Inspection and Troubleshooting of Onsite Wastewater Management Systems

What is Failure?

Compliance

Environmental and Human Health

Defining Failure

- There are a variety of factors that can cause an on-site wastewater management system to 'fail'
- What constitutes failure of an on-site system?
- We need to start by defining failure before we can talk about managing it

Common on-site wastewater treatment system failures (US EPA, 2002)

Type of Failure	Evidence of Failure
Hydraulic Failure	Untreated or partially treated sewage pooling on ground surfaces; sewage backup in plumbing fixtures; sewage/ effluent breakouts on hill slopes
Pollutant contamination of groundwater	High nitrate levels in drinking water wells; taste or odour problems in well water caused by untreated, poorly treated, or partially treated wastewater
Microbial contamination of ground and surface water	Shellfish bacterial contamination; recreational beach closures due to high bacterial levels; contamination of drinking water wells with faecal bacteria or other faecal indicators
Nutrient contamination of surface water	Algal blooms, high aquatic plant productivity; low dissolved oxygen concentrations

Defining Failure

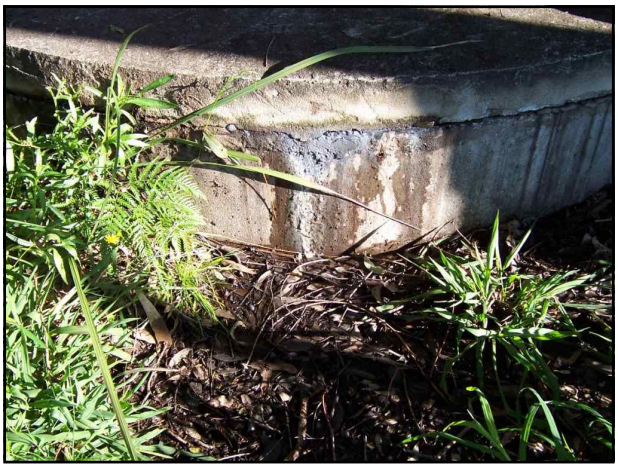
- Non-compliance with performance standards (S44 NSW Local Government (General) Regulation 2021)
- Non-compliance with regulatory guidelines
- Non-compliance with approved conditions of consent, including effluent quality, design details, maintenance etc
- Or it can relate to environmental pollution or impacts resulting in human health risks, for example, unauthorised discharge to drains and waterways or structural damage

On-site System Failure

- How do you define failure when inspecting on-site systems?
- Prior to completing an inspection, failure and compliance actions relating to that failure need to be defined to be fair and equitable
- See the Preparation session for examples of flow charts for an Inspection Program and Installation Inspection

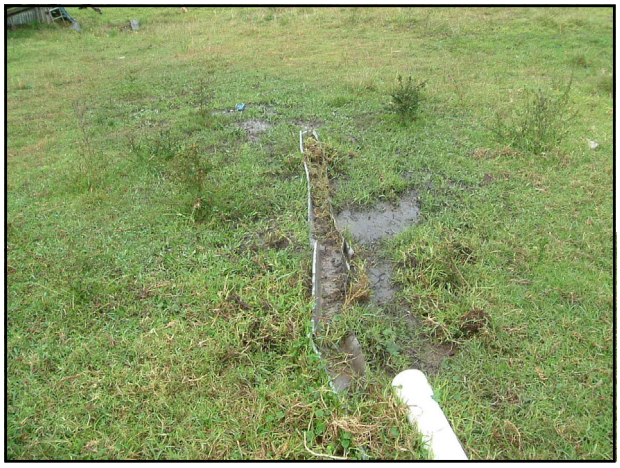
On-site System Failure

- What constitutes a failure in a treatment system?
  - Leaking tank (overflowing or unsealed)
  - Structurally unstable lid
  - Malfunctioning components
  - Different treatment system than approved



LAA System Failure

- What constitutes failure in a Land Application Area?
  - Ponding on the land surface
  - Pollutant export to groundwater
  - Seepage downslope
  - Damaged components
  - Effluent application outside the approved LAA



New Installation Inspection

- Check that installed system meets the approved design specifications and approved conditions of consent
- Check component specifications and dimensions (pipe and pump sizing)
- Check levels and falls
- If required, confirm commissioning – check flow rates, check irrigation squirt heights etc.

Operational Inspections

- What criteria does the system need to meet to be suitable?
  - Conditions of consent (installation and operation)
  - Environmental and public health protection
- Are there instant failure criteria?
  - Effluent likely to or entering a waterway
  - Tank structural collapse (internal or external)
  - Effluent surfacing in the LAA

Operational Inspections

- Are there lesser failure aspects that may be cumulative or that need to be addressed?
  - Damaged or failing components (missing inspection caps, damaged distribution box)
  - Poor maintenance (solids build-up, missed AWTS servicing, overgrown LAA)
  - Poor treatment performance (odour, turbidity)
- What additional information is required to make a decision if the system is suitable for approval to operate?

Risk-based Management

- Audit Risk Categories
  - Do you assign a risk category to OWMS on the basis of the hazards associated with that system, and audit those with the highest risk most frequently?
- What are the benefits of this approach?

Risk-based Management

- Typical factors for consideration:
  - Quantity and quality of any effluent discharge
  - Proximity to sensitive receptors, such as watercourses, groundwater bores, aquaculture
  - Lot size and density of OWMS in the area
  - Site and soil characteristics
- Are ongoing management behaviours included?

Problem Identification

- Note all problems with a system
- Field observations and measurements
- Testing results (if relevant)
- All potential inputs (wastewater flow and characteristics, leaks, stormwater, groundwater, chemicals, previous maintenance, damage)
- Interpret the information. Find the cause of the problem, not just the symptom

Possible Causes

- Poor design or installation
- Poor maintenance (treatment system, LAA)
- Leaks (dwelling, stormwater, groundwater)
- Inputs (big flows, fats, chemicals, medicines)
- Damage (gaps, crush, roots, movement, electrical, aeration)
- Uneven flows (distribution system, ground settling, installation, air system, blockages)

Effluent Surfacing in LAA

- Is entire area full/ flooded or just parts?
- Is effluent distribution even?
- Is there damage to pipes or surface?
- Is there stormwater or groundwater ingress?
- Any water leaks entering the system?
- How old is the LAA?
- Maintenance history on treatment tank?
- Size of LAA v flows and soils?