([link](https://realtimedata.waternsw.com.au/)[[5]](#footnote-6)) which targets deep aquifers | **High** (0-2mbgs)  **Med** (2-4mbgs)  **Low** (4-10mbgs)  **Very Low** (>10mbgs) |

Note: ‘mbgs’ means metres below ground surface.

With reference to the above table, Environmental Site Assessment (ESA) reports which may be included in a DA, FSOP or in Council records regarding a site or a nearby site may be available and are extremely useful when considering relevant site specific, local or regional environmental factors.

Many of these maps are included in Council GIS systems, and the NSW SEED portal ([link](https://www.seed.nsw.gov.au/)[[6]](#footnote-7)) also contains many of these geospatial layers.

**Case Study Vulnerability Assessment Reports** have been conducted to present this information in a single report to assist the Councils that partook in the adequacy review (**Appendix 2**).

## Ranking the likelihood of a potential UPSS failure/leak

Council has used the Excel version of the risk tables provided in this section of the UPSS Plan to derive the likelihood risk of a UPSS site. Outcomes of the likelihood risk assessment are included Appendix 3 for each UPSS site ranked ‘very high’ or ‘high’.

**Table 5** combines the scores from **Table 2**, **Table 3** and **Table 4**.

**Table 5: Ranking the Likelihood of a UPSS Leak**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Indicator - Environmental** | | | | **3** | **2** | **1** | **0** | **SCORE** | **Comments** | | **Check** |
| Hardstand | UPSS tanks covered in concrete hardstand, which is in good condition | | | - | No | Poor condition | Yes |  |  | |  |
| Geology | Site is likely to be predominantly Sand geology (Y/N) | | | Sand | - | - | - |  |  | |  |
| Site is likely to be predominantly Silt geology (Y/N) | | | - | Silt | - | - |
| Site is likely to be predominantly Clay geology (Y/N) | | | - | - | Clay | - |
| Soil | Site is likely to have acidic soil | | | High | Med | Low | - |  |  | |  |
| Slope | Site is on a ridge line, steep slope | | | High | Med | Low | - |  |  | |  |
| Groundwater | Site has shallow groundwater likely to be in contact with some or all of the UPSS (LIKELIHOOD: High (0-2mbgs), Med (2-4mbgs), Low (4-10mbgs), very low (>10mbgs)) | | | High | Med | Low | Very Low |  |  | |  |
| **Indicator - UPSS condition** | | | | **6** | **4** | **2** | **0** |  |  | |  |
| UPSS conditions, age, maintenance | Tanks are steel or unknown type (6), tanks are double walled fiberglass (0) | | | Steel | - | - | Double-lined fiberglass |  |  | |  |
| Site was commissioned prior to 2008 (Y/N) | | | Yes | - | - | No |  |  | |  |
| Site was previously an independent sole trader service station, operating at or before 2008 (Y/N) | | | Yes | - | - | No |
| Site was previously an independent sole trader service station commissioned and in operation after 2008 (Y/N) (?) | | |  | YES | - | No |
| **Indicator - UPSS compliance** | | | | **12** | **8** | **4** | **0** |  |  | |  |
| *UPSS Regulation* Compliance | Non-compliant - The site in not compliant with the *UPSS Regulation*. Site improvement are required and or the Person Responsible is not willing to commit to improvements | | | Non-Compliant | - | - | - |  |  | |  |
| Partially complies with the requirement of the *UPSS Regulation,* **AND** plans have been committed to by the ‘person responsible’ to make site improvements to make the site | | | - | Partial | Partial (forecourt only) | - |  |
| Complies with the requirements of the UPSS 2019 regulation | | | - | - | - | Compliant |  |
|  | |  |  | **TOTAL SCORE** | | | |
|  | | | | **The corresponding ranking for the likelihood of UPSS failure is:** | | | |  | | | |
|  |  | | | **Likelihood ranking** | | | | | | | |
|  | | | | ≤ 5 | | 6 - 11 | | 12 - 23 | | ≥ 24 | |
|  |  | | | **LOW** | | **MEDIUM** | | **HIGH** | | **VERY HIGH** | |

# Vulnerability Assessment – Consequences

A risk-based approach for Councils in managing its ARA responsibilities has two elements, namely the ‘cause’ and the ‘effect’. This section outlines a process for Council to identify and assess consequence factors, and to then identify mitigation measures to manage these factors.

Estimating the potential impacts (consequences) on human health or the environment (sensitive receptors) of a UPSS failure/leak/contamination has been framed on:

* Vapour Intrusion – **Section 5.1**
* Drinking Water contamination – **Section 5.2**
* Ecological impact – **Section 5.3**

Council has used the Excel version of the risk tables provided in this section of the UPSS Plan to derive the consequence risk of contamination from a UPSS site. Outcomes of the consequence risk assessment are included Appendix 3 for each UPSS site ranked ‘very high’ or ‘high’.

# Vapour Intrusion Risk

Understanding the proximity of a UPSS Site and its local settings (neighbours, surrounds and environment) can be used to estimate the potential for a vapour intrusion risk should there be a leak from a UPSS.

* Knowing the fuel type when there is a leak or when assessing a site is important as unleaded fuels contain significantly more volatile petroleum compounds than diesel, or kerosene (or jet fuel). Hence a leak from an underground diesel tank is less likely to cause a significant vapour intrusion impact on human health then a leak from an unleaded fuel tank.
* Where there is a potential for sensitive receptors to spend long periods of time: e.g., low and medium density of housing, special points of interest (childcare centres, schools, parks, aged care homes and services).
* Where there is a potential for underground infrastructure to be create a short and confined space for vapour accumulation: e.g., basements and services.
* Where local or regional geological and groundwater conditions facilitate the conditions for a groundwater plume to move quickly and intercept or be close to the infrastructure or the built environment.

