Food Authority

NSW GOVERNMENT

Water Reuse Guideline

For food businesses in NSW considering reusing water

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More information

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Definitions

Term	Definition
Adequate supply of water[1]	Potable water that is available at a volume, pressure and temperature that is adequate for the purposes for which the water is used.
Biosolids[2]	When solids are separated from wastewater during the wastewater treatment process, which go through biological treatment. Biosolids are a rich source of phosphorus and nitrogen and can be used in agriculture, horticulture and site rehabilitation.
Blackwater[2]	Wastewater that includes water from toilets.
Direct potable reuse[2]	Where recycled water is added directly to the drinking water supply.
Food business[3]	A business, enterprise or activity that involves: a. the handling of food intended for sale, or b. the sale of food, regardless of whether the business, enterprise or activity concerned is of a commercial, charitable or community nature or whether it involves the handling or sale of food on one occasion only.
Greywater[2]	Wastewater from any part of the home, except the toilet (in this case, wastewater from a food business).
Hazard[4]	In the wastewater context, a biological, chemical or physical characteristic or condition of wastewater with the potential to cause harm.
Handling of food[3]	Includes the making, manufacturing, producing, collecting, extracting, processing, storing, transporting, delivering, preparing, treating, preserving, packing, cooking, thawing, serving or displaying of food.
Industrial wastewater[5]	Wastewater derived from industrial sources or processes (in this case wastewater from a food business).
Indirect potable reuse[2]	Where recycled water is added to an aquifer, river or other water source, which later joins the drinking water supply.
Potable water[1]	Water that is acceptable for human consumption.
Reconditioning[6]	The treatment of water intended for reuse to eliminate the hazards or reduce them to acceptable levels fit for the purpose.

[1] Australia New Zealand *Food Standards Code – Standard 3.2.3 – Food Premises and Equipment*

[2] Sydney Water (n.d.) – *Water recycling, what to consider before setting up a recycled water scheme*

[3] *NSW Food Act 2003*

[4] NRMMC, EPHC and AHMC (2006) – *Australian Guidelines for Water Recycling*

[5] NSW Department of Water & Energy (2008) – *Interim NSW guidelines for management of private recycled water schemes*

[6] FAO/WHO (2019) – *Safety and quality of water used in food production and processing*

Term	Definition
Recycled water[5]	Water which has been obtained from a food processing operation and treated to a level suitable for its intended use.
Risk assessment[5]	A scientifically based process to assess the scale of a hazard if it occurs based on the following elements: a. hazard identification b. hazard characterisation c. exposure assessment, and d. risk characterisation.
Sewage[1]	Includes the discharge from toilets, urinals, basins, showers, sinks and dishwashers, whether discharged through sewers or other means.
Unsafe food[3]	Food is unsafe at a particular time if it would be likely to cause physical harm to a person who might later consume it, assuming: a. it was, after that particular time and before being consumed by the person, properly subjected to all processes (if any) that are relevant to its reasonable intended use, and b. nothing happened to it after that particular time and before being consumed by the person that would prevent its being used for its reasonable intended use, and c. it was consumed by the person according to its reasonable intended use.
Unsuitable food[3]	Food that: a. is damaged, deteriorated or perished to an extent that affects its reasonable intended use, or b. contains any damaged, deteriorated, or perished substance that affects its reasonable intended use, or c. is the product of a diseased animal, or an animal that has died otherwise than by slaughter, and has not been declared by or under another Act to be safe for human consumption, or d. contains a biological or chemical agent, and other matter or substance, that is foreign to the nature of the food.
Validation[7]	Involves evaluating available scientific and technical information (including historical data and operational experience) and where necessary, undertaking investigations to validate system-specific operational procedures, critical limits, and target criteria. The aim of process validation is to ensure effective operation and control of the recycled water system.
Verification[7]	Assesses the overall performance of the treatment system, the ultimate quality of recycled water being supplied or discharged to the receiving environment. It should be regarded as the final overall check that preventive

[7] DPI Office of Water (2015) – *Recycled water management systems*.

