

**ROTOMA ROTOITI SEWERAGE  
STEERING COMMITTEE  
(RRSSC)**

**in conjunction with  
ROTORUA DISTRICT COUNCIL**

**Workshop on Options**

**14 April 2014**

**PROCEEDINGS**

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## EDITOR'S NOTE

The sources of these Proceedings were fully transcribed audio tapes and presenters' PowerPoint files. The record of the spoken word was edited and key graphs and pictures from the PowerPoint slides inserted into each presentation. Slides that contained only text were incorporated into the textual document where possible. Drafts were sent to the original presenter to check for accuracy.

I would like to thank all the presenters who have kindly helped me with editing. It is a mammoth task. In the interests of expediency and accuracy I very much appreciated their support.

*Ann Green*

**Disclaimer:** These Proceedings report the formal presentations, questions and reporting back session of the Rotorua District Council and Rotoma Rotoiti Sewerage Steering Committee's Workshop on Options. It was designed to encourage open discussion amongst the stakeholders and those with a strong interest in the management and development of the Rotorua catchment. The information is **not** intended to substitute for official policy statements from parent organisations.

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## FOREWORD

The Rotoma Rotoiti Sewerage Steering Committee (RRSSC) organised this workshop at the Rotorua Energy Events Centre on 14 April 2014. The RRSSC includes representatives of iwi and other community groups, the Rotorua District Council (RDC), the Bay of Plenty Regional Council (BOPRC) and the Ministry of Health.

The purpose of the RRSSC is to recommend to RDC the best practicable option for sewerage in East Rotoiti and Rotoma. The area covered is along SH 30 from Curtis Road to the Rotoma Hills, including side roads. Kennedy Bay and Otautu Bay are excluded.

The RRSSC was set up after the RDC's attempt to obtain resource consent for its chosen scheme failed in the Environment Court in 2012. The RDC has made a fresh start working closely with iwi and community groups.

The workshop was about options for sewerage: to hear them, consider them and discuss them in depth. Community organisations including iwi, represented on the committee, were invited to bring colleagues with them to the workshop, and did so.

The workshop heard the background to dealing with sewage from the two lake communities. It then heard about a number of options, as developed by RDC and as suggested for the workshop by some Ngati Pikiao representatives. Discussion in small groups then took place, with each group taking a different approach to the topics.

At the end of the workshop, in an open forum, a consensus was reached on several issues. Some options were not favoured. On others more information was sought. The workshop also expressed its views on several related issues.

I wish to thank all presenters to the workshop, the group facilitators, and all who participated. Also the Rotorua District Council for supporting the workshop and its staff for servicing the workshop on the day.

My thanks too to Janine Gauldie for typing the transcript, and to Ann Green of LakesWater Quality Society for the substantial task of editing the transcript and producing these proceedings.

Ian McLean  
**Chair**  
**Rotoma Rotoiti Sewerage Steering Committee**

# Rotoma Rotoiti Sewerage Steering Committee (RRSSC) Workshop on Options

Skellerup Room, Rotorua Events Centre  
Monday 14 April

Session	Time	Title	Presenter
Opening	9:00	Karakia	Kaumatua
	9:05	Welcome and kawa	Ian McLean
	9:10	Introductions	Participants
Session 1	9:30	Lake water quality - Rotoma and Rotoiti - the science	Chris McBride, University of Waikato
	9:45	Questions	
	9:50	Lakes programme and Action Plans - Rotoma and Rotoiti	Andy Bruere and Anna Grayling, BoPRC
	10:05	Questions	
	10:10	Cultural considerations	Te Ariki Morehu Ngati Pikiao
	10:25	Questions	
Morning tea	10:30		
Session 2	11:00	OSET Regional Plan: Implications for Rotoma/ Rotoiti	Terry Long, BoPRC
	11:15	Questions	
	11:20	Septic tanks, sewerage systems and health	Dr Phil Shoemack, Medical Officer of Health
	11:35	Questions	
	11:40	Options for sewerage	Greg Manzano, RDC
	12:20	Further options and issues	Craig Brown, CBC Wastewater
	12:35	Questions	
Lunch	12:50		
Session 3	1:35	Group discussion	
Afternoon tea	2:55		
Session 4	3:25	Report back	Ian McLean
	3:45	- Options favoured or not favoured - Further information required - The way ahead	Ian McLean
	4:30		TBC
	4:40	Brief formal meeting of Committee to set up TAG	
Workshop Closing	5:00		
Steering Committee			
Close of Meeting			

---

# **ROTOMA ROTOITI SEWERAGE STEERING COMMITTEE (RRSSC)**

## ***Workshop on Options***

### **Purpose of Workshop**

For stakeholders to hear, consider and discuss the options for sewerage at Lake Rotoma and the eastern end of Lake Rotoiti.

### **Goals of the Rotoma Rotoiti Sewerage Steering Committee (as agreed by the Committee)**

The Committee is to select amongst options for the sewerage scheme the one that is overall the best practicable option, and which:

- Contributes best to improving the water quality in Lakes Rotoiti, Rotoehu and Rotoma by reducing such nutrient and contaminant flows from homes and properties as enter into the lakes.
- Best meets the cultural needs of tangata whenua.
- Achieves community environmental outcomes.
- Best safeguards public health.
- Complies with regulatory requirements – national and regional.
- Retains the MoH subsidy if that is appropriate.
- Is the most cost effective option for local rate payers as well as RDC.
- Has community support.

Note. Later added was the goal:

- RDC scheme options are to use proven, reliable, robust and resilient technology consistent with RDC's wastewater infrastructure requirements

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## List of Attendees

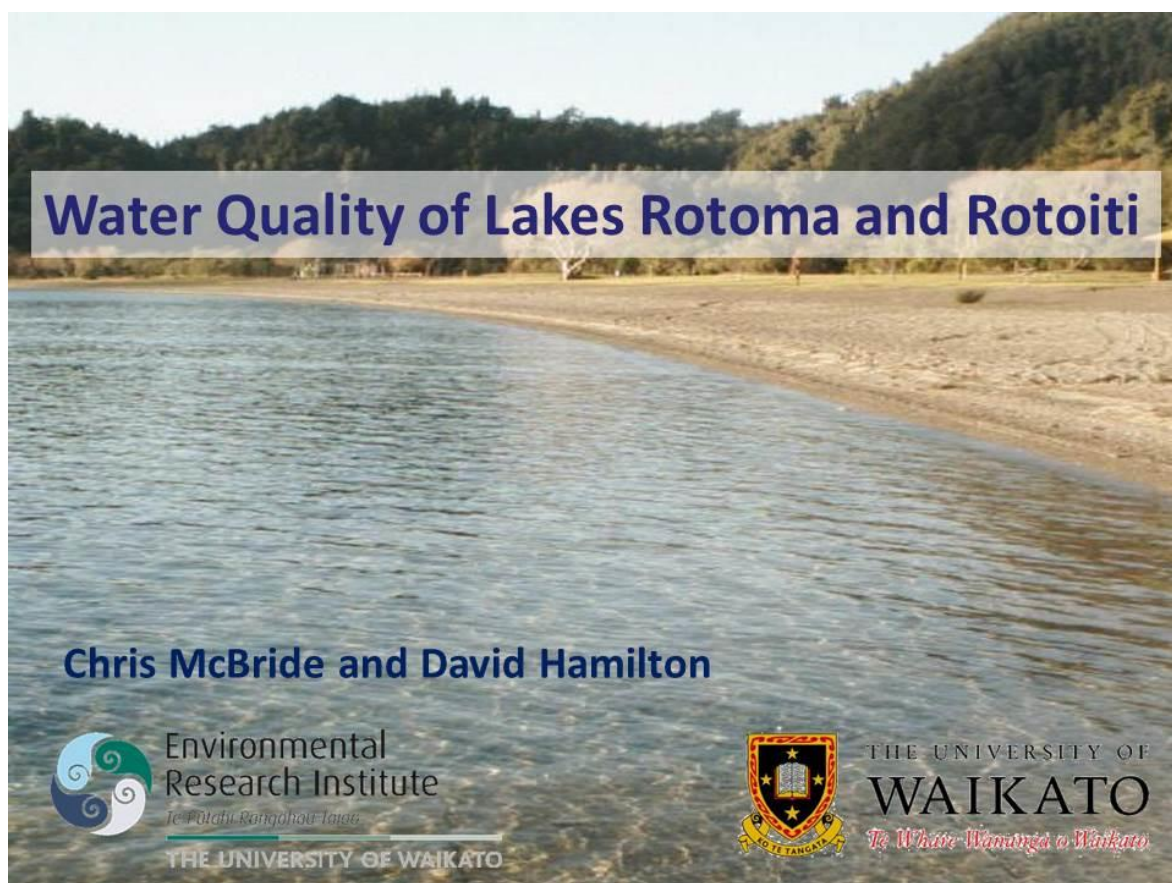
Don Atkinson, Okawa Bay, LakesWater Quality Society  
Andrew Bell, Rotorua District Council  
Peter Bentley, Councillor, Rotorua District Council  
John Bowen, Lake Rotoiti Community Association  
Jim Bradley, Independent Wastewater Advisor, MWH  
Annaka Davis, Health Protection Officer, Toi Te Ora Public Health Service  
Dave Donaldson, Deputy Mayor, Rotorua District Council  
Willy Emery, Tuarua Marae, Rakeiao Marae and Deputy Chair, Te Arawa Lakes Trust  
Tomairangi Fox, Kawerau  
Bruno Gardiner, Rotoma No. 1 Incorporation  
Davey Gardiner, Ngati Tamatea Tutau Ngati Kowati  
John Green, Chairman, LakesWater Quality Society  
Stormy Hohepa, Ngati Pikiao, Rotoiti  
Jim Howland, LakesWater Quality Society  
Gary Husband, Resident in Tamatea Street  
Alec Kameta, Resident of Rotoiti and I pay rates  
Mauriora Kingi, Ngati Whakaeue, Rotorua District Council  
Rob Lewis, Resident in Tamatea Street  
Terry Long, Bay of Plenty Regional Council  
Alison Lowe, Rotorua District Council  
Greg Manzano, Rotorua District Council  
Chris McBride, University of Waikato  
David McKenzie, University of Auckland  
Ian McLean, Independent Chair of RRSSC  
Raina Meha, Tapuwaharuru Marae Community & Bay of Plenty Regional Council  
Leo Meharry Rotorua Lakes Community Board  
Morris Meha, Ngati Makino, Ngati Tamatea Tutahi  
Nick Miller, Resident Te Weta Bay, Lake Rotoiti Community Association, LakesWater Quality Society  
Te Ariki Morehu, Ngati Pikiao, Ngati Makino  
Kepa Morgan, Ngati Pikiao, University of Auckland  
Neil Oppatt, Councillor, Bay of Plenty Regional Council  
Riaan Rossouw, Rotorua District Council  
Nick Salmon, Bay of Plenty Regional Council  
Graham Shirley, Lake Rotoma farmer  
Phil Shoemack, Medical Officer of Health, Toi Te Ora Public Health  
Colleen Skerrett, Ngati Pikiao Environmental Society, Te Rangiora, Ngati Rongomai  
Mary Stanton, Ngati Pikiao, LakesWater Quality Society, Lake Rotoiti Ratepayers Assn  
Joe Tahana, Ngati Pikiao Environmental Society  
Phill Thomass, Tamatea Street and the Rotorua Lakes Community Board  
Lyll Thurston, Councillor, Bay of Plenty Regional Council  
Francis Turner-Curtis, Rakeiao Committee  
Wairangi Whata, Ngati Tamati Tetahanga Tekawaiti  
Fred Whata, Ngati Pikiao

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## Session 1

### ***Lake Water Quality – Rotoma and Rotoiti The Science***

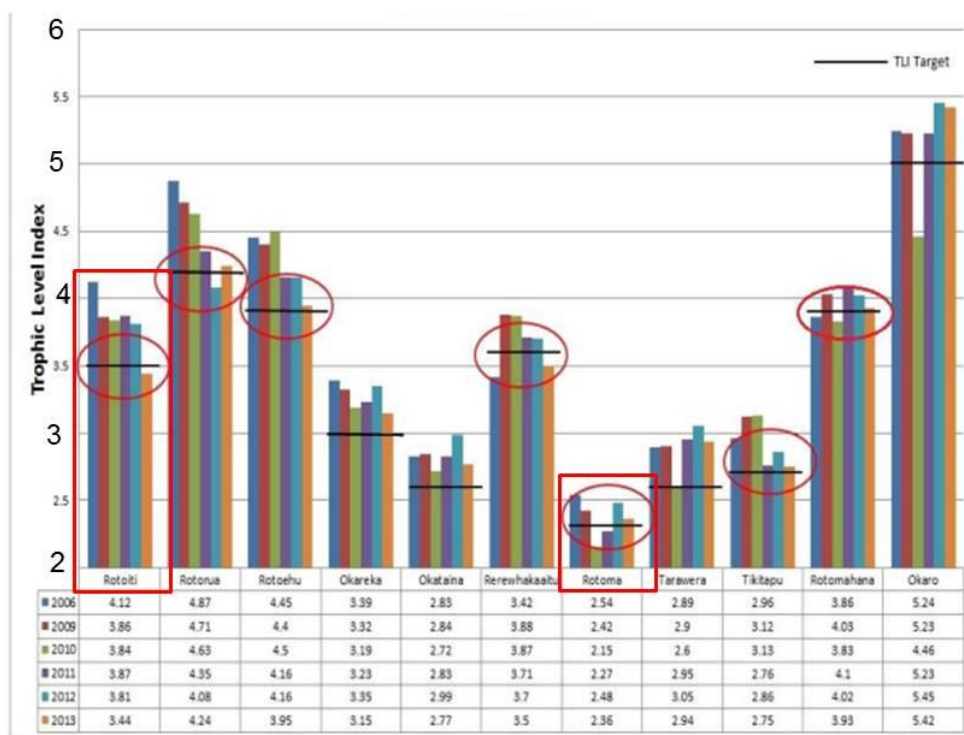
**Chris McBride**  
**University of Waikato, Hamilton**



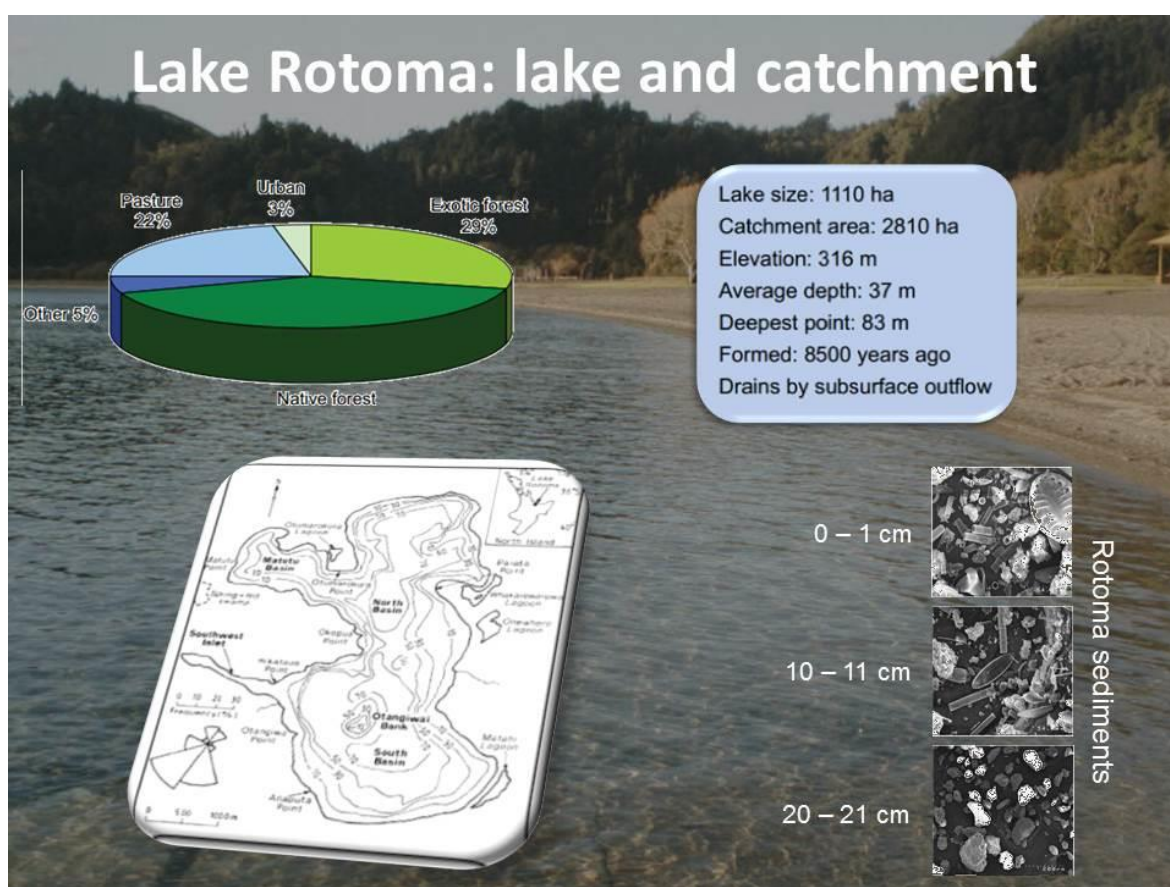
Kia ora tatou, thank you all for the opportunity to present this morning. I am here in lieu of Professor Hamilton who is working on Lake Rotorua in the South Island. I will provide a broad scientific context on the water quality of Lakes Rotoma and Rotoiti. I am well aware that many of you are probably highly informed on many of these issues and I apologise for repeating any information you already know, but I will cover the fundamentals around these two lakes.

To provide a very brief regional context, Slide 1 is the trophic level for the major Rotorua lakes and Lake Rotoma and Rotoiti are highlighted in the red boxes. Rotoma is somewhat the jewel in the crown of the Rotorua Lakes with the lowest Trophic Level Index (TLI), indicating the highest water quality in the region. Lake Rotoiti sits somewhere in the middle, as what we call mesotrophic

## Rotorua Lakes TLI



\* From Rotorua Te Arawa Lakes programme annual report 2012-2013



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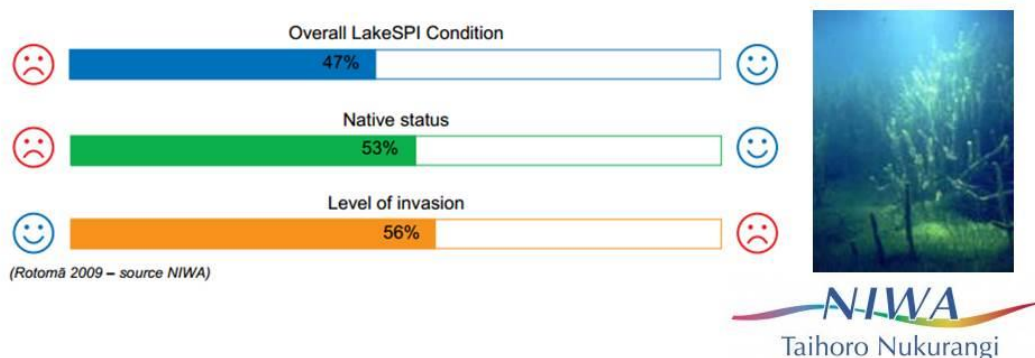
Slide 2 shows that Rotoma has a highly forested catchment, it is relatively large and deep, with pristine water quality and an interesting feature is its pumiceous sediments which are low in organic matter. You will also be familiar with the nice sandy beaches on the shores.

Slide 3 shows one of the most important features of Rotoma on a regional scale which is very high bio-diversity; abundant koura populations and a persistent native charophyte population. NIWA has an index called Lake SPI, which measures the integrity of the submerged macrophyte populations in the lake, including the extent of incursion of invasive exotic macrophytes. Lake Rotoma has extensive beds of the invasive macrophyte *Lagarosiphon major*. Rotoma scores fairly highly on a regional scale for Lake SPI with 47%, second only to Lake Rotomahana.

Slide 3

## Lake Rotoma: biodiversity value

- Abundant koura
- Persistent native charophyte populations



Slide 4 is an indicator we use to look at the overall health of deep lake ecosystems, which is bottom water dissolved oxygen concentration. In lakes with poor water quality that stratify thermally over summer periods we see steep declines in bottom water oxygen concentrations. The top plot shows dissolved oxygen at 60 metres over the course of 10 or 11 years in the bottom waters of Lake Rotoma. In a lake of very poor health we would see the blue line reaching the bottom of that plot, i.e. complete anoxia (absence of oxygen) in those bottom waters. We can see in Lake Rotoma the bottom waters stay relatively oxygenated year round, and that prevents the release of bound nutrients from lake sediments into the water column. This helps maintain good water quality.

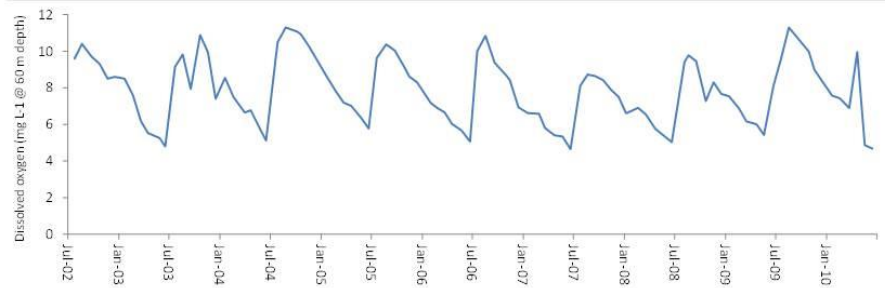
The bottom plot presents chlorophyll a concentrations in Lake Rotoma, which gives an indication of the biomass of algae in the lake. You can see from the Y-axis the numbers are low, around 2 to 3  $\mu\text{g L}^{-1}$ , and show a fairly seasonal pattern with a winter maximum.

The deep chlorophyll maximum (DCM) is generally a pattern that is unique to deep lakes of good ecosystem health, and Rotoma is a very good example of a deep clear lake.

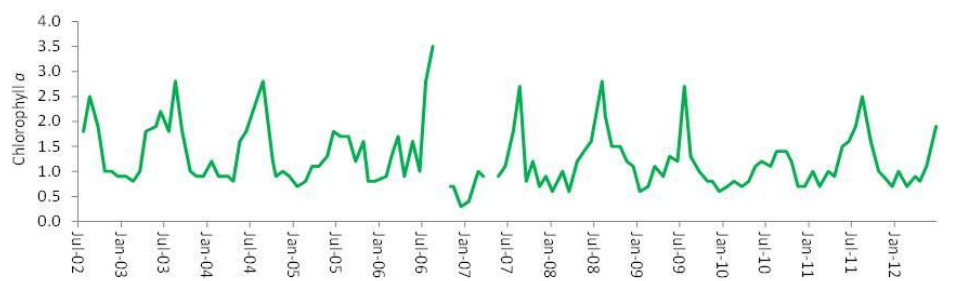
DCM's form when algal production occurs in deeper waters where there is availability of nutrients, rather than in surface waters during the summer period. Because the lake is very clear there is enough light for the growth of algae in relatively deep water.

Slide 4

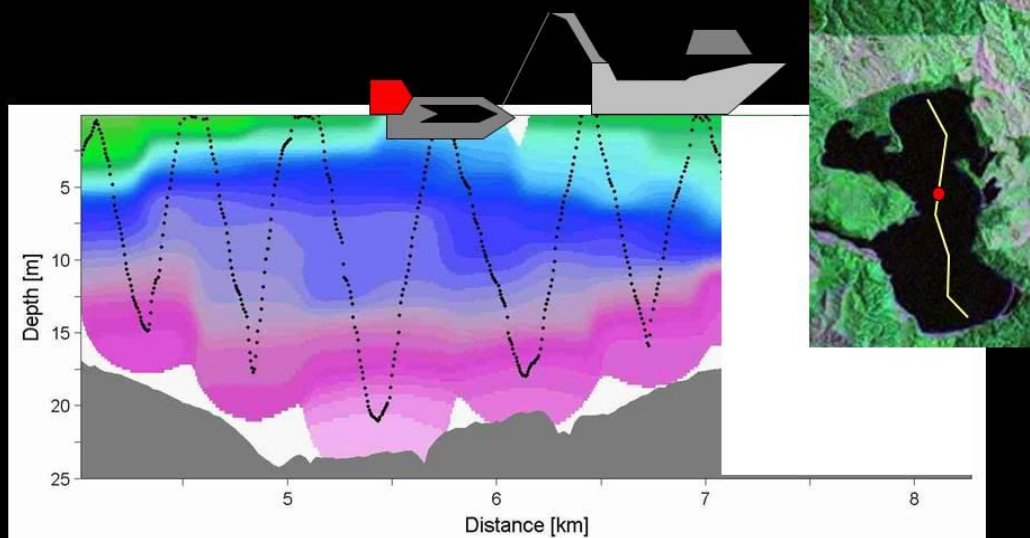
Deep (60 m) dissolved oxygen concentrations 2002 to 2011



Surface chlorophyll *a* concentrations 2002 to 2012



## "BioFish" - towed probe



**Sensors:**

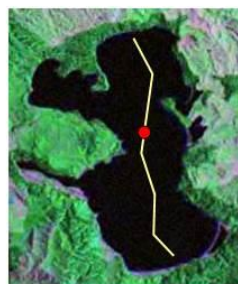
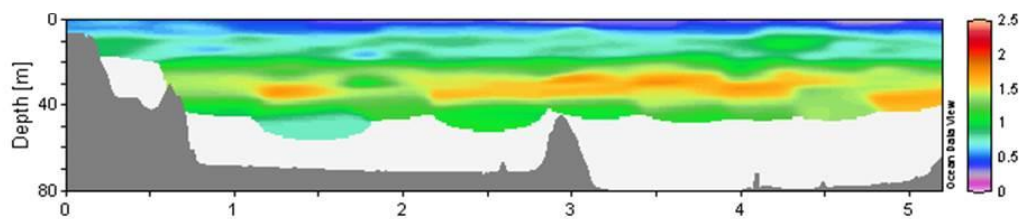
GPS coordinates	Dissolved oxygen
Echo-sounder depth	Fluorescence
Temperature	Turbidity
Conductivity	PAR

Slide 5

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We measure this with an instrument called the Bio-Fish that is towed behind a boat. It undulates vertically and takes a suite of water quality variables as we travel along a transect (path). We end up with a picture that looks something like Slide 5, where the intensity of the colour represents the water quality variable of interest. The transect in Lake Rotoma is in the map at the top right.

