SMALL COMMUNITY COLLECTIVE BIOSOLIDS STRATEGY – LOWER NORTH ISLAND

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Keywords: biosolids, strategy, beneficial use

ABSTRACT

In the lower North Island, there is an estimated 80,000 tonnes of sludge in oxidation ponds that requires management over time. Finding alternatives to landfilling of this sludge is especially difficult for smaller communities where there are limitations of lesser economies of scale to develop sustainable non-landfill options.

This project aims to develop a collective biosolids strategy and use programme in the lower North Island. The strategy will provide economies of scale and alternatives for discharge and beneficial use of biosolids which are affordable, sustainable and provide targeted solutions that are consistent with national waste minimisation strategies. The Council's involved in the Ministry for the Environment WasteMinz funded project include: Manawatu, Rangitikei, Ruapehu, Whanganui, Wairarapa, Horowhenua, Tararua, Kapiti Coast and Masterton.

The project will also quantify the extent of the resource regionally and provide contingency measures should the preferred option experience operational limitations/difficulties. In this presentation, we will discuss the planned programme of work and progress so far.

INTRODUCTION

Approximately 320,000 tonnes of wastewater treatment plant solids (at 20% dry solids) are produced annually in NZ. In addition, there are approximately 200 waste treatment pond systems which have been in operation for 30-50 years and now require desludging to continue effective operations. **All territorial authorities face the same problem of what to do with these solids.**

Management of solids is especially difficult for smaller communities where limitations because of lesser economies of scale can stifle the development and creation of workable solutions. In the lower North Island, there is an estimated 80,000 tonnes of sludge (at 20% solids) produced from the approximate 45 oxidation ponds (every 30-50 years) and additional sludge from 5 high rate treatment plants – with most this sludge currently ending up in landfills.

The quality of these wastewater solids is highly variable, ranging from raw sludge to more processed sludges which are termed ‘biosolids’. The range of different materials, along with often challenging regulatory processes, add to the complexity of finding a long-term sustainable and affordable solution. Many smaller Territorial Local Authorities’ (TLAs) simply do not have the budget to investigate alternatives to landfilling of sludge, which may require significant investment in community and Iwi consultation, fulfilling regulatory processes, assessments of environmental impacts and developing infrastructure solutions.

Landfilling is not a long-term management option and is becoming more difficult due to increased levies, lack of space and transportation distance, and a general community expectation of a need to develop sustainable use options. In addition, landfilling creates a significant regional economic and environmental issue and runs contrary to central government policy.

Lowe Environmental Impact, ESR, the national biowastes research programme CIBR, and 10 councils in the Lower North Island are collaborating on a Ministry for the Environment Waste Minimisation Project to develop a collective biosolids strategy and use programme. The strategy will provide economies of scale and alternatives for discharge and use which are affordable, sustainable and provide targeted solutions that are consistent with national waste minimisation strategies. By working together, beneficial use of sludge is much more feasible than when working as individual entities.

The project is staged over a three-year period and will:

1. Undertake a 'gap analysis' to determine the scale of the wastewater treatment plant solids issue in the lower North Island (volumes and sludge characteristics);
2. Determine the opportunities to work together and streamline processes such as: de-sludging, de-watering, transportation, processing, regulatory approvals, consultation, contingency/back up plans, and beneficial use options; and
3. Implement the strategy through assessing the feasibility of several scenarios and the ultimate establishment of both processing and operational site(s) that are economically viable and sustainable for each council involved.

Outcome

This project will firstly develop a collective approach with a tool box of scenarios for sustainable biosolids management in the lower North Island which will reduce the quantity of biosolids sent to landfill; and in the longer-term the approach will provide a model for other collectives to use nationally.

Partner councils

Buy-in from district and regional councils in the region is essential. The following councils have immediate or short-term sludge management issues and are partners in this project:

1. Manawatu DC;
2. Rangitikei DC;
3. Tararua DC;
4. Whanganui DC;
5. Horowhenua DC;

6. Horizons RC;
7. Kapiti Coast DC;
8. Masterton DC;
9. Ruaphehu DC, and
10. Palmerston North District Council

CURRENT STATE OF AFFAIRS

When considered at a national level, 62% of biosolids produced annually are disposed of to landfill (ANZBP, 2013) (Fig, 1). This figure does not include waste treatment pond systems sludges. In the lower North Island, there is an estimated 80,000 tonnes of sludge (at 20% solids) from the approximate 45 oxidation ponds (every 30-50 years).

