Safe Drinking Water Act 2011

Standard Drinking Water Risk Management Plan

GUIDANCE MANUAL (used to complete RMP Template)

Water Carting – mains supply

Government of South Australia
SA Health

Background

The *Safe Drinking Water Act 2011* (the Act) and Safe Drinking Water Regulations 2012 (the Regulations) apply to all drinking water providers who supply water to the public. Under the Act drinking water providers must prepare and implement a drinking water risk management plan (RMP).

What is a drinking water risk management plan?

A risk management approach is recommended in the Australian Drinking Water Guidelines (ADWG) and the World Health Organisation's Guidelines for Drinking-water Quality. A drinking water RMP is a document that identifies hazards and associated risks that may affect drinking water quality. A RMP also documents preventative measures that have been identified to reduce or eliminate these risks and the day-to-day operational requirements for managing the system.

The level of detail contained in a RMP will vary according to the size, complexity and risk associated with the drinking water supply system. RMPs for carting mains water do not require as much detail as those generated for complex drinking water supplies.

About this document

This guidance manual is to be used in conjunction with the Template – Standard RMP document for Water Carting (mains supply) **(template document)**. It contains all relevant information and step-by-step instructions for drinking water providers to prepare a Standard RMP. Adoption of an appropriate standard RMP fulfils the requirements of Part 3 of the Act in regard to RMPs.

Some sections of the RMP are standard for all water carters, and where applicable criteria have been pre-populated into the template document. Completion of the RMP requires the input of system specific information into the Template – Standard RMP for Water Carting (mains supply) (**template document**) using the following 9 steps (page number reference provided for relevant item in the **template document**):

Step 1: Provide RMP document control and review details (page 3)

Step 2: List relevant key contacts (page 3)

Step 3: Provide a list of extraction point locations and water source (page 4)

Step 4: Provide water cart information (page 4)

Step 5: Provide disinfection, tank cleaning and chlorine testing information (page 5)

Step 6: Undertake risk assessment of water quality hazards (page 6)

Step 7: Review maintenance program (page 9)

Step 8: Review chlorine testing program – insert relevant Table 6 (page 10)

Step 9: Review incident response criteria (page 11)

Step 10: Identify personnel responsible for activities associated with RMP (page 12)

Step 11: Prepare record keeping documents using templates in Appendix B

Who can adopt a standard RMP for Water Carting?

This RMP is for a water carting business where water is sourced from a registered drinking water provider such as SA Water.

Contents

For drinking water quality assistance and enquires contact

Water Quality Unit, SA Health

- Phone: 0421 618 311 – for incident reporting
- Phone 8226 7100 – for non-incident related enquires
- Email: waterquality@health.sa.gov.au

Document control and review

Document control ensures that the latest version of the RMP is being used and implemented. The RMP should be reviewed on an annual basis or more frequently if required. Documentation related to or generated as part of the plan (such as inspection reports, incident reports and notifications and chlorine residual results) must be kept for at least 5 years.

Step 1: *Provide RMP document control and review details in the* ***template document.***

RMP Prepared by	Who prepared the Standard RMP document?
Date prepared	Date the Standard RMP was finalised / approved by SA Health
Version number	Version number of the Standard RMP document.
Next revision date	At least 12-month review frequency

Key contacts

The Act requires registration of a drinking water provider prior to the supply of water. The registered drinking water provider is the person responsible for the operation of the drinking water system and the supply of drinking water to customers. Once the Template - Standard RMP for Water Carting (mains supply) (**template document**) has been completed and approved by SA Health, a letter addressed to the drinking water provider will be issued outlining any conditions of registration. **SA Health must be notified of any changes to the business details within 14 days of the change being made.**

Step 2: *List relevant details of the drinking water provider in the* ***template document****. These details are used to complete the registration process.*

Business details

Business trading name	The business/trading name of the registered drinking water provider – include on front cover of template document
Name of owner / manager	The owner / manager (registered drinking water provider) who is responsible for meeting all requirements of the *Safe Drinking Water Act 2011* as outlined in the approval.
Contact details of the registered drinking water provider / water supply	Phone number, email address, website, location of business/drinking water supply
Address	Postal address for the registered drinking water provider (if different from above)
Operator name and contact details	The operator who undertakes the day-to-day management of the drinking water supply

Other important contacts

Name	**Name and Phone Number**
Local Council	The local council area where the business/drinking water supply is located

Section 1: Description of drinking water supply

It is essential that a drinking water provider has a good understanding of their water supply system. For a water carting business this includes an understanding of water source, extraction points, water tanker details, tanker cleaning practices and chlorine residual testing.