Term	Definition
	measures are working effectively and that the target criteria and critical limits set from relevant guidelines are appropriate.

1. Scope

This guideline is intended for any food business in NSW considering reusing water and explains what the NSW Food Authority (Food Authority) requires a business to demonstrate.

Any reuse of water must be limited to industrial wastewater from a food production process only. The reuse of blackwater will not be permitted in a food business[8].

This guideline covers the requirements under food-related legislation only. It is the responsibility of the business to ensure compliance with all regulatory requirements, such as may be required under local planning, environmental or water authority regulations. Food businesses are encouraged to contact these agencies for further information and expertise.

This guideline aligns with the validation and verification requirements of the *Australian Guidelines for Water Recycling* (NRMMC, EPHC and AHMC, 2006) and NSW Department of Water and Energy *Interim NSW Guidelines for Management of Private Recycled Water Schemes* (DWE, 2008). While the scope of both documents does not necessarily address the direct reuse of water in a food business, the basic concepts presented in those guidelines are considered applicable for use by a business considering reusing water.

[8] Food businesses are able to use recycled reticulated (town) water supply, provided it has been treated to drinking water quality and has been approved by the relevant water authority for use as drinking water.

2. Guiding principles for water reuse

> A food business must demonstrate that the reuse of water will not affect food safety, or the hygiene and sanitation of the food processing area.

Standard 3.2.3 - Food Premises and Equipment of the Australia and New Zealand Food Standards Code (the Code) requires a food business to use potable (drinking quality) water, or else use water in a manner that will not jeopardise the safety and suitability of the food (see Appendix 1).

The NSW Food Authority requires businesses to adhere to the following principles when considering reusing water:

- All reuse of water by a NSW food business must comply with the NSW *Food Act 2003* in that it will not adversely affect the safety or suitability of the food handled by the business.
- In addition to not adversely affecting the safety of the food, the reuse of water should not adversely affect the suitability or quality attributes (flavour, colour, texture) of the food product.
- All reused water must be safe for its intended use and must not jeopardise the safety of the product through the introduction of chemical, microbiological or physical contaminants in amounts that represent a risk to the consumer.
- All water reuse by a NSW food business must comply with the requirements of the Code such that all water used in food businesses must be of a potable standard (drinking water quality). Otherwise, the businesses must be able to demonstrate that the use of non-potable water will not adversely affect the food causing the food to become unsafe or unsuitable.
- Any food business intending to reuse water must apply the principles of Hazard Analysis Critical Control Point (HACCP) and risk assessment to implement appropriate control measures to address the identified hazards.
- A food business must have adequate safeguards in place to ensure that non-potable water cannot be reused (unless previously demonstrated that it is safe to do so), and must have adequate verification measures in place to ensure appropriate reconditioning of wastewater. There should be no physical connection between the potable and non-potable water supply.
- Where a food business reconditions industrial wastewater to a potable standard through the application of appropriate technology for direct reuse, the business must use a multiple barrier approach (utilise more than one treatment process to ensure that if one step fails at least one other treatment step will control the identified hazard). The business must provide evidence of adequate validation of treatment methods in accordance with the validation guidelines specified in this document.
- Where reuse of water is for areas of direct contact with food, the record keeping and monitoring systems for the water treatment system must be incorporated into the business's Food Safety Program. The food business must ensure that regular independent audits are made on the suitable operation of the wastewater treatment system.

3. How water can be reused

3.1 Indirect reuse of water

Indirect reuse of water involves discharging treated wastewater into a receiving body such as a reservoir or holding pond. This water may then be re-treated for use within a premises. The advantage to indirect reuse is that the receiving waters may act as a significant control measure through:

- dilution, provided that contaminant levels in the receiving water are lower than those in the recycled water,
- additional treatment through natural processes, and
- additional time.