## Biofish survey showing deep chlorophyll maximum in Lake Rotoma



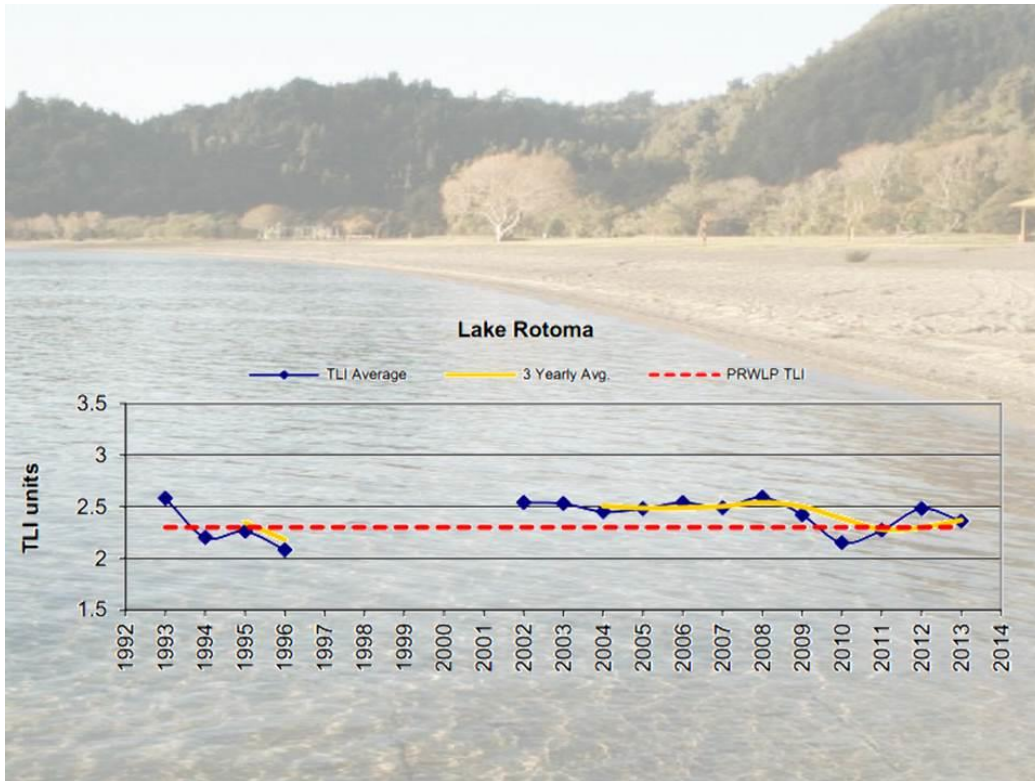
Slide 6

Slide 6 is a plot of chlorophyll, or algae distribution, in Lake Rotoma from a summer survey. The yellow-orange band through the middle at around a depth of 30 to 40 metres represents that deep algae production—something retained when there is low nutrient status and good water clarity. If water clarity reduces and nutrient concentrations increase we may end up with a situation where the production moves up in the water column and there is greater visibility of algae, which further contributes to perceptions of poor aesthetics and water quality.

Slide 7 is BOPRC data of TLI through time for Lake Rotoma and shows that with the exception of a high year in 1993, we observed water quality in the mid-1990s around the TLI target of 2.3. By contrast, and common to many of the Rotorua Lakes, in the early 2000s TLI was elevated, which led to some of the actions that we are discussing today.

It is important to consider the TLI in the context of its individual components; nutrients (nitrogen and phosphorus), chlorophyll *a* and Secchi disk (which measures the clarity of the lake). Slide 8 shows nutrient concentrations in Rotoma, and there are some notable features. Total nitrogen (TN) over the last 5 or 6 years shows a downward trend whereas total phosphorus (TP) concentrations in surface waters may be increasing.

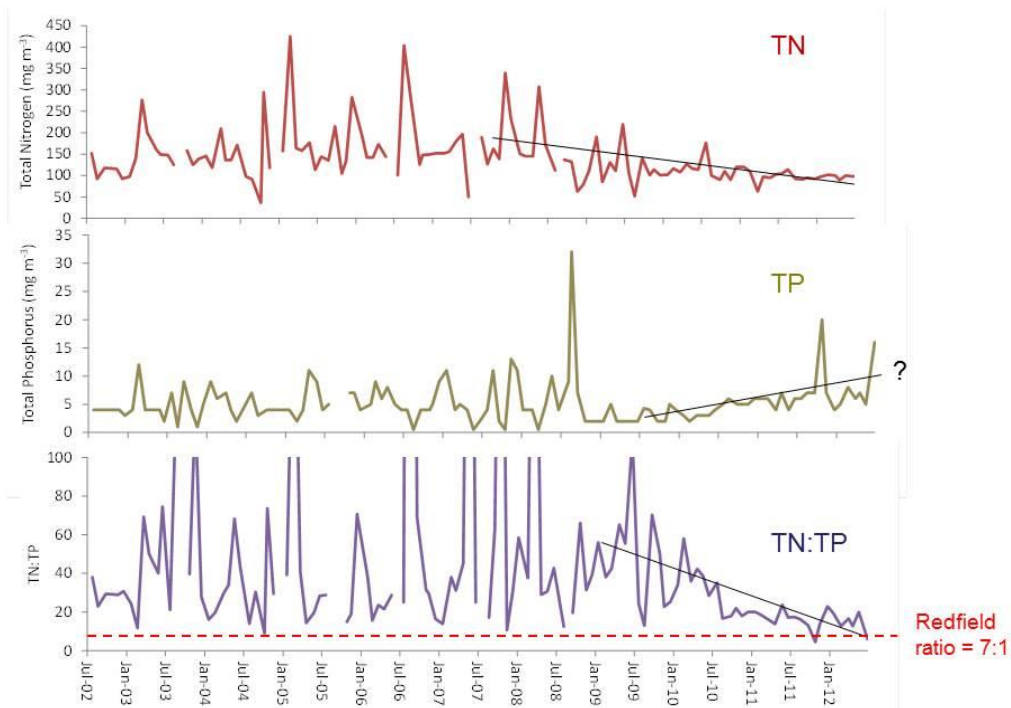
It is important to consider the TLI in the context of its individual components; nutrients (nitrogen and phosphorus), chlorophyll *a* and Secchi disk (which measures the clarity of the lake). Slide 8 shows nutrient concentrations in Rotoma, and there are some notable



Slide 7

## Lake Rotoma: surface nutrients 2002 - 2012

Source: BoPRC



Slide 8

features. Total nitrogen (TN) over the last 5 or 6 years shows a downward trend whereas total phosphorus (TP) concentrations in surface waters may be increasing.

The net effect is to lower the nitrogen to phosphorus ratio, which is shown in the bottom plot. The red dashed line is the Redfield ratio (by mass) which represents a balance in supply of nutrients, where algal production will be limited by both nitrogen and phosphorus. It confirms that the historical state of the lake is phosphorus limited, because the N:P ratio is very high. However, over recent years this ratio has reduced, towards a state where it may be co-limited by both N and P.

## Septic tank loads: Lake Rotoma Action Plan

(BoPRC 2009)

Table 1 Top three sources of nutrient losses to Lake Rotomā

Land Use	Area ha	Load			
		TN kg/year	%	TP kg/year	%
Septic tanks (251 HUE) <sup>5</sup>		2530	14	250	34
Sheep/beef + dairy-grazing	431	8425	47	190	26
Rainfall to lake <sup>7</sup>	1,115	4014	22	178	24
Other <sup>8</sup>	1,237	3141	17	118	16
<b>Catchment total</b>	<b>2,783</b>	<b>18,110</b>	<b>100</b>	<b>736</b>	<b>100</b>

TN = Total Nitrogen  
TP = Total Phosphorus

<sup>5</sup> See Appendix 2 for further details on nutrient loss to Lake Rotomā from surrounding land use.

<sup>6</sup> Rotorua District Council: Estimate of Household Unit Equivalents, maximum loading rate for 2014. 1 HUE = 2.8 fulltime residents. While this summer maximum may overestimate annual loads, the overestimate in the resident population may balance out the unaccounted load from lake visitors.

- Assumes 3.6 kg N/resident/yr. Includes 10% attenuation of N in tank and soils (NIWA literature review)
- Assumes 0.7 kg P/resident/yr with ~50% attenuation in tank and soils = 0.35 kg P/resident/yr (TAG, McIntosh pers. comm.)
- This yields N:P ratio from tanks of 10:1, consistent with available literature.

Slide 9

Slide 9 is a table from the Lake Rotoma Action Plan and shows the contribution of septic tank loads to the lake. Nitrogen from septic tanks accounts for approximately 14% of the external catchment load and phosphorus a relatively higher fraction of 34%.<sup>1</sup>

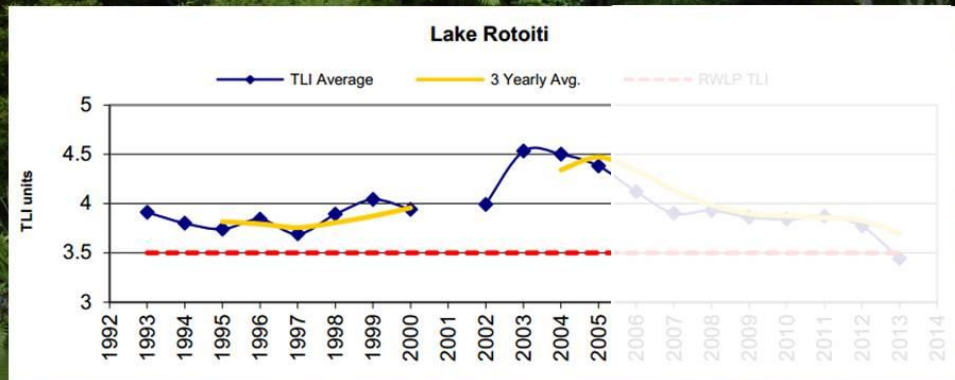
<sup>1</sup> NOTE: These figures have been superseded by more recent calculations of loads and targets. See statement from Water Quality Technical Advisory Group.

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## Lake Rotoma: conclusions

- The lake is regionally very important because it has the highest water quality of all Rotorua Lakes, and high biodiversity.
- Lake TN:TP ratio has greatly reduced in recent years; a return to 1990s' ratio of ~40:1 is desirable (TAG 2007).
- According to the Action Plan, septic tanks contribute a much greater percentage of the catchment P load than for N load. Therefore, reticulation may be an effective means to achieve the desired outcome of increasing TN:TP in the lake.
- Action plan target reductions are 1320 kg N yr<sup>-1</sup> and 250 kg P yr<sup>-1</sup>. Based on current estimates of septic tank inputs, these targets can be met or exceeded by reticulation alone.

## Lake Rotoiti



Everyone will be familiar with the issue of algal blooms in Lake Rotoiti in the early to mid-2000s. Slide 11 shows the TLI of Rotoiti well above target levels—even in the mid-1990s. The TLI target relates to water quality around the 1960s, and meeting this target was a major driver for the installation of the Ohau Channel diversion wall (Slide 12). Having conducted Bio-Fish transects on these Rotorua lakes since 2005; it was neat to see the change in the system.

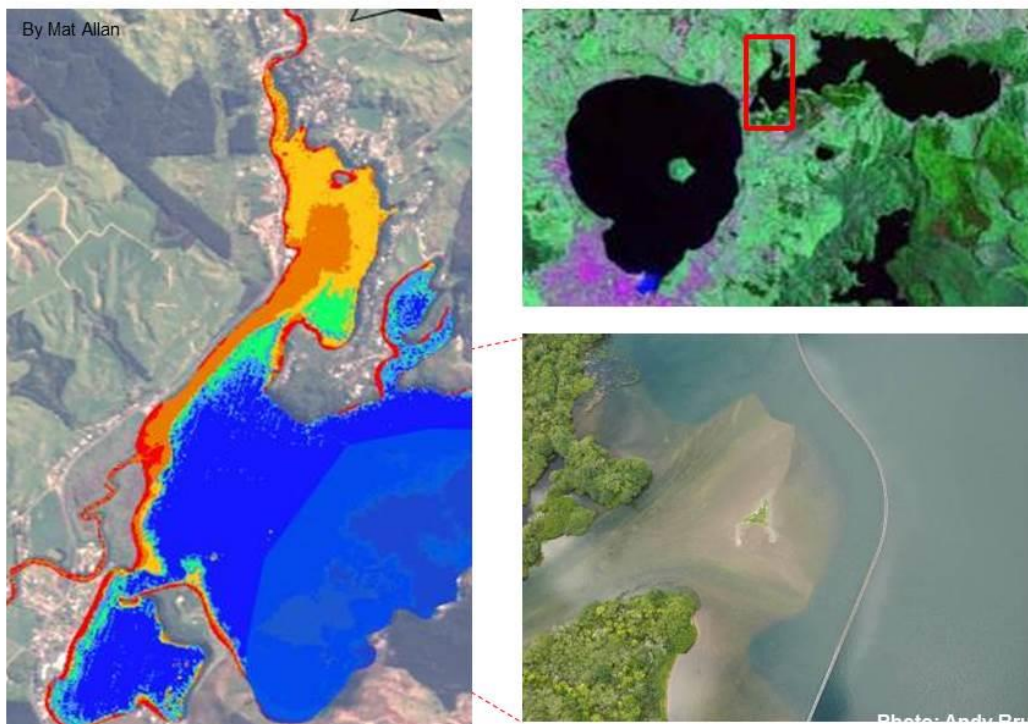


Slide 12

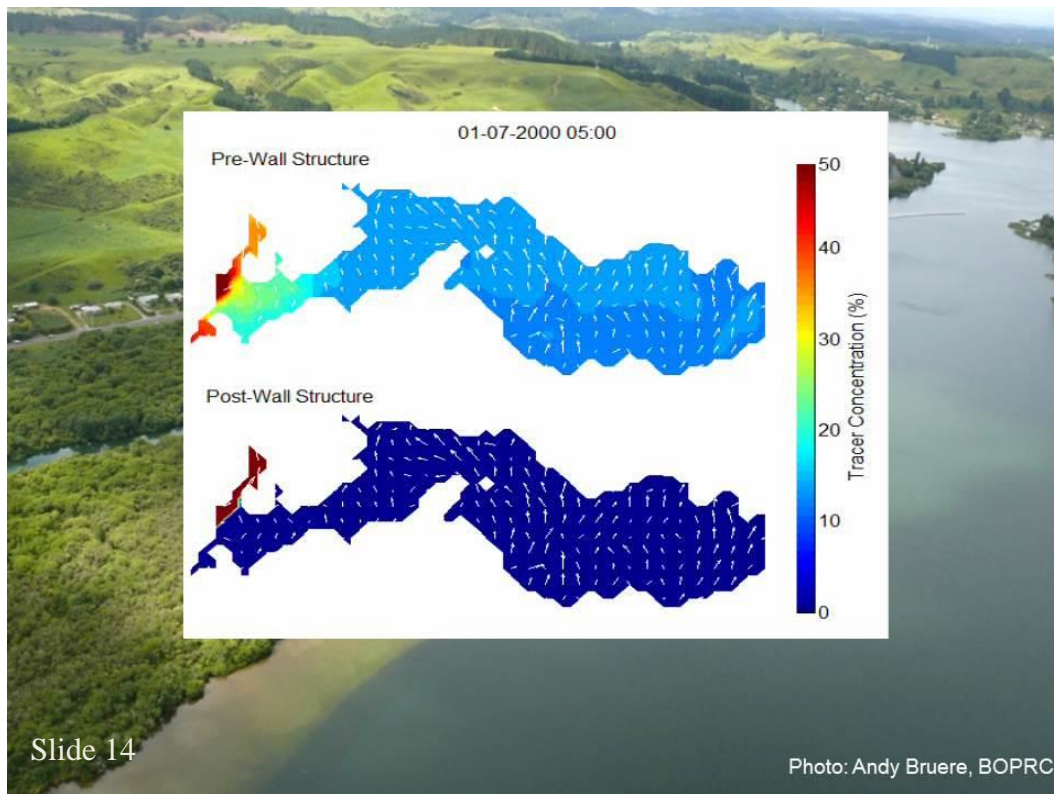
Photo: Andy Bruere, BOPRC

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## Satellite/aerial views of diversion wall, Lake Rotoiti



In Slide 13 there we can see a distinct difference in the water quality coming from Rotorua and the water now in Rotoiti, which has very high clarity compared to 2005. There has been some discussion about how effective that wall is and whether water gets sucked back into Rotoiti via backflow, rather than going down the Kaituna River. On the left panel there is an aerial photo of that system with the Ohau Chanel highlighted in the red square. Remote sensing techniques infer the amount of chlorophyll in the water, (the amount of algae), and we can clearly see the effectiveness of that wall in preventing backflow of water into Rotoiti. The Rotoiti water remaining very blue indicates lower chlorophyll relative to the water behind the diversion wall and in the Kaituna system.



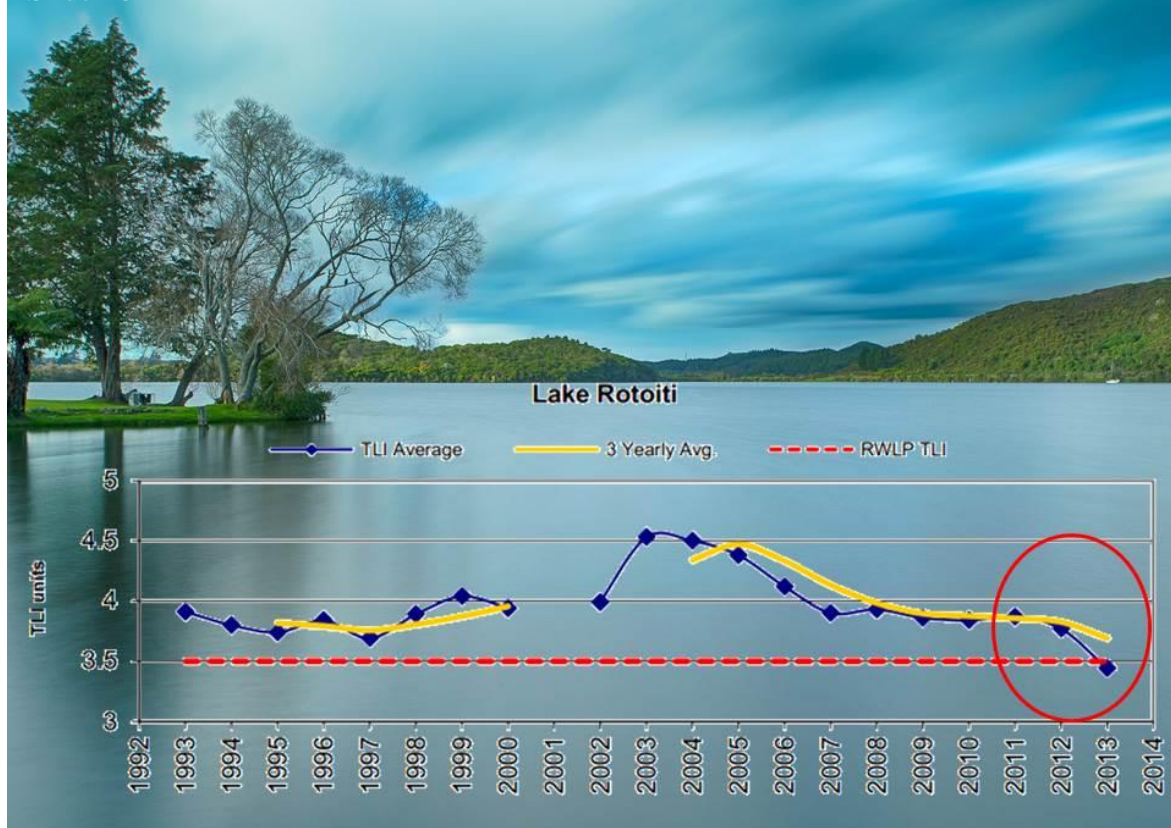
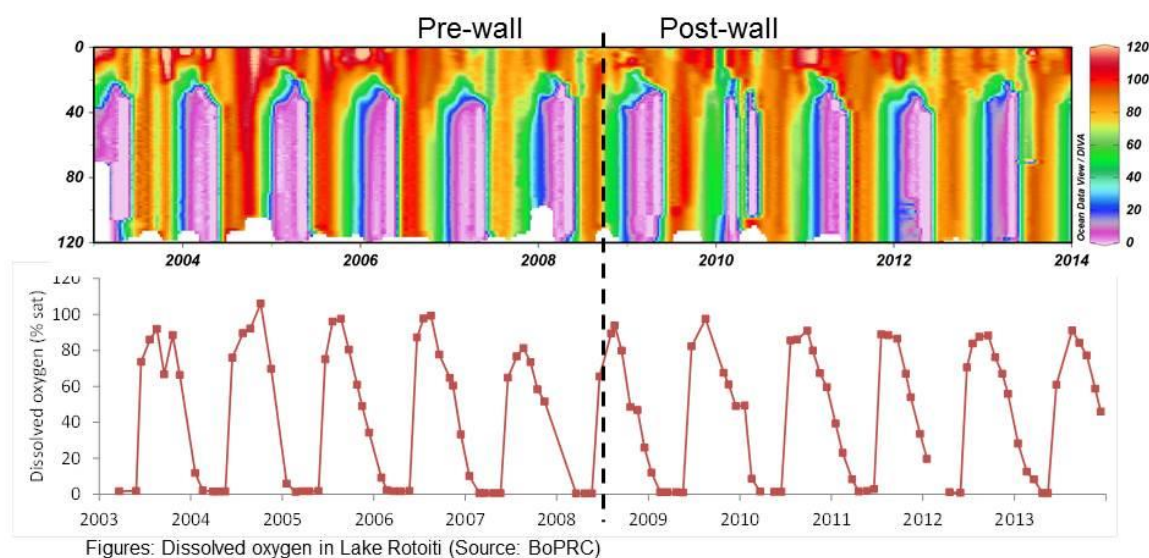
Slide 14 is a 3-dimensional hydrodynamic computer model, which uses an enormous tangle of nested mathematical equations to represent the lake system; how the water flows out the Ohau Channel behind the wall and whether it gets sucked back into the lake due to currents. The top panel is the 'natural' (no wall) state where we add a tracer to the Ohau Channel water, so that a yellow-orange-red colour represents a high concentration of water derived from Lake Rotorua. The top is before the wall and the bottom is with the wall. Modelling shows very little incursion of water from Rotorua around the wall and into Lake Rotoiti.

Slide 15 shows BOPRC's water quality monitoring, and the improvements driven by the wall installation. I mentioned for Lake Rotoma the bottom water dissolved oxygen concentration, and the slide shows two different ways of presenting that. The colour plot in the middle represents the vertical distribution of oxygen, with purple meaning no oxygen (anoxia) and red meaning fully oxygenated waters. In winter the water column is mixed and fully oxygenated and in summer during stratification there is a large extent of oxygen depletion in the bottom waters beneath the thermocline (the point in the water column of greatest temperature/density change).

The line plot at the bottom shows the same phenomenon but for a single depth—about 60 metres. In the early years of the plot, where the line reaches the bottom axis there are a number of points (months) showing complete anoxia. Whereas in more recent years there has been a relatively slower decline of oxygen in bottom waters, and hence fewer points each year sitting at complete anoxia. The net result is that the 'nutrient pump' that works when oxygen is low in the bottom of the lake has less time and works less efficiently. This causes positive feedback, whereby improvement in water quality drives additional improvements because we have less oxygen depletion and therefore less internal recycling of nutrients.

## Lake Rotoiti deep water dissolved oxygen: pre and post-wall

- Evidence of reduction in hypolimnetic oxygen depletion during stratification, e.g. plots below, and yearly HVOD calculations by Paul Scholes (2014 unpubl.).
- Likely to result in reduced internal load.



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Slide 16 shows the TLI index for Rotoiti, which in 2013 has fallen below the target line for the first time. The targets are based on a 3-year average, so we will see what happens in the next couple of years, but there are very positive signs for the water quality in Lake Rotoiti.

