



Lord Howe Island On-Site Wastewater Management Strategy

Document Control

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1.0 Forward

This On-site Wastewater Management Strategy (OSWMS) provides the framework for the management of on-site sewage systems on Lord Howe Island. The management responsibilities of the Lord Howe Island Board (the Board) under the *Lord Howe Island Regulation 2004* and the *NSW Environment and Health Protection Guidelines 1998 (Guidelines)* have been addressed in the preparation of this Strategy. The Guidelines state that the inappropriate use or disposal of wastewater effluent or solids can have adverse impacts such as:

- The spread of disease by bacteria, viruses, parasites and other organisms in the wastewater;
- Contamination of the groundwater and surface water;
- Degradation of soil and vegetation;
- Decreased community amenity, caused by odours, noise and insects.

The implementation of this Strategy will help protect both the environment and public health. The objectives of this Strategy are to:

- Prevent a public health risk (from spread of disease);
- Protect soils and vegetation (salinity, waterlogging);
- Protect surface water, groundwater and marine environment (runoff and contamination);
- Encourage conservation and reuse of resource (irrigation, composting);
- Protect the community amenity (odours, swimming waters, lagoon health).

The OSWMS will assist owners of on-site sewage systems in:

- Understanding their responsibilities;
- Maintaining existing systems;
- Assessing the adequacy of existing systems;
- Deciding on suitable systems when upgrading or installing new systems.

Design Guidelines are provided as a separate volume to this Strategy and provide further detail.

Appendix 1 in the Design Guidelines includes guidance on system design and sizing. It outlines the minimum design, sizing and installation requirements for on-site wastewater treatment and land application systems on Lord Howe Island.

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2.0 Introduction

Poorly managed on-site sewage systems can contaminate surface and groundwater resources and increase the risk of health problems. As Lord Howe Island is a highly sensitive environment with many systems located in close proximity to water resources, pollution is of particular concern. The OSWMS includes design, sizing and maintenance recommendations to ensure optimum system operation and the prevention of pollution and disease outbreak. Audits of existing systems indicate that many of the Island's on-site sewage systems are not appropriate for the Island's sensitive environment.

Lord Howe Island's wastewater is currently treated by on-site systems. There are approximately 230 separate systems on the Island. Approximately 160 of these are septic tanks with the balance being secondary treatment on-site systems. To date, the operation and maintenance of these systems has been poorly regulated and monitored and many of the systems are performing poorly. Secondary systems generally are not serviced regularly and this contributes to unsatisfactory performance. Relatively few systems disinfect the treated effluent prior to irrigation.

The current practice of wastewater treatment and disposal is contaminating the groundwater and probably the surrounding marine waters. Monitoring has revealed faecal contamination in the groundwater and elevated nutrient levels in the marine waters. Increased algal growth has been observed in the eastern area of the lagoon and a possible cause of this increased growth has been identified as high levels of nutrients in poorly treated wastewater effluent.

In May 2008 the Lord Howe Island Board (the Board) recognised that septic tank effluent represents a threat to public health and the Island's World Heritage Values. The Board agreed to have all septic tanks removed or upgraded within five years.

The Board subsequently established a wastewater management committee to determine the most effective option for the future management of wastewater on the Island. In November 2010 the Wastewater Management Committee Report was tabled identifying three feasible options for the Island and recommending several performance requirements to be incorporated into a future wastewater strategy. The report recommended that community consultation was required to identify the community's preferred approach to wastewater management.

This community consultation occurred during early 2011. Respondents to the consultation process overwhelmingly supported a wastewater strategy based on on-site treatment and disposal of wastewater. A majority of respondents accepted that higher levels of treatment and better maintenance of systems are required. The majority of respondents stated that costs of system upgrades should be borne primarily by the Leaseholder.

In May 2011 the Board endorsed the development of a wastewater strategy based on on-site sewage management that included effluent performance standards that are to be met by these on-site systems.

Since May 2011 the Board Administration has been investigating what these effluent standards should be. The Board Administration in determining these wastewater effluent standards has considered:

- What does the current LHI On-site Wastewater Management Strategy address and what deficiencies are there to bring it up to the standards required by the community?
- What proprietary systems are available that are approved by NSW Health?
- What quality levels are achievable by these systems?
- What is financially reasonable in regards to upgrading existing systems?
- What opportunities are there to utilise existing septic systems to minimise costs to Leaseholders?
- What systems can be effectively managed and maintained over the long term on Lord Howe Island?
- What are the legislative requirements?
- What are the requirements of both national and state industry guidelines?
- What do other local government authorities do?

The outcomes of these investigations have been used to generate this Strategy document.

Throughout 2013 and 2014 during the implementation of this strategy, a number of applications for upgraded on-site wastewater management systems have been reviewed and some shortcomings in site assessment, design, sizing, system selection and installation have been identified. Where possible the Board has worked with Leaseholders to address these shortcomings and provide assistance to deliver enhanced outcomes.

In reviewing these applications and the practical implementation of this strategy, the Board has sought to simplify this Strategy and associated documents for applicants, suppliers and the Board.

Version 2, Revision 2 of December 2015 addresses the following issues:

- Local Environment Plan (LEP) amendments;
- Typos;
- Reuse of treated effluent and;
- Appropriateness of alternative land disposal techniques not considered in the original Strategy.

3.0 Purpose

The Lord Howe Island On-site Wastewater Management Strategy (OSWMS) has been prepared to assess, regulate and manage the selection, design, installation, operation and maintenance of all on-site sewage systems on Lord Howe Island.

This Strategy applies to all sewage management systems on Lord Howe Island, including public, commercial and domestic facilities. The document clarifies the issues and requirements of the regulations and provides a flexible approach to on-site sewage management for both Leaseholders and the Board by using a performance based criteria for approval of systems.