# Where to get information to assess Vapour Intrusion risk

Important information required for an assessment of vapour intrusion risk can be found:

* In the FSOP, UPSS Register, Development Applications (Statement of Environmental Effects) records, or a dangerous good search (SafeWork NSW) that will provide information on the fuel and tank types. Environmental site-specific samples (soil, groundwater, or soil vapour) should be taken by Council or a Duly Qualified Person (Environmental Consultant) when assessing a specific site contaminated land issue, in order to validate the fuel type present in the environment.
* Knowing the land use zoning and location of special points of interest from your Council LEP (Contact your Council Planning and assessment team).
* Google searches and the NSW SEED database can identify special points of interest however these require ground truthing during a site inspection.
* Understanding the local built environment can increase your understanding of the likelihood of basements in the vicinity of a site or generally in the region. Dial before you dig is a useful service for understanding what underground infrastructure surrounds a site.
* Section 4.3 details how to find out about environmental factors. A shallow groundwater depth can greatly influence the potential severity of potential impacts/consequences on the surrounding environment and receptors.

Score the potential Vapour Intrusion Consequences in **Table 6**.

**Table 6: Scoring the Potential Vapour Intrusion Consequences**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Vapour Intrusion risk indicator** | **7** | **5** | **3** | **1** | **0** | **SCORE** | **Comments** | **Check** |
| Fuel type | Volatile fuels are present on site | - | **Unleaded** | **Kerosene (jet fuel)** | **Diesel** | - |  |  |  |
| Land Zoning | Any of the direct neighbouring sites are zoned residential | **Yes** | - | - | - | **No** |  |  |  |
| Land Zoning | Are there any sites within a 150m radius of the derelict site which are a residential land zoning | - | **Yes** | - | - | - |  |  |  |
| All of the sites within a 150m radius (or downslope/down gradient) are **all** zoned ‘open space’ and do not include sensitive land use | - | - | **Yes** | - | - |  |  |
| All of the sites within a 150m radius (or downslope/down gradient) are **all** ‘commercial industrial’ and do not include sensitive land use | - | - | - | **Yes** | - |  |  |
| Groundwater depth | Area is likely or known to have shallow groundwater (<4 m bgs) | **Shallow** | - | - | - | - |  |  |  |
| Area is likely or known to have groundwater at a medium depth >4 - < 10 m bgs) | - | **Medium** | **-** | - | - |  |
| Area is likely or known to have deep groundwater (>10 - <20 m bgs) | - | - | **Deep** |  |  |  |
| Area is likely or known to have very deep groundwater (>20 m bgs) | - | - | - | **Very Deep** | - |  |
| Sensitive POI | Proximity to Sensitive Point of Interest (childcare centre, school, park, hospital) | **10m** | **50m** | **100m** | **150m** | **>150m** |  |  |  |
|  |  |  |  |  |  |  | **TOTAL** |  |  |
|  | |  |  |  |  | | 0 |  |  |
| The scores and corresponding ranking for the potential consequence of vapour intrusion from a UPSS Site accordingly is: | | | | |  | | |
|  |  |  | | **Consequences ranking score** | | | |  |  |
|  |  |  | | 13 or higher | | **VERY HIGH** | |  |  |
|  |  | 10-12 | | **HIGH** | |  |  |
|  |  | 8-9 | | **MED** | |  |  |
|  |  | 2-7 | | **LOW** | |  |  |

# Drinking Water Contamination Risk

There are two scenarios where a leaking UPSS may present a contamination risk to potable water sources.

* **Source water**: UPSS sites pose a potential contamination risk to source waters for the supply of water to townships and regional centers where potable drinking water is sourced from groundwater aquifer sources and/or surface waterways (rivers).
* **Private Bore water:** Bore water suppliers are common in regional areas where there is either no reticulated (town water) supply infrastructure in place, and where rainwater is scare, and where bore water is available. Some common scenarios to consider and to consult with your Council Environmental Health Officer (EHO) (or NSW Health Public Health Unit EHO), local water utility and or water suppliers and Council Infrastructure Managers are:
  + **Private bores** – These may be registered and hence are able to be identified. Unregistered bores exist and may not be easily identifiable – however, the circumstances which lead to the use of bores for private water use are known and hence, where there are registered bores, an aquifer and potable water – it should be assumed there are also unregistered bores.
  + **Private water suppliers** – These are likely well known to the water utilities and to Council EHOs due to the reporting requirements of NSW Health[[7]](#footnote-8) for private water suppliers to provide potable water. These are often found in settings such as caravan parks, bed and breakfasts, and campgrounds.

**Note:** Rainwater collection tanks are not considered a pathway for UPSS contamination, however they are often filled with bore water during times of drought.

# Drinking water source information

NSW Health requires that a risk assessment is completed by water utilities for ensuring their source water and supply is suitably managed and a process is in place to manage contamination. Utilise the report to understand how a leak from a UPSS may potentially impact source water supplies.

These risk assessments are referenced in the Case Study Vulnerability Assessment Reports (**Appendix 2**).

# Scoring potential drinking water contamination risk

The risk ranking process assigns potential UPSS Sites with a higher ‘consequence’ score if the site is located:

* Near to a private registered groundwater bore (up to 1000m).
* In an area which is of known groundwater aquifer (up to 1000m).
* In or adjacent to a drinking water catchment (up to 1000m).
* In the vicinity (150m) of a caravan or campground (who commonly have private water supplies).
* Areas where a reticulated (town) water supply is not available (if known).

Score the potential Drinking Water Contamination Consequences in **Table 7**.