System description

Step 3: *Provide a list of extraction point locations and details of the water source in Table 1 in the* ***template document*** *using the points outlined below. Photographs of the water supply infrastructure are useful.*

Table 1: Mains water supplier and extraction points

Water source	▪ Name of the mains water supplier ▪ How is the mains water disinfected – is chlorine or chloramine used? For water extracted from a SA Water main this information can be obtained from the SA Water website. For non-SA Water supplies, contact the registered drinking water provider you source water from. ▪ NOTE: ○ For drinking water supplies treated with chlorine as the disinfectant, residuals are monitored as **free chlorine** ○ For drinking water supplies treated with chloramine as the disinfectant, residuals are monitored as **total chlorine.**
Extraction Points	▪ How is the water extracted? If the mains provider is SA Water, is water extracted with an SA Water issued metered hydrant or from an SA Water Standpipe? Other water suppliers will have specific extraction locations / hydrants. ▪ What is the filler system? Is there an air gap between the end of the filler pipe and the surface of the water in the tank to prevent backflow into the mains? ▪ Provide a photo of how the water is extracted from the mains supply and into the water tanker.

Water Tanker information

Tanks and surfaces that come into contact with water including fittings should be constructed of food grade materials, be able to be fully drained, have an access point for cleaning, be fitted with appropriate backflow devices and have an inspection point.

Best practice would include clearly marking the tank with the words '**Drinking Water.**'

Step 4: *Provide water tanker and equipment details in Table 2 in the* ***template document*** *using the detail / questions outlined below. Photographs of the tanker and equipment are useful. Additional pages can be inserted if required.*

Table 2: Water tanker and equipment information

Tanker(s) and equipment details	▪ Provide details of the tanker(s) such as volume and construction material ▪ Is the tanker(s) dedicated for drinking water only? ▪ Is the tanker clearly labelled as '**Drinking Water'**? ▪ Is the tanker completely enclosed and equipped with a manhole to enable access for filling, inspections, and cleaning? ▪ Do the materials in contact with drinking water including the tanker, fill and discharge pipes, lay flat hoses and cam lock fittings comply with WaterMark and / or AS/NZS 4020:2018 Testing of products for use in contact with drinking water? ▪ What material is the water transfer pump made from (i.e., aluminium)? Does it use food grade oils? How frequently is the pump oil changed to reduce contamination? ▪ Can the water tanker be completely emptied and drained ensuring that no water is left inside the tanker for an extended period? ▪ Where is the tanker and equipment stored? Is it in a secure location? How are the detachable fittings and hoses stored and capped to prevent contamination? ▪ How is the equipment prepared prior to use i.e., is the metered hydrant flushed with drinking water prior to use? ▪ Does your tanker comply with AS/NZS 3500:2021 Plumbing and drainage in regard to backflow prevention? This requirement must be fulfilled to draw water from SA Water mains supplies. What type of backflow prevention device i.e., physical air gap, portable / truck mounted reduced pressure zone (RPZ) device is in use to prevent backflow into the water cart?