3.1 Objectives

The **aim** of this Strategy is to protect and enhance public health and the state of the environment. The OSWMS will achieve this through meeting the following objectives:

- Minimizing the public health risk from spread of disease caused by microorganisms present in wastewater;
- Protect the community amenity through the prevention of the spread of foul and offensive odours from ineffective on-site wastewater systems;
- Protecting soils and vegetation from salinity, nutrient build up and water logging;
- Minimising negative impacts of insects and vermin; insects such as mosquitoes can act as vectors for disease where they have access to effluent;
- Protecting surface, groundwater and lagoon waters from poor quality effluent runoff or seepage;
- Encourage water conservation to reduce water entering on-site wastewater systems through water saving appliances; and
- Where appropriate provision for the reuse of resources (including nutrients, organic matter and water), such as non-potable reuse of treated effluent for toilet flushing.

3.2 Goals

The Board aims to meet these objectives by performing the following:

3.2.1 Administration

- Develop a partnership between the Board, Leaseholders and Service Agents to ensure the ongoing effective operation of on-site systems;
- Maintain a database of all existing on-site sewage systems, including details of inspections and maintenance of systems;
- Identify the risk posed by existing individual onsite systems on the Island in order to prioritise systems requiring upgrades;
- Issue “*Licence to operate an on-site Wastewater System*” for systems assessed to represent high or medium risk with a requirement for corrective action to be undertaken within the period of the licence;
- Ensure systems are inspected as per the OSWMS to ensure they meet performance requirements;

- Map and maintain details of predominant soil type and site conditions at on-site sewage systems;
- Maintain links between this Strategy and the Board Corporate Plan, Operations Plans, Local Environment Plan and other planning instruments to ensure that this Strategy is considered in the planning process;
- Establish a streamlined approval system for new and upgrading of existing on-site systems;
- Ensure that all Board staff involved with the development assessment process are aware of the objectives of this Strategy;
- Continual improvement in the regulation, assessment and approval process; and
- Conduct regular monitoring of effluent quality, along with groundwater and lagoon water.

3.2.2 Design, Construction and Installation

- Specify design and performance criteria to assess the suitability of an on-site sewage management system for any particular location on Lord Howe Island;
- Ensure that all land application areas comply with environment and health protection standards; and
- Encourage the selection, design, operation and maintenance of on-site systems so that they do not unreasonably interfere with quality of life. Special consideration to be given to odours, aesthetics and effluent contact mechanisms.

3.2.3 Education, Consultation and Communication

- Ensure the community have a good understanding of the importance of properly maintaining the on-site wastewater system;
- Encourage the conservation and reuse of water during each stage of on-site sewage system operation, including the installation of household water-saving devices and irrigation using adequately treated effluent;
- Promote the safe use and disposal of household chemicals and cleaning products;
- Provide the opportunity for the community to comment on strategy and policies before they are adopted;
- Report on the performance of the Island's on-site systems and make this available to the public; and
- Provide information on the different types of systems available and help in determining which systems are suitable for the site.

4.0 Legislative Context – Relevant Legislation, Guidelines and Standards

4.1 Legislation

The following legislation is relevant to the installation, operation and management of on-site sewage management systems:

- The Lord Howe Island Act 1953 and Regulation 2014;
- Local Government Act 1993;
- Local Government General Regulation 2005;
- Public Health Act 1991;
- Environmental Planning and Assessment Act 1979;
- Environmental Planning and Assessment Regulation 2000; and
- Protection of the Environment Operations Act 1997.

The above provide the legislative framework needed to implement the Lord Howe Island OSWMS. Under the **Lord Howe Island Regulation 2014**, Board approval is required for the installation, construction or alteration of a sewage management facility. The Board may order the owner or occupier of land or premises to repair, maintain or replace a septic tank or other human waste storage or treatment facility on the land or premises if the tank or facility is not in a safe or healthy condition. Under the **Local Government Act 1993**, the Board is able to make and enforce orders. A person who fails to comply with an order is guilty of an offence.

The **Lord Howe Island Local Environment Plan 2010**, defines exempt development and what activities are permitted on each of the differently zoned lands. The LEP allows on-site wastewater systems to be installed and operated as ‘exempt development’ subject to meeting certain development standards, including:

1. Must be installed on land within Zone 2 Settlement.
2. Must be used for domestic purposes.
3. Must not be located on land identified as “Significant Native Vegetation” on Sheet 3 of the LEP map.
4. Must comply with the design, construction and installation requirements of the Lord Howe Island On-Site Wastewater Management Strategy.
5. Treatment and disposal devices must not be located in a flood hazard area (as identified on the map marked “Flood Hazard Map”).
6. Must not be installed on a lease containing Heritage Items as listed in Schedule 2 of the LEP.

On-site wastewater systems are permitted ‘with consent’ in the following zones:

- Zone 1 – Rural
- Zone 5 – Special Uses
- Zone 6 – Recreation
- Zone 7 – Environment Protection.

The amendments to the LEP in 2015, aim to simplify the process of upgrading on-site wastewater systems on the Island so that the costs to both residents and the Board are reduced in most cases.

The **Local Government General Regulation 2005**, is not directly referred to by the LHI Regulation 2014, however, it does provide many of the principles and guidelines that are used for the management of on-site systems by Local Government. This document has adopted many of these principles. The **Public Health Act 2010** gives the Minister the power to issue orders or direct public authorities to take action to stop public health being endangered. Under the **Protection of the Environment Operations Act 1997** it is an offence to pollute waters or permit waters to be polluted.

4.2 Guidelines

The following documents are relevant to the OSWMS:

- The **Environment & Health Protection Guidelines, On-site Sewage Management for Single Households 1998** was prepared by various NSW Government Departments. This document covers a broad range of on-site issues, from developing on-site strategies to assessing site conditions, alternative treatment options and suggested conditions of approval.
- Interim NSW Guidelines for the Management of Private Recycled Water Schemes, published by the Department of Water & Energy May 2008.
- Sewage Management Facility- Sewage Treatment Accreditation Guideline, NSW Health, May 2005.

