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ON-SITE SEWAGE MANAGEMENT SYSTEM EVALUATION REPORT

PREPARED FOR: Ballina Shire Council

ADDRESS: Killen Falls Reserve
Killen Falls Drive
TINTENBAR NSW 2478

Lot 1, DP 251994

DATE: 19TH March 2018



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INTRODUCTION

This evaluation report has been prepared at the request of Ballina Shire Council (BSC), who wish to explore all options for the installation of an on-site sewage management system (OSSMS) at Killen Falls Reserve, Killen Falls Drive, Tintenbar. An onsite inspection was conducted on the 25.01.2018 with Mr James Brideson, Mr John Bruce & Mr N McCowan from Ballina Shire Council.

This report evaluates the specific site conditions, the options for different types of on-site sewage management systems and land application areas at Killen Falls Reserve. The environment, maintenance and most cost effective options have been evaluated. This will assist Ballina Shire Council in choosing the most appropriate type of on-site sewage management system for the site.

The number of persons visiting the site has been based on the Killen Falls Plan of Management Plan Part A by Mike Svikis Planning, October 2017. A site count was undertaken during a peak summer holiday period from 10am – 2pm on 22.01.2017. The number of visitors in this period was 279 persons. Further visitation numbers were explored within the management plan.

For the purposes of this evaluation for the installation of an OSSMS at Killen Falls Reserve, the following figures have been used; an average visitor rate of 300 persons per day for the six warmest months and 150 persons per day for the six cooler months. The water usage in this evaluation has allowed a toilet(s), basin(s) and drinking fountain.

The three types of OSSMS evaluated are a composting toilet, a pump out system and an aerated wastewater treatment system (AWTS). The four types of land application areas (LAA) are absorption trenches, evapotranspiration beds, sand mounds & drip irrigation fields.

SITE DESCRIPTION

Lot 1, DP 251994 is located at the end of Killen Falls Drive and consists of approximately 1.3 hectares. The land is zoned DM, deferred matter under BSC's LEP 2012; which means it comes under BSC's LEP 1987 which is 1(b), secondary agricultural land.

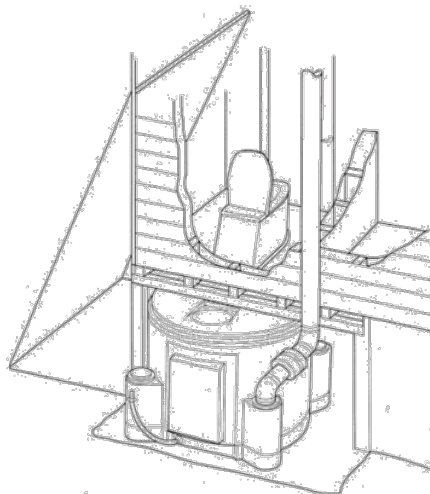
Killen Falls is surrounded by Emigrant Creek Dam to the west, residential properties to the south and macadamia plantations to the north and east. Emigrant Creek boundaries Killen Falls to the north. Killen Falls Reserve is an environmentally sensitive area which has been restored as a rainforest which has a dense tree canopy and only a small area of cleared land.

Killen Falls consists of a car park, walking track to a viewing platform. There is a walking trail to the popular swimming hole enjoyed by locals and tourists including bus tours. The small clearing at the end of road consists of a stormwater retention area, this takes up approximately half of this clearing.

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COMPOSTING TOILET

A composting toilet predominantly uses an aerobic process to treat human excreta. They are seen as a 'green' alternative & are more commonly installed in remote locations.



ADVANTAGES

- Little impact on the natural surroundings.
- Can be a lower cost to install (in a household situation, not commercial).
- Composting toilets typically use no (or little) water for flushing and are an alternative where the connection to water or a sewage treatment plant is unavailable.

DISADVANTAGES

- The construction requires elevation which can restrict access i.e. wheelchairs.
- Requires airflow such as the installation of a fan to prevent odour.
- Hand basin & drinking fountain must be connected to a grey water system to retain contaminants.
- High maintenance, more than a standard toilet.
- Requires the proper & regular removal of the waste compartment (humus) offsite which can be a health hazard.
- Requires power whether electric or solar. Solar is not an option with the surrounding trees.
- Insects including large numbers of flies.
- Rubbish such as drink bottles thrown into the composting compartment.
- The provision of and the ongoing supply of a carbon source such as sawdust (public education).
- Foul odour can be emitted if not operating correctly which is to be expected in a public situation.
- In a public situation there will be a higher concentration of liquid which leads to slower decomposition. The liquid should be drained or an element fitted for evaporation.
- People on antibiotics or chemotherapy treatment will 'kill' the composting process.
- Primary effluent cannot be applied to the area surrounding the toilet due to the close proximity of the of Emigrant Creek. Primary effluent should not be applied within 100 metres of a permanent water course as per AS1547:2012 and BSC OSSM Strategy & Guidelines.