**Table 7: Scoring the Potential Drinking Water Contamination Consequences**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Drinking Water Contamination Risk Indication** | 7 | 5 | 3 | 1 | 0 | **SCORE** | **Evidence / Comments / Site Inspection check** | **Check** |
| Private Groundwater Bores | Site is within **X** m of a single (private) **registered groundwater bore** (not part of a bore field) | **X =50m** | **X = 100m** | **X = 500m** | **X = 1000m** | **X >1000m** |  |  |  |
| Private Water Supplier | Is there a caravan park or campground within 150m of the site (private water supplier) | - | **Yes** | - | - | **No** |  |  |  |
| Groundwater Vulnerability | Site is within or adjacent to a known potable/usable **groundwater aquifer** | **Inside** | **within 150m** | **within 500m** | **within 1000m** | **>1000m** |  |  |  |
| Drinking Water Catchments | Site is within a surface (drinking/potable) water **catchment** or near (150m, 500m, 1000m) a dam, weir etc. (not an above ground bulk water storage tank) | **Inside** | **within 150m** | **within 500m** | **within 1000m** | **>1000m** |  |  |  |
| Reticulated water supply | Site is in an area known to **not** have a reticulated water supply | **Yes** | - | - | - | **No** |  |  |  |
| Private Water Supplier | Site is within an area known to have private Water suppliers who rely on local groundwater and surface water for source water | **Yes** | - | - | - | **No** |  |  |  |
|  | | | | |  |  | **TOTAL** |  |  |
|  | | |  |  |  |  |  |  |  |
| The scores and corresponding ranking for the potential consequence of drinking water contamination from the UPSS Site is: | | | |  | |  |
|  |
|  | Consequences ranking | | 8 or higher | **VERY HIGH** |  |  |
|  |  |  |
|  | 7 | **HIGH** |  |  |
|  | 4-6 | **MED** |  |  |
|  |  |  |  | 0-3 | **LOW** |  |  |

# Ecological Degradation

Contamination from a UPSS may impact the local ecology. This occurs when contaminants intercepts with a groundwater plume, or contaminated seepage water seeps or leaches into a surface water body.

The NSW EPA has previously mapped the UPSS sensitive zones across NSW which equate to all known waterways and a buffer area around these waterways. NSW Water has also identified areas where the ecosystems are dependent on groundwater.

Identify where there are sensitive ecological receptors which may be exposed to petroleum hydrocarbon contaminated water which potentially originated from a UPSS Site leak, spill or contamination.

UPSS Sites are scored with a higher ‘consequence’ score if the site is located within:

* A UPSS sensitive zone ([link](https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/risk-based-licensing/risk-assessment-tool/sensitive-zone-maps)[[8]](#footnote-9)),
* An area of known groundwater dependent ecosystems ([link](https://spatial-portal.industry.nsw.gov.au/portal/home/item.html?id=a3a671e8825c47238d6808239ce53d9f)[[9]](#footnote-10)),
* Land zoned ‘environmental protection’, or ‘environmental management’. (Refer to the Council’s Local Environmental Plan),
* Land that is NSW National Park ([link](https://www.nationalparks.nsw.gov.au/nsw-state-map)[[10]](#footnote-11)),
* Land that is adjacent to Marine Parks or Aquatic reserves ([link](https://www.dpi.nsw.gov.au/fishing/habitat/protecting-habitats/mpa)[[11]](#footnote-12)),
* Land that is adjacent or within Coastal SEPP wetlands. (Refer to the Council’s Local Environmental Plan).

Other scenarios or circumstances may exist which are most likely to be best considered on a site specific or Council local government area basis if ecological communities are not considered by the locations listed above.

**Table 8: Scoring the Potential Ecological Degradation Consequences**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Category** | **Ecological Impact Risk Indication** | **7** | **0** | **SCORE** | **Evidence** | **Check** |
| UPSS Sensitive Zones | Site is within UPSS Sensitive zone (surface water, environmental management/protection zoning) | **Yes** | **No** |  |  |  |
| Groundwater Dependent Ecosystems | Site is within known areas where there are groundwater dependent ecosystems | **Yes** | **No** |  |  |  |
| Land zoning | Site is within land zoned environmental protection or management | **Yes** | **No** |  |  |  |
| NPWS Reserve | Site is within land that is recognised as National Park | **Yes** | **No** |  |  |  |
| Miscellaneous Reserves | Site is within land that is recognised as Miscellaneous Reserves (Marine Parks, Aquatic Reserve) | **Yes** | **No** |  |  |  |
| Coastal Sepp Wetlands | Site is within land that is recognised as Coastal Sepp Wetland | **Yes** | **No** |  |  |  |
|  |  |  | **Total** |  |  |  |
|  |  | The scores and corresponding ranking for the harm to sensitive environments from the UPSS Site is: | |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  | Consequences ranking | 8 or higher | **HIGH** |  |  |
|  |  | 1-7 | **MED** |  |  |
|  |  | 0 | **LOW** |  |  |

# Mapping Council Vulnerability

Councils may benefit from presentation of these data across their LGA in a dashboard map linked to a GIS system generated map linked to their UPSS register. This would allow the construction of a basic conceptual site model of a UPSS Site and its surrounds for assessment and decision-making regarding Council business and regulation.

Additionally, a spatial view around or across environmental assets (groundwater extraction bores, rivers, catchment, recreational waters, environmental protection area) provides a method for council to understand if there are several or multiple UPSS Sites which all pose a potential concurrent risk to an environmental asset or sensitive receptor.

Two **Case Study Vulnerability Assessments** have been provided to Hay Shire Council (for RAMJO councils) and Coolamon Shire Council (for REROC councils) in Appendix 2. These cases studies have been used to provide contextual information on a detailed vulnerability assessment.