4.3 Australian Standards

The following Standards detail the design criteria and performance standards for on-site wastewater treatment units:

- AS/NZS 1546.2-2008 On-site domestic wastewater treatment units Part 2: Waterless composting toilets.
- AS/NZS 1546.3-2008 On-site domestic wastewater treatment units Part 3: Aerated wastewater treatment systems.
- AS/NZS 1547:2012 – On-site domestic wastewater management. This standard details the requirements for primary and secondary wastewater treatment performance and management of on-site domestic waste systems. It also gives guidance on site evaluation, soil assessment, options for treatment and disposal, as well as guidance on design, construction and installation.

4.4 NSW Health Accreditation

The NSW Health Department keeps a register of accredited wastewater treatment units. The list of currently accredited wastewater treatment systems can be found at:

<http://www.health.nsw.gov.au/environment/domesticwastewater/Pages/default.aspx>

The Board will not approve the installation or use an on-site wastewater system in a single lot and single dwelling residential situation if they are not on this register, unless in the following circumstance.

Clause 41(2) of the *Local Government (General) Regulation, 2005* allows exemptions where the Board may grant an approval to install or construct an on-site wastewater system without a NSW Health certificate of accreditation:

- a) *where a sewage management system has been specifically designed for and is to be built by the owner or occupier of the premises on which it is to be installed.*

It is intended that the on-site wastewater system be designed exclusively, built exclusively and used exclusively by the owner / occupier of the premises. Photocopied plans of on-site wastewater systems installed on other properties do not comply with the exemption. This defeats the purpose that mass produced or standard design on-site wastewater systems should be accredited to ensure that they protect public health and the environment. Further, the applicant has not researched the design, construction and use of the on-site wastewater system and is therefore not considered to be committed to the safe operation of the on-site wastewater system. Manufacturers of accredited on-site wastewater systems are required to produce a quality assured product, installation and operation manuals, warranty, and other features designed specifically to teach and assist the owner / occupier in the use of the that system.

- b) *where the sewage management system is specifically designed, by a person other than the owner / occupier specifically and uniquely for those premises.*

Again it is intended that the on-site wastewater system be designed exclusively for, built exclusively for, and used exclusively by the owner / occupier of the premises. Typical examples include vessels such as cast-in-situ septic tanks, collection wells, greywater tanks and waterless composting closets. This is not meant to apply to more complex systems such as aerated wastewater treatment systems, greywater treatment systems and recirculating sand filter systems where component parts are installed. Submission of photocopied plans also does not comply with the exemption.

This design must be unique to those premises. A composite construction of off the shelf Aerated Wastewater Treatment Systems does not qualify for the exemption.

Leaseholders who choose to install a non-accredited system will need to demonstrate compliance with the effluent treatment performance standards of this Strategy. Leaseholders will be responsible for all costs associated with demonstrating compliance. Leaseholders will be initially issued a “*Licence to operate a wastewater system*” for a period of 12 months to provide sufficient time to demonstrate compliance with this Strategy. Should systems fail to meet the requirements of this Strategy, then they will be assessed as high or medium risk and be issued a licence with requirements for rectification.

4.5 Board Powers Regarding On-site Wastewater Systems

Section 124 of the *Local Government Act 1993* gives the Board power to issue orders requiring a person:

- to comply with an approval (Order 30)
- to take action to maintain premises in a healthy condition (Order 21)
- to store, treat or dispose of waste (Order 22)
- not to use or permit a human waste storage facility to be used (Order 25)

Orders can be given to the owner or occupier of the premises or to the person responsible for the waste or the container in which the waste is stored.

5.0 On-site Wastewater Management Strategy (OSWMS)

The LHI OSWMS is based around three key elements being:

- (i) Effluent performance standards;
- (ii) Effluent disposal including storage;
- (iii) System management and maintenance.

These key elements have been structured to address the risks to the community's public health and environment, and a history of poor system management and maintenance. This Strategy is not prescriptive on what systems are to be used and has been structured this way to reflect the wishes of the community which identified during consultation that flexibility in managing onsite wastewater is desirable.

All on-site wastewater systems will need to comply with the requirements of this Strategy.

5.1 Definition of Wastewater System Types

Wastewater treatment systems on Lord Howe Island service a wide range of facilities, including:

- single lot residential premises
- clusters of residential premises
- small and large commercial premises with wastewater of a domestic nature, both with and without commercial kitchens
- businesses
- restaurants
- community facilities

Treatment systems need to take into consideration both the quantity and quality of effluent generated. The level of treatment must ensure adequate protection of public health and the environment into which it is discharged.

The Board has set a minimum standard of secondary treatment with disinfection for land application of effluent. Higher levels of treatment are required for higher level reuse such as toilet flushing or laundry reuse. Thus it is important that appropriate treatment systems are selected which can achieve the required level of treatment. Correspondingly, treatment systems require an appropriate level of servicing, maintenance, monitoring and reporting to ensure satisfactory ongoing performance.

5.1.1 Domestic and Small Commercial Residential Systems

Domestic and small commercial residential properties accommodating up to 10 persons and generating up to 2000 L/day, which do not have commercial kitchens, are to be serviced by a NSW Health accredited secondary treatment system incorporating disinfection (unless the requirements listed in Section 4.4 are met). Such systems are to be serviced in accordance with NSW Health requirements and testing and monitoring is to be undertaken as outlined in Table 5.2.1. A small commercial residential property system is defined where a maximum of one system will service the whole lease or business – including any residential dwellings. Multiple systems will not be permitted in order to achieve this “small commercial” status.

5.1.2 Larger Commercial Residential Properties, and Non-Residential Businesses and Community Facilities, without Commercial Kitchens

Larger commercial residential properties accommodating more than 10 persons or generating more than 2000 L/day, and non-residential businesses and community facilities, which do not have commercial kitchens, are to be serviced by a Board approved secondary treatment system incorporating disinfection. In recognition of the increased inherent risk associated with such a larger system, testing and monitoring is to be undertaken as outlined in Table 5.2.2.