## Septic tank loads: Lake Rotoiti

### 6.1.1 What is the problem?

Action Plan (BoPRC 2006)

Approximately 5.9 tonnes of nitrogen/yr and 0.21 tonnes of phosphorus/yr entering Lake Rotoiti come from septic tanks.

Slide 17 shows calculations based on previous understanding, and also an update of, the coefficients of nutrient export from septic tanks. Original values are from the Lakes Rotorua and Rotoiti Action Plan (BOPRC 2009), New values are based on McIntosh (2012).

## Septic tank loads: Lake Rotoiti

These numbers are now considered out-of-date due to recent literature reviews

### 6.1.1 What is the problem?

Action Plan (BoPRC 2006)

Approximately 8.4 tonnes of nitrogen/yr and 0.84 tonnes of phosphorus/yr entering Lake Rotoiti come from septic tanks.

Rotoma Action Plan assumes:

10 kg N/HUE/yr

1 kg P/HUE/yr

..therefore, at Rotoiti...

# Septic tank load revisions – Lake Rotoiti

	t N yr <sup>-1</sup>	% TN	t P yr <sup>-1</sup>	%TP
<b>External load targets (BoPRC 2009)</b>	<b>234</b>		<b>10</b>	
<b>Lake Rotoiti "pre-wall" to 2008 (BoPRC 2009)</b>				
Ohau Channel (pg. 10)	150.0	56.3	15.0	76.5
Septic tanks (2014 estimate)	8.4	3.2	0.84	4.3
Other	108.1	40.6	3.8	19.3
<i>Total external load (pre-wall)</i>	<i>266.5</i>		<i>19.6</i>	
<b>Lake Rotoiti "with-wall" 2008 -?</b>				
Ohau Channel*	7.5	6.0	0.75	13.9
Septic tanks (2014 estimate)	8.4	6.8	0.84	15.6
Other	108.1	97.0	3.8	70.4
<i>External load (post wall)</i>	<i>124.0</i>		<i>5.4</i>	
*assumes 5% back-flow around wall (worst-case)				
<b>Lake Rotoiti "wall removed"</b>				
Ohau Channel*	?	?	?	?
Septic tanks (2014 estimate)	8.4	?	0.84	?
Other	205.6	?	13.2	?
<i>External load (post wall)</i>	<i>?</i>		<i>?</i>	

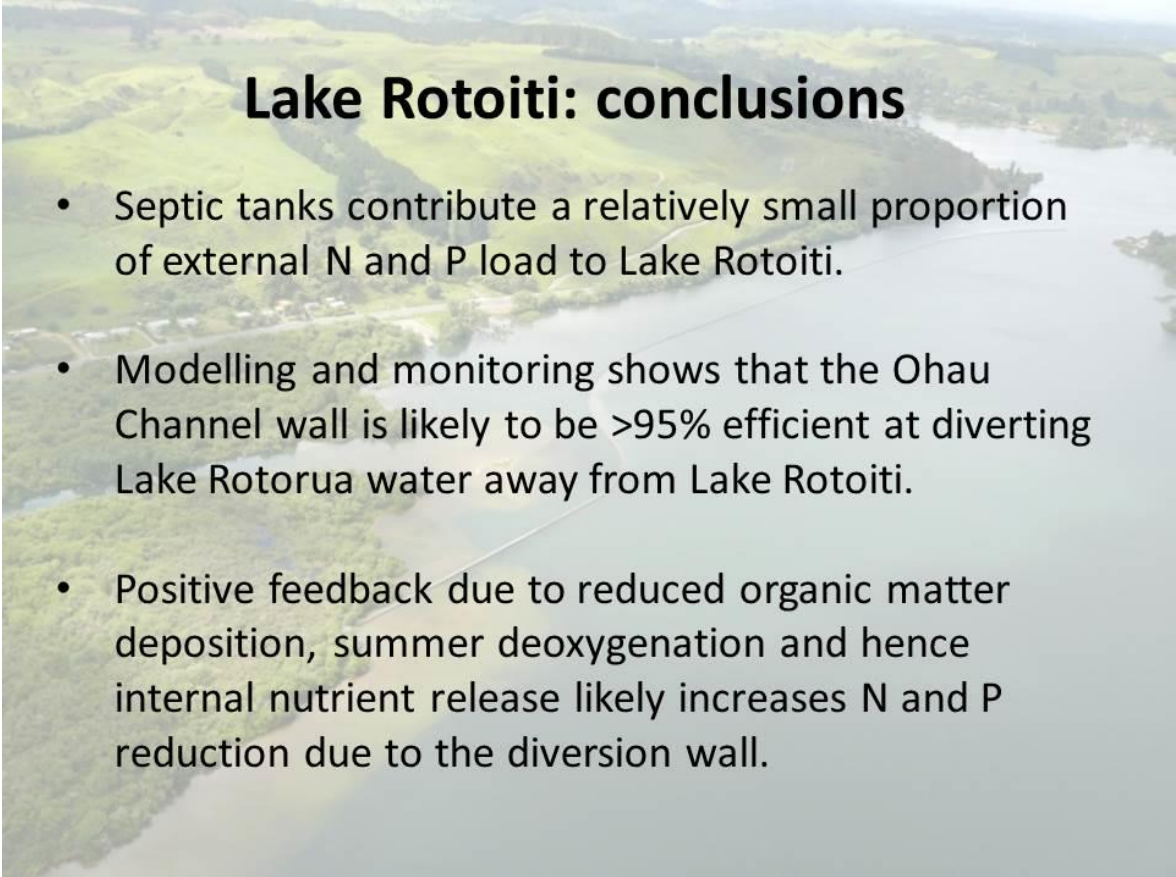
- The above table uses the same assumed household nutrient export rates as for the Rotoma Action Plan (2009)

Slide 18 shows that if we apply the updated septic tank coefficients to the Rotoiti residency, (840 household units), the contribution from septic tanks might be quite a bit higher. We have gone from 5.9 tonnes of nitrogen to 8.4 and from 0.21 tonnes of phosphorus to 0.84.

If we look at the contribution of septic tank loads to the overall catchment scale load, before the wall it is around 3% of nitrogen and 4% of phosphorus. Obviously with the input of the wall we removed a very large proportion of the overall nutrient inputs to the system. Those septic tank loads become a much higher proportion of the total catchment load, around 7% nitrogen and 15% of phosphorus after the removal of Ohau Channel input.<sup>2</sup>

<sup>2</sup> NOTE: These percentages calculations are now also out of date after more recent

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An aerial photograph of Lake Rotoiti, showing a long, straight diversion wall extending from the shore into the water. The surrounding landscape is green and hilly.

## Lake Rotoiti: conclusions

- Septic tanks contribute a relatively small proportion of external N and P load to Lake Rotoiti.
- Modelling and monitoring shows that the Ohau Channel wall is likely to be >95% efficient at diverting Lake Rotorua water away from Lake Rotoiti.
- Positive feedback due to reduced organic matter deposition, summer deoxygenation and hence internal nutrient release likely increases N and P reduction due to the diversion wall.

## Questions

*Wairangi Whata:* Why are there high levels of algal bloom in Okawa Bay at the moment?

*Chris McBride:* We have had summer conditions, a long, hot, dry, still, calm summer. Okawa Bay is like a little micro-climate within the lake and the bloom is fairly isolated. It is hard to know what is driving that. I have not been involved with the work around Okawa Bay and will defer to Andy Bruere from BOPRC.

*Andy Bruere:* Whoever asked that question has asked a really good, tough question. We had an algal bloom about 2 years ago in Okawa Bay and thought it was to do with LINZ spraying the weed within the bay and then the weed broke down over the summer period and released its nutrients. This time we are not certain what the reason is because there was no spraying over the summer. We have had no algal bloom since 2011. So this problem is something to come back to and I will be discussing it with Professor Hamilton.

*Chris McBride:* Yes there is more research and monitoring work to be done around that particular system. Obviously the flow dynamics in Okawa Bay are different now with that wall in place. Previously a large volume of water flushed into the deep basin and created more circulation than is likely happening now.

*Morris Meha:* Kia ora, what impact will global warming and warmer water temperatures have on water quality?

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*Chris McBride:* A good question, a lot of these water quality issues are around cyanobacteria, which are scum-forming species. What makes this species so competitive is their ability to float; they can produce gas vesicles and float to the top. In comparison to other species, cyanobacteria prefer warmer conditions. High temperatures tend to lead to dominance of cyanobacteria over other species which are more competitive at colder temperatures (such as diatoms).

Our modelling follows this clearly and shows that when we have increased temperatures due to global warming we will have an increased proliferation of those nuisance scum forming cyanobacteria and, therefore, a higher occurrence of algal blooms. How those higher temperatures might have an impact on algae population dynamics is definitely a consideration.

*Dr Kepa Morgan:* Kia ora, thank you for the presentation. You emphasised the increase in loadings from septic tanks based on the estimated household unit equivalents, even with that increase it is still less than 20% of the N coming in, is that correct?

*Chris McBride:* Yes I believe so. It was 15% for P under the current scenario with the diversion wall in place.

*Dr Kepa Morgan:* Yes, so where is the other 85% of N loading coming from?

*Chris McBride:* My table does not give a specific breakdown by land use. Andy may have those figures, but there are dry stock farms and some dairy in the catchment. Is that right Andy?

*Andy Bruere:* It is probably 50% forestry. I will go through those numbers in my presentation. They probably equal forestry and farming.

*Nick Miller:* I assume those estimates you gave for the input from septic tanks to Rotoiti included the fact that a substantial number of the settlements in that lake have been sewered over the last 3 or 4 years?

*Chris McBride:* No that is the wholesale contribution of the septic tanks based on the equivalent household units that are given in the Action Plan, published in 2009. Any reticulation since 2009 would not be accounted for. Consider it the 2009 benchmark and obviously those numbers would have to be informed by what has been reticulated. I did not have access to them when I ran the calculations.

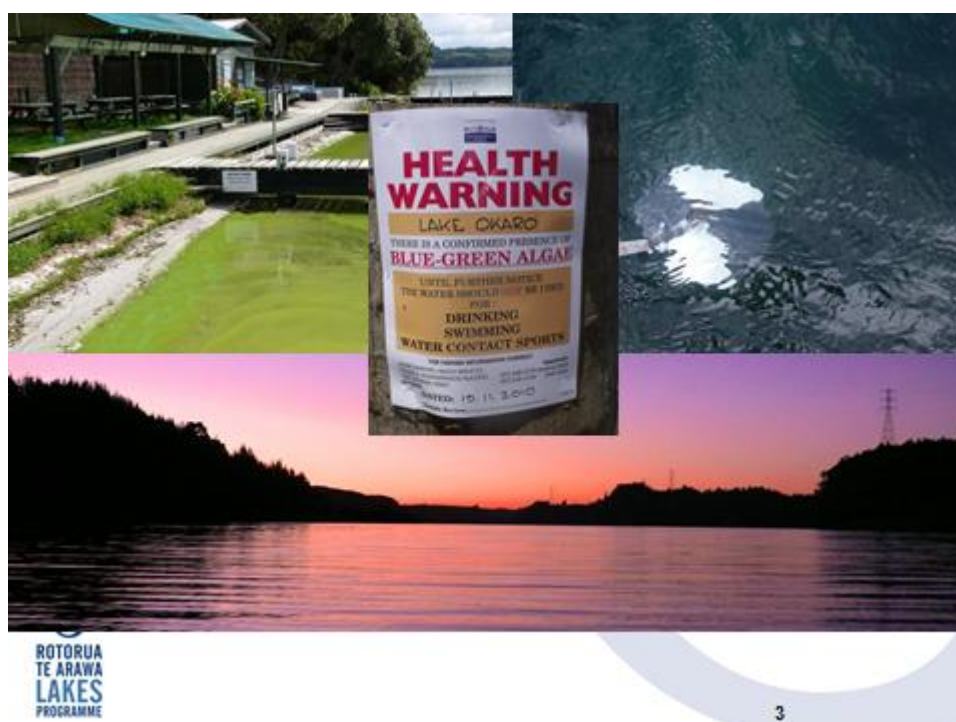
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## ***Lakes' Programme and Action Plans Rotoma and Rotoiti***

### **Andy Bruere Lakes Operations Manager, BOPRC**

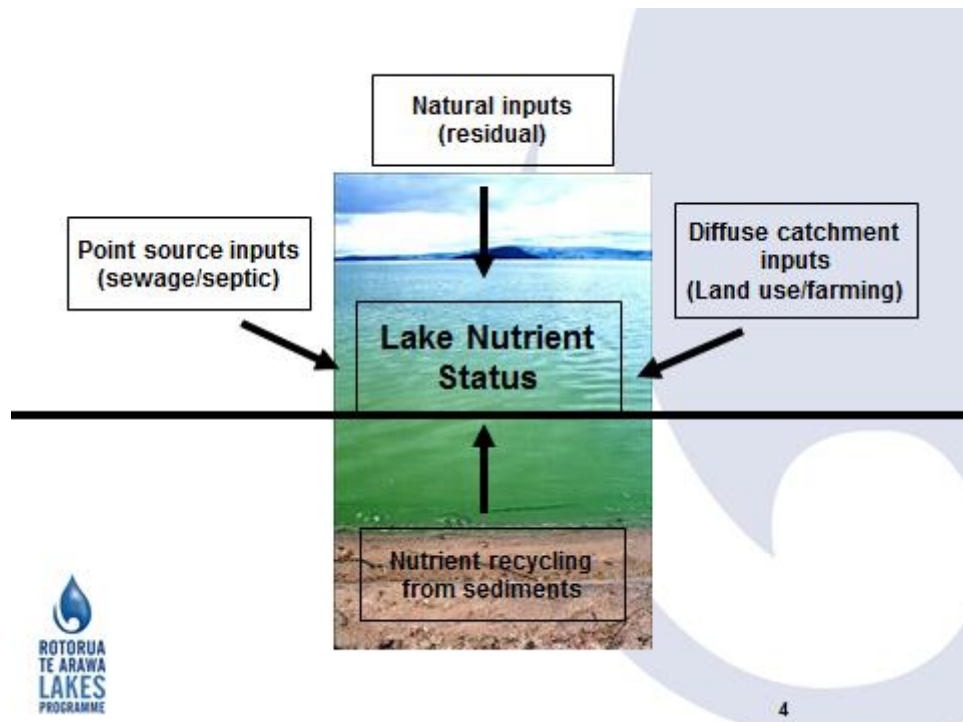
Kia ora and tena koutou katoa. I have been asked to talk about the action plans for Rotoiti and Rotoma. Chris has given a good summary and I will add some extra background information about the action plans; how they are formed, what we do with them and then specifics about Rotoiti and Rotoma.

Slide 3 explains why the community was very concerned about the state of our lakes with the water turning green by the hot pools at Rotoiti in the early 2000s. Not only that, we had very good water quality in Rotoma and did not want it going in the same direction. The right hand picture is Lake Okaro and we did not want to see algal blooms coming up on our lakes as frequently as it was in those times.

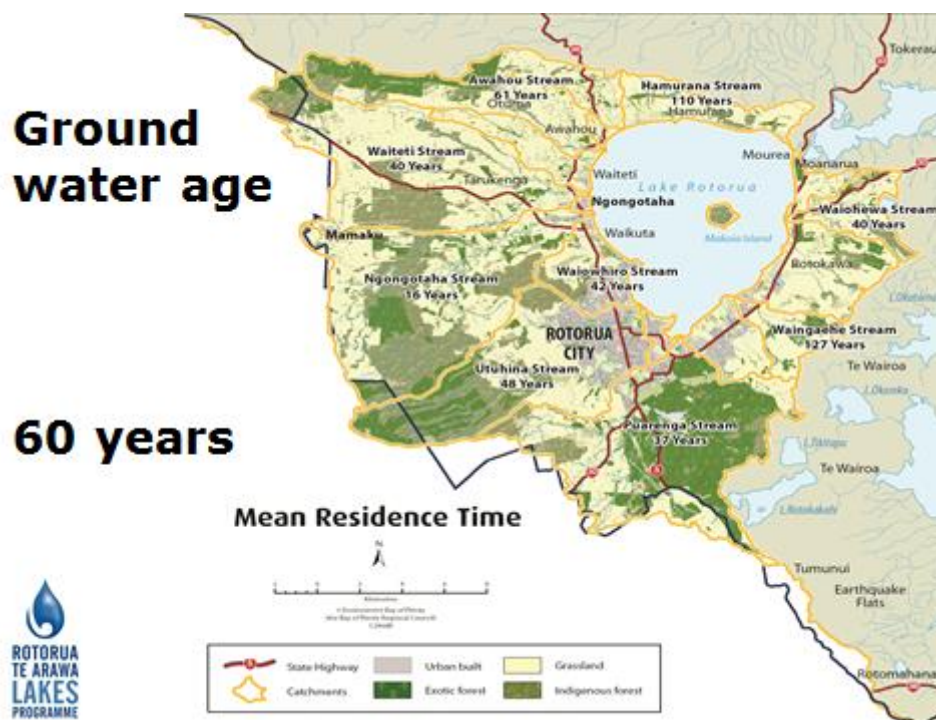


Slide 4 gives a background of where the source of nutrients come from. Inputs from sewage have occurred around Lake Rotorua for many years. What is often overlooked is that different land uses around the lakes also put nutrients into the lakes. This depends how much of the land is in production and the type of farming. They all have their own impacts on the lakes.

The natural and residual inputs are often overlooked. Even with good land use, such as native bush or forestry, there are still inputs to the lake. People also forget that rainfall brings nutrients into our lakes. Within our region geothermal inputs add mainly phosphorus, but some flows are nitrogen.



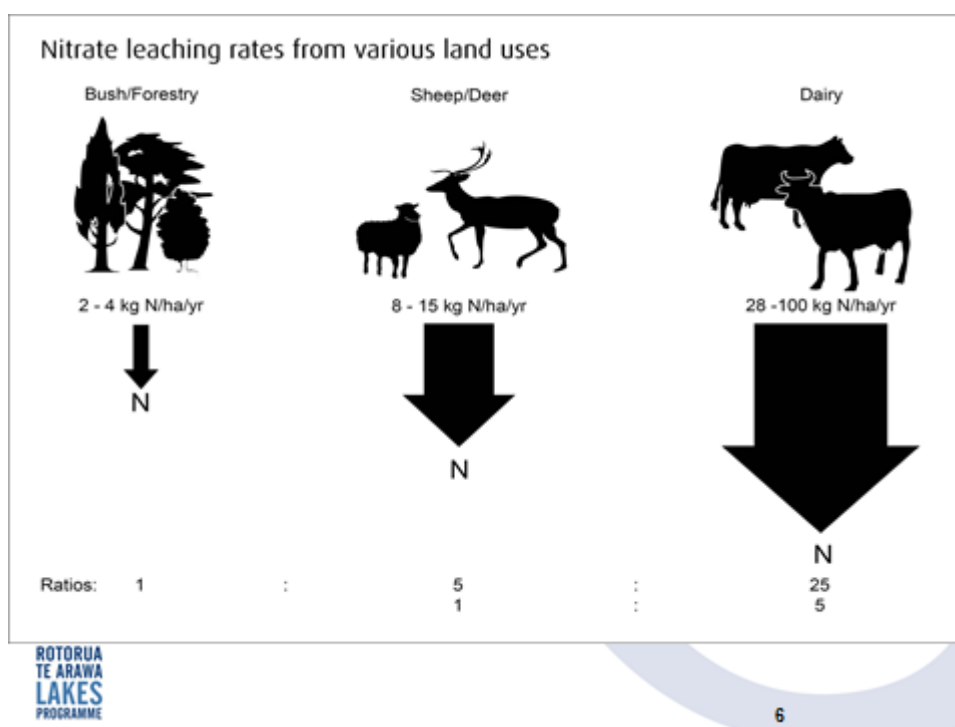
People recognise that nutrients come from sediments but do not understand why that occurs. Chris explained that a healthy lake has oxygen and an unhealthy lake loses its oxygen. If the lake is healthy nutrients in the sediments do not matter because the bottom of the lake is oxygenated. When oxygen is lost from the bottom waters it drives nutrients out of the sediments, particularly phosphorus, into the water and that causes cyanobacteria blooms which we do not like. So it is important to know where the nutrients come from.



Slide 5

Slide 5 is neither of the lakes that we are talking about but demonstrates another aspect of our programme to restore the lakes. It is important to realise that whatever type of land use happens in the catchment, depending on the distance away, it takes a variable amount of time before nutrients enter the lake and make a difference in water quality. An area being developed further away from the lake will put nutrients into the ground but it will take time before they affect the lake. Even when improving land use by decreasing nutrients it will still be a number of years before the impact is noticeable in the lake.

For Lake Rotorua that average time for change is 60 years. For some areas such as Ngongotaha there is about 16 years' ground water age. On the other hand Hamurana is the extreme, over 100 years' ground water age. So depending on what the ground water characteristics of each lake are there is a time delay before water from land use reaches the lake.




Different land uses have different nutrient footprints. Slide 6 shows the numbers, the detail at this point is not important, but it is important to remember that even when land use which has a high nutrient footprint is converted to bush or forestry - very good land use - there is still a nutrient footprint. I am not saying that it is not good practice to go there, but just be aware that there is still a residual nutrient footprint.

Chris explained very well what the TLI target involves, 4 parameters – nitrogen and phosphorous (nutrients), Secchi disk (water clarity) and chlorophyll-a which is a measure of how much algae is in the water. The standards have been set in the Regional Water and Land Plan developed through a community process.

## Lake TLI Targets

- What is TLI?
  - N, P, Secchi, algae
- Regional Water and Land Plan
- Community process → TLI
- Action plans
- Non-statutory
- Science foundation
  - Inputs
  - Identify reduction target
  - Identify actions



Okaro 5.0	5.42
Rotorua 4.2	4.24
Rotoehu 3.9	3.95
Rotoramahana 3.9	3.92
Rotoiti 3.5	3.44
Rarehokaiti 3.5	3.50
Okareka 3.0	3.23
Tikitapu 2.7	2.75
Okataina 2.6	2.77
Tarawera 2.5	2.94
Rotoma 2.3	2.35
Rotorohia** 3.1	3.59

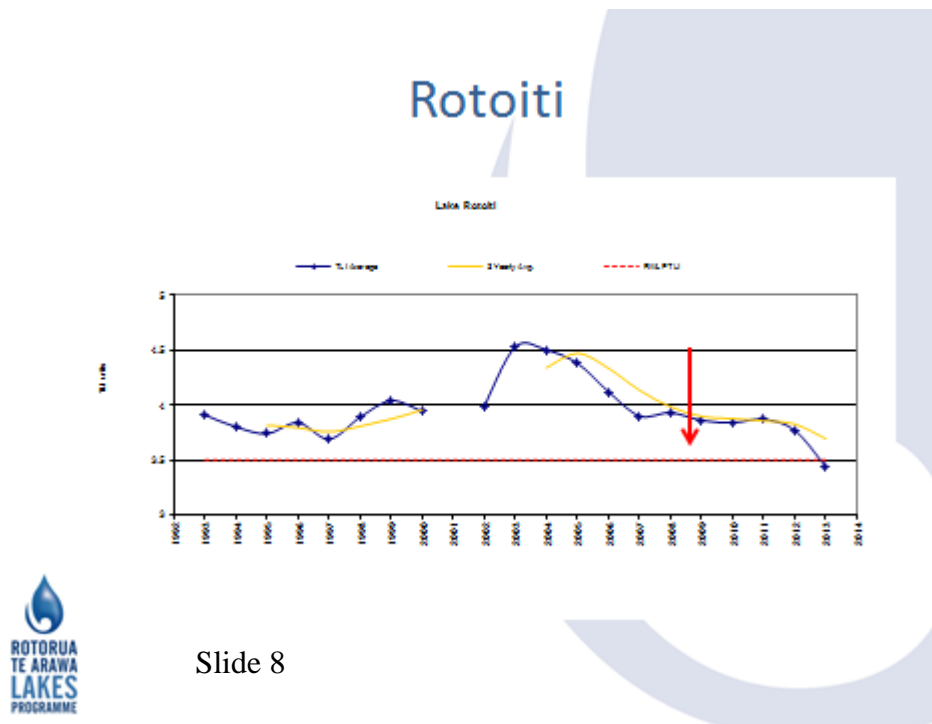
TLI stands for Trophic Level Index. (Slide 7) The table gives the trophic level target for each of the 12 lakes. The desired trophic level target is the smaller number. Compare Lake Rotoma at 2.3 to Lake Okaro at 5 and it shows that this lake has much better water quality. We are always trying to get to a lower number. The TLI for each of these lakes is not the same and has been developed through a process we have identified the community's aspirations and what is possible for that particular lake. Some lakes like Rotoma and Tarawera are likely to have much better water quality than lakes like Okaro, Rotorua or Rotoehu. That is not to say we cannot improve the water quality of those lakes, but it would be artificial to try and get them to the same quality as others with more pristine water quality.

The right side column is the current annual TLI. If that number is greater than the target then the lake needs improvement. If it is less than the target then the lake is at its target or below and demonstrates that the target for Rotoiti is 3.5 and it is now at 3.44.