3.2 Direct reuse of water

Direct reuse involves treating or reconditioning wastewater for direct reuse within a premises. Food businesses considering this form of reuse must, at a minimum, meet the following requirements:

- exclude human sewage (blackwater) from the wastewater to be treated,
- no physical connection between the potable and non-potable water supply,
- follow HACCP principles for identifying hazards, implementing control measures, and validating and verification of Critical Control Points (CCPs),
- use a multiple barrier approach (utilise more than one treatment process to ensure that if one step fails at least one other treatment step will control the identified hazard), and
- have access to a potable water supply in case of failure with the wastewater treatment system.

Treated water must be suitable for its intended use, according to the three basic types of direct water reuse:

- in direct contact with food (for example washing of fresh produce),
- on food contact surfaces (for example cleaning of conveyors), and
- on non-food contact areas, (for example cleaning outside areas and in cooling towers).

Reuse of water in direct contact with food

Where a food business is considering reusing water in direct contact with food, the food safety requirements will be stringent.

The water must be of potable quality, to ensure the safety and suitability of the food is not jeopardised and the risk of contamination is minimal. This does not restrict the possibility of a food business implementing technology to recondition their industrial wastewater.

All water used in direct contact with food (whether reconditioned or not) must be potable (drinking quality) water as defined in the *Australian Drinking Water Guidelines* 6 (NHMRC & NRMMC, 2011) for microbiological, chemical and physical properties (see Appendix 2).

Reuse of water on food contact surfaces

The same stringent standards will be applied to the reuse of water on food contact surfaces.

The use of non-potable water could potentially contaminate the surface, which in turn could lead to cross contamination of the food which comes into contact with the surface. Therefore, all reused water to be used on food contact surfaces must be of potable quality, as defined in the *Australian Drinking Water Guidelines* 6 (NHMRC & NRMMC, 2011) for microbiological, chemical and physical properties (see Appendix 2).

Reuse of water in non-food contact areas

Where water will be reused on non-food contact areas, there is less risk for this practice to lead to contamination of food.

The Code allows for the use of non-potable water in a food business, in situations where it will not jeopardise the safety and suitability of the food. Examples where non-potable water could be used include:

- cleaning of non-food contact surfaces (for example outside environment, loading docks, transport vehicles, animal holding yards),
- water for flushing toilets, or
- cooling towers and evaporative coolers.

4. Determining applications for water reuse

A food business considering reusing water must make an application to the Food Authority. The *Alternative Compliance Application Form* must be completed with all relevant details and submitted to the Food Authority for consideration. The form is available on the Food Authority's website.

The Food Authority will evaluate the proposal to reuse water from each food business on a case-by-case basis. The Food Authority will look at:

- the adequacy of the water treatment risk assessment including hazard identification,
- where the reused water will be in direct contact with food or food contact surfaces, the adequacy of the wastewater treatment to recondition the water to a potable standard,
- the adequacy of the validation of the wastewater treatment and the verification monitoring carried out before the system is implemented,
- the adequacy of the ongoing operational monitoring of the water treatment system,
- the adequacy of the proposed corrective action, and
- the adequacy of the incorporation of the water treatment system into a Food Safety Program, including hazard identification and the establishment of Critical Control Points (CCPs) and critical limits.

4.1 Risk assessment process

A food business considering reusing water must conduct a risk assessment. A risk assessment involves identifying and managing risks in a proactive way, rather than simply reacting when problems arise.

The first step is to look systematically to all the hazards in the wastewater. This will dictate the type of wastewater treatment required to recondition the water to a safe and suitable quality for its intended use. The implementation of Hazard Analysis Critical Control Point (HACCP) principles will identify the appropriate control measures for the identified hazards. In addition, it will help to identify which operational parameters will need to be monitored to verify that the system is working correctly.

> A food business must undertake a comprehensive risk assessment to identify the potential hazards associated with the reuse of water on their premises.

The hazard identification must cover any potential hazards to human health such as:

- chemical hazards
  - veterinary and agricultural chemicals, pharmaceutical, hormones and antibiotics
  - processing aids such as water treatment additives, disinfectants and disinfection by-products and cleaning chemicals
- microbiological hazards
  - bacterial pathogens, viruses and parasites
- physical hazards to the treatment processes
  - temperature, turbidity, pH, high organic load.

