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Subject	Kohukohu Septage Management Review	Project Name	Opononi/Omapere and Kohukohu Options Assessment
Attention	Jaye Michalick	Project No.	IZ134400
From	Jessica Daniel		
Date	July 9, 2020		
Copies to	Jess Daniel, Melissa Parlane, Ben Bowden, Becky Macdonald, Kate Simmonds, Andrew Slaney		

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## 1. Introduction

In February 2020 Far North District Council (FNDC) engaged Jacobs to review the current sludge management practices for the Kohukohu township. In Kohukohu, wastewater is partially treated by council owned septic tanks located on 76 properties, where primary sludge is removed, and some BOD treatment is achieved. The partially treated wastewater is then conveyed to the Kohukohu wastewater treatment plant (WWTP) which consists of a single oxidation pond followed by a constructed wetland. Treated effluent is then discharged into a catchment drain, which flows for a short distance before discharging into the Hokianga Harbour. Sludge accumulated at the bottom of each septic tank is digested by bacteria present inside the system, reducing its volume and organic content. This sludge is periodically removed by suction tanker and transported to the Rawene WWTP.

The existing resource consent for the Kohukohu WWTP expired on 31 August 2016. An application for a new resource consent was lodged with NRC in May 2016 and the WWTP has been operating under the old consent since that time. In January 2020 NRC issued a Section 92 request to FNDC for further information in relation to the application. This Section 92 request included a request for “an assessment of the effectiveness of the septic tank maintenance schedule and treatment plant desludging schedule” at Kohukohu.

This memorandum will address this Section 92 request by reviewing the current septage management and maintenance practices at Kohukohu and, where relevant, will make recommendations on possible improvements.

## 2. Kohukohu Township Septage Management

### 2.1 Review of Current Septage Management in Kohukohu

A request for existing information on desludging of the septic tanks did not uncover any documentation relating to desludging or sludge management. This was due, in part, to the Covid restriction meaning there was no access to paper records held by FNDC or their operations contractor. Hence information was gathered through phone interviews and email correspondence with Jaye Michalick, a planning consultant working with FNDC, and Tommy Gordon, a representative from the operations contractor (Broadspectrum). From these conversations the following was established:

- Septic tank desludging for the entire Kohukohu township is undertaken every 5 years by local vacuum/sucker truck contractor. The collected sludge is transported to the septage reception facility at the Rawene WWTP.
- There are both older and more modern style septic tanks within the township.
- The tanks were last emptied in April/May of 2019 and are currently not due to be deslugged until 2024.
- Septic tank desludging is typically carried out across the entire township within a one-month period. The collected sludge is transported to Rawene WWTP and the sudden increase in sludge tends to destabilise the Rawene WWTP for a period.
- Tank inspections had been implemented initially but have not been continued on a regular basis.
- Total suspended solids (TSS) and faecal coliform (FC) loadings at the Kohukohu WWTP reduce after desludging, mostly likely due to the increased capacity of the de-slugged septic tanks.
- Over the past 10 years, the wet weather peaking factor for the Kohukohu WWTP was 15 x, most likely due to infiltration or stormwater connections to the septic tanks.

## 2.2 Existing Septic Tank Bylaws

There are a number of clauses in the FNDC Bylaw for the “Control of On-site Wastewater Disposal Systems” that are relevant to the maintenance and disposal of Kohukohu septage. Clause 2803 of the bylaw (Far North District Council, 2010) is summarised in Table 2-1 and Clause 2806 is summarised in Table 2-2. FNDC’s compliance with these bylaws is also highlighted, although it should be noted that this assessment is based on the information obtained to date. It is evident from the information regarding septic tank maintenance and assessment provided, and the levels of compliance of the bylaws, that FNDC would benefit from the development of septage management plan for Kohukohu.

Table 2-1 Clause 2083 – Control of Onsite Wastewater Disposal Systems

Point No.	Clause Details	FNDC Compliance
1.	Council requires that every On-Site Wastewater Disposal system of a septic tank, or similar type system, be assessed, and if necessary, maintained at periods of not more than five yearly intervals.	Achieved – desludging is completed on a 5-year cycle.
2.	The owner of the property on which an on-site wastewater system is installed, is required to have assessments and maintenance carried out in accordance with the manufacturer’s instructions and recommendations.	Not achieved – there is no evidence that a system is in place to monitor the property owner maintenance. As the Kohukohu septic tanks are council owned FNDC should be responsible for this.
3.	The maintenance requirements to consist of the cleaning of the tank and a full site assessment, as detailed in the Second Schedule.	Not achieved – there is no evidence that a system is in place to monitor the property owner maintenance
4.	Council may give notice to the owner of the land on which the On-Site Wastewater Disposal System is located, requiring the owner to carry out such work, at the owners cost.	Not achieved – there is no evidence of a programme for regular inspections of individual septic tanks. As the Kohukohu septic tanks are council owned FNDC should be responsible for this.