# Risk Ranking

The likelihood and consequence scores for each of the risk pathways is brought together for the three exposure pathways are presented in Table 9, Table 10, and Table 11. The rankings for each pathway are presented in Table 12.

Table 9: Risk Ranking - Vapour Intrusion

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Likelihood ranking** | | | | | | |
| 3 | 5 | 6 | 11 | 12 | 23 | >24 |
|  |  |  | **LOW** | | **MEDIUM** | | **HIGH** | | **VERY HIGH** |
| **Consequences ranking** | 13 or above | **VERY HIGH** | **HIGH** | | **VERY HIGH** | | **VERY HIGH** | | **VERY HIGH** |
| 10-12 | **HIGH** | **HIGH** | | **HIGH** | | **HIGH** | | **VERY HIGH** |
| 8-9 | **MED** | **MEDIUM** | | **MEDIUM** | | **HIGH** | | **HIGH** |
| 2-7 | **LOW** | **LOW** | | **MEDIUM** | | **HIGH** | | **HIGH** |

Table 10: Risk Ranking - Drinking Water Contamination

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | |  | **Likelihood ranking** | | | | | | |
|  | 3 | 5 | 6 | 11 | 12 | 23 | >24 |
|  |  |  | **LOW** | | **MEDIUM** | | **HIGH** | | **VERY HIGH** |
| **Consequences ranking** | 8 or above | **VERY HIGH** | **HIGH** | | **VERY HIGH** | | **VERY HIGH** | | **VERY HIGH** |
| 7 | **HIGH** | **HIGH** | | **HIGH** | | **HIGH** | | **VERY HIGH** |
| 4-6 | **MED** | **MEDIUM** | | **MEDIUM** | | **HIGH** | | **HIGH** |
| 0-3 | **LOW** | **LOW** | | **MEDIUM** | | **HIGH** | | **HIGH** |

Table 11: Ecological Degradation

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Likelihood ranking** | | | | | | |
|  |  |  | 3 | 5 | 6 | 11 | 12 | 23 | >24 |
|  |  |  | **LOW** | | **MEDIUM** | | **HIGH** | | **VERY HIGH** |
| Consequences ranking | 8 or above | **HIGH** | **MEDIUM** | | **HIGH** | | **VERY HIGH** | | **VERY HIGH** |
| 1-7 | **MED** | **MEDIUM** | | **MEDIUM** | | **HIGH** | | **VERY HIGH** |
| 0 | **LOW** | **LOW** | | **MEDIUM** | | **MEDIUM** | | **HIGH** |

Table 12: Risk Pathway Rankings

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Human Health Protection** |  |  |  |  |
| Vapour Intrusion | **LOW** | **MEDIUM** | **HIGH** | **VERY HIGH** |
| Drinking Water Contamination | **LOW** | **MEDIUM** | **HIGH** | **VERY HIGH** |
| **Environment Protection** |  |  |  |  |
| Ecological degradation | **LOW** | **MEDIUM** | **HIGH** | **VERY HIGH** |

# UPSS Inspection and Monitoring – Risk Ranking, Prioritisation and Actions

The Risk Based approach makes use of the Risk Ranking to guide and inform development of Council’s UPSS Inspection and Monitoring Program. The process comprises a sequence of steps with summary tables provided in Appendix 3 for each site ranked ‘very high’ or ‘high’. The steps are::

* Step 1: Consider the **Risk Ranking** and UPSS Site Specific Inspection **Prioritisation**.
* Step 2: Consider the UPSS Site’s **Risk Profile**.
* Step 3: Determine and Describe the **Critical Risk Drivers**
* Step 4: Determine effective **Risk Mitigation** and/or **Risk Management** options – **Site Inspection**
* Step 5: Ongoing, continuous UPSS **Site improvements** and **Compliance Monitoring**.