The direction to prepare action plans comes from the Regional Water and Land Plan. If the lake 3 year average TLI has been at more than 0.2 points above its target TLI for a period of more than 2 years we are obliged to start an action plan. It is a non-statutory document and so has no statutory powers, unlike a Regional Plan, but it is about identifying actions to improve the water quality of the lake.

Action plans are based on a science foundation. We work with scientists and the community to find what inputs there are to each lake. Through a process of modelling we identify a reduction target for each of the lakes and then identify the likely actions. Those actions have come from many different sources. There may have been a community request to do a particular action and if it seems reasonable or worthwhile trialling we have undertaken the action. Other actions have come from engineers, scientists or people with technological experience who have identified actions which we put into our action plans.

Slide 8 is the TLI for Rotoiti. The high numbers during the early 2000s were the times when we had algal blooms and the water quality of Lake Rotoiti was undesirable. The TLI was reducing and the water quality started to improve even before we completed the diversion wall. It had been in place for about 5 years before we met the actual TLI target. We will wait and see what the future holds which monitoring will tell us.



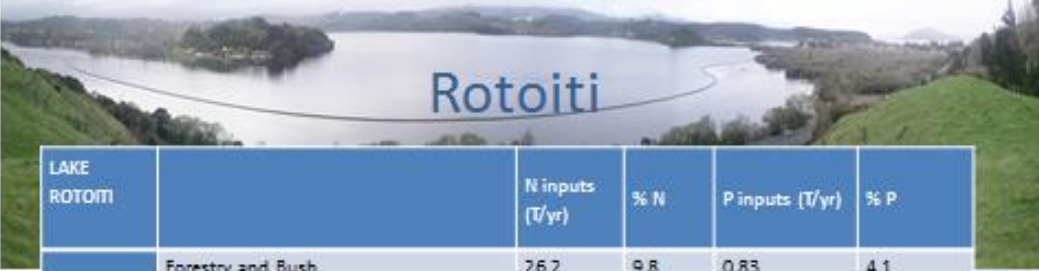
Slide 8

The Rotoiti Action Plan is part of the Rotorua/Rotoiti Action Plan. It was written to cover both lakes because of the obvious linkages between the two. This Action Plan was never adopted by the Bay of Plenty Regional Council because they were not satisfied that the land use targets were big enough to satisfy restoration of Lake Rotorua.

There were three actions in that Action Plan for Lake Rotoiti:

- 💧 Sewerage reticulation
- 💧 Monitor sediment releases

The first of those actions is now completed. I understand for Rotoiti about half of the sewerage reticulation is completed now. What we are really interested in is how much nutrient is coming from the sediment as we change the dynamics of the lake by putting in a diversion wall and sewerage reticulation.



LAKE ROTOITI		N inputs (T/yr)	% N	P inputs (T/yr)	% P
	Forestry and Bush	26.2	9.8	0.83	4.1
	Pastoral Farming	26.5	10	1.1	5.6
	Septic Tanks	8.4	3.2	0.840	4.2
	Other	3.0	1.1	0.300	1.5
	Springs, geothermal and rainfall	52	19.5	1.7	8.6
	Ōhau Channel*	150	56.4	15	75.9
	<b>Total</b>	<b>266.1</b>		<b>19.77</b>	
	Sediment recycle	50	NA	20	NA
	Reduction targets	130 T N /year	49	19 T P/year	96
	Sewage reduction contribution to reduction target **	8.4	6.6%	0.840	4.4 %

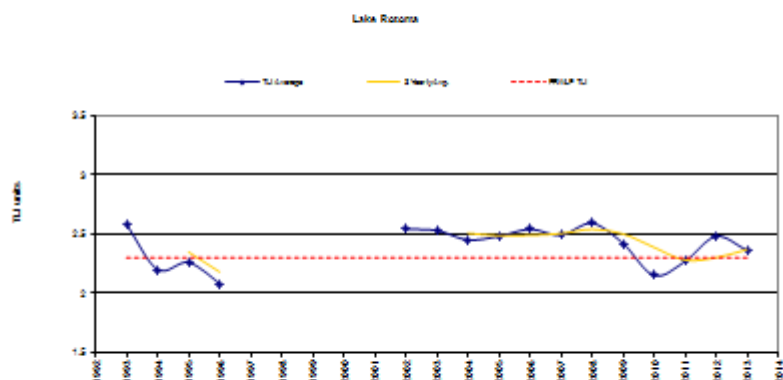
Slide 10

Slide 10 shows the inputs into Rotoiti before the diversion wall was in place. The Action Plan is specific about different types of land uses and it also discounts the Ohau Chanel inputs. That is, even though there are 260 tonnes of nitrogen coming from Lake Rotorua through the Ohau Chanel we do not actually get 260 tonnes into the main body of Lake Rotoiti without the diversion wall there. About 10% of the nitrogen comes from each sector, forestry and bush and pastoral farming. These sectors contributed similar amounts before the diversion wall was put in place. They both contribute about 4 to 5% of the phosphorus. Then if we go to the Ohau Chanel about 56% of the nitrogen and about 76% of the phosphorus comes from Rotorua.

Chris has pointed out some adjustments to the potential amount of nitrogen and phosphorus from septic tanks within the catchment. That comes out at about 8.4 tonnes and about 840 kilograms of phosphorus. The other thing to note here is the sediment releases, potentially 50 tonnes of nitrogen and 20 tonnes of phosphorus could be released annually. We believe that is reducing as the lake is not being de-oxygenated to the same extent as what it was before the diversion wall went into place.

If we look at the nitrogen reduction targets of 130 tonnes of nitrogen and 19 tonnes of phosphorus per year, effectively the wall is doing the main part of that. Sewerage reticulation is about 6.6% for nitrogen and 4.5% for phosphorus of the reduction target.

## Rotoma



Slide 11

TLI for Rotoma (Slide 11) shows that we were a little above the line for a while, then below the line in 2011 and now cruising above the line. The Regional Water and Land Plan requires that we reduce nutrient inputs to Lake Rotoma to meet our target. Slide 12 summarises the inputs into 3 different categories. The nutrient reduction target for Lake Rotoma is 1.3 tonnes of nitrogen and 250 kilograms of phosphorus. The main action within the Action Plan is sewerage reticulation. If we remove 2.5 tonnes of nitrogen we would be well above the nitrogen target and 250 tonnes of phosphorus would achieve the phosphorus target for the lake.

## Rotoma

LAKE ROTOMA		Nitrogen inputs (T/yr)	% N	Phosphorus inputs (kg/yr)	% P
	Septic tanks	2.5	14%	250	34%
	Pastoral Farming	8.4	47%	190	26%
	Forestry, rainfall, other	7.0	39%	296	40%
	Nutrient reduction targets	1.32		250	
	Sewage reduction contribution to reduction target	2.5	190%	250	100%
	Restoration actions	Sewage reticulation			

12



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In closing I would like to make some general comments around sewerage reticulation and land use change. The first point is that our lakeside communities are right beside the lake and there is direct leaching of whatever is in the septic tank into the lake water. Whatever happens on the land beside the lake will go in and get there relatively quickly. The certainty of different interventions that we can do around the catchment depends on things like the ground water age and the time of travel for example. If we do something well away from the lake in land use it is going to take longer before that reduction in nutrients manifests in an improvement of lake water quality and some time to get there. That means some uncertainty.

The monitoring of outcomes in land use change compared with sewerage is important to understand. The way we monitor land use change and determine how much nutrient reduction is achieved comes from modelling of land use through programmes such as Overseer and ROTAN. They are land use, farming or catchment based models which tell us what to expect if certain changes are made on land. One of the difficulties is that we must continue monitoring what farmers are doing on the land to ensure that they have made those changes, or continue modelling to find actual (modelled) nutrient reduction that was predicted. With sewerage reticulation, if we take that sewage away through a physical pipe and put it into a treatment system, we know at the end of the day exactly what we get out of that system. So there is a certainty and ease of monitoring in sewerage reticulation.

It is worth thinking about in terms of future population increases. With sewerage reticulation we have a better understanding of what happens as populations increase. If we allow people to do their own thing with septic tanks, even advanced systems, then every time there is a new property there is an increase in the nutrients that get discharged at that point. There are other benefits from sewerage reticulation such as health.

### **General Comments**

- 💧 Communities close to lakes → leaching
- 💧 Certainty of interventions → GW age, time of travel, etc.
- 💧 Monitoring of outcome: LUC vs sewerage
- 💧 Future population increases → with/without sewerage?
- 💧 Other benefits → health

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## Questions

*Craig Brown:* Andy thanks for your presentation. Are the numbers you are using for the volume of nutrients coming from the septic tanks for Rotoma and Rotoiti based on peak occupancy rates?

*Andy Bruere:* No, there is always a little bit of uncertainty on the numbers in that community because it peaks at Rotoma in summer time, but then there are very few people during the rest of the year. It is not based on peak occupancy.

*Chris McBride, Waikato University:* Those numbers are based on 2.8 full time residents and 3.6 kilograms nitrogen per year per resident and 0.7 kilograms per year of phosphorus with 50% attenuation of P. That yields an export ratio of around 10 to 1 N to P ratio.

*Morris Meha:* Andy, you spoke about the delay in the water travelling through the ground back into the water flows. What is the quality of the water that falls from the sky? It is recycled over time. I have heard a lot in the media and on the net about recycled water because that is what is happening to water, it is being recycled. What is the quality of the water that falls on our land prior to it being used on and under the land? Is that quality of water diminishing because it evaporates over the sea, goes up, forms clouds and then falls again somewhere else?

*Andy Bruere:* Maurice, the calculations that have been done for the Action Plan consider this. Rainfall is pretty uncontaminated but does contain nitrogen and phosphorus and it is quite surprising how much it does carry back into the lakes. Unfortunately I cannot tell you off the top of my head.

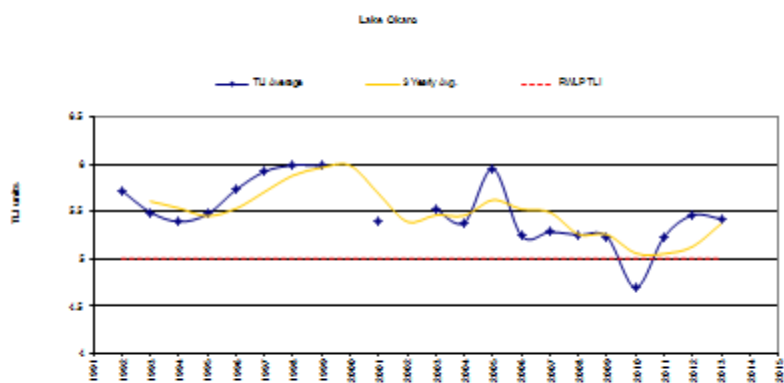
It is probably worthwhile mentioning another thing. There was some comment about climate change and that relates to what Morris is asking. I understand from discussion with Professor Hamilton that we are likely to get more regular big rainfall events. It is not so much what the rainfall will contain but that the event will be more intensive on the land and potentially create more erosion and carry more nutrients or contaminants from erosion of the land.

*Francis Turner-Curtis:* Two questions. First question, on Slide 11 of your presentation you showed that the TLI levels had gone below in the 2010 period. Do you know what that was attributed to?

*Andy Bruere:* I will answer that one first. I knew someone was going to ask that question so I added these slides. I don't know whether I can answer that, but can say that in 2010 Lake Okaro (Slide 15) popped down and has come back up again. In 2010/11 both Lake Okataina (Slide 16) and Lake Tarawera (Slide 17) went down too.

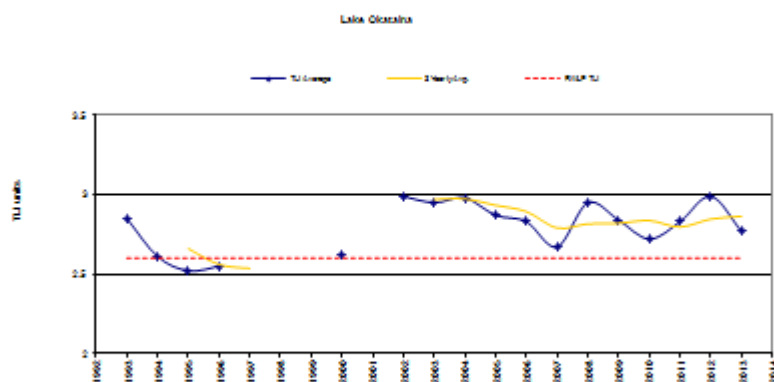
Slide 15

## Okaro

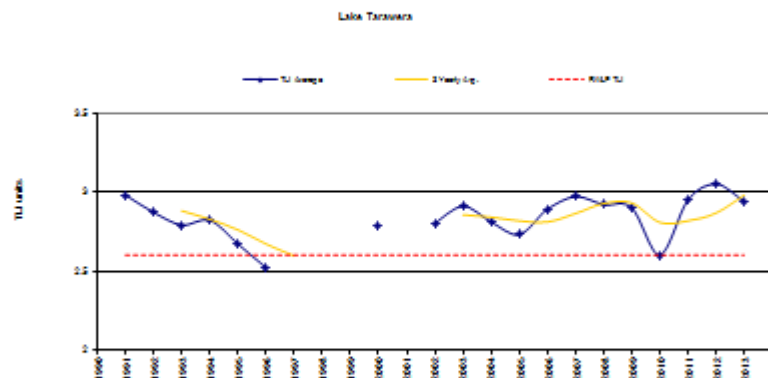


Slide 16

## Okataina



## Tarawera



*Francis Turner-Curtis:* Must have been something in the water?

*Andy Bruere:* Nice comment, but there may well have been something about the climate that made it happen, so I thought it was worth presenting to you.

*Francis Turner-Curtis:* Thanks, second question; is there a dialogue with Federated Farmers around their land use change? Looking through your presentation and Chris's it is clear it has a lot to do with land use change. How effective is that dialogue to start looking at land use change being sped up, or is it just about money?

*Andy Bruere:* For these three lakes the dialogue is quite different. For Lake Rotorua a major proportion of the nutrients in the lake come from more intensive land uses. Rotoiti and Rotoma have a lower percentage of nutrients coming from land use, particularly Rotoiti. The dialogue with Rotoiti farmers is just benchmarking those farms and that project has been completed. It has capped their nutrients at their 2001 to 2004 levels and they cannot go above that level. For Rotoma the dialogue is around stewardship agreements with the farms. There is a commitment between the Regional Council and the farmers to say what can be done to prevent any increase in nutrients and voluntarily reduce nutrients. There are no actual rules around that.

*Kate Graham:* My question relates to the fact that you had forestry and bush as a single category. If the bush is protected obviously it has a lot lower level of runoff. It would mask the effects of forestry. Is protected bush included in your category there?

*Andy Bruere:* It is actually. There is always some uncertainty around these numbers but regarding forestry and bush, my understanding is that the Overseer programme used for looking at nutrient leaching from land use has some allowances in for forestry and native bush. I think its allowances for native bush are higher than those for forestry. That would conflict with what you might intuitively think because native bush does not go through a 25 year harvesting cycle. It is probably fair to say they are relatively close, but I would be inclined to think forestry has a higher nutrient footprint than native bush.

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*Kate Graham:* I am sure it must have if you are cutting the forest down and leaving the land exposed. That goes on to my next question which is have you done any work to see what benefits there would be doing some predator control in the catchment to improve the bush? Obviously heavily browsed bush, if it is heavily browsed, is going to have more sediment coming off it. Have you done work to quantify what the benefit would be of getting rid of browsers like wallabies, deer and possums?

*Andy Bruere:* There are two answers to that, yes and yes. The first part is that work has been done with some exclusion plots put in place and it has been going on for some time. They have signs on them for New Zealand Forestry Service. We have a PhD student working with Professor Hamilton. A big part of his PhD topic is looking at the influence of land predators as well as the influence of trout on water quality. Within about 2½ years we will have good information quantifying that in the catchment of Lake Okataina.

*Mary Stanton:* I have two questions. Andy thank you very much for your presentation and commitment to the lakes. My first experience when it came to sewage was living in Mourea and the high water level. We could not get our septic tanks to work because we were so close to the Ohau Chanel, and we were finding we had sewage problems. This is when we started questioning all authorities. What I am trying to say here is that Maori, me being Ngati Pikiao, we would say sewage should not go into our food basket, stop the sewage. Do you agree that this is one of the Maori perspectives of removing sewage knowing that it is going to affect our waterways and our food basket?

*Andy Bruere:* Mary, I would not give you any comment on Maori perspectives, I will leave that to other experts here, but the idea that effluent should not go into a food basket is certainly very positive and that is personally something I agree with.

*Mary Stanton:* Thank you. I believe that we have to provide scientific evidence otherwise we would not get government funding. So when we throw all these numbers in the air, figures, we have to come to a compromise right across the border and all agree that we have to definitely look at scientific evidence. Can you please enlarge on that please Andy?

*Andy Bruere:* That is a really good point Mary but I think we are pretty much there in terms of funding if we can put a proposal together. I am sure the District Council will be able to comment more fully on that. But the funding for Lake Rotoiti for any sewerage reticulation is covered by the agreement with the Crown, and the funding for Lake Rotoma as I understand it is covered by an agreement which has been extended from the Ministry of Health funding and another part of the funding is Regional Council.

*Kepa Morgan:* Thanks for the presentation Andy. In your last slide on general comments you made the statement that you had a preference for wastewater reticulation. I have some questions on that, and you can run through them once I have asked them. Are you assuming that if you have wastewater it means that there is total N and P removal from the catchment? If you are assuming that is it to Rotorua? Why would you assume that if Rotorua's wastewater treatment plant is not coping with its current loading? If it is going to be in catchment is it not exactly the same as land use change where you will have the nutrients being applied, but over time you will see them end up back in the lake? Just like a land use change is going to result in the same change. The last one is what about reduction at source? In terms of your suggestion that we should be looking at wastewater have you considered effective interventions such as urine separation, dry composting, and those sorts of things. In terms of the pilot that I think you expressed an interest in before the Environment Court hearing, where are we at with that so that we can see if these solutions are as effective as we believe they will be?

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*Ian McLean:* Can I say that you have really covered a whole lot of the stuff for the Workshop, Kapa, and most of the thoughts will need to be drawn out as we go through. Can you deal with the last one?

*Andy Bruere:* Yes I will make two comments there. You asked quite a few questions. I do not have any particular preference for sewerage reticulation or land use change. I am pointing out that in this particular programme with our 12 lakes, our communities are lakeside communities and generally very close to the lake. What that is telling me is that because of their location and the amount of direct leaching from septic tanks to lakes then getting that reticulated and out of there is very positive. In terms of land use, because we are modelling the changes and because the changes can be further away from the lake, then it is less likely to make an improvement so rapidly and it may be less certain as to whether we make an improvement.

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## **Cultural Considerations**

### **Te Ariki Morehu Ngati Pikiao**

Kia ora tatou. We are very careful about how we treat water because we cannot live without water. Our water has to be clean all the time. Let me go back to how we were brought up. We lived by the water; there was a special place where you drew your water from, a special place where you washed your clothes or yourself. Now in those days we had the long drop and as you go around the lakes you will see many of the Maori homes further back, not too close to the lakes. I wonder why that was? It may be because of the long drops. But what our people did when the long drop needed to be removed they would plant fruit trees there, and they were the best fruit trees in the country. So that is the way that our Maori people treated sewage and that is what we are talking about, sewage.

When I grew up and started coming into Rotorua it was all manuka from Ngapuna into Rotorua. There was an old rubbish dump with car frames, batteries, all sorts of stuff, the Rotorua side of the Ngapuna Bridge. We all saw it, it was all covered up and there was nothing mentioned after that, nothing.

You talk about the lakes getting dirty when the sewage overflows and we decided to pump it up into the Whaka forest. That could only stand a certain amount and it flowed out into the Puarenga Stream where our Whaka children swim every day. We talk so much about pollution, clean Ngapuna up first. Why not get all that rubbish out of there? Sulphur Point, I can go on all day about sewage and we can talk about around the lakes, but we have got to start from here first, Rotorua.

My people here took on the Council for wanting to put a reticulation pond up above Rotoma and Rotoehu. We won our case. We are adamant about keeping all the lakes clean and I am surprised that you did not talk about Lake Rotoehu, which is one of the dirtiest lakes around. We were there the other day having a look at it. We have got a new weed growing now, I just forget the name of it, it looks a very odd kind of a weed but it is a new weed coming up. I knew about Lagarosiphon, but I certainly do not know about this one. So why are we not talking about Rotoehu?

I think I have said enough, you know how I feel and I repeat we won our case in the Environment Court. Tena koutou any questions?

### **Questions**

*Don Atkinson:* I was holding a question from the previous session and if you do not mind I would like to revisit it to make sure that my mind is correct. Andy, looking at the Rotoma Action Plan, is it correct that the P target can only be met from the septic tank removal? That was my observation of what I saw there.

*Andy Bruere:* That is a good point and I think it is an important thing to understand. With the figures in the Action Plan the P target will be met by sewerage reticulation, but it brings into question a comment that we need to recognise from Kepa. If we reticulate all the sewage out of the catchment then it is possible to get the full P target, because the target and the load is calculated at 250kg/yr equally. If reticulation does not go out of the

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catchment and there is some residual discharge into the environment that comes back to the lake then of course we will not get all of the P target. If we do land use change we would be about 60 kilograms of phosphorus short without considering the residual flow of phosphorus from any new land use. So yes that is correct.

*Kepa Morgan:* Andy you started to answer my question from the earlier session which you did not touch on. If you had urine separation toilets would that solve the problem?

*Andy Bruere:* I am not sure if it would solve the problem or not I am not experienced enough to know that, sorry.

*Kepa Morgan:* So you don't know?

*Andy Bruere:* No.

*Colleen Skerrett:* What about the farming loads? What is going to be done about that because for Rotoma they are bigger than the septic tanks?

*Andy Bruere:* For Rotoma, I mentioned that before when someone asked what the discussion with the farmers is. The farming target is to have stewardship agreements with the farmers and we have stewardship agreements with two of the land owners but not with the forest owners yet.

*William Emery:* Just to follow up on that question, are we talking about those farmers on the eastern side of Lake Rotoma?

*Andy Bruere:* Yes that is correct, Peter Davies and Graeme Shirley.

*Lyall Thurston:* The question I pose as a long-time resident of Rotorua, with regards to the comments from the Kaumatua, would the District Council be able to update us on the current status and plans that are in train for the old Rotorua dump. I can remember as a student here in the sixties being sent regularly down there to dump the family rubbish and I can assure you there were more than old car bodies there. Everything from fridges to old ovens to whatever you can imagine. Can someone give us an update? Is there a strategy because as I recall it was very close to the water's edge and it was akin to the current dump up at Waihimo Gorge.

*Dave Donaldson:* Some in this room will know that there is another Project Steering Committee running in tandem with this one which is looking at alternative options for the Rotorua Land Treatment System which currently operates in Whakarewarewa Forest. We are about the third iteration of a heads of agreement with CNI Iwi Holdings to commit to a timeframe to get rid of that treatment system from the forest. Part of the discussions around all of that is looking at the various options. It has been raised by several in the community, and I think I first heard about it from Te Taru White probably 3 years ago now, about the old city dump on the Sulphur Flats. We are keen to have that registered as a contaminated site with the Ministry for the Environment and the Mayor is leading the charge. We had that discussion with Todd McClay about an hour ago just to refresh his memory on that.

Down in that general area as well is the Rotorua BMX track and Council has approved in principle the moving of that to the horse paddock at Waipa, or a biking hub. That will make room to do other things around the Wastewater Treatment Plant in terms of alternative options for land treatment. We are keen that whatever alternative we come to will involve a clean-up, but for Council the numbers on these alternative options are big numbers and

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so in the last week we have had discussions with both of our MPs to seek some Crown assistance with what has to be done in getting out of the Whaka Forest and also cleaning up the Sulphur Flats because it is not cheap. Figures of \$18 million have been suggested for the cheapest option and that is a big capital project for this Council and the timeframe to implement it all is very short. It is a work in progress that is the undertaking from Council.

*Phill Thomass:* Andy I had a question from your slide when you were talking about leaching from septic tanks in the settlements around the edges of the lakes. What sort of distance away from the lake do you get before that leaching effect is mitigated or removed? Do you know - is it 100 metres, 200 metres, a kilometre, somewhere between here and Wellington?

*Andy Bruere:* I wonder if Terry might be able to help us on that question. Ok he is going to say no. It is probably worth saying that it is similar to our land use. If you are further away then there is a longer time before nutrients get to a lake. It also depends what nutrient you are talking about. Nitrogen is very soluble and it does not matter how far away. If there is a water connection between some point and the lake in the future it will get there unless there is a process in between which can prevent it, such as going through a wetland where it might be de-nitrified. So it will generally get there but there may be some transformations which prevent some of it reaching the lake. Phosphorus is less soluble and attaches more readily to soil particles. If you are close to the lake, over a period of time discharging phosphorus into a soakage field will initially be absorbed and not go into the lake, but over time that field will become saturated and the phosphorus will travel further until it eventually reaches the lake. If you are some distance away from the lake then it is possible that the phosphorus will get absorbed at some point travelling down through the soil profile or even in the ground water.

Conversely within our soils around the Rotorua district because of the geology they are quite high in phosphorus. Water travelling through the soil dissolves phosphorus out of the geology and takes it to the lake as well. That is why we have high phosphorus levels in some of our lakes even where there is not a big population.