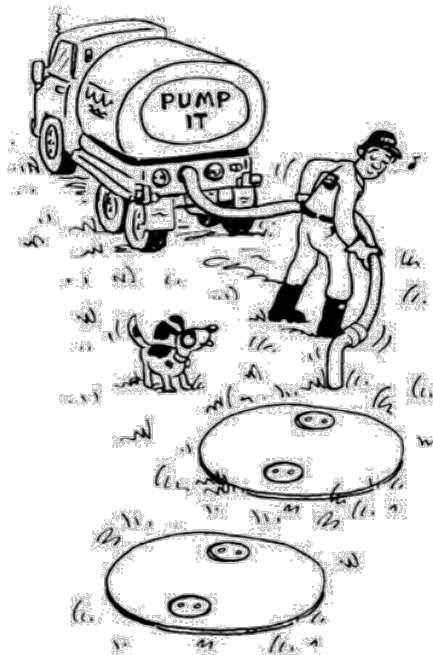
Unable to determine the running costs per annum. Four Clivus Multrim CM 40 toilets (suitable for up to 55 persons part time per toilet) would be a minimum material cost of approximately \$ 32 000. This does NOT include the cost to construct the building, PC items, the installation of toilets or the cost of power and water connected to the site.

A composting toilet is NOT allowed for this environmentally sensitive location as per AS1547:2012.

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PUMP OUT SYSTEM

A pump out system is typically installed on properties where the land area is too small for the volume of wastewater generated. The system generally consists of a primary septic tank and collection well. The wastewater collects in the septic tank, flows to the collection well, where it is stored prior to the removal by an authorised contractor.



ADVANTAGES

- Little impact on the natural surroundings.
- Can work in restricted sites.
- A flushing toilet, hand basin & drinking fountain.
- Minimal odour generated.
- Reasonably low installation cost to install.

DISADVANTAGES

- High cost of maintenance in a public situation.
- May require pumping out weekly.
- Requires power.
- Requires an alarm system.
- Can overflow during periods of high use which can be a health hazard.
- Proximity to Emigrant Creek if it fails.
- Access for pump out trucks.
- Many Council's won't allow this type of system.

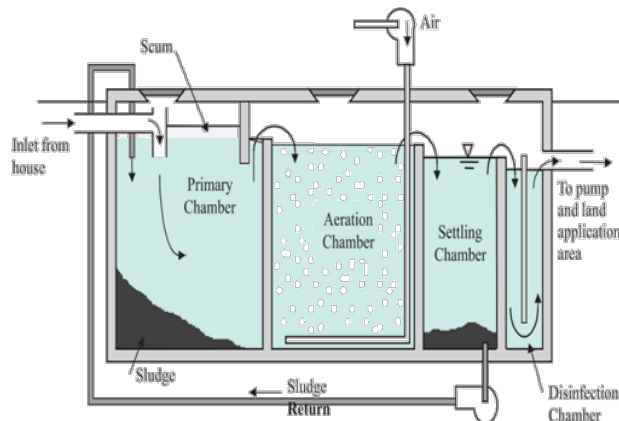
Based on a tank capacity of 10 000 litres with a pump out of 7 500 litres (truck capacity); this system would require pumping out approx 22 times during the warmer months, and 11 times during the cooler months. The approx running costs will be \$ 16 500 per year without emergency pump outs. Two tanks and associated plumbing will cost approx \$ 22 000. This does NOT include the cost to construct the building, PC items or the cost of power and water connected to the site.

**A pump out system will NOT be allowed by Ballina Shire Council
at this sensitive location.**

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AERATED WASTEWATER TREATMENT SYSTEM (AWTS)

An aerated wastewater treatment system (AWTS) is designed to treat wastewater to a secondary standard which is a higher standard than septic tanks & composting toilets. The wastewater is treated in several compartments. They can be either a poly or concrete cylindrical collection well.



ADVANTAGES

- A smaller land application area.
- Produce a higher standard of wastewater which is beneficial in environmentally sensitive areas.
- Higher level of treatment of effluent.
- Better for restricted sites.
- Visual amenity.
- Flushing toilet, hand basin & drinking fountain.

DISADVANTAGES

- The initial installation cost.
- Power is required as well as ongoing power costs to run.
- Power disruptions can cause system failure.
- More complicated with pumps than septic tanks & require more frequent maintenance.
- Ongoing maintenance and associated costs.

The approx cost to install the recommended two tank AWTS with the land application area and associated plumbing will cost approx \$ 35 000. This does NOT include the cost to construct the building, PC items, or the cost of power and water connected to the site. The cost to run the AWTS including power, pump out and servicing per annum would be approx \$ 2 500.

An AWTS is recommended as per AS1547:2012 as the effluent can be pumped outside the environmentally sensitive location.