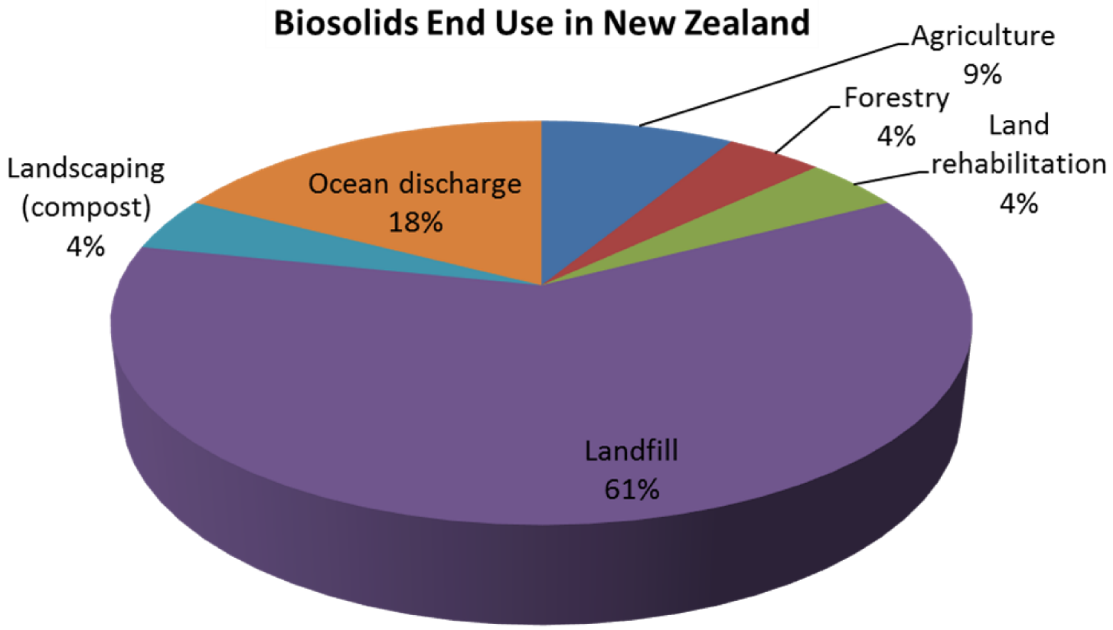

Fig. 1. Biosolids end-use in New Zealand.

A workshop held with Lower North Island Council's in March 2016, identified that most sludges in the region were not beneficially used. Management included the following:

- Landfill
- Mono-fill

- Stock-pile
- Geo-bags
- Composting

Fig. 2. Geobag trial at Paraparaumu Wastewater treatment plant on the Kapiti Coast

PROJECT STAGES/METHODOLOGY

The project methodology and stages of work are outlined below.

Strategy Development

Gap Analysis

The first part of the project will involve a 'gaps analysis' to determine the scale of the sludge issue within in each District. This will involve identifying:

- What is happening now?
- Volumes and characteristics of sludge in the region, and predicted future increases;
- Regulatory environment and limitations; and
- Relativity to the national picture.

Where information does not exist, investigations will be undertaken to assess both the volume and quality of sludge.

Opportunities to Work Together

Based on the information collated in the ***Gaps analysis,*** investigations will be undertaken to determine the feasibility of the partner councils working together to manage biosolids and develop a collective strategy. This will include looking at common 'problem areas' such as:

- De-sludging;
- Dewatering;
- Transport;
- Sludge processing;
- Application;
- Regulatory approval;
- Consultation;
- Cost savings; and
- Contingency.

This process will identify regional capacity and areas where Councils could work together, sharing costs, equipment and identify areas where scalability is most appropriate. The use of existing infrastructure will be essential, as will the ability to provide contingency scenarios.

Community and Stakeholder Engagement Framework

New Zealand has unique central and local government drivers for consultation and public engagement. These include the Local Government Act (year) and the resource Management Act (1991/2013). Amongst other issues, consultation is seen as a recommended action for any development and infrastructure project, and in the case of Tangata Whenua there is a need to consider the obligations within the Act regarding the Treaty of Waitangi.

Kapiti Coast District Council (KCDC) are developing an Iwi consultation framework for investigating alternatives to landfilling for their biosolids in their district. LEI/CIBR will work alongside KCDC as they develop their framework and provide technical (LEI) and scientific (CIBR) expertise required to support the process.

Scenario Evaluation

Once background work is completed in the previous stages, the information will be drawn together to make decisions on a common process and the level/extent of collaboration between partners. This may include a range of different scenarios that base operations at treatment plants or other council facilities, or possibly shared or jointly run processing and discharge sites. For example:

- centralised site for biosolids processing;
- identification of regional biosolids re-use options such as application to farm land; or
- global resource consents for discharge to land.

To finalise the Strategy there will need to be the confirmation of preferred collective scenarios and engagement through consultation within the respective partner's councils and with Stakeholders (Tangata Whenua and the wider community). The CIBR/LEI community consultation framework (Baker et al., 2016)[8], will be followed for this purpose.

Pilot Scale Trial(s)

Pilot scale trials will be undertaken to glean knowledge as to confirm the practical and/or technical viability of some scenarios being considered for the strategy. These trials may ultimately be the basis and provide a site for both processing and operational site(s) that are economically viable and sustainable for each partner involved.

Two sites, Manawatu and Horowhenua will undertake pilot trials blending different biosolids with greenwaste and composting to produce a high-quality product. These trial sites will be used as pilot templates to determine the feasibility of blending sludges from different communities with a variety of available green waste to produce a high value end-product.

[8] Baker, V., Ataria, J., Goven, J., Langer, E. R., Leckie, A., Hill, P., Lowe, H., Horswell, J. (2016). The CIBR Community Engagement Framework. Report for local government staff, engineers and consultants in the waste and wastewater sector. CIBR Report No. 16-02.CEC; Council of the European Communities (1986). Council Directive of 12 June 1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (86/278/EEC). Official Journal of the European Communities No. L 181/6-12.

Fig. 3. Composting trial currently being undertaken at Feilding Wastewater Treatment Plant Composting facility

Discharge to Land Pathway

Consultation to date has clearly identified that the partner councils want to pursue scenarios that see sludges and biosolids used in a beneficial way. A critical consideration in any land application scenario for biosolids is finding an end-use for the stabilised product. This part of the project will investigate the potential land use options and end-users, and ideally secure access to an end use for each partner.

RESULTS AND DISCUSSION

The project will guide the implementation of a collective strategy to manage biosolids in the lower North Island, but in the longer-term will provide a basis for sustainable biosolids management in other regions in New Zealand, national guidelines and policy directions. The outputs that can be used as templates for other regions include:

- National statement on oxidation pond sludge and characteristics;
- Processes and methodology for how biosolids producers (e.g. Regional and District Council's) can work together;
- Community and Iwi Engagement Frameworks;
- Biosolids end-use options; and
- Consenting processes.