*Morris Meha:* It is not so much a question as a comment on what the Deputy Mayor has just said. There are about three of us on this Rotorua Sewerage Steering Committee and at our first meeting two options were put to us that related to the proposed discharge at Ngapuna. After 2021 RDC cannot discharge in the Whaka Forest so the first two options were to discharge at Ngapuna right next door to the current plant. I raised issues around that at that meeting and the second meeting. Where is the discharge going to go? That is really the key question because we are hearing now it has to be taken out of the catchment. That comes at a cost, so for those of you who are not aware of that it is one of the key drivers behind what we are doing. Where are we going to discharge?

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## Session 2

### ***OSET Regional Plan: Implications for Rotoma/Rotoiti***

**Terry Long**

**Bay of Plenty Regional Council**

Firstly I must pay tribute to Esther Farquhar who was the planner on a plan change with respect to OSET and to John Whale who was the wordsmith. I am here today as a representative of that team. It was a team approach and sometimes I had to accept that they were right and I was wrong.

OSET is the On-site Effluent Treatment Regional Plan and I was asked to be specific to Rotoiti, Rotoehu and Rotoma. The Plan sets out the policies and rules around on-site disposal of wastewater on a property and it seeks to manage those effects on the environment. The purpose of the Plan is to reduce the impact of wastewater and in some locations it is creating a health hazard and nutrient problems.

The OSET Plan had its origins in 1996; it was reviewed in 2006. Plan Change 1 was completed in 2010, it deferred some dates. Plan Change 2 2013 extended some dates and made some other changes as well. The next full review is due in 2016.

Plan Change 2 is the decisions that were notified in October 2013. It was not a full review and extended some dates by which communities needed to connect to reticulation or to upgrade their systems. It made amendments to the terminology used in the Plan to make it consistent with the New Zealand standards. It added and removed maintenance zones, so those areas which have been reticulated no longer need to be maintenance zones and were removed. We looked at the monitoring data and a number of locations that could be added. In the end we only added one area as a maintenance zone and included some new reticulation zones.

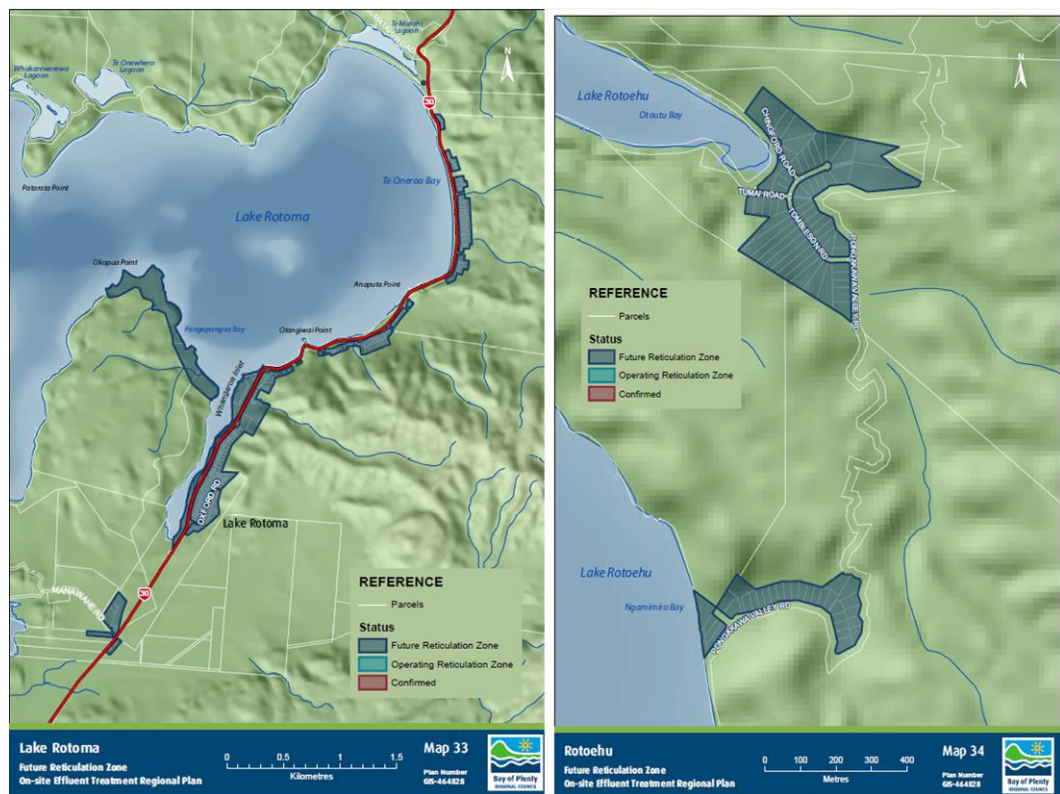
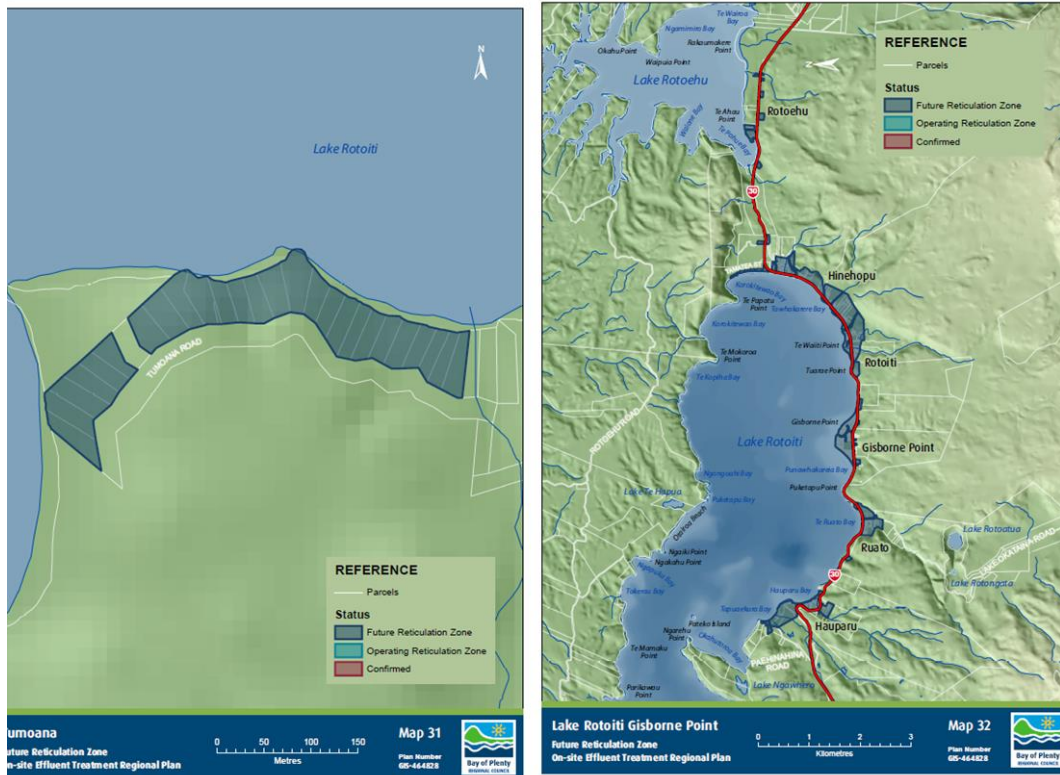
What does all this mean for Rotoiti, Rotoehu and Rotoma? Firstly there is a need to manage our wastewater. The Plan identifies some communities as future reticulation zones and that is where the local authority will investigate options for reticulation. It creates a bit of space for this discussion to take place.

#### **Overview of the Rules**

If we have a septic tank there is the question – are we going to continue with that or are we going to have sewerage reticulation? If reticulation is supported by the community then we all need to connect to it. If we decide against reticulation then there is a deadline looming, in some cases 2014, others 2016. We need to have that decision and then upgrade to an aerated wastewater treatment system with nutrient reducing capabilities or get resource consent.

#### **What are Future Reticulation Zones?**

This includes Tumoana, Haupara, Ruato, Gisborne Point, Hinehopu, Rotoehu, Doctors' Point, Rotoma, Otautu Bay and Kennedy Bay. When reticulation becomes available then properties must connect. There are some riders on that of course, but we must not regard OSET systems as an alternative where reticulation is available. If there is reticulation then you must connect.



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If the community decides not to reticulate then we look at the OSET Plan rules and, in particular for existing systems, Rule 2. In the requirements for Rotoma, Rotoehu and Rotoiti the system must meet some minimum standards and the septic tank be maintained by a 3 year pump out interval or for a new one we have extended that to 6 years if the contractor agrees.

### **Rules for Septic Tanks**

- Rule 2D - septic tanks will become discretionary in maintenance zones by 1 December 2016
- Rule 2E - within 200 metres of a lake, which includes Rotoehu, and there is no reticulation available, if outside a maintenance zone then you must upgrade to AWTs + NR by 1 December 2014
- Rule 2F - in the catchments of Rotoiti and Rotoehu, if you are on a property of less than 2 hectares then you must upgrade by 1 December 2016

### **What are the Upgrading Options?**

An aerated wastewater treatment system with nutrient reducing capabilities, or  
A resource consent which must meet the minimum standards and you must pay a financial contribution.

**This means by the end dates for each community you must connect to reticulation, or upgrade to AWTs + NR, or apply for resource consent.**

## **Questions**

*William Emery:* It would be helpful for us moving forward if we knew what the costings were for each of those items that you have put up, not necessarily today.

*Terry Long:* I agree, it would be helpful in reaching a decision if you knew what the costs were but there are also environment considerations that need to be taken into account.

*Kepa Morgan:* Kia ora, Terry. With OSET does it deliberately exclude non water based treatment?

*Terry Long:* Yes it does at this point.

*Kepa Morgan:* So when nobody does anything at the end of the year and it is shown that there are superior options to the limited narrow consideration of OSET, what is going to happen?

*Terry Long:* Council have considered alternative systems and they have flagged that in 2016 when there is a full review of the OSET Plan those options will be considered.

*Kepa Morgan:* That is encouraging, but why did they not consider them in 2006 when submissions were made?

*Terry Long:* I am sorry I have no idea why certain decisions were taken back then.

*Kepa Morgan:* I made the presentations and they said OSET was only about wastewater systems that were water based. BOPRC has created their own problem by a very narrow interpretation of what on-site treatment can be. In terms of the deadlines being set you

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have no legal basis on which to stand. If you tried to take anybody to court over non-compliance by 2014 the immediate defence would be – there were better options back in 2006 presented to the OSET Commission and they were ignored and then perhaps it is your problem. We can help you out by trialling these options which we have been asking to do for numerous years. All BOPRC has to do is contribute a little bit of their mass of resources to get those trials off the ground. They can be done within 6 months.

*Terry Long:* I am not in a position in a forum like this to enter into some sort of agreement with you.

*Kepa Morgan:* I suggest that would be a good way forward though, thank you.

*Neil Oppatt:* Can you clarify – apply for resource consent, what does that mean?

*Terry Long:* Suppose you have an existing house and wastewater system and want to continue to use it then you would apply for a resource consent and would have to characterise what you have and we would give you a consent for a period of time, typically 10 years, and tell you, 'Yes, you can continue with that'. There would be requirements that it is maintained and around occupancy. You cannot enlarge the house and you would need to pay a financial contribution.

*Neil Oppatt:* The reason I raised it is that we have built two new homes in the last two years and have got a resource consent. How does that apply to these two new homes that we have built?

*Terry Long:* If you have got a resource consent then it continues in force until it expires.

*Ian McLean:* These are policy issues. Do any of the councillors want to make a comment on this?

*Neil Oppatt:* Yes I agree, Kepa, there are some short comings with it and I also agree that we will be taking people to Court. The trouble with OSET was that it went ahead of all the other catchment nutrient management and out of step with everything else. This relates only to properties less than 2 hectares. What do we do with properties over that? Over the next 12 months Council will look at this again. You are quite correct, it is difficult if people do nothing and that is probably what most people will do and then what do we do?

Council has to decide what the options are in a specific catchment. In fact if reticulation is deemed to be the only viable option to meet the catchment target then the Regional Council will say so, as opposed to opting out to individual systems. There are also issues with managing these systems over the long term. Our biological system has to be managed well to be effective. I do not like this being presented because there are shortcomings which I have voiced to my colleagues in Council. There is a fair amount of understanding now that we have to fix those shortcomings. How far we go with alternative reticulation or community treatment systems I do not know. It is based on research and planning through the whole process.

What is going to happen in 2014, I cannot say because it is law, but we will make clearer what options are available for residents. Certainly looking at catchments like Rotoma and Tarawera, to meet the reduction targets for the catchment, it will be some sort of community system as opposed to an individual system.

*Ian McLean:* The Deputy Mayor will want to tell us where this leaves RDC.

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*Dave Donaldson:* Terry thanks for your presentation. I would love to get a copy. The key point from a district council perspective and, having sat on the Lakes Community Board the previous two terms during the process over Lake Rotoma and Rotoehu who opted out, it is great to see an acknowledgement that the community has to opt for reticulation. It is not a case of Council ramming it down their throat.

It was also good to hear the first question - what are the dollars? At the end of the day that is what will matter to people living in the catchment full time and to the absentee owners. We know this as a TLA trying to implement potable water reticulation to lakeside communities. The absentee holiday home owners are often quite happy with a tank, because that provides enough water for the occasional occupancy for their property. But the Mary Stantons of this world want their water every day. Mary has lobbied hard for Mourea but we have never got it across the line. So it is the dollars that are important.

Another important thing to understand is there are no subsidies for OSET or other alternatives to reticulation. The Central Government 50% subsidy is retained at this stage but only applies to a reticulation scheme as does the \$1,500 subsidy per HUE from RDC and the Regional Council subsidy? For OSET you have to pay the full cost as a property owner and the same would apply for a resource consent. It is really important to see those dollars to be informed.

*Mary Stanton:* Kia ora. Willy Emery asked the question, 'What are the dollars?' We have gone through the experience of having a reticulated sewerage scheme and I believe in helping other people and sharing information to understand things better. When it comes to the dollars we had that question too before everybody signed up for the Mourea sewerage scheme. We were given figures but they were not what we paid because we had connection fees added. It was distance from the road. The authorities concerned looked at the road for the sewerage scheme to be installed. If they did not go through the road then they went along the water's edge, the Queens Chain, and that made a huge difference when it came to costings. People further away from the waterways were different. On our Mourea property it was a long distance from the Ohau Chanel to the main road. Therefore my brother, William Newton, paid more because of that distance. Connection fees have to be taken into consideration. The old homes were harder to connect because they had old fixtures and fittings and that also made a difference.

*Ian McLean:* Can I ask you to hold the thought and we will deal with this question in the next session.

*Mary Stanton:* That's alright. The last thing I will say is that if you can get a subsidy you are better off, kia ora.

*Ian McLean:* While I appreciate the questions being asked, they are going to be dealt with by a later speaker, Greg Manzano, RDC, who is going to talk about the costs.

*Kepa Morgan:* This is a clarification of the statements made by Deputy Mayor Donaldson. He was not totally correct. In terms of the subsidy availability it was stated in the Environment Court that the subsidies may be available for alternatives. Councillor Donaldson is suggesting the only option that will attract the subsidy is the reticulation, which is incorrect. I wanted to correct that for the record, thank you.

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## ***Septic Tanks, Sewerage Systems and Health***

**Dr Phil Shoemack**  
**Medical Officer of Health, Tauranga**

Kia ora tatou, I am Medical Officer of Health with Toi Te Ora Public Health, which is the public health unit that provides public health service across the population served by both Bay of Plenty and Lakes District Health Boards.

I am going to talk about the perspective of public health. Our prime interest is the same as everyone else's, the protection of our health. Obviously our health depends on an intriguing web of interactions with our environment. My health is more than about what I am born with. It is about the whole environment that I am part of. This becomes particularly important once we start talking about complex things such as waste and treatment of waste. It is worth remembering that our waste is not inert. It is potentially dangerous because it includes a number of things which can cause us harm, specifically microbes, particularly harmful bacteria, and other micro-organisms.

### **Why are sanitary systems needed?**

- Sewage contains disease causing organisms ( $10^6$  -  $10^8$  per ml) and nutrients harmful to aquatic life
- Infections that can be passed on in sewage are present in the community
- Fundamental purpose is to protect the health of individuals and the wider community from an environment contaminated by sewage

For that reason health is better protected by any system that safely and thoroughly treats our waste. The main purpose of safe effective sewage treatment is to protect the population from harm, both directly from physical contact with sewage and its by-products, but also more indirectly downstream.

We have heard this morning that the water quality of our local lakes is affected by the waste from both people and animals whether they be farm animals or feral creatures living freely in the environment. Water quality is also affected by forestry operations, particularly when the trees are felled, and from natural processes such as geothermal activity. We like to think that everything in nature is safe, but that is not necessarily the case.

Inevitably, there is an interaction between human waste and drinking water because our eco-system is complex. Wherever human waste gets treated ultimately there will be some discharge to the environment. That is going to be linked inextricably with our drinking water because they are all part of the same process. This is why it is so important, as far as possible, to separate the treatment of human waste from sources of drinking water.

Another fundamental is that we should look wherever possible to prevent problems before they occur rather than wait for an adverse health outcome and then try to fix it. If our environment becomes contaminated with our waste it has huge impacts.

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### **Safeguarding Public Health**

- Prevent direct contact with infectious material
  - People, pets, farm animals, food crops/vege gardens
- Protect drinking-water sources
  - current and future, ground and surface water
- Protect recreational and wild food gathering waters
  - algal blooms, elevated bacterial levels

### **Reduce person to person spread and level of disease in community**

I have been primarily alluding to the direct health impacts of infections caused by the bugs that are in our sewage. But the impacts are much more widespread than that. Treatment of human waste was one of the first advances of public health in the 19<sup>th</sup> century.

- It is important that we do not repeat the problems of the past.
- It is important that we learn from the lessons of the past and ensure that our waste is treated effectively and safely, both in the short term and in the long term.

### **Sewage Treatment and Disposal Key Messages**

- A sewage contaminated environment impacts on the social, cultural and economic health of the environment, individuals and the community
- Safe treatment and disposal of sewage is one of the most important measures for protecting public health
- Public Health supports the best practicable sanitary services to protect health

We have already heard about the long time that it takes for water to pass through given water tables. In a way it comes down to judgement about what is the best practical solution taking into account belief systems, costs and the level of risk we are prepared to accept because none of these systems are 100% safe. The greater the risk reduction, the greater the compromise. Such compromise usually includes cost, but it can also include decisions about land use or where the sewage treatment and the discharge of treated effluent is going to occur? Is it on my own property? Is it on some communal property close by or will it be on some distant property?

To any of these challenges there will be lots of engineering solutions. If there was just one option it would be very straight forward. There is usually a range of options and it is a

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matter of deciding which is best for the local scenario. In general terms a reticulated system with centralised treatment is better at reducing risk to the public's health. It might not be as good at doing some other things, but I am confident that for a community of more than a few houses it is preferable. On-site treatment systems do have their place. They can be incredibly effective at safely and adequately treating human waste for a small number of relatively isolated properties each of which has a significant piece of land on which their on-site treatment occurs; and provided the on-site treatment system is distant from any water course.

Inevitably it is about finding the best compromise for the given local scenario. For Rotorua city where there are 45-50,000 people it would require a strong argument to persuade me that on-site treatment is an effective and safe option. In smaller communities the argument is not quite so clear. Expecting individual house owners, or people who are renting someone else's property, to take full responsibility for looking after their on-site treatment system is a big ask. Someone very knowledgeable and dedicated to the cause will look after their own on-site treatment system, but most people have more important things in their lives than managing their own sewage treatment system.

## Reticulated vs Onsite Systems

Reticulated and centrally treated systems	Onsite Treatment and Disposal Systems
People separated from their waste	Sewage treated and disposed on-site
Suitable for built-up areas	Suitable for isolated individual dwellings/buildings, depending on location
Professionally designed and maintained	Homeowner maintains and operates
Single discharge location	Each dwelling has separate discharge location
Quality of treated effluent is monitored	Unknown and variable quality of treated effluent



The current central government subsidy was introduced in 2003 following a Cabinet decision. The subsidy was explicitly designed to assist small, relatively rural, communities to improve their sewage treatment. Taking into account the Environment Court statement, the rules that Cabinet put in place state that on-site treatment systems are not eligible for the subsidy.

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### **Sanitary Works Subsidy Scheme (SWSS)**

- Administered by the Ministry of Health
- Finite pool of money
- Subsidy criteria include:
  - Sanitary systems serving a minimum of 100 people
  - Only reticulated (sewerage) systems eligible (no on-site systems)
- Subsidy amount is based on:
  - Risk to health from present sanitary systems
  - Level of improved health protection from a proposal
  - Ability of the community to pay

No new applications for subsidies have been taken for the last 3 years. The Rotoma/Rotoiti proposal has provisional approval with final approval awaiting confirmed engineering design of an eligible sewerage system; there is a process of preliminary, provisional and final approval. The Minister of Health has extended availability of the subsidy for the Rotoiti/Rotoma system until later this year.

A number of communities were successful in attracting a subsidy and have since commissioned fully operational new sewerage schemes. Rotoiti/Rotoma is one of the last communities to have a subsidy waiting to be uplifted. As one of the conditions for the subsidy Rotorua District Council has undertaken to operate and maintain the system for 20 years.

In summary, as a Medical Officer of Health I believe it is important to separate people from their waste in order to minimise the risk to public health. On-site systems can be effective and safe but only in certain circumstances; far away from water bodies, on large

### **Sanitary Works Subsidy Scheme**

- Rotoma/Rotoiti scheme has provisional approval
  - for 50% (\$4.46M) of the sewerage works
- Provisional approval extended until 30 June 2017 following the Environment Court decision.
- Security of subsidy beyond that date is highly unlikely
- Provisional approval dependent on:
  - the proposed scheme meeting the subsidy criteria
  - investigations, consultation and confirmation of scheme to be completed by 30 June 2014
  - preliminary design and consents completed by 30 June 2015
  - commissioning and construction completed by June 2017

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pieces of land and servicing a few scattered dwellings. The daily operation of a wastewater system is not simple. It requires a lot of technical knowhow, expertise, ongoing attention and commitment and most individuals cannot, or do not want to, take that responsibility.

### Summary

- Separation of people from their waste is paramount for the protection of public health.
- Use of onsite systems is only appropriate for isolated dwellings
- Without regular maintenance onsite systems have the potential to fail and cause a health nuisance
- Reticulated professionally operated waste water disposal is the most protective of public health.

## Questions

*Francis Turner-Curtis:* Kia ora, you are preaching to the converted, thanks for the health lesson. We had an expert around our waste disposal and our water through Waikino waikino, waimate and waiora. It can also be referenced in Dr Hirini Moko Mead's book on Tikanga, we have been practising what you have explained for generations - through our Tikanga around tapu and noa. Hence why we have our old people, our kuia, here today. But my real question is around the Sanitary Works Subsidy Scheme and I am speaking on behalf of our marae around the Rotoiti area. In hindsight, and hindsight is always a good thing, it would have been nice to have had this information a lot earlier and available for all of us so that we can get on with it.

*Phil Shoemack:* The rules and requirements associated with the Sanitary Works Subsidy Scheme are on the Ministry of Health website, which is moh.govt.nz.

*Ian McLean:* One of the purposes of this workshop is to get the information that is required and a list of the people to make sure it can go out.

*Lyall Thurston:* Phil thanks for your presentation. In terms of the subsidy from the Ministry of Health, if and when the putea is handed over, would it be inflation adjusted? I am mindful of the dwindling pot that will inevitably be passed over.

*Ian McLean:* Greg you probably know more about the movement that there has been in the subsidy amount than I do.

*Greg Manzano:* The subsidy is 50%, or a lump sum of \$4.46 million. Probably there will be some adjustments with CPI but that is to be a discussion between our RDC and John Harding in the Ministry of Health. Rotoma is subsidised by the Ministry of Health, 50% or \$4.46 million, and the Rotoiti scheme is from the Ministry of Health subsidised by the Ministry for the Environment at a rate of 50% of the total cost.

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*Phill Thomass:* I want to confirm, which Greg just did, that the Sanitary Works' subsidy is only for Rotoma and a portion of Rotoehu if they did join the scheme. Rotoiti gets their funding from Ministry for the Environment, is that right?

*Phil Shoemack:* That's my understanding.

*Phill Thomass:* You mentioned that one of the requirements is that RDC maintains a system for 20 years. One of the options on the table would be taking the discharge from the reticulated system to Kawerau, would the subsidy still be applicable if the reticulation was to Kawerau?

*Phil Shoemack:* My understanding is that the subsidy would still be applicable.

*Jim Bradley:* You gave us a good summary of on-site versus community reticulated. The question of separate urine collection from individual properties has cropped up; can you be any more specific on that? To my knowledge we do not have that in New Zealand but it does not mean it is not the way to go. Has the Ministry been watching that overseas? Can you be more specific from a health point of view putting aside the subsidy issue?

*Phil Shoemack:* There are plenty of engineering solutions and whatever system that separates urine is technically feasible. From a public health perspective I am not yet convinced that they are any more protective of public health, and my fear is that they are less protective of public health than a reticulated system.