| **Steps** | **Actions** | **Example (Petrol Station R&Rtown)** |
| --- | --- | --- |
| Step 1a – **Risk Ranking** | | |
| Complete the tables 1 to 12 above for each site (or a selection of sites). | 1. Update the UPSS Register with the **Risk Ranking,** date and comments relevant to the ranking process. | The Petrol Station R&R town was risk ranked using the tables 1 to 12. Following the scoring process the highest rank was:   |  | | --- | | **VERY HIGH** |   Thus, the Initial **Risk Ranking** is recorded in the UPSS Site Register as:  ***Very High, ranked on [date], noting that the risk ranking occurred prior to initial Site Inspection***.  This is a high priority site for inspection as it is ranked a Very High risk. |
| Step 1b: **UPSS Site Inspection Prioritisation** | |
| Compare the individual UPSS Sites **Risk Ranks** to one another.  An individual site’s **Risk Ranking** will be according to the highest ranking of the three pathways.  The **Risk Ranking** comparison can inform which UPSS Sites are an initial high priority for inspection. | 1. Once the inspection prioritisation is complete the next steps (2 to 5) should be considered prior to each UPSS Site inspection on an ongoing basis as information is received and relevant events (site improvements, notifications) occur. |
| Step 2: **Risk Profile** | | |
| Consider all of the individual **Risk Rankings** to determine the UPSS Site’s **Risk Profile**.  The **Risk Profile** considers all 3 of the risk pathways. | 1. Update the UPSS Register with the Risk Profile. | The Risk Profile of Petrol Station at R&R town is: Very High risk of Vapour Intrusion, Medium risk of Ecological degradation, with a Low risk of Drinking Water Contamination.   |  |  | | --- | --- | | Human Health Protection | Risk Ranking | | Vapour Intrusion | VERY HIGH | | Drinking Water Contamination | LOW | | Environment Protection |  | | Ecological degradation | MEDIUM | |
| Step 3: **Critical Risk Drivers** | | |
| **Critical Risk Drivers** are these highest scoring items.  Some of the risk ranking scores may be able to be reconsidered upon obtaining further site-specific information or after improvements to the site have been made. Others are not able to be adjusted (e.g. environmental conditions). Where this is the case, the risk is driven by these environmental factors (e.g. a shallow groundwater table) | | |
| Identify the highest scoring items in the likelihood tables.  These determine the UPSS Site’s **Critical Risk Drivers (Likelihood)** | 1. Note the **Critical Risk Drivers** (Likelihood) in the Site Register.   Use the Critical Risk Drivers as a focus of both the Site Inspection and ongoing Compliance Monitoring.   1. During the site inspection draw the Critical Risk Drivers to the Person Responsible’s attention, if they are not already aware. | The **Critical Risk Drivers** (**Likelihood**) of Petrol Station at R&R town identified from the FSOP and a desktop review are below:   |  | | --- | | **Critical Risk Drivers - Likelihood** | | * FSOP is incomplete. * Tank Age > 20 years * Forecourt bunding is not compliant. There is potentially uncontrolled forecourt stormwater run-off leaving the site without treatment. | | | | |
| Step 3a: **Critical Risk Drivers** – **Likelihood** of UPSS failure | |
| Where a high score for the following factors is identified, Council should consider the influence of this factor across all of the pathways identified to be complete and vulnerable to potential risks:   * **Concrete hardstand** – If the UPSS is not covered by concrete, or if the concrete is in a very poor condition (cracked, weathered etc.) there is a potential for storm water or forecourt water to seep into the tank pits and infrastructure channels where the UPSS is located. This can substantially increase the likelihood of corrosion of the UPSS occurring. * **UPSS age** – If the UPSS is greater than 20 years old, they are almost certainly older than their design life. Hence, they are highly likely to eventually fail – depending on the underground conditions and other factors. Replacing the old tanks with new tanks may not appear to be a financially acceptable option, however cleaning up underground contamination from a UPSS failure can be extremely expensive and carry substantial liability for damages to third party property should the contamination migrate off site from the UPSS site. * **UPSS Compliance** – if the site is non-compliant to the *UPSS Regulation*, all of the items are within the *Person Responsible’s* control and site or administrative practices can be completed to achieve compliance. However, some actions (e.g. forecourt amendments) may be very expensive. Council may wish to use this step-wise risk-based approach to have the high-risk items attended to first when planning the steps a *Person Responsible* can take when moving from non-compliant, to partially compliant, to compliant. | |
| Step 3b: **Critical Risk Drivers** – **Consequences** of contamination from a UPSS failure | | |
| Review the identified consequences of a potential UPSS failure for each pathway.  Highlight the factors which are within the *Person Responsible’s* control and those factors which are not. | | |
| Identify the highest scoring items in the consequence tables. These determine the UPSS Site’s **Critical Risk Drivers (Consequence).** | 1. Note the **Critical Risk Drivers** (Consequences) in the Site Register. Use the Critical Risk Driver as a focus of both the Site Inspection and ongoing Compliance Actions and Monitoring. 2. During the site inspection draw the **Critical Risk Drivers** to the *Person Responsible’s* attention, if they are not already aware. | The **Critical Risk Drivers (Consequences)** of Petrol Station at R&R town are identified for each pathway below: |
| Step 3b continued: Critical Risk Drivers – **Vapour intrusion** | |  |
| * Take note of the **groundwater depth.** A high/very high-risk vapour risk ranking may be considered relative to the groundwater depth. A shallow contaminated groundwater is more likely (in very general terms) to produce a great risk than a deeper groundwater table. * Take note of the **groundwater flow direction** (if known) and consider the vapour intrusion risks only in the direction of the groundwater flow direction (down gradient) and to the sides of a potential groundwater plume (cross-gradient). * Take note of the **soil type.** A high/very high-risk vapour intrusion risk ranking may be considered relative to the soil type. Groundwater moves through a porous (sand) soil type more quickly than through a less porous soil type (silt), and slowest through a clay soil type. The same principle applies for petroleum hydrocarbon vapour which will move easiest through a porous (sand) soil type, less easy through a less porous (silt), and won’t move very easily at all through a clay soil type.   The **location of groundwater wells** on a UPSS Site is critical when attempting to understand if they can act as **sentinel wells** for detecting contaminated groundwater moving from a potentially leaking UPSS and into the direction of sensitive receptors. A sentinel well acts as an early warning prior to a contaminated groundwater plume reaching an off-site sensitive receptor. Best practice regarding targeting of groundwater wells during installation will attempt to locate groundwater wells in this manner. However, well locations may not always be optimal due to the location of infrastructure and the layout of the site. If there are no sentinel wells, Council may consider requesting that they be installed. | | The **Critical Risk Drivers (Consequences)** of Petrol Station at R&R town identified for the vapour intrusion pathway are:   |  |  |  | | --- | --- | --- | | **Human Health Protection** | **Risk Ranking** | **Critical Risk Drivers - Consequence** | | Vapour Intrusion | **VERY HIGH** | Proximity of the site to the residential neighbours who share the northern border. |   The groundwater depth is estimated to be DEEP, approximately 10 m below ground surface. However, this information is from Regional estimates (not available in the FSOP). The soil type is a silty clay, the site is generally flat with a gentle slope towards the north however the measured groundwater flow direction and gradient is unknown. |
| Step 3b continued: Critical Risk Drivers – **Drinking water contamination** | | |