Step 5: *Provide tanker disinfection and chlorine testing information in Table 3 in the* ***template document*** *using the information outlined below. Refer to* ***Section 3*** *of this document for further information.*

Table 3: Disinfection, tanker cleaning and chlorine testing

Disinfection and tanker cleaning maintenance	▪ What type of chlorine is used to disinfect the tanker (liquid sodium hypochlorite 12.5% or solid calcium hypochlorite)? ▪ The **tanker cleaning and disinfection procedure** has been populated in Section 3 of the **template document**. If your procedure for disinfection and tanker cleaning differs to the procedure outlined in Section 3, please discuss with the Water Quality Unit, SA Health and record in RMP.
Chlorine Testing	▪ If the water is extracted from a mains supply, what type of chlorine is measured - free or total chlorine? ▪ What equipment is used to measure the chlorine in the water i.e., handheld chlorine photometer? Provide equipment details and a photo. ▪ How often is the chlorine testing equipment calibrated? ▪ Is the chlorine level tested at the mains extraction point or at delivery to customer?

Section 2: Water Quality Hazards

Drinking water providers should be aware of the potential to compromise the quality and safety of carted drinking water. Many of the hazardous events outlined below can be avoided through the completion of regular maintenance as documented in Section 3.

Step 6: *Table 4 has been populated in the* ***template document.*** *Undertake a risk assessment of your drinking water supply. Below is a comprehensive list of potential hazards.*

Table 4: Mains water carting hazards, risks and preventive measures

Hazardous event	Risk	Preventive Measure
Poor source water quality	▪ Aesthetic or health issues	▪ Only use water from a registered water provider
No chlorine residual in water supply	▪ Reduced protection from recontamination during transport	▪ Measure chlorine residual in supply: ○ For chlorinated supplies - if free chlorine is less than 0.5 mg/L, add chlorine to achieve 1.0 mg/L free chlorine ○ For chloraminated supplies - if total chlorine is less than 1.0 mg/L, seek advice from Water Quality Unit, SA Health
Too much chlorine added to water during chlorination	▪ Irritation of skin and mucous membranes	▪ Measure the amount of chlorine prior to adding to the water and measure residual prior to delivery to customer. ▪ If free chlorine or total chlorine is greater than 5 mg/L - Allow the tanker to sit. Retest the chlorine to ensure that it is below 5 mg/L before delivery
Contamination of mains water during filling	▪ Illness due to ingestion of harmful pathogens	▪ Drain tanker and clean as per tanker cleaning method to prevent supply of contaminated water ▪ Install appropriate backflow prevention device on water tanker to prevent contamination of mains water ▪ Ensure that appropriate hygiene procedures are in place
Contamination of drinking water during transportation	▪ Illness due to ingestion of harmful chemicals, pathogens or changes to water quality	▪ Check all tanker openings are closed prior to transport ▪ Only use water tankers that are suitable for use with drinking water ▪ Use water tankers dedicated to carrying drinking water only. ▪ Regularly clean tanker ▪ Do not allow water to stand in tankers for long periods of time ▪ Ensure that appropriate hygiene procedures are in place

Hazardous event	Risk	Preventive Measure
Contamination of customer tank during filling	▪ Illness due to ingestion of harmful pathogens or chemicals	▪ Keep hoses clean at all time ▪ Maintain an air gap between the water in the customer tank and the hose during filling of container ▪ Ensure that appropriate hygiene procedures are in place ▪ Do not allow hose openings to come into contact with the ground

Section 3: Monitoring Program

Maintenance of equipment is critical as equipment in poor condition may impact water quality. This includes regular inspections of the water tanker and equipment and tanker cleaning.

Records of completed maintenance activities and chlorine residual testing should be kept with the RMP.

Maintenance Program

Water carts that are used continuously should be cleaned (see procedure below) and disinfected at least once **every 3 months**.

Tanker cleaning and disinfection procedure

Tanker Cleaning

- Physically clean the inside of the tanker with drinking water, if possible, using a high-pressure hose. Clean the outside of the tanker and all fittings, particularly near to the fill point. Flush the tank with clean drinking water after cleaning.

Tanker Disinfection before use

- **Chlorinated supply** - Fill the tanker (full) with water containing free chlorine residual of at least 1.0 mg/L and hold for approximately 2.5 hours. Dispose water for non-drinking purpose.
- **Chloraminated supply** - Fill the tanker (full) with water containing total chlorine residual of at least 2.0 mg/L and hold for approximately 15 hours. Dispose water for non-drinking purpose.