*Joe Tahana:* Morena, you alluded to separating people from their waste is important. Septic tanks achieve that to a certain degree unless you are in an area close to a lake. If that is the case then have you issued health notices against those non-compliant homes close to the lake?

*Phil Shoemack:* No I have not because that is not my role; it is the Regional Council's role.

*Joe Tahana:* But you made the comment that if I am close to the lake then in all probability there will be a health risk with my septic tank.

*Phil Shoemack:* It is not a case of whether there is or isn't a risk. It is about the level of risk. There is a higher level of environmental and health risk in that situation.

*Joe Tahana:* Have you any data that supports your assessment of high risk out there at the moment within the lake catchments?

*Phil Shoemack:* No, I said higher risk. I have not got the figures in front of me but the Regional Council has done a survey of septic tanks within the catchments that we are talking about and a significant proportion were not operating as they would have been originally designed to. This is either because they were not built as designed, or they have not been appropriately operated and maintained.

*Joe Tahana:* Thank you. That leads on to the next question. Does Regional Council know how many non-compliant systems are out there close to the lake?

*Phil Shoemack:* Is there anyone here from the Regional Council? I am aware that there were surveys done about 2006/7.

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*Unidentified speaker:* It is like a moving feast and so this week there could be quite a number, next week there might be more or less and we do not know at any given time which one is available.

*Craig Brown:* To cut to the chase does RDC know of a survey, have they got the surveys?

*Phil Shoemack:* I guess on fundamental first principles there are many properties with a low water table which are on septic tanks. I do not know what proportion but some were never constructed adequately in the first place and others have not been adequately maintained. This means that there is an increased level of risk.

*Craig Brown:* Sorry you were alluding to problems with the septic tanks around the lake.

*Phil Shoemack:* Well, contamination of the environment and extra nutrient loading on the lakes, for instance.

*Craig Brown:* Yes those are the problems you alluded to. So my question was, you said that it was better to prevent problems before they occur, but has anything been done to do that?

*Phil Shoemack:* That is why we are here, the purpose of today, I thought.

*Craig Brown:* No sorry I need to clarify, you said before they occur, but you have also said that they have occurred. We cannot be preventing them before they occur if they have already occurred.

*Kepa Morgan:* Kia ora, Phil. To fill in the gap in knowledge around urine, it is sterile; you can drink your own urine. To allude that there is a higher risk with urine than with waste water is just silly, you need to do some reading Phil.

On the second one, have you got an issue with the reticulated system effects on the Puarenga Stream, because you have suggested reticulation is superior to on-site? We have established there are no notices or valid data around the septic tanks.

*Ian McLean:* This is not to do with the Puarenga, can we focus on the first question.

*Kepa Morgan:* It is in because you want to take the waste from Rotoiti and put it through the Rotorua scheme. If we are to be confident that reticulated schemes are working, that is where it is going at the moment and how is that performing? I will let you tell us.

*Phil Shoemack:* I am not responsible for the Rotorua Treatment Scheme and as has already been suggested today there is a lot of work that needs to be done to improve that as it cannot carry on the way it is.

*Kepa Morgan:* So the reticulated option is failing?

*Phil Shoemack:* One of the reticulated options needs to be improved.

*Kepa Morgan:* It is currently not meeting consent.

*Phil Shoemack:* I do not think it is useful to use terms like safe or dangerous, or failing or effective. It is still working, it needs to work better and there needs to be some engineering changes to improve it.

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Going back to urine separation systems, they can work very well. In practice I am not convinced that they will in every instance. To get an absolute separation of urine from faecal matter will work pretty well a lot of the time, but there will be problems associated with that. That is all I am saying. It is not about safe or dangerous, it is about minimising the level of risk.

*Don Atkinson:* Just a matter of clarity, prior to the sewerage scheme in Okawa Bay, during the holiday period we walked around the bay with shoes or gumboots to avoid going through the sewage. Are those sewage weeps the danger that you are talking about?

*Phil Shoemack:* One of, yes definitely. And I can assure you that around the rest of the lake in many locations where there are septic tanks that is still the case.

*Ian McLean:* Thank you everybody for a lively session and in particular thank you very much Phil for coming over. Unfortunately Phil has commitments this afternoon and he is not able to be here, but Annaka will be here. So anything that you wanted to ask Phil this afternoon you will be able to ask Annaka.

We now come to a change of pace in the programme. We have been dealing so far with background and now we have the options for sewage and there are going to be two speakers in this session. Firstly, Greg Manzano will lay out options as they have been developed by RDC on the basis of the last Steering Committee's request. We also have Craig Brown who will be presenting on further options and issues. All the questions will be dealt with together after Craig's presentation.

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## Options for Sewerage

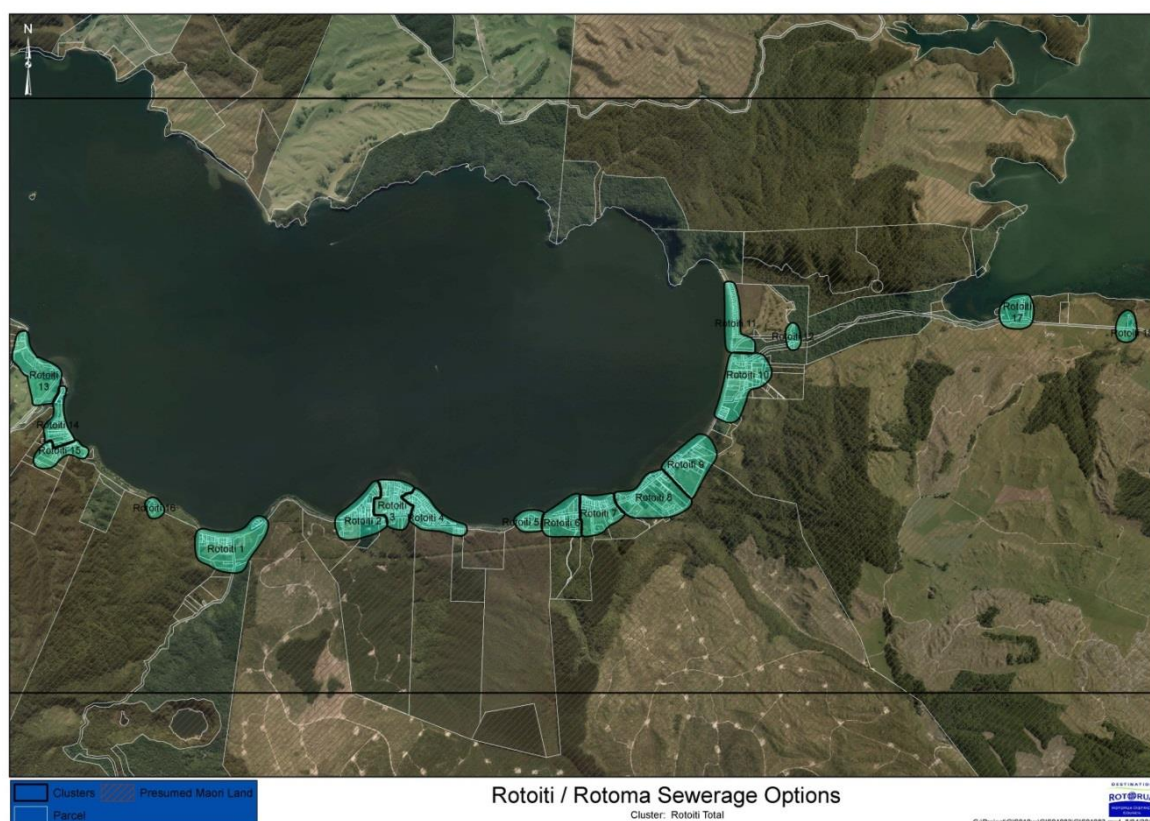
### Greg Manzano Rotorua District Council

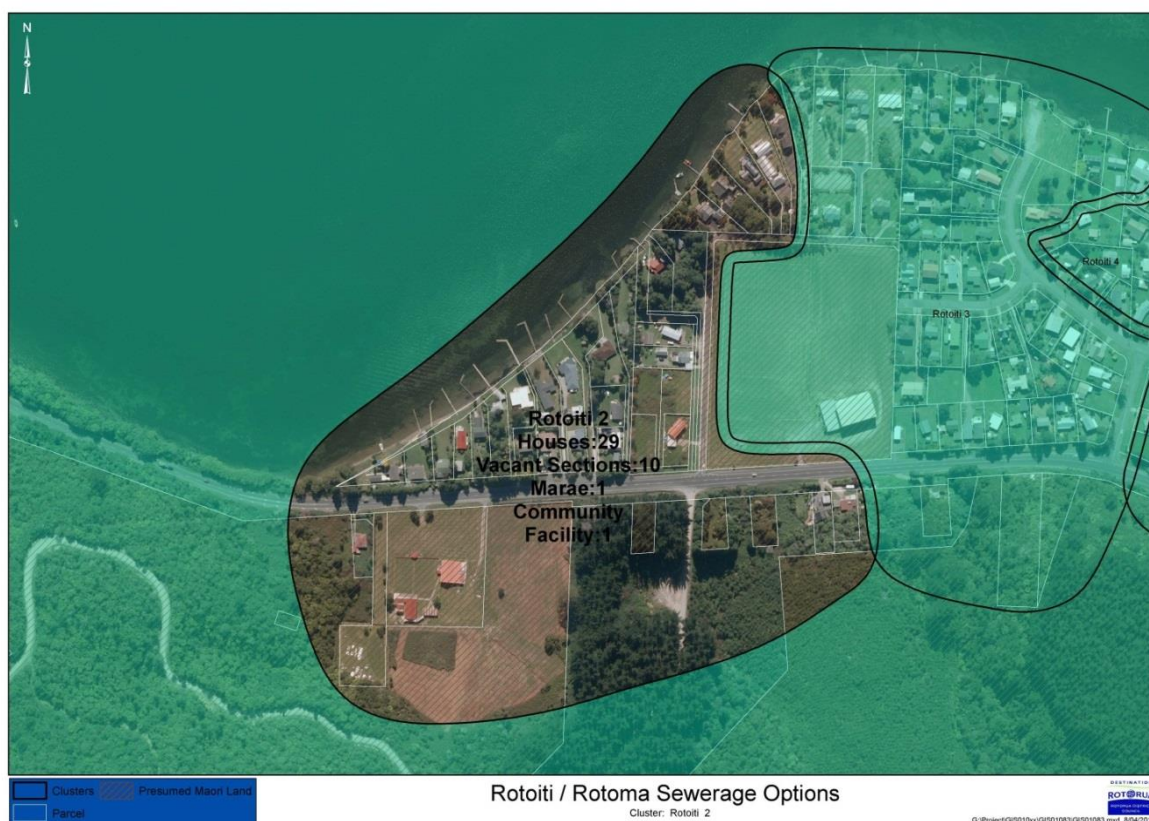
*Ian McLean:* Greg Manzano has been design engineer and managing the construction for RDC over its expansion of sewerage and has brought most of the projects in, if not all, on time and below budget, which is a very good achievement for an engineer.

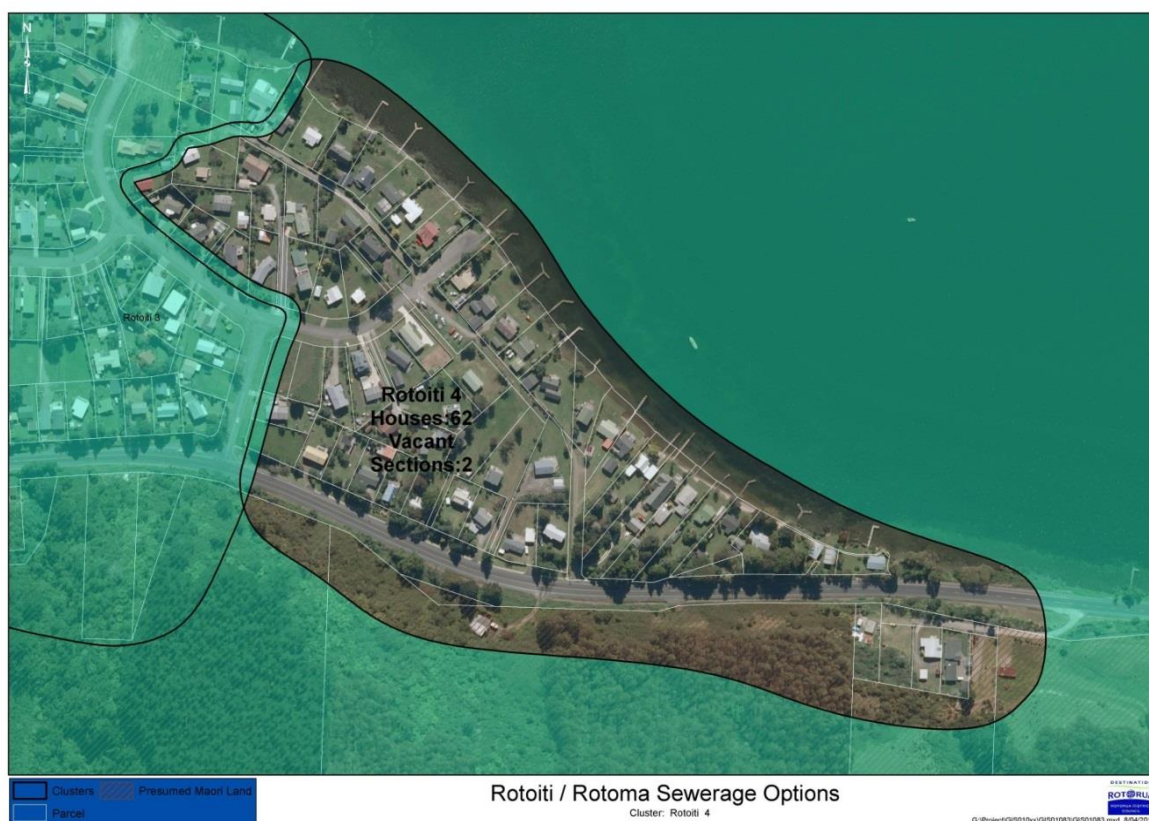
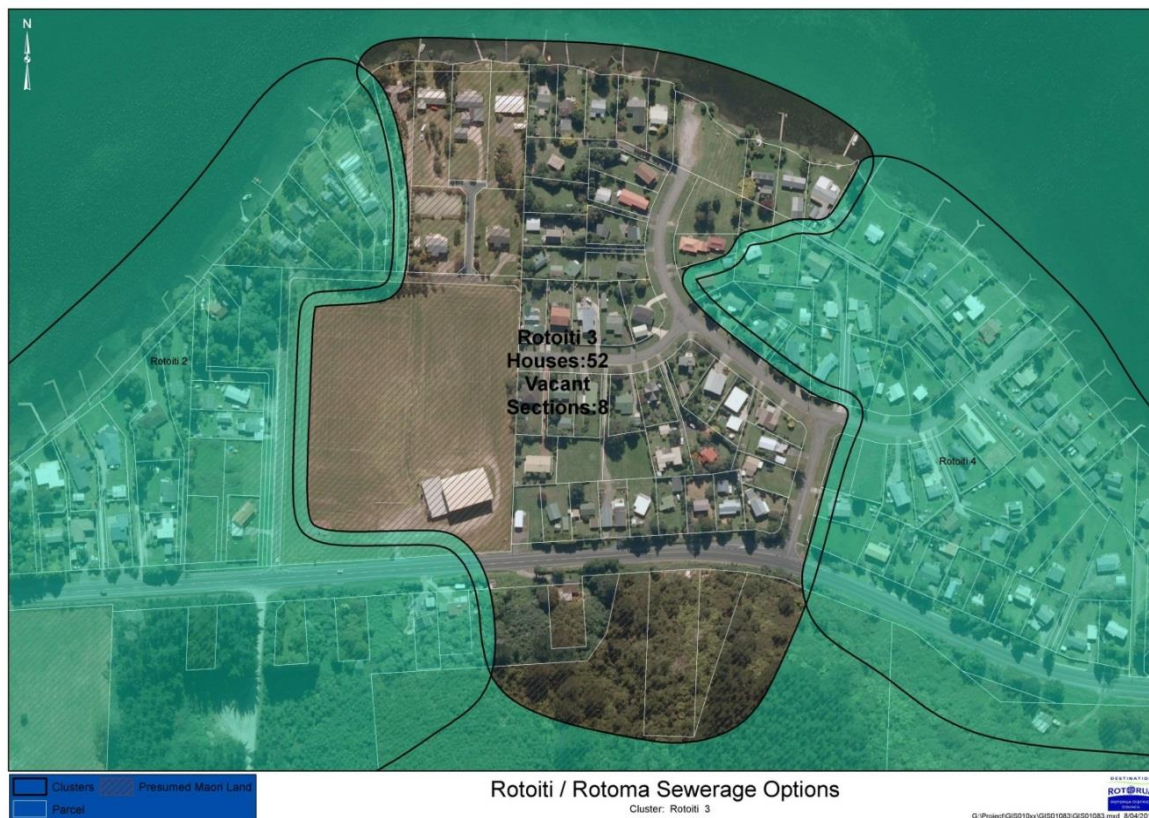
*Greg Manzano:* Thank you Ian, I hope I can live up to that expectation. Before I proceed I would like to acknowledge the work that has been done by my team. I did not do this alone. Riann has been the main driver developing much of the schemes and thanks for the work done by Jim Bradley and obviously my boss Andy Bell.

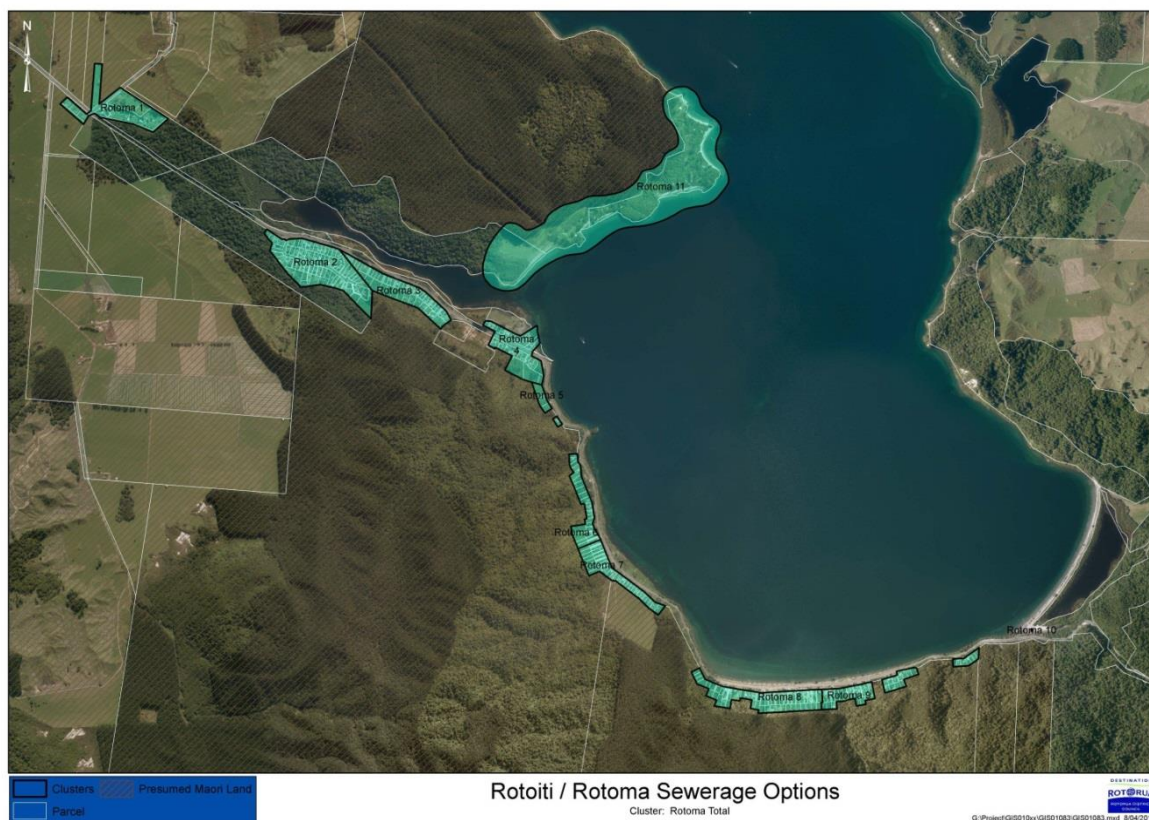
There are six options currently under consideration plus an option that will be presented later by our colleague Craig Brown. The presentation will cover most of the six options with a summary of the key aspects of each option and indicative costs of the options will also be provided.

These are a series of slides showing Lake Rotoiti and Lake Rotoma and the clusters around each lake. The Rotoiti scheme starts from Curtis Road, Tamatea Street, Gisborne Point, Ruato Bay and Morehu Road and passes by two clusters at Lake Rotoehu.