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LAND APPLICATION AREAS (LAA)

The site has many limitations as to where a land application area could be installed. These include:

- An environmentally sensitive area.
- Dense tree canopy with limited tree removal.
- The close proximity to Emigrant Creek.
- Has high volume of stormwater runoff from the road surface.
- Only a very small area of usable cleared land.
- Access.

ABSORPTION TRENCHES

Absorption trenches are a sub surface drain run along the contour of the ground. The wastewater is absorbed into the soil. The number of and the size of the trenches are determined by numerous factors including site constraints. Not recommended due to limited land area.

EVAPOTRANSPIRATION BEDS (ETA's)

Evapotranspiration beds are wider & shallow than trenches. The wastewater can be taken up by plants, reducing the infiltration into the soil. The number of and the size of the beds are determined by numerous factors including site constraints. Not recommended due to limited land area.

WISCONSIN SAND MOUNDS

A sand mound is a disposal field constructed above the surface of the ground. It is constructed from specific sand materials capped with clay loam soil and turfed. Effluent dispersal is mainly evapotranspiration with some absorption into the soil. Mounds generally can be constructed using a smaller footprint.

DRIP IRRIGATION FIELD

A shallow subsurface drip irrigation field distributes effluent into the topsoil layers to provide in-soil treatment of the remaining effluent residuals, as well as provide nutrient uptake & evapotranspiration by grass and shrubs. The secondary treated effluent is distributed from a system of pressure compensating drip emitters/small pipework. Drip irrigation fields are delivered directly to the root zone, increases nutrient uptake and reduces the risk of human contact.

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LAND APPLICATION AREAS CONTINUED

The cleared area below the car park is not large enough for a land application area and is shaded. It is recommended the area located approximately fifty metres before the car park on Killen Falls Drive (road number 10.026) is utilised for a land application area provided permission is sought and granted. All LAA's require fencing off to prevent public and vehicular traffic. There are limited alternative reserve sites for future land application areas.

A drip irrigation field is the recommended type of land application area for this environmentally sensitive location.

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RECOMMENDATION

Due to the site limitations at Killen Falls Reserve, including but not restricted to:-

- An environmentally sensitive area.
- Dense tree canopy with limited tree removal.
- Is in close proximity to Emigrant Creek & neighbouring properties.
- Has high volume of stormwater runoff from the road surface.
- Minimal solar access due to dense tree canopy.
- Only a very small area of usable cleared land.
- Access.

Considering all factors:-

- The toilet is for use in a public area.
- It will have relatively high use.
- Visual amenity.
- Access.
- Potential odour issues.
- Maintenance.
- Running costs.

Assessing the specific site constraints, a maximum of 100 EP per day using the toilet facilities or 600 litres per day is possible using the available land area on Killen Falls Drive. ***The recommended option is the installation of a holding tank before an aerated wastewater treatment system (AWTS) with a drip irrigation field as the land application area.***

It is recommended a holding tank and AWTS are installed within the Killen Falls Reserve area. It is proposed the effluent is distributed to a drip irrigation field, located on Killen Falls Drive, adjoining Lot 9 DP 635047, which is located approximately fifty metres south of the entrance to Killen Falls Reserve.

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REFERENCES

- Ballina Shire Council's OSSMS Strategy and Guidelines.
- Ballina Shire Council's zoning maps.
- Ballina Shire Council's OSSM Owners Education Booklet.
- AS1547:2012 - 5.4.1.5, alternative toilet systems.
- Victorian Onsite Wastewater Management Code of Practice.
- NSW State Government Environment & Health Protection Guidelines OSSM.
- Mike Svikis Planning, Killen Falls Plan of Management Plan Part A.
- Mr J Brideson, Mr J Bruce, Mr N McCowan, Ballina Shire Council.
- Service reports for the AWTS at Pat Morton Lookout, Lennox Head.
- Mr Ian Jackson, Septic Solutions Australia.

DISCLAIMER

This report has been based on information supplied by the client specifically for the evaluation of the installation of an OSSMS at Killen Falls Reserve, Killen Falls Drive, Tintenbar. It is the role of the owner to ensure accurate information has been supplied for the purposes of evaluating which type of OSSMS is suitable. Septic Solutions Australia takes no responsibility if the details supplied are incorrect.

Numerous factors are taken into consideration when evaluating an OSSMS, including the type of usage of the OSSMS, soil type, number of persons, water saving devices etc. The designer takes no responsibility for the type of OSSMS chosen, or if any of the information supplied was incorrect.

The lids on the AWTS must be secured to prevent public access. The LAA must be fenced off to prevent public and vehicular access.

This evaluation report is not to be used by any other person(s) or corporation in anyway.

Septic Solutions Australia accepts no responsibility for any loss or damage whatsoever to any person(s) or corporation who contravene the recommendations in this report.

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