| A good understanding of the **source water supply** and the coverage of a reticulated water supply in a local area is important. It is highly unlikely that contamination from a UPSS will impact on the reticulated/town water supply as there are multiple control points for water quality that would prevent that happening.  If however, it is determined that drinking water source water (catchment water, bore water, river water, dam water) is potentially vulnerable from a leaking UPSS – discussions with the local water utility, private water supplier or bore water user will be critical to understand how the potential risk can be monitored, mitigated and managed. Having the *person responsible*, Council and the water utility consider the development of a **conceptual site model** to consider the risk pathways is recommended.  Consider having a meeting between the person responsible, water utility (or private water supplier) and Council so the risk is known, and it can be suitably managed. In most cases, compliance with the UPSS regulation will be adequate for risk management purposes. The stakeholders may determine and agree (in good faith) that a high frequency of inspection, monitoring or reporting is a good idea and can be implemented through a risk management plan. | | The **Critical Risk Drivers (Consequences)** of Petrol Station at R&R town identified for the drinking water contamination pathway are:   |  |  |  | | --- | --- | --- | | **Human Health Protection** | **Risk Ranking** | **Critical Risk Drivers - Consequence** | | Drinking Water Contamination | **LOW** | (R&R Township has reticulated water supply, drawn from the River with the intake upstream of the R&Rtown Site) | |
| Step 3b continued: Critical Risk Drivers – **Ecological degradation** | | |
| A good understanding of the sensitive ecological receptors in the vicinity of the UPSS Site is critical.  If a potential ecological impact is identified – further consideration of how a UPSS leak, spill or contamination event may impact the local ecology in a site-specific manner should be considered. Having the *person responsible* develop a **conceptual site model** to consider the risk pathways is recommended. Once the potential risks are confirmed as a having a source (UPSS), pathway (surface water, groundwater, seepage water), receptor (creek, river, stream, wetland, dam, swamp, groundwater dependent ecosystem) then risk monitoring, management or mitigation plans can be put into place. | | The **Critical Risk Drivers (Consequences)** of Petrol Station at R&R town identified for the Ecological degradation pathway are:   |  |  |  | | --- | --- | --- | | **Environment Protection** | **Risk Ranking** | **Critical Risk Drivers - Consequence** | | Ecological degradation | **MEDIUM** | Proximity to Parkland and River | |
| Step 4: **Risk Mitigation and Management** | | |
| When a **Critical Risk Driver(s)** is identified that is **within the control** of the *Person Responsible*, **Risk Mitigation** steps should occur.  These steps may be site improvements, administrative changes, or monitoring and reporting requirements. | Council should outline the steps the P*erson Responsible* should take in order to **mitigate** or remove the potential risk.  Record the steps in the UPSS Site Register. | The example is continued below: |
| Where a **Critical Risk Driver(s)** is identified that is **not within the control** of the *Person Responsible*, **Risk Management** should occur.  These steps may be the development of a risk management plan that sets out what actions should be taken in order to monitor the **Critical Risk Driver**. | Council should outline the steps the P*erson Responsible* should take in order to **manage** and monitor the potential risk.  Record the steps in the UPSS Site Register. |
| During the site inspection observe or check if these **Critical Risk Drivers** are true.  It is highly likely that compliance to the *UPSS Regulation* will cover most of these risk scenarios. | Discuss with the *person responsible* what can be can be done to mitigate, prepare, or plan so that the identified **Critical-Risk Drivers** are **mitigated** or **managed** over a suitable and agreed timeframe.  Provide a letter to the *Person Responsible* stating what Council requires. |
| EXAMPLE Continued:  All Critical Risk Drivers identified at Petrol Station at R&R town – Prior to Site Improvements   |  |  |  |  |  | | --- | --- | --- | --- | --- | | **Human Health Protection** | **Risk Ranking** | **Critical Risk Driver - Likelihood** | **Critical Risk Driver - Consequence** | **Potential Risk Mitigation Requirements** | | Vapour Intrusion | **VERY HIGH** | Examples:   * FSOP is incomplete 🗷 * Tank Age > 20 years 🗷 * Forecourt bunding not compliant 🗷 | Proximity to residential neighbours | Detailed understanding of groundwater depth, gradient and migration direction required | | Drinking Water Contamination | **LOW** | R&R Township has reticulated water supply | Nil | | **Environment Protection** | |  |  | | Ecological degradation | **MEDIUM** | Proximity to Parkland and River | Check stormwater flows and adequacy of forecourt bunding.  Detailed understanding of groundwater depth, gradient and migration direction required. | | | |
| Step 5 - Ongoing, continuous UPSS Site improvement and Compliance Monitoring | | |
| Reconsider the **Critical Risk Drivers** following the UPSS Site inspection and the commitments made by the *Person Responsible*. | Amend the **Critical Risk Drivers** in the consequence and likelihood tables and record the new **Risk Ranking** and **Risk Profile** in the **UPSS Site Register**. | The example is continued below: |
| Reconsider the **Critical Risk Drivers** following, completion of the site improvements as agree by the *Person Responsible* for the site. | Amend the **Critical Risk Drivers** in the consequence and likelihood tables and record the new **Risk Ranking** and **Risk Profile** in the **UPSS Site Register**. |
| If, due to the site settings and environmental conditions which are not in the *Person Responsible’s* control, the site remains a **high-risk** site – the UPSS Site may benefit from having a **Risk Management Plan** in place. This is important if the risks are not addressed by the requirements of the *UPSS Regulation*. This may be discretionary and by agreement between a UPSS Site’s *Person Responsible,* stakeholder who may be potentially impacted and the Council. A **Risk Management Plan** may be developed by a duly qualified person if the issues are complex, e.g., existing contamination exists on the site, a tank upgrade is not possible, there is a remediation system present on the site. | |
| Determine a site inspection frequency as detailed in the UPSS-SOP, Appendix 1. | |  |
| EXAMPLE Continued:  Following the site inspection of Petrol Station at R&R town, additional information is provided by the *Person Responsible.*  It is understood that the groundwater flow direction is in a northly direction, towards the residential area; however, the soil type is silt with a low gradient (groundwater flow will be slow), the groundwater depth is approximately > 10 m below ground surface. The distance between the UPSS and the nearest residential dwelling is 50m. The houses are unlikely to have basements and are likely to be built on piers with crawl spaces. This is a lower risk setting for vapour intrusion.  Hence, the vapour intrusion risk can now be considered a **medium risk** at the time of inspection.  Additionally, there is a groundwater monitoring well between the UPSS and northern boundary of the site beyond which is the residential properties. The *Person Responsible* has offered to have this well tested every 6 months (not just dipped) as it acts as a sentinel well.  The FSOP is updated with the new risk ranking and risk profile and includes the specific requirements detailed in the Risk Management Plan.  Petrol Station at R&R town has addressed all of the Critical Risk Drivers within their control. The Risk Ranking of the site is changed to reflect the new site conditions and the remaining environmental conditions.  EXAMPLE Continued:   |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | | **Human Health Protection** | **Risk Ranking (prior)** | **Critical Risk Driver - Likelihood** | **Critical Risk Driver - Consequence** | **Risk Management**  **Plan** | **Risk Ranking (after)** | | Vapour Intrusion | **VERY HIGH** | * FSOP is complete 🗹 * Tank Age > 20 years 🗷 * Forecourt bunding compliant 🗹 | Proximity to residential neighbours | * Sentinel well monitoring * Annual inspection of housing stock to the north of the site | **MEDIUM** | | Drinking Water Contamination | **LOW** | R&R Township has reticulated water supply | Nil | **LOW** | | **Environment Protection** | |  |  |  | | Ecological degradation | **MEDIUM** | Proximity to Parkland and River | Nil - River is now protected from regular site stormwater run-off. | **LOW** | | | |
|  | | |