5.1.3 Larger Commercial Residential Properties, and Non-Residential Properties, with Commercial Kitchens

Larger commercial residential properties accommodating more than 10 persons or generating in excess of 2000 L/day, and non-residential properties (eg restaurants, lodges, cafes, bakeries etc) with a commercial kitchen, are to be serviced by a Board approved secondary treatment system incorporating disinfection. Where a commercial kitchen is serviced, an appropriately sized grease trap must be installed. The grease trap should be regularly inspected and cleaned and serviced according to manufacturer's instructions. Testing and monitoring is to be undertaken as outlined in Table 5.2.3.

5.1.4 Reuse of Treated Effluent

Any property which seeks to reuse recycled water for non-potable reuse (e.g. toilet flushing and/or laundry reuse), will require a treatment facility that meets Class A recycled water standards. Testing and monitoring is to be undertaken as outlined in Table 5.2.4.

5.2 Effluent Treatment Performance Standards

This Strategy prescribes the performance standards to be achieved by LHI wastewater systems.

The following tables specify the minimum wastewater effluent quality requirements to be achieved by on-site wastewater systems for domestic, commercial residential, and non-residential properties. To achieve these quality requirements a minimum of secondary treatment with disinfection is required.

Septic systems will not meet these standards and are therefore are not permitted under this Strategy.

Greywater diversion or disposal systems are also not permitted under this Strategy as they result in direct discharge of untreated wastewater to the environment with potential for adverse environmental and public health impacts. No reduction in required land application area is acceptable based on reduced hydraulic load determined by greywater diversion.

Greywater treatment using a NSW Health accredited greywater treatment system is acceptable. Internal reuse of treated greywater for toilet flushing or laundry reuse can be taken into consideration by the Board in determining the size of the required land application area.

These standards have been determined based on NSW Government Guidelines, Recycled Water standards and importantly what commercially available systems are able to produce. In particular, for domestic systems, the standards considered what current proprietary systems can achieve.

5.2.1 Domestic and small commercial residential properties accommodating up to 10 persons and generating up to 2000 L/day, which do not have commercial kitchens.

Parameter	Effluent compliance Value	Effluent Monitoring (during validation period)	Notes
E.Coli	<10 cfu/100ml	Annual*	<ul style="list-style-type: none"> - Quarterly inspection and service with reporting to the Board - Board Inspection every 3 years - Random audits may be carried out by or on behalf of the Board - *Quarterly/Annual validation testing to be done at same time as quarterly inspection and service. Refer to Section 2.4.1 of the Design Guidelines for additional detail on validation sampling for the system. - All UVs require quarterly inspection and servicing
BOD	<20 mg/L (90%ile) <30 mg/L (max)	Annual*	
Suspended Solids	<30 mg/L (90%ile) <45 mg/L (max)	Annual*	
pH	6.5 – 8.5	Quarterly*	
Turbidity	<1 NTU if UV disinfection ¹ <5 NTU if Chlorine disinfection	Quarterly*	
Disinfection	Cl: 0.2-2mg/L residual UV: To be advised Ozone: To be advised	Quarterly*	
Nitrogen	<30 mg/L		
Phosphorus	<10 mg/L		
Dissolved Oxygen (AWTS only in aeration chamber)	>2 mg/L	Quarterly*	

These effluent standards meet the requirements for *medium* risk of human exposure. Consequently, the treated effluent can be utilised for Urban irrigation with some restricted access and application. Surface drip irrigation is allowable but not when human contact is likely. It is not suitable for irrigation of food crops.

¹ Where systems incorporate continuous monitoring of either turbidity or UV Transmittance (UVT) and are able to automatically adjust UV intensity and/or contact time and demonstrate that BOD and Suspended Solids are continuously maintained at <10mg/L, turbidity should be in the range <2NTU (24-hour average) and <5NTU at all times.

5.2.2 Larger commercial residential properties accommodating more than 10 persons or generating in excess of 2000 L/day, and non-residential business and community facilities, which do not have commercial kitchens.

Parameter	Effluent compliance Value	Effluent Monitoring	Notes
E.Coli	<10 cfu/100ml	Quarterly*	<ul style="list-style-type: none"> - Quarterly inspection, sampling, testing and service with reporting to the Board - Board Inspection every 3 years - Random audits may be carried out by or on behalf of the Board - *Quarterly testing to be done at same time as quarterly inspection and service - All UVs require quarterly inspection and servicing - Refer to Section 2.4.1 of the Design Guidelines for additional detail on validation sampling for the system.
BOD	<20 mg/L (90%ile) <30 mg/L (max)	Quarterly*	
Suspended Solids	<30 mg/L (90%ile) <45 mg/L (max)	Quarterly*	
pH	6.5 – 8.5	Quarterly*	
Turbidity	<1 NTU if UV disinfection ¹ <5 NTU if Chlorine disinfection	Quarterly*	
Disinfection	Cl: 0.2-2mg/L Free Residual Chlorine UV: To be advised Ozone: To be advised	Quarterly*	
Nitrogen	<30 mg/L	Quarterly*	
Phosphorus	<10 mg/L	Quarterly*	
Dissolved Oxygen (AWTS only in aeration chamber)	>2 mg/L	Quarterly*	

These effluent standards meet the requirements for *medium* risk of human exposure. Consequently, the treated effluent can be utilised for Urban irrigation with some restricted access and application. Surface drip irrigation is allowable but not when human contact is likely. It is not suitable for irrigation of food crops.

¹ Where systems incorporate continuous monitoring of either turbidity or UV Transmittance (UVT) and are able to automatically adjust UV intensity and/or contact time and demonstrate that BOD and Suspended Solids are continuously maintained at <10mg/L, turbidity should be in the range <2NTU (24-hour average) and <5NTU at all times.