More help on how to perform a risk assessment for water reuse can be found in the *Australian Guidelines for Water Recycling* (Phases 1 and 2) (NRMMC, EPHC and AHMC, 2006 & 2008).

4.2 Validation of wastewater treatment system

A food business considering reconditioning (treating) wastewater for reuse will be required to enlist expert assistance in the implementation and validation of wastewater treatment technology.

> The wastewater treatment system must provide the level of reconditioning appropriate for the intended water reuse.

To ensure that appropriate water treatment systems are selected, a validation process will need to be developed to determine whether the proposed treatment technologies/systems will perform effectively. The validation process should be fully documented, including all procedures for sampling and testing.

Food businesses must utilise a multiple barrier approach to ensure the wastewater treatment is fully effective. As stated in the *Australian Guidelines for Water Recycling*, no single barrier is effective against all conceivable hazards or is completely effective all the time. Multiple barriers protect against variations in performance of individual barriers.

Validation of a treatment system must include all components of the process, such as treatment technology, balancing tanks, storages, online monitoring, and disinfection. Where several water treatments are used in combination, the assumptions and manufacturer specifications for each piece of equipment and each barrier need to be validated for each system to prove that it is effective when combined in the complete system.

The *Interim NSW Guidelines for Management of Private Recycled Water Schemes* (DWE, 2008) recommends a minimum of 12 weeks validation period when continuous compliance with the discharge limits is required.

Validation must also include a review of the process flow diagram used in the risk assessment against the actual treatment system to ensure all potential hazards and CCPs have been identified. A re-validation may be required where there are changes to the influent quality, system design and/or technology that may affect the performance of the water treatment system.

Where water treatment systems have been validated, verification testing in-situ (see Verification of a wastewater treatment system below) is required once the system is commissioned. During both the validation and verification testing periods, the water must not be reused and must go directly to sewer or some other use where the business can demonstrate that it will not affect the safety and suitability of the food.

Further details on methodology of validation and verification for water treatment systems can be obtained from the *Interim NSW Guidelines for Management of Private Recycled Water Schemes* (DWE, 2008) and *Australian Guidelines for Water Recycling* (Phase 2) (NRMMC, EPHC and AHMC, 2008).

4.3 Verification of a wastewater treatment system

Verification needs to be carried out to make sure that the water treatment system is performing as planned and meeting the water quality compliance values. The *Interim NSW Guidelines for Management of Private Recycled Water Schemes* (DWE, 2008) suggest that verification testing of water quality parameters should be undertaken in-situ at the site of the recycled water (once the system has been installed) continuously for a minimum of 4 weeks.

Verification of the water treatment system will assess the overall performance of the treatment scheme, including the operational and limits at the CCPs, and the ultimate quality of the reconditioned water. System-specific verification is essential as variability in influent water quality may have a large impact on the efficacy of the treatment system.

For guidance, Appendix 3 outlines the minimum recommended monitoring requirements for the validation and verification of water treatment systems. Once the water treatment system has successfully undergone verification testing and met the guideline levels for potable water (or as required for its intended use), the system can be fully commissioned, and the water can be reused in the food business.

4.4 Ongoing operational monitoring requirements for a wastewater treatment system

Wastewater treatment systems require a high standard of operation, monitoring and control to maintain the high quality of the end product.

> Ongoing operational monitoring of the water treatment system is required to ensure the reconditioned water quality is maintained and the safety and suitability of the food is protected.

The frequency of monitoring and testing are dictated by factors such as the quality of the influent water and intended reuse of the water. Where water is reconditioned to a potable quality for use in direct contact with food or food contact surfaces, this will require a greater level of reconditioning (and therefore more frequent monitoring and testing to ensure the water is safe) than reuse on non-food contact surfaces.

The risk assessment and application of HACCP will have identified appropriate CCPs for water quality parameters. The target operating range and critical limits for each variable of the treatment process (for example flow rate, pressure, chlorine residual) should be specified so that the system will recondition the water to the appropriate standard. The method, location, and frequency for each of the proposed monitoring parameters should be clearly specified in the operational monitoring plan.