1. **UPSS Compliance - Standard Operating Process**

Contained in a separate document [Council workflow – SoP for UPSS Plan.doc]

1. **Case Studies - Vulnerability Assessment Reports**

(see VA-Hay Shire Council.pdf and VA-Coolamon Shire Council.pdf)

1. **Risk Rating Tables**

Appendix 3 contains the following tables:

* List of UPSS Sites (as of 1 December 2021) and commentary on the compliance risk assessment undertaken for each site,
* Likelihood and Consequence risk assessment tables for sites with compliance risk rating of ‘high’,
* Critical risk drivers and mitigation measures for the following sites:
  + List of sites whose compliance risk rating was determined to be ‘high’ (i.e. this rating was derived from an assessment of responses received to the environmental compliance self-evaluation survey)

**UPSS Sites (as of 1 December 2021)**

*Populate the table below with the required information. This information can be obtained from responses to the environmental compliance self-evaluation survey. A record should be created for those sites that did not provide a response to this survey.*

| **Property Information** | | | | | | | | | **UPSS Infrastructure** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Lot** | | | **Section** | **DP** | **Parcel** | | **Address** | **Site Name** | **No. Tanks** | **Status** | **Risk** |
| 5 |  |  | 12 | 758606 | 1299 |  | 2 Xanadu Drive, Xanadu, NSW, 1111 | Grease Lightning | 6 | Active | [High][Medium][Low] [ARA-EPA] |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |

Explanation

The use of italics denotes either:

* The site is operated by a Public Authority (including Council) and thereby UPSS infrastructure is regulated by the EPA and no compliance risk rating is determined (see note below); or
* The activity occurring on the site requires to be confirmed as a ‘scheduled activity’ under the POEO and thereby UPSS infrastructure is regulated by the EPA, or
* Council is yet to confirm fuel storage is aboveground and thereby excluded from requirements of the UPSS Regulation.

***Note:*** *UPSS infrastructure owned by Council or managed by a third party on behalf of Council is regulated by the EPA. Hence Council should inspect and monitor these sites to ensure they comply and maintain compliance with the requirements.*

The status of UPSS infrastructure denoted as ‘decommissioned’ do not always have the same risk rating. The rationale for the attribution of a risk rating is as follows:

* If the site is designated as a ‘former’ UPSS site and has been subject to an EPA notification and investigation, then a rating of ‘low’ is used,
* If the site is designated as a ‘former’ UPSS site and has had a change in land use via a Development Application, then a rating of ‘low’ is used,
* If there is knowledge that UPSS infrastructure has been decommissioned, but there is no evidence of this process, then a rating of ‘high’ is used,
* If there is knowledge the UPSS infrastructure has been decommissioned for a given site and a Validation Report has been provided to council, then a rating of ‘low’ is used, and
* If there is no knowledge on the UPSS infrastructure then the status of this infrastructure is ‘abandoned’ and a rating of ‘high’ is used.

High Risk means

* Sites with UPSS infrastructure that do not comply with the UPSS Regulation, or
* Default attribution as the site owner did not provide a response to the Environmental Compliance Self Evaluation Survey. It must be noted some of these sites may be regulated by the EPA as a ‘scheduled activity’ under the POEO, or
* Sites denoted as ‘former’ sites but there is no information on whether UPSS infrastructure has been decommissioned in-situ or removed, or abandoned. Hence assumed to be abandoned until Validation Report provided to Council.

Medium Risk means

* Sites that partially comply with the compliance but whose tanks are pre 1 June 2008, or
* Council has not sighted the FSOP, report on loss monitoring procedure, and report on leak detection (sampling and testing of groundwater).

Low Risk means

* Sites that fully comply with the UPSS Regulation, or
* Sites whose tanks have been decommissioned, but no Validation Report provided to Council, or
* Sites that have provided their FSOP and reports on loss monitoring and leak detection.