5.2.3 Larger commercial residential properties accommodating more than 10 persons or generating in excess of 2000 L/day, and non-residential properties, where a commercial kitchen is serviced.

Where a commercial kitchen is serviced, an appropriately sized grease trap should be installed. The grease trap should be regularly inspected and cleaned and serviced according to the manufacturer’s instructions.

Parameter	Effluent compliance Value	Effluent Monitoring	Notes
E.Coli	<10 cfu/100ml	Quarterly*	<ul style="list-style-type: none"> - Quarterly inspection, sampling, testing and service with reporting to the Board - Board Inspection every 3 years - Random audits may be carried out by or on behalf of the Board - *Quarterly testing to be done at same time as quarterly inspection and service - All UVs require quarterly inspection and servicing - Refer to Section 2.4.1 of the Design Guidelines for additional information on validation sampling for the system
BOD	<20 mg/L (90%ile) <30 mg/L (max)	Quarterly*	
Suspended Solids	<30 mg/L (90%ile) <45 mg/L (max)	Quarterly*	
Total Oil and Grease	<5 mg/L (max)	Quarterly*	
pH	6.5 – 8.5	Quarterly*	
Turbidity	<1 NTU if UV disinfection ¹ <5 NTU if Chlorine disinfection	Quarterly*	
Disinfection	Cl: 0.2-2mg/L Free Residual Chlorine UV: To be advised Ozone: To be advised	Quarterly*	
Nitrogen	<20 mg/L	Quarterly*	
Phosphorus	<10 mg/L	Quarterly*	
Dissolved Oxygen (AWTS only in aeration chamber)	>2 mg/L	Quarterly*	

These effluent standards meet the requirements for *medium* risk of human exposure. Consequently, the treated effluent can be utilised for Urban irrigation with some restricted access and application. Surface drip irrigation is allowable but not when human contact is likely. It is not suitable for irrigation of food crops.

¹ Where systems incorporate continuous monitoring of either turbidity or UV Transmittance (UVT) and are able to automatically adjust UV intensity and/or contact time and demonstrate that BOD and Suspended Solids are continuously maintained at <10mg/L, turbidity should be in the range <2NTU (24-hour average) and <5NTU at all times.

5.2.4 Any property which seeks to reuse recycled water for non-potable reuse (e.g. toilet flushing and/or laundry reuse).

The following table details effluent standards that meet Class A recycled water standards and are suitable for non-potable reuse (e.g. toilet flushing and/or laundry reuse).

Parameter	Effluent compliance Value	Effluent monitoring frequency	Notes
E.Coli	<1 cfu/100ml	Quarterly *	<ul style="list-style-type: none"> - Board Inspection every 12 months - Random audits may be carried out by or on behalf of the Board - *Quarterly testing to be done at same time as quarterly inspection and service - All UVs require quarterly inspection and servicing - Refer to Section 2.4.1 of the Design Guidelines for additional information on validation sampling for the system
BOD	<10 mg/L	Quarterly*	
Suspended Solids	<10 mg/L	Quarterly*	
pH	6.5 – 8.5	Continuous online	
Turbidity	<1 NTU if UV disinfection ¹ <2 NTU if Chlorine disinfection <5 NTU (max)	Continuous online	
Disinfection	Cl: 0.2-2mg/L Free Residual Chlorine UV: To be advised Ozone: To be advised	Continuous online	
Coliphages	<1 pfu/100mL	Quarterly*	
Clostridia	<1 cfu/100mL	Quarterly*	
Nitrogen	<10 mg/L	Quarterly*	
Total Oil and Grease	< 1 mg/L	Quarterly*	
Phosphorus	<5 mg/L	Quarterly*	
Dissolved Oxygen (AWTS only in aeration chamber)	>2 mg/L	Quarterly*	

These effluent standards meet the requirements for the highest risk of human exposure. Consequently, the effluent can be utilised for:

- Residential dual reticulation for non-potable use;
- Multi-unit dwellings (lodges), internal non-potable reuse and external irrigation;
- Agricultural irrigation of unprocessed foods for example salad crops;
- Urban irrigation with unrestricted access and application.

¹ Where systems incorporate continuous monitoring of either turbidity or UV Transmittance (UVT) and are able to automatically adjust UV intensity and/or contact time and demonstrate that BOD and Suspended Solids are continuously maintained at <10mg/L, turbidity should be in the range <2NTU (24-hour average) and <5NTU at all times.

5.3 Effluent Disposal and Storage

Effluent disposal is a very important component of the OSWMS. Serious public health issues can occur if human contact with inadequately treated effluent occurs. Human contact can be through contact with effluent:

- Ponding on the ground;
- Sprayed by irrigation systems;
- Used to irrigate food crops;
- Which enters the groundwater and is used untreated for irrigation or other non-potable purposes; and
- Which enters marine waters where people swim.

The higher the level of treatment of effluent the lower the risk to public health and the greater the opportunity for reuse of treated effluent.

Waterlogging is a particular concern on clay soils but can also occur if there is a shallow water table or indurated layer or rock at shallow depth.

In sandy soils the effluent can drain quickly to groundwater, increasing the risks of contamination of this resource and consequently domestic bores and the lagoon.

Land application areas should be constructed away from natural drainage lines, with stormwater berms or diversion in place to reduce run-on. Ideally, land application sites have low gradients and receive good light and ventilation.

Spray irrigation is not permitted as a method of effluent disposal in this Strategy.

Land application areas are to be sized by water and nutrient balance using the monthly water balance in Appendix 1 of the Design Guidelines. Where possible, land application areas are sized to avoid the need for wet weather storage. Where on-lot land application area is limited the Board will use its best endeavours to assist in identifying suitable off-lot land application areas.

5.3.1 Wet Weather Storage

In some cases, it may not be possible to design and install land application areas which do not require wet weather storage. In such cases, wet weather storage provision might be required and irrigation systems required to be time-programmable and to incorporate soil moisture sensors.