Appendix 4 outlines the recommended ongoing operational monitoring requirements for water treatment systems. Over time the sampling frequencies may be reduced based on a satisfactory historical record.

Results consistent with the compliance values should be produced for all operational monitoring. Where guideline values are exceeded, corrective action must be taken and sampling frequencies should be increased. Where sample results are collected from an online sampler, a schedule of online calibrations should be developed and records of the calibration are kept.

Appropriately trained personnel should collect all water quality samples. A National Association of Testing Authorities (NATA) accredited laboratory should be used to carry out all analyses[9].

> It is essential that all staff involved in the design, management, operation, monitoring and audit of a wastewater treatment system have sufficient knowledge and skills to carry out their role.

[9] Laboratories are accredited by NATA for specific methods. Information can be found at: https://nata.com.au/

4.5 Corrective action for a wastewater treatment system

If the ongoing operational monitoring shows that an operational or critical limit is not being met, then the potential exists for the water treatment system to be producing water that is not of a potable quality and not suitable for use.

The system should be designed such that untreated or partially treated wastewater cannot bypass the treatment system and go direct to the point of use. When treated water may be temporarily unsuitable or unavailable, an alternative source (for example the reticulated town water supply) should be made available to avoid disruption to the food production line. There should also be a method of disposal (for example sewer) for unsuitable water, that is approved by the local water authority and the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

> Proper maintenance of the wastewater treatment system is critical to avoid having the system become a source of contamination.

4.6 Incorporation of the wastewater treatment system into a Food Safety Program

A food business considering reusing water must demonstrate to the Food Authority that they have applied HACCP principles and taken appropriate risk management strategies to control the identified hazards. All elements of a wastewater treatment system must be incorporated into a Food Safety Program for the business, including the establishment of Critical Control Points (CCPs) and critical limits, and the ongoing operational monitoring plan.

For food businesses licensed with the Food Authority, the wastewater treatment elements of the Food Safety Program may be subject to regular audit by the Food Authority, in accordance with the normal audit schedule. For food businesses not licensed with the Food Authority, the business must ensure that periodic audits are carried out by an independent third-party auditor.

> Regular independent audits must be made on the suitable operation of a wastewater treatment system.

5. Contact details for water reuse experts

Food businesses are referred to the appropriate agency for expert advice on water treatment, as the expertise in water treatment systems lay outside the NSW Food Authority. Food businesses must ensure that they comply with all legal requirements (for example planning requirements of the local council, environmental requirements).

NSW Department of Climate Change, Energy, the Environment and Water

4 Parramatta Square

12 Darcy Street, Parramatta NSW 2150

Ph: 1300 081 047

water.dpie.nsw.gov.au/

NSW Health

1 Reserve Road, St Leonards NSW 2065

Ph: 9391 9000

health.nsw.gov.au

NSW Environment Protection Authority

Ph: 131 555

epa.nsw.gov.au/

Sydney Water

Ph: 13 20 92

sydneywater.com.au

Australian Government Department of Agriculture, Fisheries and Forestry

The reuse of water in export registered facilities is regulated by the Australian Government Department of Agriculture, Fisheries and Forestry (DAFF).

Ph: 1800 900 090

agriculture.gov.au/biosecurity-trade/export

6. References and further reading

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Appendix 1 – Food Standards Code requirements

Standard 3.2.3 – Food Premises and Equipment of the Australia New Zealand Food Standards Code requires the following:

> 4 Water supply
>
> (1) Food premises must have an adequate supply of water if water is to be used at the food premises for any of the activities conducted on the food premises.
>
> (2) Subject to subclause (3), a food business must use potable water for all activities that use water that are conducted on the food premises.
>
> (3) If a food business demonstrates that the use of non-potable water for a purpose will not adversely affect the safety of the food handled by the food business, the food business may use non-potable water for that purpose.