**Likelihood and Consequence Risk Tables**

*Populate the table below with the required information. This information can be obtained from the Excel risk-based tool. A record should be created for those sites that did not provide a response to this survey and therefor were not subject to the Excel risk-based tool.*

| **Site Details** | | **Likelihood** | **Consequence** | | | **Overall Risk Rating** | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Address** | **Site Name** | **Vapour Intrusion** | **Drinking Water** | **Ecological Degradation** | **Vapour Intrusion** | **Drinking Water** | **Ecological Degradation** |
| 2 Xanadu Drive, Xanadu, NSW, 1111 | Grease Lightning | {insert rating} | {insert rating} | {insert rating} | {insert rating} | {insert rating} | {insert rating} | {insert rating} |
| 6 Xanadu Drive, Xanadu, NSW, 1111 | I Did Not Reply to the ECSES |  |  |  |  |  |  |  |

**Critical Risk Drivers and Mitigation Measures**

The following sections set out the ‘causal’ and ‘consequence’ critical risk drivers for UPSS sites with an overall risk rating of ‘very high’ or ‘high’ for ‘vapour intrusion’, ‘drinking water’ and/or ‘ecological degradation’.

Information in these sections and associated tables are to be used by Council to guide and inform development of a service delivery model (‘SDM’) for Council’s inspection and monitoring program for UPSS.

The key considerations for a business case include:

* SDM options for Council to deliver the inspection and monitoring program for UPSS
  + In-house based on Council having the necessary capabilities and capacities, or
  + External if Council does not have capacity and/or capabilities, or
  + Do nothing.
* Resourcing options
  + In-house – either activate current FTE resources or recruit FTE capacity (and capabilities, if required), or
  + External – entertain a Service Delivery Agreement with a neighbouring Council or contractor to deliver the service on behalf of Council
* Fees and charges to ensure the service delivery model is on a sustainable footing
  + Charge the same fee as per a food inspection, or
  + Charge a higher fee to cover the impost of administration elements of the service, or
  + No fee based on a marketing campaign to achieve behavioural change in UPSS owners/operators.

*2 Xanadu Drive, Xanadu, NSW, 1111*

*The ‘person responsible’ for UPSS infrastructure at this site responded the EPA iteration of the Environmental Compliance Self Evaluation survey in 2019. An assessment of this response identified a compliance risk assessment of ‘high’ which was predicated on the following observations:*

* *Unknown ‘age’ of the UPSS tanks, but estimated to be greater than 20 years old,*
* *The tanks being made of steel,*
* *Having not sighted the FSOP, and*
* *No evidence of implementation of the loss monitoring and leak detection procedures.*

*The ‘age’ of the tanks is a key influential factor in the ‘overall risk rating’ of the site, as well as the sand geology and zoning of adjacent and nearby land. Hence an inspection and monitoring program should seek to collaborate with the site operators to implement measures that reduce the risk to an acceptable level. The following table outlines proposed mitigation measures for Council to work closely with the site operators to reduce the overall risk rating for this site.*

*Council is also aware that this site was subject to an EPA investigation after which it was determined the nature and extent of site contamination did not warrant regulation under the Contaminated Land Management Act. However, it is uncertain when this investigation was undertaken, nor whether the EPA provided Council is documentation in support of this finding.*

Table – 2 Xanadu Drive, Xanadu, NSW, 1111 – mitigation measures

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Human Health Protection** | **Risk Ranking** | **Critical Risk Driver - Likelihood** | **Critical Risk Driver - Consequence** | **Potential Risk Mitigation Requirements** |
| Vapour Intrusion | **VERY HIGH** | * Tank Age > 20 years * Tank made of steel * State of forecourt (is concrete hardstand covering UPSS infrastructure in good condition) | Proximity to residential neighbours | * Detailed understanding of groundwater depth, gradient and migration direction required. * Obtain evidence of loss monitoring and leak detection procedures by requesting copies of each report for the past 6 months and 2 years, respectively. * Need to check stormwater flows and adequacy of forecourt bunding to control forecourt stormwater run-off leaving the site without treatment. |
| Drinking Water Contamination | **High** | Council has reticulated water supply | * Council does not source potable water from groundwater |
| **Environment Protection** | |  |  |
| Ecological degradation | **MEDIUM** | Proximity to Parkland and River | Council has ‘irrigation channels’ traversing the town.   * Detailed understanding of groundwater depth, gradient and migration direction required. |

Repeat for other sites.

1. <https://www.fuelcheck.nsw.gov.au/app> [↑](#footnote-ref-2)
2. <https://resourcesandgeoscience.nsw.gov.au/miners-and-explorers/geoscience-information/products-and-data/maps/geological-maps> [↑](#footnote-ref-3)
3. <https://www.environment.nsw.gov.au/eSpade2WebApp> [↑](#footnote-ref-4)
4. <https://datasets.seed.nsw.gov.au/dataset/acid-sulfate-soils-risk0196c> [↑](#footnote-ref-5)
5. <https://realtimedata.waternsw.com.au/> [↑](#footnote-ref-6)
6. <https://www.seed.nsw.gov.au/> [↑](#footnote-ref-7)
7. <https://www.health.nsw.gov.au/environment/water/Publications/private-water-supply-guidelines.pdf> [↑](#footnote-ref-8)
8. https://www.epa.nsw.gov.au/licensing-and-regulation/licensing/environment-protection-licences/risk-based-licensing/risk-assessment-tool/sensitive-zone-maps [↑](#footnote-ref-9)
9. http://www.bom.gov.au/water/groundwater/gde/map.shtml [↑](#footnote-ref-10)
10. https://www.nationalparks.nsw.gov.au/nsw-state-map [↑](#footnote-ref-11)
11. https://www.dpi.nsw.gov.au/fishing/habitat/protecting-habitats/mpa [↑](#footnote-ref-12)