Table 2-2 Clause 2806 – Supply and Keeping of Records

Point No.	Clause Details	FNDC Achievement
1.	Every owner of a property on which an On-Site Wastewater Disposal system is installed shall provide evidence to Council in the form of a certificate from the contract cleaner, to show that their disposal system has been assessed and maintained in accordance with clause 2805.1 of this Bylaw.	Not achieved – there is no evidence that a system is in place to monitor the property owner maintenance. Where FNDC has arranged cleaning, a copy of the cleaning certification should be put on the property PIM.

## 2.3 Consequences of the Current Management System

The current septic tank management at Kohukohu does not meet the requirements of the Bylaw and a number of potential consequences have been identified:

- As the septic tanks fill with sludge, there is expected to be increased carry-over of total solids and BOD. This will increase sludge volumes at the WWTP increasing the necessity for dredging of the pond and negatively impacting the treatment performance of the Kohukohu WWTP.
- As the septic tanks fill with sludge the high level of sludge can generate unpleasant odours and attract pests (AS/NZS, 2012).
- The high wet weather peaking factor suggests there is either groundwater infiltration, or stormwater connections to the septic tanks. If the flows are due to stormwater connections, these high flows will result in low retention times in the septic tank and potentially “flushing” of the system. This can result in sludge carryover from the septic tanks, increasing the load on the WWTP.
- Desludging all of the septic tanks in the Kohukohu township over a 1-month period can shock load and destabilise the Rawene WWTP which receives the sludge for treatment.
- A lack of maintenance records, including desludging procedures, makes it difficult to understand the effectiveness of desludging, the septic tanks condition and performance, and the impact of these on the performance of the WWTP.
- Currently the FNDC Bylaw for the “Control of On-site Wastewater Disposal Systems” is not actively enforced, making it difficult to understand how well managed the septic tanks are by the property owners.
- The Bylaw assumes the property owner is also the owner of the septic tanks, which is not the case for Kohukohu.

## 3. Guidance from New Zealand Authorities

### 3.1 Water NZ

Water NZ have recommended guidelines for the management of septic tanks, including guidance on maintenance and tank desludging schedules (Water New Zealand, 2012), which is summarized in Table 3-1.

Table 3-1 Water NZ Septic System Maintenance and Inspection Guidelines

Treatment System Type	Inspection and Maintenance Requirements
Older style septic tank	<ul style="list-style-type: none"> <li>▪ Pump-out at 3-year intervals</li> <li>▪ Alternatively, check scum and sludge levels and pump-out on demand (around half full of scum and sludge)</li> </ul>
Modern septic tank with effluent outlet filter	<ul style="list-style-type: none"> <li>▪ Check scum and sludge levels (2-yearly) and pump out on demand (around 6 to 8 years)</li> <li>▪ Check and hose down effluent outlet filter during pump out</li> </ul>
Aerobic treatment unit (aerated system)	<ul style="list-style-type: none"> <li>▪ Periodic effluent quality “sniff and look” inspection (6-months)</li> <li>▪ Check power consumption (3-months)</li> <li>▪ Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)</li> </ul>
Septic tank/sand filter system	<ul style="list-style-type: none"> <li>▪ Periodic effluent quality “sniff and look” inspection (6-months)</li> <li>▪ Confirm sand is draining satisfactorily and not clogging (12-months)</li> <li>▪ Replace upper sand layer if draining slowly (as required)</li> <li>▪ Carryout equipment service check at 6-months (as specified in the supplier/installer maintenance contract)</li> </ul>

### 3.2 AS/NZS 1547

The AS/NZS 1547 standard for Onsite Domestic Wastewater Management (AS/NZS, 2012) recommends the following maintenance measures for septic tanks:

- 1) Annual inspection and regular pumping once scum and sludge occupy two thirds of the tank volume
- 2) Grease tap should be inspected at least quarterly and cleaned out regularly
- 3) The vent and access cover of the septic tank should be exposed
- 4) The outlet filter should be inspected and serviced in accordance with manufacturer recommendations

#### 3.2.1 Other Councils

Guidance from other councils, such as Waimakariri District, Auckland and Taranaki regional councils, generally follow the guidelines proposed by Water NZ and AS/NZS 1547 with regards to frequency of desludging and inspections (Waimakariri District Council, 2015-2018) (Taranaki Regional Council & Northland Regional Council, 2006) (Auckland Council). These councils have also produced very clear maintenance produces and measures to lower sludge volumes and keep bacterial populations high to aid treatment performance. FNDC would likely benefit from a similar approach to onsite septage maintenance, regardless of whether the septic tanks are owned by FNDC or the individual property owner.

