Assessing A20 permit applications for onsite wastewater management systems

Training for Council Officers

Risk Based Designs

Assessment of setback distances/buffers

- Setback distances to sensitive receptors are defined to minimise risks of failure or poor performance
- Have typically been conservatively set "single figure" distances for individual landscape features or structures, defined by the level of treatment
- In Special Water Supply Catchment Areas (potable water supply), could be reduced by up to 50% conditional on defined requirements

Special Water Supply Catchment Areas

Could be reduced by up to 50% provided that:

- Effluent is secondary treated to 20/30 (BOD/TSS) standard as minimum
- A maintenance and service contract is in place
- Council is satisfied the reduction is necessary to permit the appropriate development of the site and that the risks to public health and the environment were minimised

Has often been assumed or considered automatic

Risk assessment

Council is satisfied "that the risks to public health and the environment were minimised"

- There is clear need to demonstrate that these risks have been assessed
- Appropriate to undertake a risk assessment
- Should be quantitative or a least semi-quantitative
- A suitable methodology for assessment of setback distances is outlined in AS/NZS1547:2012, Appendix R

Risk assessment AS/NZS1547:2012, Appendix R

- Presents a means by which quantitative assessments of setback distances can be determined for various site features
- Appropriate setback distances can be set, within a specified range (i.e. is risk-based)
- Considers relevant site constraints
- Setback distances applied to land application areas
- Based on site constraints identified by desktop study and field-based site and soil evaluation

Risk assessment AS/NZS1547:2012, Appendix R

Appendix R presents two tables:

- Table R1 Guidelines for Horizontal and Vertical Setback Distances
- Table R1 identifies site features for which setback distance ranges are defined and relevant site constraint items of specific concern are listed
- Table R2 Site Constraint Scale for Development of Setback Distances
- Table R2 outlines a site constraint scale for development of setback distances

Tables R1 and R2

- Tables R1 and Table R2 are set out in full at the end of these PowerPoint slides
- A number of qualifying notes apply and these are set out following each table

Method

- For the chosen site, relevant site features from column one of Table R1 should be identified and listed
- Only the rows which relate to relevant site features need be used
- For each relevant site feature, the range of constraint scales outlined in Table R2 should be considered and a determination made as to the level of constraint posed: Low, Moderate or High depending on the appropriate point on the scale

Method

- For some site / system features, for example G (flood potential) it is a simple matter of deciding between Low and High, as in the case of flood potential, the site will be either be above or below the 1 in 20 year flood contour
- In other cases, for example D (slope) a site may lie between the slope ranges defined for Low and High, so then the level of constraint might be described as Moderate

Method

- The constraint should be described
- The level of constraint posed should then be listed
- The risk is then quantified and assigned a level; Low, Moderate, or High
- Calculate a weighted 'Risk Rating' for each site feature

Method

- The weighted 'Risk Rating' is the sum of the individual scores for the particular site feature; 1 for Low; 2 for Moderate; and 3 for High
- The 'Risk Rating' is assigned based on where the calculated score lies on the possible range of aggregated scores
- Aggregated score ranges depend upon the number of site constraint items of specific concern described for each site feature

Site feature	Number of site constraint items of specific concern	Risk Rating Aggregated score range		
		Low	Moderate	High
Property boundary	3	3 - 4	5 - 7	8 - 9
Buildings/houses	3	3 - 4	5 - 7	8 - 9
Surface water	7	7 - 11	12 - 16	17 - 21
Bore, well	4	4 – 6	7 - 9	10 - 12
Recreational areas, children's play areas, swimming pools	3	3 - 4	5 - 7	8 - 9
In-ground water tank	3	3 - 4	5 - 7	8 - 9
Retaining wall, embankment, escarpment, cutting	3	3 - 4	5 - 7	8 - 9
Groundwater	6	6 - 9	10 - 14	15 - 18
Hardpan, bedrock	3	3 - 4	5 - 7	8 - 9

Method

- For all OWMS designs, all risks should be mitigated to a Low level
- For any risk elements identified as Moderate or High, measures should be described which will reduce the risk to a Low level

Method

- In the case of setback distances to identified site features, appropriate setback distances are determined at an appropriate point on the setback distance range for the level of risk
- The required setback distance is calculated based on the risk rating, with the setback distance range divided proportionally according to the risk rating
- The available setback or buffer distance (what can be realistically achieved) should be described and compared with the required setback distance