5.4 System Management and Maintenance

Over the history of on-site wastewater systems on Lord Howe Island there has been evidence of poor system management and maintenance. Consequently, systems installed and not managed or maintained properly do not meet the performance standards set by manufacturers or this OSWMS.

Community feedback on the Island's wastewater management revealed that a majority of the community wanted responsibility for wastewater management to remain with the Leaseholder.

The community identified that it was prepared to incur additional costs to maintain on-site systems to meet the specified requirements.

Given poor past practices in relation to system maintenance, improved requirements for maintenance and reporting have been developed and incorporated into the Strategy. These requirements have been based on NSW Health accreditation requirements for a Sewage Management Facility¹.

A copy of the following information shall be provided (by the Leaseholder from the system installer) to the Board, except where a NSW Health accredited system is proposed, and the supplier has previously provided the information for the identically installed system.

- Statement of warranty
- Statement of service life
- Quality Assurance Certification
- Installation Manual
- Service Manual for use by service technicians, which incorporates a detailed three yearly evaluation and maintenance schedule based on three monthly service intervals and desludging as specified by the manufacturer. Effluent testing program is to be included to confirm compliance with effluent quality requirements as outlined in this Strategy, with quarterly reporting to the Board. The maintenance schedule shall specify the work to be carried out by a service contractor as part of the continuous maintenance
- Household Operators Manual including:
 - troubleshooting and signs of failures
 - a list of toxic substances / loads to be avoided
 - desludging requirements
 - safety information
 - alarm information and use restriction
- Service Report Form suitable for use by service technicians;
- Engineering Drawings in A3 format;
- Detailed Specifications;
- Accreditation documentation from NSW Health.

All systems, whether accredited or not, require the following information from the Leaseholder:

- a copy of the Service Agreement or contract with the Agent who will maintain the system
- Scaled and dimensioned A4 site plan(s) showing:
 - Existing wastewater treatment system and notes on demolition or alteration
 - North point
 - Lease size in square metres
 - Soil type(s) and sample location(s)
 - Flood mapping (if applicable)
 - Heritage items (if applicable)

¹ SEWAGE MANAGEMENT FACILITY SEWAGE TREATMENT ACCREDITATION GUIDELINE – NSW Health May 2005

- Location of system, pipework and associated irrigation areas including valves and method of irrigation, including dimensions
- Alarm, flushing valve, air valve and pump locations
- Buffer distances to buildings, adjacent leases, groundwater wells, drainage lines, permanent water bodies
- Significant Native Vegetation (SNV) (if applicable).

5.4.1 Service Agents

All wastewater system Service Agents need to register with the Board. Service Agents will need to provide details of:

- What systems they are authorised to maintain including a certificate from the system supplier that they are appropriately trained and qualified to undertake the service requirements
- Details of any ongoing training requirements
- Details of any licences that they are required to maintain
- Maintain and supply to the Board as required under Section 5.2, details of the systems they service including all test and service inspection reports.

Service Agents who fail to provide such information will be deregistered and will not be permitted to service on-site wastewater systems. There is no fee to register as a Service Agent.

5.4.2 Reporting Requirements

Service Reports and test results are to be supplied to the Board on a quarterly basis, as outlined in this Strategy, by the Service Agents. Leaseholders are to ensure their service agents provide this data to the Board. Failure to supply reports and test results may result in:

- Removal of “*Approval to operate without a licence*” (see below);
- Issuing of a “*Licence to operate a wastewater system*” with improvement conditions and associated fees; and
- Issuing of fines to the Leaseholder in accordance with the *Local Government Act* regulations.

In the event of a test failure, the service agent is to advise the Board of the failure within 48 hours of receiving the test results. The Service Agent is to take corrective action to fix the fault. A report is to be prepared and attached to test results stating what corrective action was taken. A re-test of effluent is required confirming that corrective action has fixed the problem. Copies of the re-test are to be provided to the Board.

5.4.3 Alarms and Warning Systems

All systems are to have appropriate alarms and warning systems to advise the Leaseholder of system failures.

As a minimum, a warning light is to be installed in a location visible on approach to the building where the wastewater system is connected. The location is to be shown on a site plan submitted as part of the application process.

6.1 Risk Assessment

The development of this Strategy has been based on an assessment of risk, including public health and environmental risk.

It was identified by the LHI Wastewater Management Committee that generally there is a significant pollution risk from on-site systems on Lord Howe Island. The high annual rainfall, poor soil types, density of dwellings, proximity to ground and marine waters and the use of these waters, as well as the World Heritage value of the environment all contribute to the high risk rating. In order to protect the surrounding environment and minimise the risk to public health, regular inspections of on-site systems are to be carried out.

Over recent years the Board has undertaken inspections for all on-site sewage systems. Data collected includes the type of system, the performance of the treatment system and disposal area.

There is sufficient data collected to identify a risk rating for existing systems. Assessment of the risk of existing systems were initially made based on the precautionary principal in that all existing systems will be initially assessed as high or medium until they can demonstrate compliance with requirements of this Strategy.

The risk classification is used to identify priority systems for upgrading. The classification of risk is broken into three (3) categories as detailed below.

It is the intention of this Strategy that all systems on the Island ultimately are rated as Low Risk.

- **High Risk**

A system will be assessed as being High Risk if it doesn't:

- (i) Meet the performance requirements of this Strategy; or
- (ii) Meet the requirements of this Strategy for the disposal of effluent; or
- (iii) Meet the system management and maintenance requirements as specified under this Strategy;

AND any of the following criteria:

- (i) The irrigation area is less than 35m from permanent surface waters;
- (ii) The irrigation area is less than 50m from a well or bore used for any purpose;
- (iii) The irrigation area is less than 20m from non-permanent water ways (drainage channels, gullies etc.);
- (iv) The system is located on a property less than 1,500m² in size;
- (v) The system and/or irrigation area is situated on a flood-labile area;
- (vi) The effluent produced by the system settles in a pond on the ground surface at any time;
- (vii) The system is a septic system with no further treatment;
- (viii) Aerated systems, except where service records, including report on condition of irrigation area, are kept up to date;
- (ix) An aerated system which has an irrigation system in poor condition;

- (x) The property has had a history of problems associated with the on-site system or the initial inspection reveals that it has not recently been operating in accordance with performance standards;
- (xi) The owners of the system have demonstrated a lack of knowledge as to how to properly maintain the system, do not undertake regular maintenance or have not agreed to provide the Board with documentation of on-going and regular maintenance upon request.

