ILUKA WASTEWATER MANAGEMENT – A CASE STUDY

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Abstract

The town of Iluka is located on the North coast of New South Wales. In addition to a permanent population of about 2000 people, the town receives a significant number of visitors during holiday periods. Iluka is currently unsewered. Wastewater management is generally by septic tanks and absorption trenches. Proposals to install a centralised system in Iluka have been raised at various times and have caused considerable debate in the local community. Further investigations of options for wastewater management at Iluka have been ongoing during 2000/1. This paper describes some of the key findings of these investigations and the way in which they have been used for consultation and decision making.

Keywords

centralised systems, Iluka, stakeholder consultation, urban wastewater management

1 Introduction

Iluka is a coastal town with a permanent population of approximately 2,000 people set on a narrow peninsular on the northern side of the mouth of the Clarence River. The peninsular is approximately 2 km wide and bounded on the eastern side by the Pacific Ocean and on the western side by Clarence River.

The town has a reticulated water supply, and septic tank and absorption trench systems are used for wastewater disposal. It is currently the largest unsewered town in New South Wales. Lot sizes are commonly small with 50% of lots less than 800 m^2 in area and 18% less than 600m^2.

Proposals to install a centralised wastewater system in Iluka have been raised at various times and have caused considerable debate in the local community. Further technical investigations of options for wastewater management at Iluka were engaged by Maclean Shire Council and the Department of Land Water Conservation and have been ongoing during 2000/1. The aim of this initial round of investigations was to identify the full range of options available for wastewater management and to present these for consideration.

To assist with consideration of the options the Iluka Consultative Working Group (ICWG) was formed. ICWG has representatives of a range of stakeholder groups from the local community, Local Government and State Government.

2 Existing Wastewater Management

The soils at Iluka are coastal sands and there is an unconfined freshwater aquifer at shallow depth, generally one to four metres below ground. The groundwater is of generally high quality and is considered of high value by management authorities. Significant use is made of groundwater within Iluka. Private spear points are common and are generally used for irrigation of gardens. There is an extensive irrigation system on the golf course fairways and greens, and the town playing fields are also irrigated.

There were few historical records available of the performance of the existing wastewater management systems. Anecdotal reports suggested that the main problem areas were commercial premises and low-lying properties close to the waterfront. To gain an understanding of the current condition and performance of the existing septic tank systems the study team undertook a survey.

The survey was based on visual inspection of the existing installations, probing of absorption fields and interviews with the occupiers of the premises surveyed. The survey was taken in 100 properties distributed throughout Iluka, representing approximately 10% of the total number of properties. The properties surveyed were a mix of residential, commercial and industrial uses.

The majority of systems surveyed were well-maintained and providing satisfactory service in the disposal of wastewater. Approximately 8% were in clear need of remedial action and another 9% showed evidence of nascent problems that would probably require remedial action in the event of wet weather or high loading.

The available historical records of groundwater quality were reviewed to assess impacts of the existing wastewater management systems on groundwater quality. The records were found to be unreliable and inconclusive.

Subsequently, a modelling study was undertaken to estimate the impacts of the existing on-site wastewater management systems on water quality in Iluka. The study combined a modelling approach with interpretation of the findings of the field survey of on-site systems, plus some interpretation of the groundwater and surface water monitoring programs carried out previously.

The model estimated the effects of chemical and biological processes on water quality during the passage of effluent from the absorption systems to the receiving waters via the soil and by overland flow. The decay in contaminant concentrations in the water as it moves along these pathways was calculated so that an estimate of the aggregate quantities of contaminants reaching the receiving waters could be made.

The study found that on-site effluent disposal is contributing to the nutrient and pathogen load on the estuary, and in particular the near shore estuarine waters. It also found that contaminated groundwater was contributing to elevated pathogen levels in near shore estuarine waters.

The modelling indicated that the greatest contribution to water pollution is from properties within two blocks of the river. These areas have the shortest groundwater flow path to the river and are generally at lower elevation where the groundwater table is closer to the ground surface. These areas also contain most of the commercial and medium density residential developments.