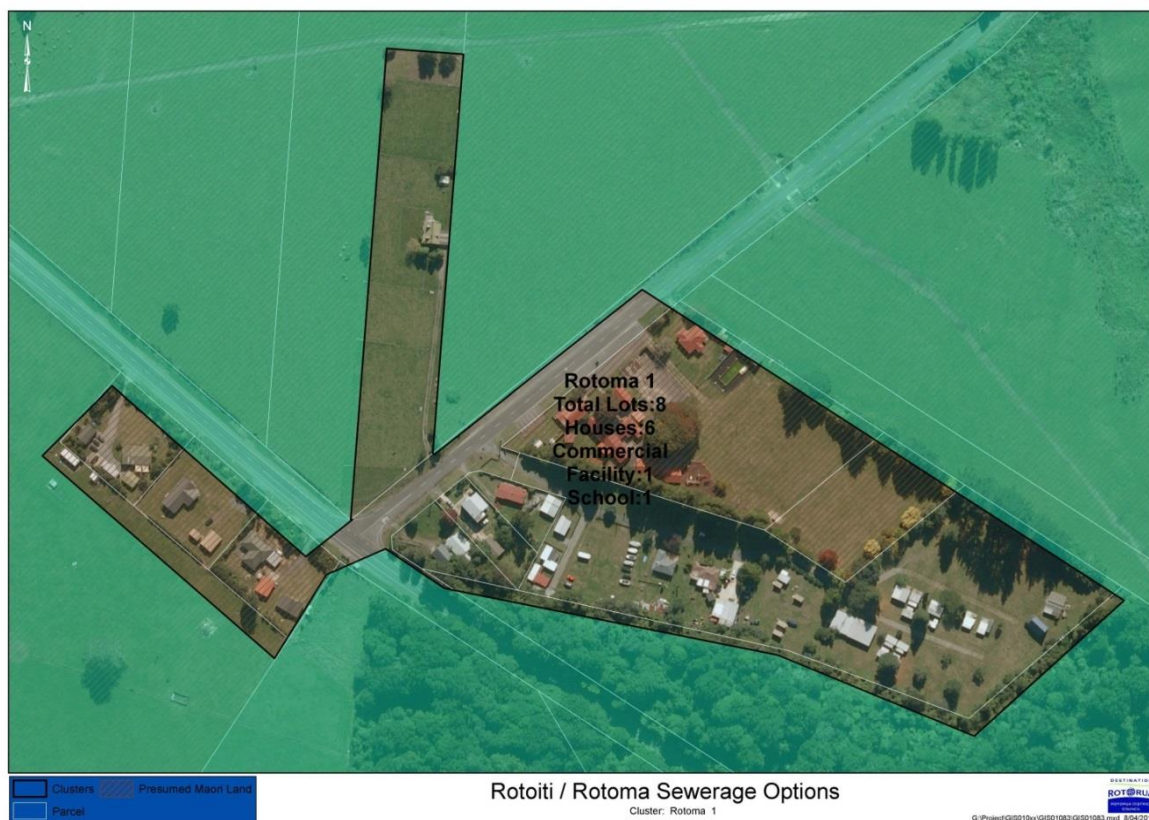


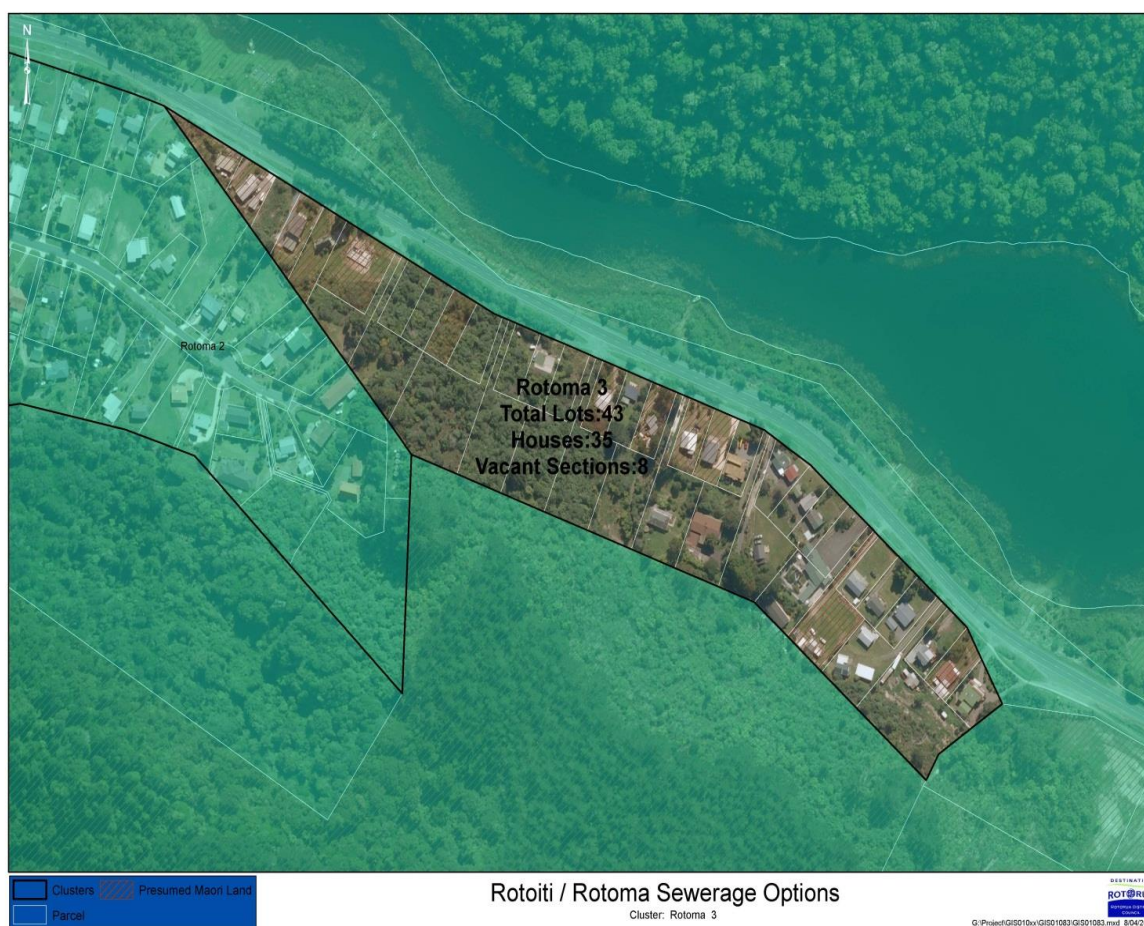
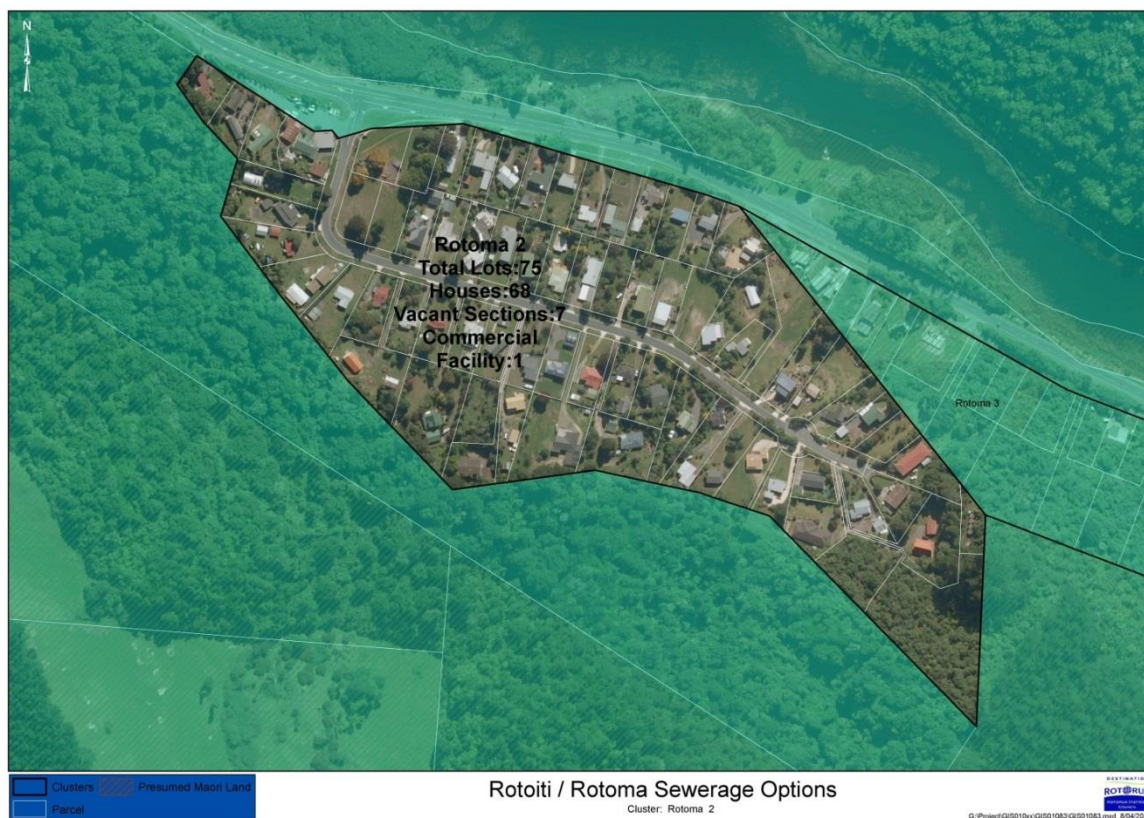




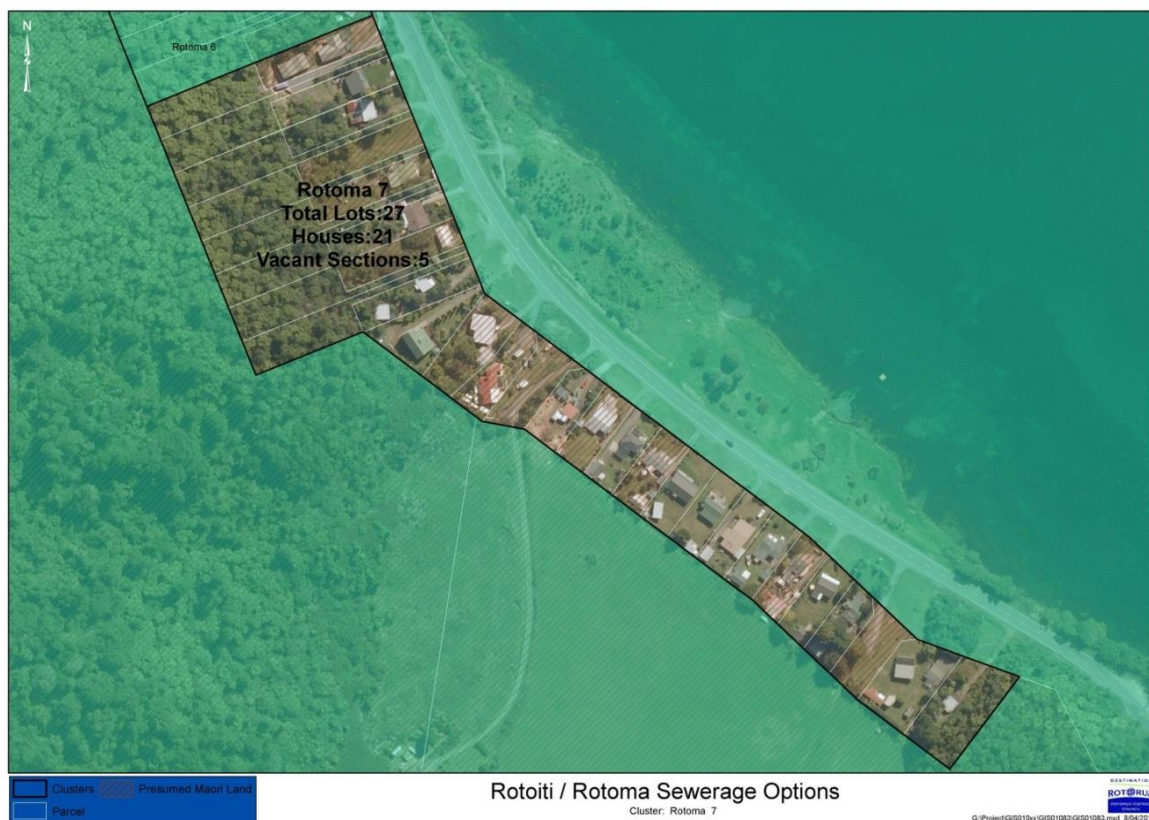


Rotoma starts from Manawahe Road with a series of clusters and ends at the foot of the Whakatane hill where there is a public toilet, and includes Doctors' Point.









One of the options came through this committee process from a comment by Morris Meha about clustering of the properties. We did some work developing clusters for the whole area of benefit, called area of service 53, and developed statistics of the clusters. Our criteria were cluster properties where their gravity drains into a collection point. We identified 29 clusters with a range of properties from 6 to 79 a cluster.

If you want to look at it in detail there is a hard copy and for the sake of time I will not go through them one by one. What may be of interest is the summary of the individual statistics of the clusters (Slide16). We broke down the 29 clusters into total number of lots, occupied houses, vacant sections, marae, community facilities, commercial facilities, schools and public toilets.

## Summary of Properties and Facilities

Description	Rotoma	Rotoiti	Total
Occupied houses	Rotoma Main Area: 232 Doctors Point: +20 = 252	Ruato Bay to Hinehopu Main Area: 362 Curtis / Haupara: +39 Morehu: +13 = 414	666
Vacant Sections	Rotoma Main Area: 43 Doctors Point: +4 = 47	Ruato Bay to Hinehopu Main area: 107 Curtis / Haupara: +6 Morehu: +0 = 113	160
Marae	0	7	7
Community facility	2	2	4
Commercial facility	4	1	5
Schools	1	1	2
Public Toilets	1	2	3

The Rotoma main area is the community around the state highway with 232 occupied houses. Doctors' Point has 20, and there are 43 vacant sections at Rotoma and 4 at Doctors' Point, a total of 47 vacant sections and 252 occupied houses and 2 community facilities, the school and the fire station. There are 4 commercial facilities, the shop, the café, the fuelling station and the camp ground, and one school and a public toilet at the bottom of the Whakatane hill.

For Rotoiti there are 414 occupied houses from Curtis Road down to Morehu Road and 113 vacant sections. Rotoiti has 7 marae and 2 community facilities, the rugby club and the school. Altogether there are 666 occupied houses for the whole scheme and 160 vacant sections or 826 potential unsubdivided sections.

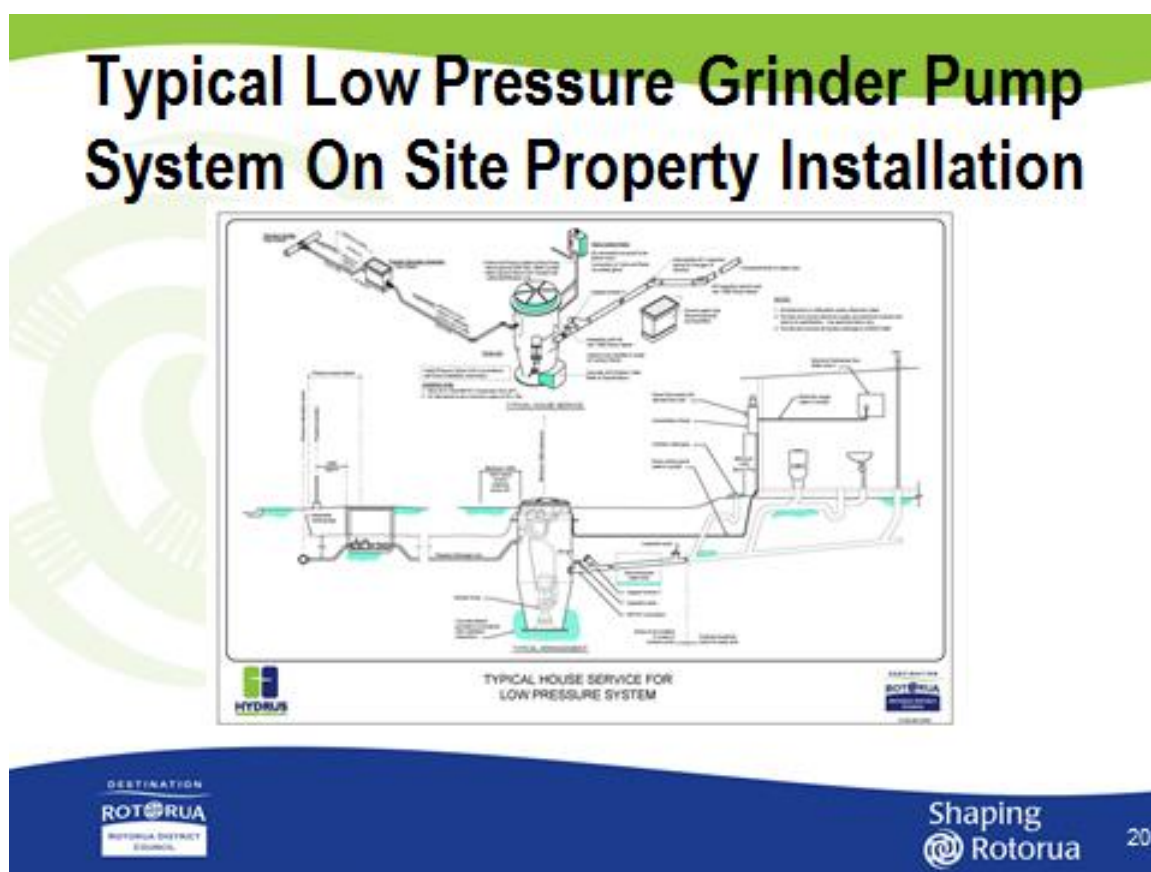
The options were based on several investigations from the time the scheme was first proposed in 2007. We have updated the information in terms of technology and indicative costs of each option. There are 6 potential options plus the option to be presented by Craig. We will summarise the key aspects of the options and also the non-cost aspects.

A community reticulation system requires a wastewater treatment system and a disposal system. The centralised reticulation system is based on a low pressure grinder pump system. The wastewater treatment plant is based on a membrane bio-reactor plant for the centralised and clustered systems. The MBR is the system we use in town and it could bring the level of nitrogen up to a concentration of 5 milligrams per litre. The cost estimates are based on concept level details and preliminary design.

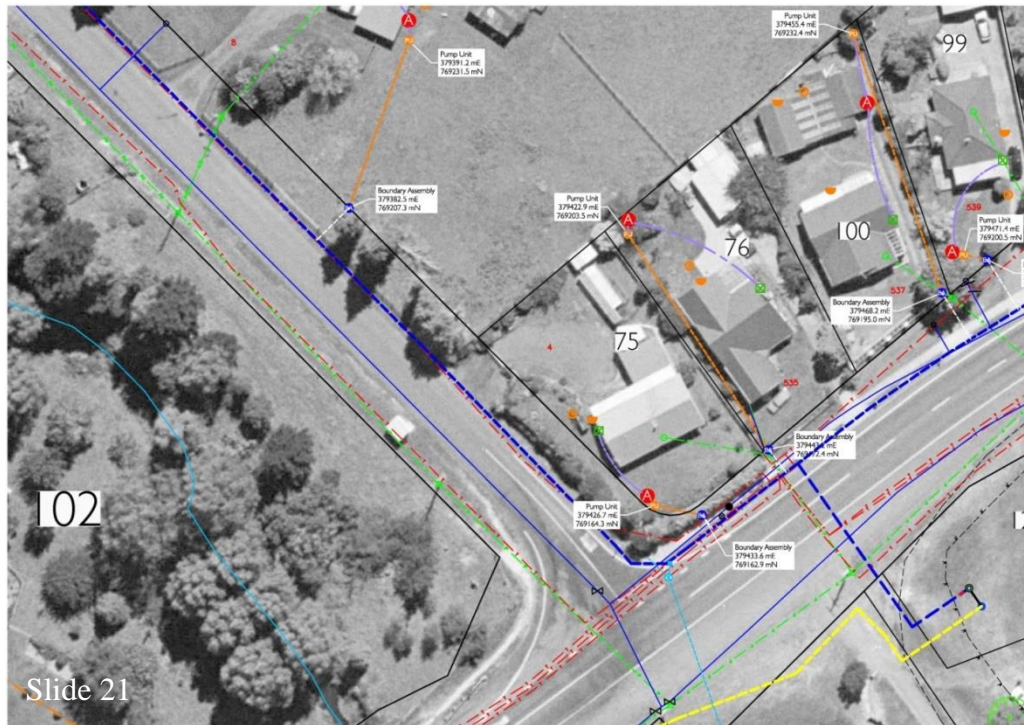
In terms of the estimates comparing different costs, if they are within a 5% difference of each other, they should be taken as the same at this stage. That means for a \$30 million cost, a \$1.5 million difference does not matter, for a \$40 million cost, a \$2 million difference does not matter. This explanation will help in the context when we compare the options later on.

The capital cost in the option to come back to Rotorua includes a contribution from the community towards a potential upgrade of the Rotorua MBR or the already existing capacity of the Rotorua Treatment Plant and Land Treatment System. We have not allowed for a capital cost of joining to Kawerau, and have put a continuous operational cost as a charge from Kawerau to Rotorua.

When we go to the cost per property we have applied central government subsidies from the Ministry of Health, 50% or a cap of \$4.46 million, and another central government subsidy from the Ministry for the Environment which is 50% of the capital costs. There was initially a cap but there is an application to remove that and Andy would probably be the one to comment, but we are still working on that. We also have the Bay of Plenty Regional Council subsidy which ranges between \$1.6 and \$2.2 within the two communities, and obviously the RDC subsidy which is \$1,500 per property.



Slide 20 is a diagram of a low pressure grinder pump system which has been implemented, starting from Hinemoa Point, then Brunswick, Rotokawa, and we also have Okareka, Okere Falls, Otaramarae, Whangamarino and the recently completed Hamurana Ohau scheme. Over the last 5 to 6 years around 1,500 units of this system have been installed within the district and according to our operations manager we have no major issues.



How does it work? Slide 21 shows a typical low pressure grinder pump system reticulation layout. A pump will be installed to each property and there would be a boundary where the service connection joins the pump to the community system. There would be an individual pump for each property with about 1,000 litres of storage capacity. Then the plumbing system of the property will drain into the pump and the power supply is connected to the power supply of the property. The control panel provides control between the pump and the power supply.

The ownership model adopted by RDC means that the system is owned by RDC, declared as an RDC asset and operated and maintained by RDC. The individual units pump into a street main and from the community system it would go into a trunk system on to a treatment plant and disposal point.

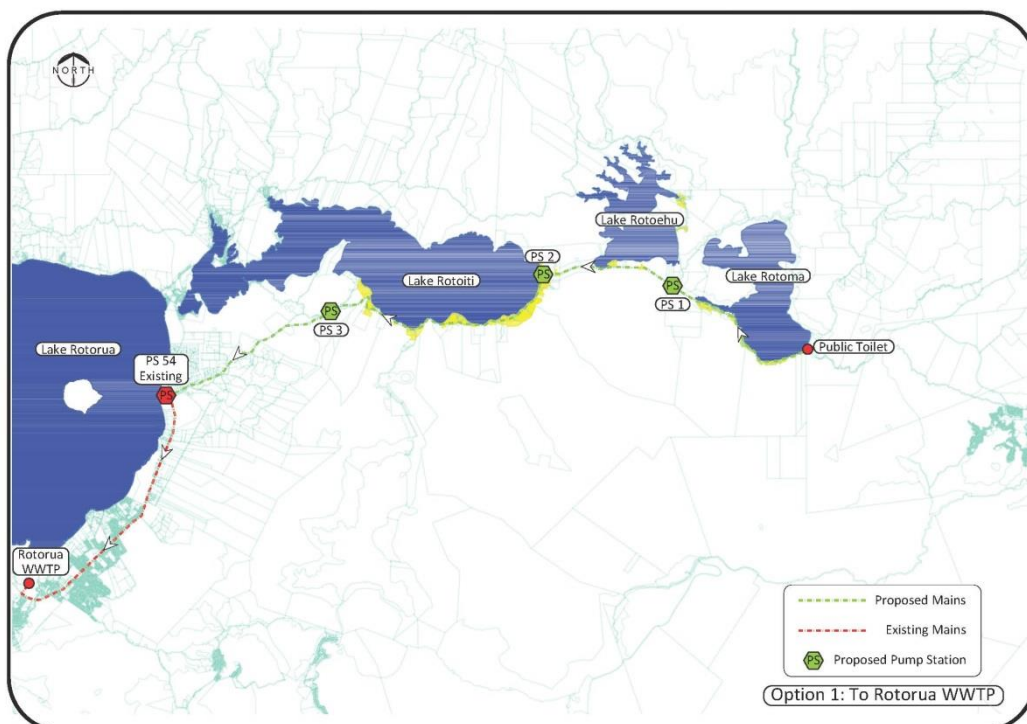
### **Option 1 – Centralised Reticulation System to the existing Rotorua Wastewater Treatment Plant and Land Disposal System (WWTP and LDS)**

The first option is a centralised reticulation system to the existing Rotorua Wastewater Treatment Plant and Land Disposal System. One of the key issues in terms of technical and environmental consideration is the additional hydraulic and nutrient loading into the treatment plant, which could probably complicate our resource consent application which is currently in the process of a variation to our existing resource consent.

The two communities connect to the existing Rotorua wastewater Treatment and disposal system

- Additional hydraulic and nutrient loading at the existing Rotorua WWTP and LDS and septicity and odour issues related to the long sewer trunk mains are key technical and environmental considerations
- Pipeline alignment to respect wahi tapu sites and transfer of wastewater (human waste) from one rohe to another are key cultural considerations
- Disruption of State Highway traffic during construction of sewer trunk main needs to be considered
- Inclusion of effluent from the two communities into the current application for variation of existing Rotorua WWTP and LDS resource consent
- Indicative Estimate of Costs
  - Capital \$27M
  - Operating \$0.60M/year average
  - NPV \$40.50M (40 years at 3.5%)
  - Indicative Rotoma Cost per Property (unsubsidised/subsidised)  
\$30,000 / \$12,000
  - Indicative Rotoiti Cost per Property (unsubsidised/subsidised)  
\$32,000 / \$8,500

Pipeline alignment is also a very tricky matter. There would be around 23 kilometres of rising main from the end of Rotoma coming into Rotorua. It is not only the technical issues related to trenching on the road, we also have to respect the wahi tapu sites along the area and we have already had an initial discussion with Iwi. Of course the transfer of waste from one rohi to another is an issue. The capital cost for this is around \$27 million, with an operating cost of around \$0.6 million per year. It brings this option to \$40.5 million over the duration of 40 years at 3.5% interest. When you break that down into cost per property, for Rotoma an unsubsidised cost of \$30,000 and a subsidised cost of \$12,000 per property. For Rotoiti, an unsubsidised cost of \$32,000 and a subsidised of \$8,500.



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Slide 23 shows the system starting from the public toilet, passing through the main area of Rotoma, through Tamatea Street, Gisborne Point, climbing up the Tikitere hill, down into State Highway 1 where it joins the existing pump station which we call the Mataikotari Road pump station at the bottom of the road. That pump will take the sewerage into the existing Rotorua Wastewater Treatment Plant. We have 3 major pump stations in around 23 kilometres of rising main.

## **Option 2 – Centralised Reticulation System to the existing Kawerau WWTP and LDS**

The two communities connect to the existing Kawerau WWTP and Rapid Infiltration beds

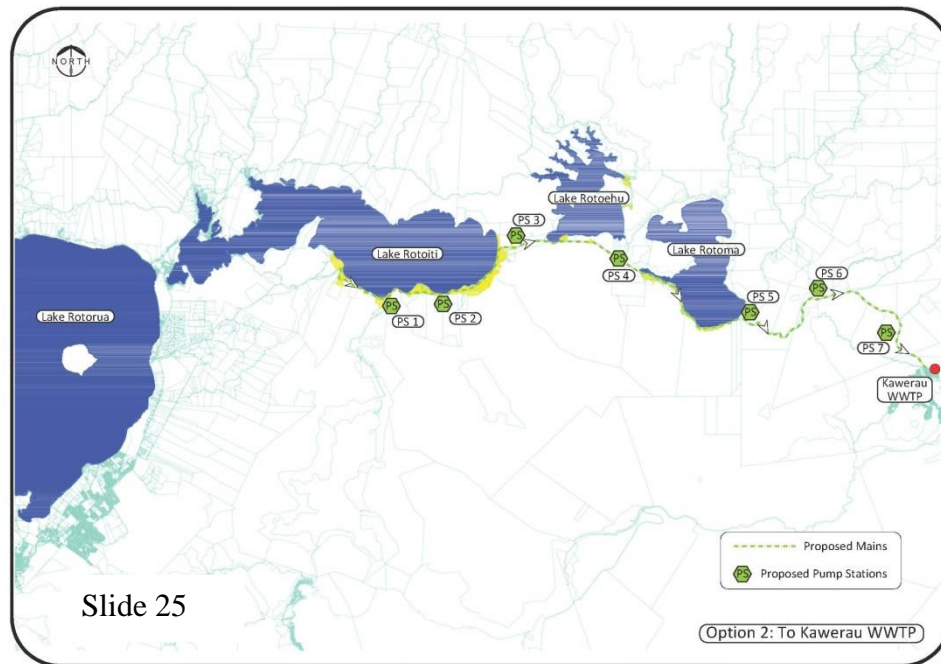
- Additional hydraulic and nutrient loading at the existing Kawerau WWTP and rapid infiltration beds and septicity and odour issues related to the long sewer trunk mains are key technical and environmental considerations
- Pipeline alignment to respect wahi tapu sites and transfer of wastewater (human waste) from one rohe to another are key cultural considerations
- Disruption of State Highway traffic during construction of sewer trunk main needs to be considered
- Long term agreement with Kawerau needs to be established
- Variation to consent conditions of the existing Kawerau WWTP and rapid infiltration likely to be required
- Indicative Estimate of Costs
  - Capital \$25M
  - Operating \$0.50M/year average
  - NPV \$34.50M (40 years at 3.5%)
  - Indicative Rotoma Cost per Property (unsubsidised/subsidised)  
\$27,000 / \$9,000
  - Indicative Rotoiti Cost per Property (unsubsidised/subsidised)  
\$30,000 / \$7,500

Option 2 joins the two communities to the existing Kawerau Treatment Plant and rapid infiltration beds. This is a system that is going the other way but another variation of the centralised system. Another issue, which is always a problem when going into an existing system, is the additional hydraulic and nutrient loading it will impose on the existing Kawerau Treatment Plant. Although at the very preliminary level there is enough capacity, we still have to do a detailed exercise to make sure that is the case.