The system must be operating in accordance with the Performance Standards as specified in this Strategy before an “*Approval to operate without a licence*” can be given.

The maximum period of Licence for a High Risk system is one (1) year. If at the end of the Licence period, the system still represents a High or Medium Risk, application may be made for a new Licence. If the application is approved, a new Licence will be issued with conditions and a licence fee will apply. Exemptions to the licence fee may be granted by the Board in exceptional circumstances.

Failure to get an “*Approval to operate without a licence*” through failing to undertake maintenance or make modifications to bring the system up to standard is an offence under the *Local Government Act*.

- **Medium Risk**

A system will be assessed as being Medium Risk if it doesn't meet:

- (i) The performance requirements of this Strategy; or
- (ii) The requirements of this Strategy for the disposal of effluent; or
- (iii) The system management and maintenance requirements of this Strategy.

AND ALL of the criteria listed below are met:

- (i) The system and irrigation area are not situated on a flood-liable area;
- (ii) The system does not produce effluent that settles in a pond on the ground surface;
- (iii) The system does not have a recent history of problems and inspection does not reveal evidence of recent failure to comply with performance standards;
- (iv) The system is located on a property greater than 1,500m² in size;
- (v) The irrigation area is located more than 50 metres from a well or bore used for any purpose;
- (vi) The irrigation area is greater than 35 metres from permanent surface water;
- (vii) The irrigation area is greater than 20m from non-permanent waters (e.g. major drainage channels, gullies etc);
- (viii) The owners of the system have demonstrated a lack of knowledge as to how to properly maintain the system, do not undertake regular maintenance or have not agreed to provide the Board with documentation of on-going and regular maintenance upon request.

The system must be operating in accordance with the Performance Standards as specified in this Strategy before an “*Approval to operate without a licence*” can be given.

The maximum period of Licence for a Medium risk system is three (3) years. If at the end of the Licence period, the system still represents a High or Medium Risk, application may be made for a new Licence. If the application is approved a new Licence will be issued with conditions and a licence fee will apply. Exemptions to the licence fee may be granted by the Board in exceptional circumstances.

Failure to get an *“Approval to operate without a licence”* through failing to undertake maintenance or make modifications to bring the system up to standard is an offence under the *Local Government Act*.

- **Low Risk**

A system will be deemed a Low Risk and granted an *“Approval to operate without a licence”* if it meets **ALL** of the following criteria:

- (i) The performance requirements of this Strategy; and
- (ii) The requirements of this Strategy for the disposal of effluent; and
- (iii) The system management and maintenance requirements of this Strategy.

Random inspections of Low Risk systems may be undertaken at no cost to the owner as a precaution to ensure the process is effective.

6.2 Approval to Operate Without a Licence

Wastewater systems that are assessed as Low Risk will be given *“Approval to Operate without a Licence”*.

The approval remains in place whilst the system meets the requirements of this Strategy. In the future should these systems be found to represent a High or Medium Risk, the approval to operate will be withdrawn and a licence will be required.

An *“Approval to operate without a licence”* is issued free of charge, subject to meeting the requirements of this Strategy.

6.3 Licence to Operate an On-site Wastewater System

Wastewater systems that are assessed as High or Medium Risk will be issued a *“Licence to operate a wastewater system”*. This licence will be valid for a period of up to three years (depending on risk assessment). The licence will include conditions that must be met before an *“Approval to operate without a licence”* will be issued.

If systems that are under a licence are upgraded to meet the requirements of this Strategy, the Leaseholder will be granted an *“Approval to operate without a licence”*.

The issuing of a licence by the Board incurs an annual fee for the duration that the licence is in effect.

6.4 Approval Process to Upgrade or Install a New Wastewater System

Development Consent may not be required for all new and upgraded systems. All Leaseholders should contact the Board to discuss the process before commencing or committing to a supplier. The Board is able to provide a checklist for use by Leaseholders which sets out the

steps involved in assessing, designing, approving, installing and operating a new or upgraded wastewater system.

6.5 Change of Leaseholder

The *Local Government (Approvals) Amendment (Sewage Management) Regulation 1998* states that the approval process is personal. That is, the “*Approval to operate without a licence*” is not issued to the property, but to the Leaseholder. If the Leaseholder of a property changes, the new Leaseholder must apply for approval to operate within three months of the date of transfer.

The person who purchases (or otherwise acquires) the property may operate the system within this three month period without approval. If the new Leaseholder applies within two months of the date of transfer, they may continue to operate the on-site wastewater system without approval until such time as the application is determined. The new Leaseholder must apply to the Board for a change of ownership by lodging a change of ownership form and paying the relevant fee as prescribed in the Board fees and charges. An inspection of the wastewater system will then be carried out by the Board.

6.6 Board Inspections

On-site wastewater systems will need to be managed and maintained in accordance with an approved Service Manual. This Service Manual details the inspections that are to be undertaken by the Leaseholder and Service Agent to ensure the system is operating to the requirements of this Strategy.

In addition to inspections undertaken as part of the Service Manual, the Board may undertake inspections of the system.

Board officers will undertake an inspection of all on-site wastewater systems where an “*Approval to operate without a Licence*” has been issued, at least once every three years. The Leaseholder will be notified in writing and given a minimum of one week’s notice prior to Board Officers undertaking an inspection. There will be no fee for this inspection.