Ongoing tanker disinfection – *every 3 months*

- **Chlorinated supply** - Fill the tanker (full) with water containing free chlorine residual of at least 1.0 mg/L and hold for approximately 15 mins. Dispose water for non-drinking purpose.
- **Chloraminated supply** - Fill the tanker (full) with water containing total chlorine residual of at least 2.0 mg/L and hold for approximately 3 hours. Dispose water as for non-drinking purpose.

After disinfection

- Refill tanker with clean water for delivery OR empty the tanker and close all openings to stop dust, other contaminants, or sunlight from entering the tank.

Hoses and fittings – *every month*

- **Cleaning** - Clean all fittings with soft brush including fill point.
- **Disinfection** - Fill hose with water containing free chlorine residual of at least 1.0 mg/L and hold for approximately 15 mins. Rinse with clean water. Drain, dry and secure hose end to prevent dust entry. Store all fittings in a manner that will prevent contamination.

Disinfection

There are two forms of chlorine that may be used for disinfection: liquid sodium hypochlorite or solid calcium hypochlorite (generally available as swimming pool chlorine). Liquid sodium hypochlorite is typically available in a 12.5% chlorine solution. This form of chlorine has a short shelf-life and must be used before the use-by date. Calcium hypochlorite is available as a solid in a 70% concentration and

should be dissolved in water prior to addition to the tank. Always follow the manufacturer's directions and appropriate safety procedures when handling and storing chlorine. If the tank has a recirculation system, it should be operated to provide mixing after the addition of chlorine and prior to discharge into the receiving storage.

Do NOT use stabilised chlorine or chlorine that contains cyanuric acid and NEVER mix solid and liquid chlorine due to the likelihood of explosion.

A method for calculating the volume of water in a tank can be found in Appendix A.

Other cleaning procedures should be discussed with the Water Quality Unit, SA Health.

Step 7: *The approved maintenance program should be undertaken as documented below. Review the maintenance activities to ensure they are relevant to your drinking water supply. As a minimum these activities should be conducted at the frequency stated.*

Table 5 has been populated in the ***template document****:*

- *If the frequency is varied to outlined below, amend the timeframe that has been specified*
- *Develop a log for recording completed maintenance activities. Examples of documentation are available in Appendix B*

Table 5: Maintenance program

Area	Frequency	Maintenance Activity	Corrective Actions
Tanker interior	▪ 3 monthly	▪ Inspect interior of tanker for cleanliness / hygienic condition ▪ Inspect interior of the tanker for any rust, damage to linings or any foreign matter	▪ Clean and disinfect interior of water tanker ▪ Flush out any foreign matter in the tanker
Tanker/trailer exterior surfaces	▪ 3 monthly	▪ Check external surfaces are in good order	▪ Repair external surfaces as required
Delivery hoses and pipes	▪ 3 monthly	▪ Check hoses are in good order and free from slime	▪ Repair/replace hoses if structurally unsound
Chlorination	▪ 3 monthly	▪ Ensure adequate supplies of chlorine ▪ Check use-by date of chlorine	▪ Dispose of out-of-date chlorine and replace as required.
Tanker Cleaning	▪ Initial use and 3 monthly	▪ Water tanker cleaning and disinfection	▪ Clean and disinfect interior of water tanker as documented – see above procedure

Section 4: Water quality testing

The drinking water must be tested prior to distribution to customers to ensure there is adequate chlorine residual.