Editorial note:

The *Australian Drinking Water Guidelines* 6 (2011) of the National Health and Medical Research Council (NHMRC) and the Natural Resource Management Ministerial Council (NRMMC) and its amendment may be used by food businesses and authorised officers for guidance concerning what constitutes acceptable water.

Appendix 2 – Guideline values for water supplies (from the *Australian Drinking Water Guidelines* 6 (2011))

Monitoring for additional parameters may be required depending in the presence of particular materials or industrial activities. A comprehensive risk assessment must be undertaken to identify potential contaminants in the source water.

Microbiological parameters

Microorganism	Limit in drinking water	Comments
E. coli	Not Detected in 100 mL	Used to indicate the presence of faecal contamination. If detected, immediate action should be taken including investigation of potential source of contamination.
Thermotolerant coliform	Not Detected in 100 mL	Used to indicate the presence of faecal contamination. If detected, immediate action should be taken including investigation of potential source of contamination.
Cyanobacteria		If there is a suspicion of Blue Green Algae (cyanobacteria) contamination, the water should be tested.

Physical parameters

These factors may cause taste or odour complaints in the water, or may lead to corrosion or the formation of scale.

Aesthetic characteristics	Limit in drinking water (not to exceed the stated value)	Comments
pH	Between 6.5 and 8.5	• A pH of 7 is neutral, greater than 7 is alkaline and less than 7 is acidic. • Water with increased acidity (pH is below 6.5) may corrode plumbing fittings and pipes. • Water with increased alkalinity (pH greater than 8.5) can lead to deposition and build-up of calcium carbonate that may eventually block the pipe. • A pH greater than 11 may cause corrosion in plumbing fittings and pipes. • A pH greater than 8.0 can decrease the efficiency of chlorine.
Total dissolved solids (TDS)	600 mg/L	• TDS consist of inorganic salts and small amount of organic matter that are dissolved in water. • TDS affect the palatability of the water. • High TDS values may be associated with excessive scaling in pipes. Water with very high or very low TDS may also be corrosive.
Total hardness (as calcium carbonate)	200 mg/L	• Total hardness is the sum of the concentration of calcium and magnesium ions expressed as a calcium carbonate equivalent. • Hard water requires more soap to obtain a lather and can cause scale to form on pipes and fittings.
Turbidity	5 NTU (less than 1 NTU is desirable at the time of disinfection)	• Turbidity is the measure of cloudiness of water. It indicates the amount of suspended matter present in the water. • This can affect the taste or the water as well as reduce the efficiency of chemical and UV disinfection. • Unusual increases in turbidity can indicate a disturbance in the water supply system.

Chemical parameters

Health-based characteristics	Limit in drinking water (not to exceed the stated value)	Comments
Antimony	0.003 mg/L	• Antimony can be harmful in high concentrations. • It is not commonly found in water, but may leach from antimony-tin solder or be deposited in pollution from lead or copper smelters.
Arsenic	0.01 mg/L	• Arsenic is found in soil and rocks, but is also released by the burning of fossil fuels, and in drainage from old gold mines and some types of sheep dip.
Cadmium	0.02 mg/L	• Cadmium is a toxic metal that, in cases of long exposure, can cause kidney problems.
Chromium	0.05 mg/L	• Chromium is a toxic heavy metal, which are carcinogenic.
Copper	2 mg/L	• Copper can be found in many rocks and soils. Because it is relatively resistant to corrosion, it is frequently used in water pipes and fittings.
Fluoride	1.5 mg/L	• Fluoride occurs naturally in seawater, soil and air.
Lead	0.01 mg/L	• Lead is a toxic heavy metal. It may enter a water supply from natural sources or from lead plumbing, solder, or roof flashings.
Nickel	0.02 mg/L	• Long term exposure to nickel can cause kidney problems. • Nickel may enter water supplies from coal-fired power stations or in small concentrations from nickel-plated tap and plumbing fittings.
Nitrate Nitrite	50 mg/L 3 mg/L	• Excessive nitrate or nitrite in water can lead to ‘blue baby syndrome’ in infants fed with formula made up using the water. • The decomposition of organic wastes such as manure can introduce nitrate to water supplies. Nitrite is only likely to be present in water that has not been aerated.