## 4. Recommended Improvements to the FNDC Septage Process

The review of the available information on the Kohukohu township septic tank maintenance and desludging schedules has identified a number of improvement opportunities:

- The development of a Septage Management Plan for Kohukohu which would align with New Zealand standards and guidelines from Water NZ and be comprised of the following improvements:
  - Increased septic tank inspections – Establish protocol for regular septic tank inspections, by FNDC as the owner of the tank, including frequency, and method of inspection, with documented evidence that this has been completed. This will provide a mechanism for identifying site specific issues such as and poor maintenance and the potential for stormwater connections. FNDC should also clearly relay to Kohukohu residents, proactive measures and guidelines for proper septic tank operation. AS/NZS 1547 (AS/NZS, 2012) advises the following:
    - Increased desludging of septic tanks – Older tanks should be emptied at least every 3 years and newer systems emptied every 5 years or tanks emptied once sludge levels reach two thirds of the total volume.
    - Improved record keeping and development of standard procedures for the desludging of septic tanks (see example in Appendix A).
- Maintenance records and documentation should be retained by FNDC as evidence of the annual inspection
- An assessment of the age and design of individual septic tanks should be undertaken to identify older tanks that require 3 yearly desludging and newer tanks which require 5 yearly desludging.
- Staging sludge disposal at the Rawene WWTP – To avoid shock loading at the Rawene WWTP disposal at the WWTP should be staged, so that desludging occurs on approximately 20% - 30% of the properties every year and is spread over the whole year, rather than a 1-month period.
- In addition to the development of a Septage Management Plan for Kohukohu, FNDC should consider updating the Bylaw “Control of On-site Wastewater Disposal Systems” to clarify the responsibility for maintenance and cleaning of on-site septic systems. Specifically does this sit with the property owner or the owners of the septic tanks.

## 5. References

AS/NZS. (2012). On-site Domestic Wastewater Management.

Auckland Council. (n.d.). Help protect our special places by maintaining your septic tank - A Septic Tank Guide.

Environmental Management Services Ltd. (2009). Septic Tank Failure in New Zealand: How Serious Is the Problem?

Far North District Council. (2010). Control of On-site Wastewater Disposal Systems.

Taranaki Regional Council & Northland Regional Council. (2006). Looking after your household Sewage System.

USEPA. (2017). Why Maintain Your Septic System. Retrieved from United States Environmental Protection Agency.

Waimakariri District Council. (2015-2018). Septic Tanks. Retrieved from Waimakariri District Council: <https://www.waimakariri.govt.nz/services/water-services/wastewater/septic-tanks>

Water New Zealand. (2012). On-site Wastewater Systems.

Appendix A - AS/NZS Monitoring Records Templates

**MONITORING REPORT**  
**ON-SITE WASTEWATER MANAGEMENT SYSTEM**  
**SITE INFORMATION**  
(available from records of regulatory authority and other sources)

**1.0 COUNCIL OR AUTHORITY**

**1.1 Location details**  
 Locality: .....  
 Owner: .....  
 Lot no: ..... Address: .....  
 Phone: ..... Mobile: .....  
 Site plan ref no. or description: .....  
 Grid reference                      E:                      N:  
 Aerial photo details:..... Topographic map no: .....  
 Orthophotomap no: .....

**1.2 Geology of site**

**1.3 Soil terrain and soil type**  
 Data source used:

**1.4 Climate**  
 Annual rainfall: .....mm    Annual evaporation: ..... mm  
 General description of seasonal variations, rainfall intensities, and so on

**1.5 Water supply**  
 Public supply                       Rainwater                       Bore/well/dam

**1.6 Performance of this system**  
 Years in service: ..... Years of monitoring records: .....  
 Years satisfactory service: ..... Years problems evident: .....  
 Causes of problems recorded or reported: .....  
 Details of reports prepared on this on-site system: .....

**1.7 Preliminary assessment of sustainability of on-site system:**

**FIGURE U1 MONITORING FORM – SITE INFORMATION**

**SUSTAINABILITY REPORT  
ON-SITE WASTEWATER MANAGEMENT SYSTEM  
ON-SITE ASSESSMENT**

(Attach site plan, photographs, and results of any site tests)

**2.0 CONDITIONS DURING ASSESSMENT**

Date/s: .....

Weather (on day and preceding week): .....

**2.1 Reason for on-site assessment**

(such as regular monitoring, report of failure or incipient failure, complaint):

**2.2 Description of indications of successful operation or problems**

(if space insufficient, attach separate sheet):

**2.3 Soil and terrain (where not confirmed)**

Type of terrain: .....

Geology: .....

Soil landscape and drainage: .....

Slope: ..... Ground cover: .....

**2.4 Site constraints (show details on site plan)**

Adequacy of boundary clearances: .....

Distances to watercourses, water bodies, wells, bores, or drainable lines downhill: .....

High water table (permanent, seasonal, episodic): .....

Downstream embankments, barriers or other impedances to drainage: .....

Buildings: .....

Unstable soils: .....

Other (specify): .....

Native plants intolerant of high nutrient load: .....

**2.5 Site exposure**

Site aspect: .....

Predominant wind direction: .....

Presence of shelter belts, trees, or shrubs: .....

Presence of topographical features or structures: .....

**2.6 Drainage controls**

Cut-off drains, diversion banks, storages: .....

**2.7 Reserve areas**

Area available: .....

% of land application area: .....

**FIGURE U2 MONITORING FORM – ON-SITE ASSESSMENT**