Worked example

Scenario:

- Two bedroom cabin with full water-reduction fixtures
- Occupancy: three persons
- Site area 1,180m^2
- Located ~415m from shoreline of a water reservoir of high environmental value
- An intermittent drainage feature discharging to the reservoir is located adjacent the Site

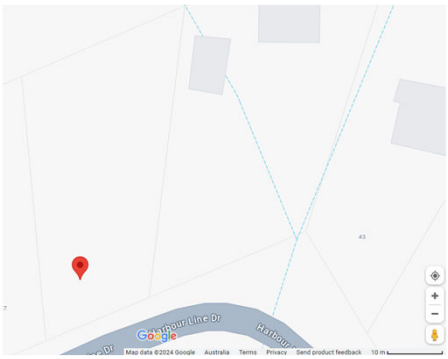
Proposed OWMS design

- Design flow rate (daily hydraulic load): 450L/day
- Secondary treatment (20/30mg/L BOD/TSS) with an aerated wastewater treatment system (AWTS)
- Effluent reuse via subsurface irrigation (SSI)

Site characteristics

- Site area 1,180m^2
- Located ~415m from shoreline of a water reservoir of high environmental value
- Downslope intermittent drainage feature discharging to the reservoir adjacent
- Slope >30%
- Soil: loam (Category 3)
- Rainfall (moderate)
- Flooding: above 1 in 20 year flood level

Site plan



Example risk assessment template

Project: Site address					AS1547:2012 Table R1 and R2 Buffer Distance Justification							
		Constraint Scale			Risk Assessment							
Site Feature	Site Constraint Item of Concern	Low Constraint	High Constraint	Applicable Constraint	Risk Assessment	Low (1)		Moderate (2)		High (3)		Risk Rating
Surface Water 15m (low) - 100m (high)	Microbial Quality of Effluent	Secondary treated effluent (with disinfection) and Contractual Service Agreement	Primary treated effluent (no disinfection)	Primary treated effluent (no disinfection)	High	✓	1		0		0	Moderate (15)
	Surface Water	Category 1 to 3 soils no surface water down gradient within 100m; low rainfall area	Category 4 to 6 soils/ permanent surface water <50m down gradient; high rainfall; high numbers / environmental value	Category 4 soil; proposed LAA >40m from downgradient intermittent drainage line; moderate rainfall area (~1,000mm pa)	High		0	✓	2		0	
	Slope	0-6% (surface effluent application); 0 -10% (subsurface effluent application)	>10% (surface effluent application), >20% subsurface effluent application	Slope 2-12% in LAA; subsurface (absorption system) effluent fixed application method	Moderate	✓	1		0		0	
	Position of Land Application Area in Landscape	Downgradient of surface water, property boundary, recreational area	Upgradient of surface water, property boundary, recreational area	Proposed LAA upgradient of surface water	Moderate		0		0	✓	3	
	Drainage	Category 1 to 2 soils; gently sloping area	Category 6 soils; sites with visible seepage; moisture tolerant vegetation; low lying area	Category 4 soils in un-drained, sloping landscape with good drainage observed within LAA	Moderate		0		0	✓	3	
	Flood Potential	Above 1 in 20 year flood contour	Below 1 in 20 year flood contour	Proposed LAA above 1 in 20 year flood contour	Low		0		0	✓	3	
	Application Method	Drip irrigation or subsurface application of effluent	Surface / above ground application of effluent	Subsurface application	Low	✓	1		0		0	

Determination of risk based setback distance to water body

- List Site Constraint Items of Concern (Table R1)
- For each Site Constraint Items of Concern determine the level of Constraint; High, Moderate or Low (Table R2)
- Assign Risk Rating;1 for Low, 2 for Moderate and 3 for High
- Calculate Aggregated Score
- Determine overall Risk Rating from Aggregated Risk Score

Site Constraint Items

- List the Site Constraint Items relevant for the Surface Water Site Feature and determine their Risk Rating
- Calculate Aggregated Score

Determination of risk based setback distance to water body

- Consider Setback Distance Range from Table R1
- Calculate Required Setback
- Consider against Available Setback
- Determine if Required Setback is met