On-site wastewater systems of Leaseholders with a “*Licence to operate a wastewater system*” will be inspected at least annually for the duration of the licence. Board Officers will normally attend the property without written notification. There will be a fee charged for this inspection.

Permitted Board Officers will inspect any on-site wastewater system without notification if a complaint is received or where, during the course of regular inspections, a faulty system is observed. If the inspection reveals that rectification works are required, the Board will advise the Leaseholder of the nature of the problem and requirements to rectify the problem. If there is no immediate environmental or public health risk, the Board will generally allow a three-month period to have the required works completed. Otherwise, if it is determined that there is an environmental or public health risk, the period of time to complete the works will be shorter.

The Board will not issue an invoice for the inspection fee with a rectification letter. If the works are completed within the time frame and the Board is advised of the rectification, the Board

will only issue an invoice for the initial inspection fee. However, if no contact with the Board is made within three months (or earlier if specified), a Board officer will re-inspect the property and, if the works are not completed, an invoice for both the initial inspection and the re-inspection will be issued immediately with a further Notice requiring completion of the rectification works.

6.7 Effluent Disposal Systems

The sizing of effluent disposal areas (land application areas) by water and nutrient balance is outlined in Appendix 1 of the accompanying Design Guidelines.

All existing effluent disposal areas will need to be assessed for compliance with the Design Guidelines accompanying this Strategy. If existing disposal systems do not meet the requirements of the Design Guidelines then they will need to be upgraded to meet the Guidelines.

Where possible, disposal areas should be contained within the lease boundary, and if not, options to reduce the disposal area should be considered. These options include:

- Water reduction measures – composting toilets, dual flush toilets, water saving showerheads
- Higher level treatment of water to reduce required irrigation areas – e.g. nutrient removal
- Higher level treatment to enable reuse of waste water for non-potable purposes

When the above measures have been considered and the disposal area remains too large for the lease, disposal of effluent off-lease should be considered.

Absorption trenches are not permitted under this Strategy.

Sand mounds are an acceptable method of disposal of secondary treated effluent, provided that the mounds are designed in accordance with the Wisconsin Mound Soil Absorption System: Siting, Design and Construction Manual (Converse and Tyler 2000), Section 9 of Designing and Installing On-site Wastewater Systems, (Sydney Catchment authority 2012) and AS/NZS1547:2012. Sand mound designs must demonstrate by nutrient balance that appropriate consideration has been given to nutrient management and that mound footprints are sufficient to allow sustainable nutrient assimilation. Further guidance on sand mound design and construction, including an informative video prepared by the Sydney Catchment Authority, is available at <https://vimeo.com/72859822> Media selection for sand mounds must take into consideration the specific characteristics of sand and crushed glass available on the Island. The Board has conducted some limited testing of the materials which are available to leaseholders, suppliers and designers.

6.8 Water Use

Leaseholders should reduce the quantity of wastewater entering the system where possible. This can be achieved through water conservation practices such as the use of dual flush cisterns, composting toilets and water saving shower heads. Heavy water use activities should also be spread over the entire week to avoid shock loads and overloading of the system. System

overloading can result in poorly treated effluent being released, shortening the life of disposal areas and increasing health and environmental risks. Responsible water use can improve the functioning of a system and help reduce the level of supervision required by the Board.

Leaseholders are encouraged to use low phosphorus detergents and cleaning products to improve the quality of the wastewater effluent.

Commercial properties are encouraged to achieve a higher standard of effluent treatment to enable reuse of effluent.

6.9 Continuous Improvement

The Board is committed to continuous improvement in the regulation and operation of on-site wastewater systems.

In response to inspections carried out to date, the work of the LHI Wastewater Management Committee, community consultation and early lessons from the implementation of the 2013 Strategy, the On-site Wastewater Management Strategy has been updated to provide a system that is more flexible and provides mechanisms for owners of systems who consistently meet performance standards and practice regular maintenance to have their risk category lowered.

As inspections continue over time, the Board's approach will be reassessed and modified accordingly to meet changing requirements, objectives and needs. This Strategy will be reviewed as required, but at least every five years.

Examination of the current development standards and approval criteria for the installation of new systems will help improve the overall performance of on-site wastewater systems on Lord Howe Island.

7.0 Glossary

AWTS	Aerated Wastewater Treatment System; a wastewater treatment process typically incorporating: <ul style="list-style-type: none">○ Settling of solids and flotation of scum;○ Oxidation and consumption of organic matter through aeration;○ Clarification — secondary settling of solids; and○ Disinfection of wastewater before surface irrigation.
De-sludging	Withdrawing sludge, scum and liquid from a tank.
Effluent	Wastewater discharging from an on-site wastewater system.
Groundwater	All underground waters.
Land Application Area	The area over which treated wastewater is applied.
Pathogens	Micro-organisms that are potentially disease-causing, include but are not limited to bacteria, protozoa and viruses.
Septic Tank	Wastewater treatment device that provides a preliminary form of treatment for wastewater, comprising sedimentation of solids, flotation of oils and fats, and anaerobic digestion of sludge.

REFERENCES

- Department of Local Government, 1998, Environment and Health Protection Guidelines: On-Site Sewage Management for Single Households, Department of Local Government
- Department of Water and Energy, Water for Life, Interim NSW Guidelines for Management of Private Recycled Water Schemes, May 2008
- NSW Government, Bankstown, Local Government Act 1993 and Local Government (General) Regulation 2005
- *NSW Guidelines for Greywater Reuse in Sewered, Single Household Residential Premises*, Department of Energy, Utilities and Sustainability 2007
- NSW Plumbing Guidelines Department of Energy, Utilities and Sustainability, *New South Wales Code of Practice – Plumbing and Drainage*, 2006
- NSW Health, *Sewage Management Facility Sewage Treatment Accreditation Guideline Part4, Clause 43(1) Local Government (Approvals) Regulation, 1999*, May 2005
- Tamworth Regional Council, On-site Sewage Management Strategy, October 2008