Aesthetic characteristics	Limit in drinking water (Not to exceed the stated value)	Comments
Manganese	0.1 mg/L	• At concentration exceeding 0.1 mg/L, manganese imparts an undesirable taste and stains plumbing fixtures. • Even at concentration of 0.02 mg/L, manganese can form a coating on pipes that can slough off as a black ooze. A discretionary target of 0.01 mg/L is suggested at the treatment plant. • It would be a health consideration when the concentration exceeds 0.5 mg/L.
Sulfate	250 mg/L	• Sulfate ions are likely to enter water supplies from natural sources. The highest concentrations are likely to be seen in groundwater. • The guidance level is set to avoid the undesirable taste in water. • Under some conditions it can also contribute to corrosion of plumbing fittings. • Sulfate at the levels greater than 500 mg/L can have purgative effects.

Water can also be tested for aluminium, ammonia, chloride, iron, sodium and zinc, which are of less health concern, but can have an influence on water quality.

Appendix 3 – Minimum requirements for validation and verification monitoring

The monitoring frequencies described in Appendix 3 and 4 are the minimum requirement. Food businesses must customise their monitoring frequencies to reflect the source of the water, associated hazards and control measures and the end use of the reconditioned water.

End use of water	Parameter	Effluent Compliance value	Influent monitoring frequency	Effluent monitoring frequency
Direct contact with food Or Used on food contact surfaces **Exposure risk level = HIGH**	*E. coli*	Not detected in 100 mL	weekly	2 times/week
	Biological Oxygen Demand (BOD)	<10 mg/L	Not required	2 times/week
	Suspended Solids (SS)	<10 mg/L	Not required	2 times/week
	Turbidity	<1 NTU (95%ile)[10] <5 NTU (max)	Continuous online (or weekly)	Continuous online
	pH	6.5 – 8.5	Continuous online (or weekly)	Continuous online
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual[11]	N/A	Continuous online
Used in non-food contact areas **Exposure risk level = MEDIUM**	*E. coli*	<10 cfu/100 mL	weekly	2 times/week
	BOD	<20 mg/L	Not required	2 times/week
	SS	<30 mg/L	Not required	2 times/week
	Turbidity	<5 NTU (95%ile)	Continuous online (or weekly)	Continuous online
	pH	6.5 – 8.5	Continuous online (or weekly)	Continuous online
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual	N/A	Continuous online

Adapted from the *Interim NSW Guidelines for Management of Private Recycled Water Schemes* (DWE, 2008).

[10] NTU: Nephelometric Turbidity Units. Limit must be met prior to disinfection.

[11] Total chlorine residual after a minimum contact time of 30 minutes.

Appendix 4 – Minimum requirements for operational monitoring

End use of water	Parameter	Effluent Compliance value	Influent monitoring frequency	Audit frequency
Direct contact with food Or Used on food contact surfaces **Exposure risk level = HIGH**	*E. coli*	Not detected in 100 mL	weekly	Audit required every 12 months
	Turbidity	<1 NTU (95%ile)[12] <5 NTU (max)	Continuous online	
	pH	6.5 – 8.5	Continuous online	
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual[13]	Continuous online	
Used in non-food contact areas **Exposure risk level = MEDIUM**	*E. coli*	<10 cfu/100 mL	monthly	Audit required every 3 years
	Turbidity	<5 NTU (95%ile)	Continuous online	
	pH	6.5 – 8.5	Continuous online	
	Disinfection	Chlorine: 0.2 – 2.0 mg/L residual	Continuous online	

Adapted from the *Interim NSW Guidelines for Management of Private Recycled Water Schemes* (DWE, 2008).

NOTE: If operational monitoring shows values exceeding those listed above, it must be investigated and corrective action taken and documented.

[12] NTU: Nephelometric Turbidity Units. Limit must be met prior to disinfection.

[13] Total chlorine residual after a minimum contact time of 30 minutes.