3 Wastewater Management Strategies

Wastewater management strategies using on-site systems as well as those using centralised systems were considered in the development of potential options. Three generic approaches are available for wastewater management in this situation – do nothing; improved on-site systems; or, centralised systems.

The 'do nothing' approach comprised the traditional septic tank followed by an absorption trench.

Three approaches to the provision improved on-site systems that could yield improved environmental performance were considered.

Enhanced Treatment – a more sophisticated wastewater treatment system, such as an AWTS system to provide a better quality effluent, followed by a soil absorption system.

Enhanced Effluent Management - the traditional septic tank followed by a mound system. This could provide reduced quantity discharge of effluent to the environment through the use of evapo-transpiration and reduced nutrient levels through the use of modified soil in the mound.

Reduced Wastewater – Use of a waterless toilet system to deal with toilet waste, leaving only the greywater to be treated and disposed of. This would result in a significant reduction in the discharge of contaminants to the soil absorption system.

In addition, ten different strategies incorporating centralised systems were considered. These strategies encompassed a range of different collection technologies and a range of different effluent management methods. The implied philosophies ranged from a 'treat and dispose' philosophy to ones that would maximise reuse, including one for potable reuse.

A summary of the on-site options considered is presented in Table 1.

Table 1: Potential On-Site Wastewater Management Strategies

	PHILOSOPHY	TREATMENT SYSTEM	EFFLUENT MANAGEMENT SYSTEM
1.	Do Nothing	Septic tank	Absorption trench
2.	On-site treatment upgrade	AWTS	Subsurface irrigation.
3	Enhanced effluent management	Septic tank	Modified mound system
4	Reduced wastewater	Composting toilet AWTS	Removal of compost from premises Subsurface irrigation.

4 Comparison of Strategies

A comparative assessment of the strategies under consideration was prepared. The assessment included a qualitative indicator of the performance of each of the strategies against a range of criteria identified by ICWG. These criteria included environmental, social/cultural, economic and technical factors.

In developing the concept arrangements for each of the strategies, it was found that some of the on-site strategies would not be capable of acceptable outcomes on all properties in Iluka. Strategy 1 had been shown to have unacceptable environmental outcomes. Strategy 3 could not be implemented for up to 50% of properties due to small lot sizes that would not have sufficient area for the installation of a mound system.

An economic comparison of the strategies was also prepared. The ranking of each of the strategies in this comparison is shown in Table 2. The cost estimates used for this ranking were based on the 'total cost to the community' – whether that cost was paid directly by the property owner, or by Local or State Government. This comparison of costs indicated that the on-site options ranked well on capital cost but poorly on ongoing costs.

Table 2: Financial Ranking of On-Site Wastewater Management Strategies

PHILOSOPHY	RANKING		
	Capital Cost	O&M	NPV
1. Do Nothing	1	11	1
2. On-site treatment upgrade	3	13	6
3 Enhanced effluent management	2	12	3
4 Reduced wastewater	5	14	13

The findings of the options study were presented to ICWG for consideration, without any indication of a preferred strategy. ICWG used a system of scoring each strategy against key performance criteria in order to compare the options and screen out those that would not be considered further.

The ICWG screening process resulted in the selection of four strategies that would be the subject of further study. The strategies selected for further study comprised the 'do nothing' option and three options involving centralised systems. The further studies include investigations to better define the constraints and feasibility of some elements of the short-listed strategies.

5 Conclusions

On-site wastewater management strategies were considered alongside centralised wastewater management strategies for long term service of the town of Iluka. None of the on-site strategies considered were short-listed for further investigation and development. The reasons on-site strategies were not favoured were varied, but included the following:

- Could not meet stringent environmental performance criteria – particularly with regard to groundwater contamination.
- Sufficient space is not available in the context of an urban area where some small lot sizes have already been developed.
- High ongoing costs that result in higher whole of life costs compared to alternatives.
- Preference of some stakeholders for centralised systems due to perceptions of a higher level of service and convenience.

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