- Use a test kit to test chlorine residuals (free and total) (swimming pool kits are acceptable)
- Record water quality testing results in delivery log sheet (see Appendix B for template)
- For chlorinated supplies - the free chlorine residual in the tanker must remain > 0.5 mg/L prior to delivery to customers
- For chloraminated supplies - the total chlorine residual must remain > 1.0 mg/L

Step 8: *Table 6 outlines the chlorine testing program that must be conducted at every delivery of drinking water.*

- *Include the Table 6 (either free chlorine or total chlorine or both) in the* ***template document*** *to reflect your drinking water supply*
- *Insert the location of chlorine testing in the relevant column in Table 6 within the* ***template document***
- *Develop a log for recording chlorine measurements with every delivery and water tanker disinfections. These are to be kept with your RMP. Examples of documentation are available in Appendix B*

Table 6: Testing chlorinated supplies – free chlorine

Sample point	Frequency	Corrective Actions
Identify location of chlorine testing (i.e., extraction point or at point of customer delivery)	▪ At every delivery	▪ If free chlorine is less than 0.5 mg/L Add chlorine to achieve 1.0mg/L free chlorine ▪ If free chlorine is greater than 5 mg/L Allow the tanker to sit. Retest the free chlorine to ensure that it is below 5 mg/L before delivery

Table 6: Testing chloraminated supplies – total chlorine

Sample point	Frequency	Corrective Actions
Identify location of chlorine testing (i.e., extraction point or at point of customer delivery)	▪ At every delivery	▪ If total chlorine is less than 1.0 mg/L Contact Water Quality Unit, SA Health for further advice ▪ If total chlorine is greater than 5 mg/L Allow the tanker to sit. Retest the total chlorine to ensure that it is below 5 mg/L before delivery

Section 5: Incident identification and notification protocol

An RMP prepared by a drinking water provider must include an approved incident identification and notification protocol as outlined in Table 7.

Incident response

If any of the criteria in Table 7 are confirmed for your drinking water supply:

- Contact Water Quality Unit, SA Health immediately on **0421 618 311**
- Undertake immediate remedial actions as outlined below
- Complete the SA Health Water Quality Incident notification form available from the SA Health website
- Submit the completed form within 24 hours to Water Quality Unit, SA Health via email waterquality@health.sa.gov.au

Step 9: *Table 7 has been populated in the* ***template document****.*

Table 7: Incident identification and notification protocol

Parameter	Criteria	Notification requirements to SA Health
Odours / taste / discolouration	▪ Observation or customer complaint(s) due to odours / taste / discolouration of water (other than chlorine)	Immediate notification to SA Health on **0421 618 311** AND incident notification form is submitted within 24 hours via email waterquality@health.sa.gov.au.
Undefined incident	▪ Any other incident or where specific concerns exist over the quality of the drinking water supply	

Section 6: Management and record keeping

To ensure your drinking water supply remains safe to drink, activities required to manage your water supply must be documented including inspections and maintenance, chlorine residual test results and incident management.

Responsibilities table

Step 10: *Identify the personnel in your business that are responsible for fulfilling the activities outlined in the RMP. Multiple tasks may be assigned to the same individual. Populate Table 8 in the* ***template document.***

Table 8: Responsibilities Table

RMP review	Who updates the RMP document when required?
Maintenance activities	Who undertakes maintenance activities?
Chlorine residual testing	Who undertakes chlorine residual testing?
Who notifies SA Health if required?	Who notifies SA Health if required?
Corrective action in response to a water quality incident	Who undertakes any corrective actions in response to a water quality incident?
Record keeping location	Document where your RMP, maintenance records, chlorine residual test results and incident notification forms are kept

Record Keeping

Step 11: *Establish a record keeping system that is easily accessible, such as a folder of printed documents or electronic files, to allow for quick reference during a water quality incident and also for review during an inspection. The record keeping system should include this plan and records of maintenance activities, water quality results and any incidents and corrective actions. Record keeping templates are provided in Appendix B*

Additional information is available from:

- SA Health Website – Providing safe drinking water

Appendix A: Determining the size of tanks for chlorination and chlorine dose rates

Tank volume calculation

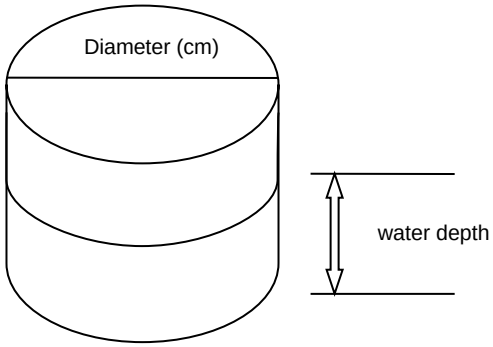
To calculate the volume of a rectangular tank, use the formula:

- Volume (in litres) = depth (cm) x width (cm) x length (cm) ÷ 1000

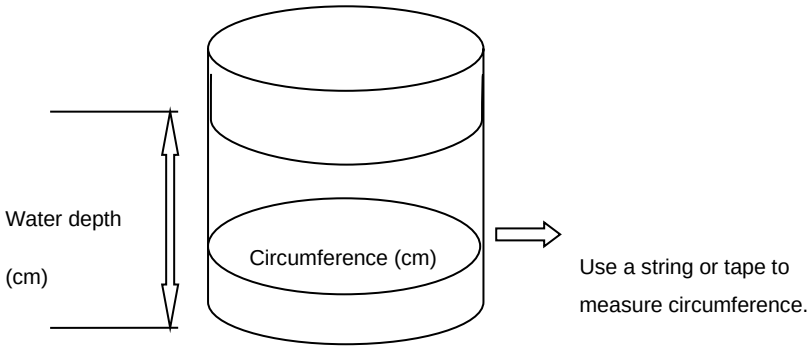
To calculate the volume of a cylindrical tank either use the formula:

- Volume (in litres) = π x diameter^2 (cm^2) x depth (cm) ÷ 4000 (where π = 22 ÷ 7)

OR use one of the following methods, **remember to calculate the volume of water in the tank and not the volume of the tank:**



FORMULA 1: Volume (in litres) = 0.8 x water depth (cm) x diameter^2 (cm^2) ÷ 1000



FORMULA 2: Volume (in litres) = 0.08 x water depth (cm) x circumference^2 (cm^2) ÷ 1000

Chlorine doses

To achieve 5 mg/L of free chlorine, use the following measurements (mL or g) of hypochlorite (liquid or solid) assigned for the tank volume (calculated above).

Remember to calculate the volume of water in the tank not the volume of the tank

Chlorine Concentration	**5 mg/L**	
Tank Volume (L)	**12.5% liquid Sodium Hypochlorite**	**70% solid Calcium Hypochlorite**
	mL	**g**
1000	40	7
2000	80	14
3000	120	21
4000	160	28
5000	200	35
6000	240	42
7000	280	49
8000	320	56
9000	360	63
10000	400	70
11000	440	77
12000	480	84
13000	520	91
14000	560	98
15000	600	105
16000	640	112
17000	680	119
18000	720	126
19000	760	133
20000	800	140

Appendix B: Record Keeping - Template documents

These are suggested template documents to be used as part of your record keeping for maintenance activities and for logging the delivery of carted water to customers (see Section 3).

Maintenance activities template document

Modify as required to align with Table 5. If the frequency varies for the task consider using multiple tables.

Maintenance program (specify frequency)

Area		**Tank interior**	**Tank exterior**	**Delivery hoses and pipes**	**Chlorination**	**Tanker Cleaning**
		Inspect interior of tank for cleanliness and in hygienic condition Inspect interior of the tank for any rust, damage to linings or any foreign matter	Check external surfaces are in good order	Interior structures of hoses are in good order and free from slime	Ensure adequate supplies of chlorine Check use-by date of chlorine	Water tanker cleaning and disinfection
Date	**Name**					

Mains water delivery details log sheet

Operator details:
Name:
Date:
Signature:
Date:
Fill time commenced:
Mains fill location (standpipe):
Chlorine residual measured at source:
Chlorine added (if any):
Customer name:
Customer address:
Point of delivery to customer (e.g., tank at house):
Volume delivered:
Time/date of delivery:
Chlorine residual at delivery (if required):
Comments:

For more information

Water Quality Unit
Health Protection and Regulation
Public Health Division
PO Box 6
Rundle Mall SA 5000
Telephone: 08 8226 7100
www.sahealth.sa.gov.au

Government of South Australia
SA Health