There is also the issue of long sewer trunk mains where odour could happen which is the same with the other option. Similarly to Option 1 we have to look at the alignment of the trunk mains to ensure that we respect wahi tapu sites and the cultural considerations when transporting human waste from one rohi to another and that has to be considered very carefully with Iwi.

One of the key political aspects that we need to consider with this option is developing a long term agreement with Kawerau in terms of operation and maintenance. We do not want to connect where after 3 years there is a change in politicians and they will not accept it anymore.

For this option there is a capital cost of about \$25 million, with an operating cost of \$0.5 million and a net present value of \$34.5 million over 40 years. The indicative costs for Rotoma are \$27,000, subsidised cost of \$9,000. Rotoiti unsubsidised is a cost of \$30,000 and the subsidised cost of \$7,500. Slide 25 is the schematic layout going the other way from Option 1 but we have more technical issues in terms of designing the hydraulics of the pipeline and need to establish around 7 pump stations and 30 kilometres of trunk main. The system will connect directly into the inlet of the existing treatment plant.



### Option 3 – Centralised Reticulation System with a common WWTP and LDS

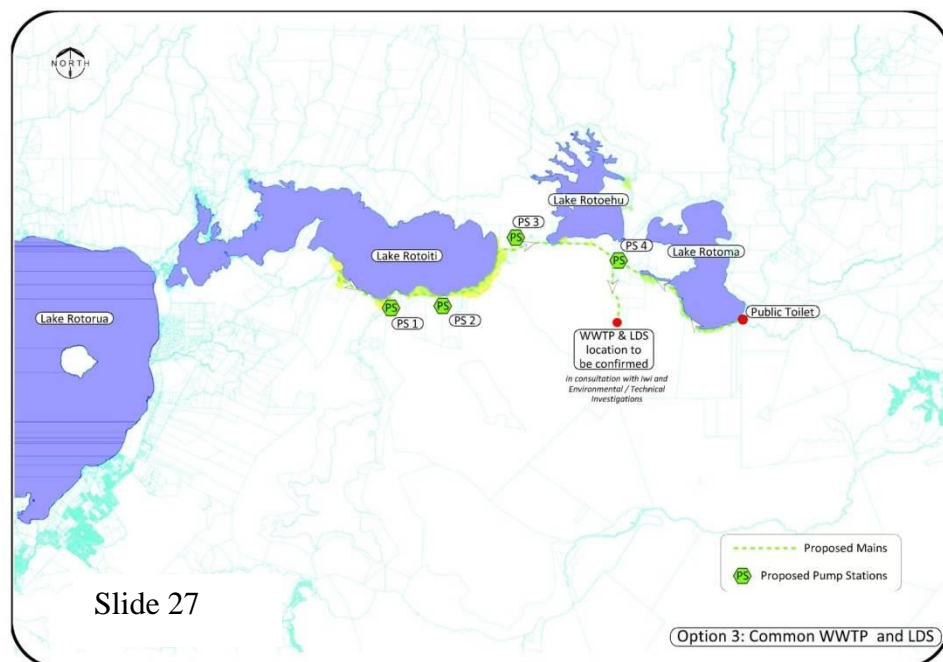
The two communities connect to a common WWTP and LDS located within the boundaries of the two communities

- Availability of Land for WWTP and LDS site
- WWTP and LDS site selection in consultation with iwi consider all cultural, engineering, geotechnical, groundwater and environmental requirements
- Variations in summer and winter loadings a significant consideration
- Pipeline alignment to respect wahi tapu sites and WWTP and LDS site selection in consultation with Iwi to respect wahi tapu sites are key cultural considerations
- Disruption of State Highway traffic during construction of sewer trunk main needs to be considered
- Resource consent for WWTP and LDS will be required
- Indicative Estimate of Costs
  - Capital \$27M
  - Operating \$0.50M/year **average**
  - NPV \$39M (40 years at 3.5%)
  - Indicative Rotoma Cost per Property (unsubsidised/subsidised)  
\$25,500 / \$7,500
  - Indicative Rotoiti Cost per Property (unsubsidised/subsidised)  
\$35,000 / \$10,000

This option is a centralised reticulation system with a common treatment plant and land disposal site within the area. That means the two communities join into a common wastewater treatment plant and disposal site. One of the key issues is where do we discharge this? What is the availability of land for a treatment plant and disposal site? Obviously in determining the wastewater treatment plant and land disposal site we need to consult with Iwi and undertake technical ground water and environmental investigations. A centralised system brings into focus a bigger area, which is the whole of Rotorua; we need to carefully consider the variations in the summer and winter loadings in the design of the reticulation system and treatment plan.

With any pipe system, the alignment must respect the wahi tapu sites and we have already done some initial work in this area. We will need resource consent for the treatment plant and land disposal system for this new facility.

The NPV is \$39 million, the capital cost is \$27 million and the operating cost is about half a million a year for this scheme. The Rotoma cost per property unsubsidised will be \$25,500 and \$7,500 subsidised. For Rotoiti it is \$35,000 unsubsidised and \$10,000 subsidised. Slide 27 shows the schematic of the potential system.



I should point out again that if it is going to proceed the key to this land treatment system is the availability of that land. It will be the first walk that we need to do. There was a site when we did the initial work in the Totaramata Forest site, but we need to look again at that option with the property owners and do more work on the geo-technical and ground water investigations.

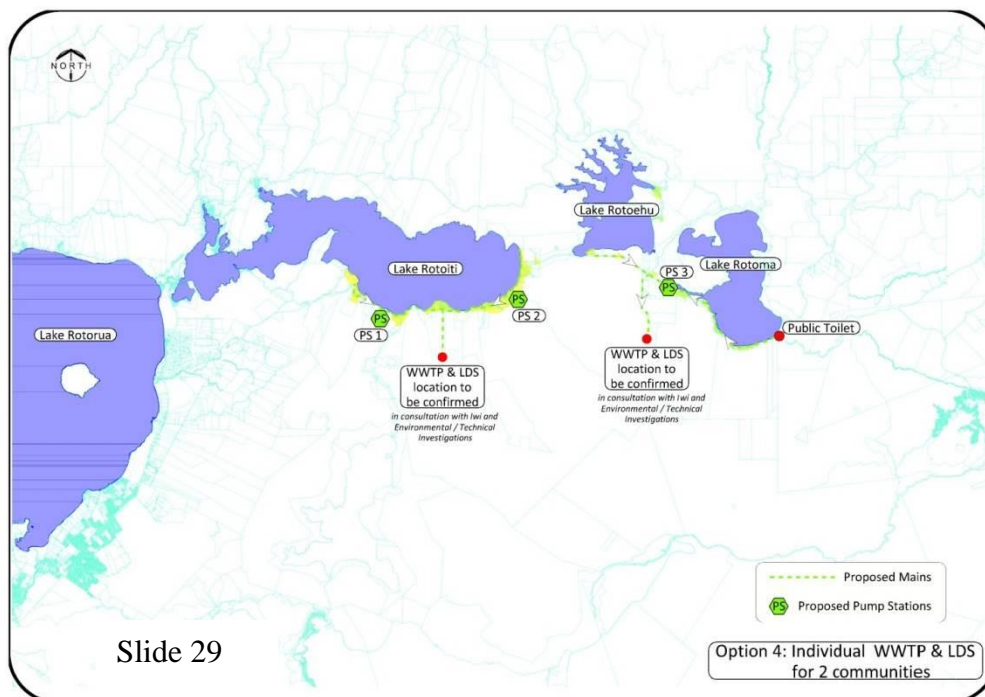
#### **Option 4 – Two Centralised Reticulation Systems for Rotoma and Rotoiti with Individual WWTP and LDS for Each Community**

Instead of a common treatment plant this option requires two centralised systems for Rotoma and Rotoiti each with their individual wastewater treatment plant and land treatment system located within their own catchments.

Each Community will connect to their individual WWTP and LDS located within the individual catchments

- Availability of land for WWTP and LDS site
- WWTP and LDS site selection in consultation with Iwi to consider all cultural, engineering, geotechnical, groundwater and environmental requirements
- Variations in summer and winter loadings a significant consideration
- Pipeline alignment to respect wahi tapu sites and WWTP and LDS site selection in consultation with Iwi to respect wahi tapu sites are key cultural considerations
- Resource consent for 2 – WWTP and LDS sites will be required
- Indicative Estimate of Costs
  - Capital \$30.50M
  - Operating \$0.60M/year average
  - NPV \$44M (40 years at 3.5%)
  - Indicative Rotoma Cost per Property (unsubsidised/subsidised)  
30,000 / \$12,000
  - Indicative Rotoiti Cost per Property (unsubsidised/subsidised)  
\$38,000 / \$11,500

Again the key for this scheme is the availability of land for the treatment plants and land disposal sites. We need to undertake a site selection in consultation with Iwi and geo-technical engineering investigations to be able to confirm the site. Concentrating into smaller schemes requires careful consideration of the variations in winter and summer loadings because the system is smaller. Like any reticulated system it is important to look at the alignment of the pipelines to respect wahi tapu sites. We will need two resource consents, one for Rotoma and one for Rotoiti. The capital cost is \$30.5 million, operating cost of around \$0.6 million per year, with a net present value of \$44 million over 40 years. Indicative costs for Rotoma unsubsidised \$30,000 per property, \$12,000 subsidised. Rotoiti unsubsidised of \$38,000 and \$11,500 subsidised. Slide 29 is a schematic of the scheme; the two boxes are just a point in the map as we still have to look for that site. The key is determining available land for wastewater treatment plant and land disposal.



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## Option 5 – Clustered Sewerage Systems

A cluster of properties connects by gravity reticulation to a small WWTP and LDS located within an area made available within the cluster of properties

- Typically 6 to 80 properties per cluster and about 29 clusters in total
- Availability of land for WWTP and LDS site located within the immediate vicinity of the clustered properties
- WWTP and LDS site selection in consultation with iwi to consider all cultural, engineering, geotechnical, groundwater and environmental requirements
- Variations in summer and winter loadings may be significant
- Availability of package plants suitable for application
- Operation and maintenance of numerous (29) WWTP and LDS within the area
- Power supply to numerous WWTP and LDS within the area
- High groundwater levels in some sites may not allow sufficient contact with land to effect efficient effluent filtration and die off of pathogens
  - Pipeline alignment to respect wahi tapu sites and WWTP and LDS site selection in conjunction with Iwi to respect wahi tapu sites are key cultural considerations
  - Central government subsidy depends on ownership of system
  - Numerous (29 approx) resource consents for clustered system WWTP and LDS
  - Indicative Estimate of Costs
    - Capital \$72.50M
    - Operating \$2.50M/year average
    - NPV \$121M (40 years at 3.5%)

The clustered systems were based on gravitating into a common point, and typically have 6 to 80 properties in around 29 clusters over the whole two communities. We need to look at the availability of land within those clusters to put a treatment plant and a land disposal system. We have transported the idea of a reticulated system into smaller combinations, still as a reticulated system but within the clusters. We will apply an MBR plant so it is comparable with the performance of the reticulated system but using smaller MBR plants and land treatment systems sites. The variations in summer and winter loadings need to be considered in smaller systems. There could be issues of power supply to the 29 plants and where there is a high ground water table there may not be enough separation between the ground water and the effluent to affect an efficient effluent filtration of the faecal coliforms.

A key issue is who is responsible for operating those 29 plants and land treatment systems? The central government subsidy for this scheme is dependent on the ownership of the system.

The capital cost is \$72.5 million and Dr Morgan might look at me, but this was based on a similar smaller scale MBR and land disposal system, 29 plants, and from quotations from suppliers. Even the operating costs have come from quotations from suppliers. If that is taken out to 40 years it is a big number, \$121 million.

I am aware of the option to separate the urine, another possible cluster system, but we have not had time to cost out an individual system that separates number 1s and 2s. The urine would be contained within individual properties and the number 2s would go into a Biolytix system, a communal disposal point. We were not able to get the costings given the short period of time but can later and compare with the others.

## Option 6 – Individual OSET Compliant Systems

Individual properties connected by gravity to an OSET compliant system installed within the confines of individual properties

- OSET compliant nutrient removing systems provides lesser removal rates when compared with nutrient removing community wastewater treatment plant and land disposal system
- Sufficient land to contain required land disposal area within the boundaries of individual properties should be available
- Variations in summer and winter loadings a significant issue for dwellings occupied intermittently
- High groundwater levels in some sites may not allow sufficient contact with land to effect efficient effluent filtration and die off of pathogens
- Central government subsidies will not apply
- Resource consents for individual OSET systems will be required
- Indicative Estimate of Costs
  - Capital \$13.5M
  - Operating \$0.50M/year
  - NPV \$25.5M (40 years at 3.5%)
  - Indicative Cost per Property **\$17,500**

The last, but not the least, are the individual OSET compliant systems; individual systems for each property, each connected to an OSET compliant system. The treatment and disposal will be within the confines of the property. We must remember that OSET compliant systems provide a lesser removal rate compared with a nutrient removing community wastewater treatment plant. In terms of concentrations of nitrogen, an MBR could bring down the levels to as low as 5 milligrams per litre. I understand the OSET compliant systems can only go as far as 15 milligrams per litre.

For this scheme central government subsidies will not apply. A resource consent is needed for each system. Regarding capital – we have a unit rate of around \$17,500 per property to convert into this system and if applied to about 771 HUE's it is around \$13.5 million to the community with an operational cost of \$0.5 million per year or a long term NPV of \$25.5 million. This applies to just one of the systems that are available in the market. It is a grinder system which is not the only way to go. Slide 33 shows the ground disposal system and a household wastewater treatment plant.

### Option 6 – Individual OSET Compliant Nutrient Removing Systems



Individual Household "on site" Ground Soakage (Land Disposal System)



Individual Household OSET Compliant Packaged Wastewater Treatment Plant

Slide 33

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## ***Further Options and Issues***

### **Craig Brown CBC Wastewater**

*Ian McLean:* Craig Brown is with CBC Wastewater and operates from Waiheke Island. He has done extensive work with smaller systems of different kinds.



*Craig Brown:* I have to apologise as I do not have a lot of photos in my presentation as I only had a week to put it together. Normally I write it then I take all the words out and put more photos in. I will start with this photo. Ignore the fact that this is an oil pipeline, it seemed ideal for the Sewerage Steering Committee.

The topic is to do with further options and issues. I just want you to do some work for me; have a little think. I am going to pose a series of questions, just answer them to yourselves. Why are we here today? What are we trying to achieve? What outcome do we want? The answer that you should have in your head is that we should be looking at the water quality; that's what we are about today. We should be considering the land uses and how they contribute to the quality of the water. Obviously we have the trophic level index targets and related to those the nitrogen and phosphorus targets. I noticed in the goals for the workshop micro-biological contamination was also listed, so we should have targets for those as well so we can evaluate the different options.

Can we get on with hearing the solutions? No we need to stop one more time and think. The committee is called a Sewerage Steering Committee and sewerage is about pipes and pumps and they carry liquid based wastewater. If we are not careful we will preclude

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some options by the way we set up the terms of reference. Bearing that in mind, change the name of the committee in your head to the Water Quality Steering Committee.

#### **Environment Court Decision No. [2013] NZEnvC 116**

- The *necessity* of the reticulation system was not established to the court's satisfaction:  
  
"Given the existing high water quality standards of Lake Rotoma, and limited reticulation in relation to Lake Rotoehu, it is difficult to understand, overall, the necessity of the reticulation system...it would be fair to say that the applicant's case was in significant difficulty before the evidence of cultural matters was produced before the court".
- This does not mean that the value of the particular scheme was not established to the court's satisfaction, but that the *value of any reticulation was not established*.

I have related this to a big picture of an elephant. It is the Environment Court decision which according to my synopsis said the necessity of the reticulation system was not established to the Court satisfaction. The Court said in its judgement that it was difficult to understand overall the necessity of the reticulation system. This did not mean that they did not understand the necessity for, or the value of the particular one that was put to the Court; they did not understand the necessity for a reticulating system - full stop.

#### **The 7 Options**

I am not necessarily suggesting that we do nothing, but it is important to have a base line to know what doing nothing means.

##### **Alternative Option 1 – Do Nothing (Baseline)**

- No change to wastewater systems, no cost
- No difference to microbiological health of lakes
  - Is there a problem now?
  - What information have you reviewed that suggests that there is?

### Microbiological issues?

The Medical Officer of Health's letter that was submitted to the Environment Court as evidence cited a 2006 EBOP study "Onsite Effluent Disposal in the Bay of Plenty" as evidence of health risks from septic tanks. However that report states:

- *"Health issues arising from contaminated drains due to septic tank effluent are unlikely to be an issue for the Rotoma community due to the porous nature of the soils"*
- *"It seems unlikely that faecal contamination of the near shore lake environment is occurring due to septic tank effluent. Elevated levels of indicator bacteria have been detected in freshwater shellfish, however shellfish sampling takes place in an unpopulated area of the lake"*
- *"Bathing monitoring has been undertaken at three sites at Lake Rotoma...two sites located adjacent to residential areas and one site, near a recreational reserve...Monitoring at Whangaroa Bay, the most built up of the area lake, displays a marginally higher median E.coli level than the other two sites. This area also attracts water fowl due to its wetland fringes in the sheltered bay. All sites are well within recommended bathing guidelines levels and show only background levels of faecal contamination"*

What about the micro-biological impacts of doing nothing? The study quoted above was alluded to earlier and cited in the Environment Court as a reason suggesting that there were problems with septic tanks. But in fact it says that health issues are not likely to be an issue from septic tank effluent in the Rotoma community nor does the contamination in the near shore lake environment arise from septic tank effluent. Elevated levels of indicated bacteria are found in areas of the lake that are unpopulated. It suggests that bathing quality is good and the one place where there are higher e-coli levels is also the place where there are water fowl which could of course account for them.

Slide 18 is about work done by Rotorua District Council and shows there has been an improvement in e-coli counts.

## Alternative Option 1 – Do Nothing (Baseline)

- RDC report Bathing water quality in lakes:
  - *"RDC Monitoring results from 2003/04 to 2010/11 show that most lakes are relatively stable, **with a slightly decreasing E.coli count trend**. This is shown in trends for lakes Rotorua, **Rotoiti**, Tarawera, **Rotoma** and Okaro".*



<http://www.rdc.govt.nz/our-services/environment-and-health/theenvironment/Pages/Bathing-water-quality-in-lakes.aspx>

Slide 18

Consider Slide 19 which comes from the Rotorua and Rotoiti Action Plan and shows the nutrient contributions from septic tanks into these lakes. I have adjusted it by halving the amount of reticulation that has already happened. We heard earlier that somebody else had made an adjustment and increased it because of a different basis of calculation. But this is what I took from the Plan, so we can discuss later whether that should be increased or not.

## Alternative Option 1 – Do Nothing (Baseline)

- No difference to nutrient contributions
  - The contributions now from on-site systems are as follows:

Lake	Nitrogen	Phosphorus	Reference	Required reductions to achieve target TLI (Lakes Action Plans)	
				Nitrogen	Phosphorus
Rotoiti	0.85%	0.55%	Page 10 Lakes Rotorua and Rotoiti Action Plan (EBOP, 2009) states 1.7% N and 1.1% P from septic tanks and stormwater. These figures are halved to estimate the reduction from the reticulation scheme already implemented at Okawa Bay	35.7%	65.5%
Rotoehu	1.1%	1.2%	Point 130, page 34 Ms Nicholas' evidence	16.7%	29.0%
Rotomā	7.3%	20%	Lake Rotoma Action Plan (also point 126, page 33 Ms Nicholas' evidence) states 14% and 34%. Point 33 Mr Bruere's evidence states that Action Plan calculations over-estimate contributions by 51.4%	7.3%	41.2%

Can only achieve a reduction of these full amounts  
if 100% of properties connected/included  
and discharges are made out of catchment

Slide 19

Slide 19 are figures taken from the Rotoiti, Rotoehu and Rotoma Action Plans and adjusted by the amount that was submitted into Court in evidence from Andy Bruere as the over estimation. It compares the reductions that are required to achieve the targets. If they are correct, which I believe they are more or less, they are going to struggle. I am giving an overall picture to improve lake water quality. If we reticulate or find some other way of removing nutrients from septic tanks it is not going to be enough. It is probably not the first thing to do. Nutrient reduction needs to be found from somewhere else.

The Lake Rotoma Action Plan used this estimate below based on maximum occupancy rates, but in fact the lower rate used by the District Council is more likely to be realistic.

### Action Plans based on peak loading

Evidence presented to court:

- *“The Lake Rotoma action plan estimate of about 2,530kg per year is based on maximum occupancy rates, but it is unlikely that extended peak occupancies will occur and the lower rate of 1,230kg per year used by RDC is likely to be closer to their realistic annual nitrogen contributions” (Bruere evidence)*

But many holiday homes...  
So not 14% N but 7.3%  
And not 34% P but 20%  
So not enough to meet target on its own  
Must reduce nutrient loading from farms  
Voluntary stewardship agreements insufficient?

We need to base it on the actual nutrients from the septic tanks, not the potential maximum if the houses were occupied all the time.

## Alternative Option 2 – Buy and decommission a Farm

### Alternative Option 2 – Buy and decommission a Farm

Nutrient contributions from all sources into Lake Rotomā

Sources	Nitrogen kg/yr	Percentage N	Cost to avoid \$/kg/N/yr	Phosphorus kg/yr	Percentage P
Septic tanks	1230	7.3%	Via Manawahe reticulation scheme: \$4684	121.5	20.0%
Farming	8425	50.1%	Via conversion to lifestyle blocks: \$5	190	31.3%
Rainfall	4014	23.9%		178	29.3%
Other	3141	18.7%		118	19.4%
Required change to achieve TLI		7.3%			41.2%

Figures from Lake Rotomā Action Plan, with septic tank data corrected as per Mr Bruere's evidence to court. Costs from Craig Brown's evidence to court, assuming reticulation and conversion to lifestyle blocks as the methods of reduction. Costs of converting to lifestyle blocks taken from 'Intervention Package' by BECA, NIWA, AgResearch, GNS Science & Nimmo-Bell Ltd. (2011) for Lake Rotorua catchment

Slide 21

We can always argue over figures but as a rough figure Slide 21 is taken from a great piece of research by BECA, NIWA, Ag Research, GNS Science and Nimmo-Bell which was for the Rotorua catchment. It was conversion of dairy land to lifestyle blocks and the cost per kilogram of nitrogen per year to reduce was \$5. Whereas the cost that I calculated, and no doubt Greg may have a different cost for the scheme that was rejected by the Court, was \$4,684 per kilogram of nitrogen reduced. Of course all the new proposals will have their own figure and this is how we should be presenting them - cost per kilogram of nitrogen per year and cost per kilogram of phosphorus per year.

### Alternative Option 2 – Buy and decommission a Farm

Slide 22

Sources	Rotoehu Percentage N	Rotoehu Percentage P	Rotoiti Percentage N	Rotoiti Percentage P	Rotomā Percentage N	Rotomā Percentage P
Septic tanks	1.1%	1.2%	0.85%	0.55%	7.3%	20.0%
Farming	64.2%	46.4%	?	?	50.1%	31.3%
Required change to achieve TLI	16.7%	29.0%	35.7%	65.5%	7.3%	41.2%

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Slide 22 highlights the obvious, the other elephant in the room. To me farming contributes a significantly higher proportion of nutrients into the lakes. We are here today talking about sewerage reticulation, but we should be talking about the wider context of what is the best way to achieve lake water quality with a limited pot of money to do that.

I am not suggesting that Council lean on the farmers and make it uneconomic for them to operate their farm by cutting the amount of nutrients that go out into the environment. I am suggesting that they come to an amicable agreement to purchase the farm for a market rate. Hopefully they will be a willing seller at the right price. Then close it down, turn it into lifestyle blocks and that is a cheap way to reduce the nutrients going into the lakes - a lot, lot cheaper than the reticulation proposals. Bear in mind of course that farms do contribute with the run-off micro-biological standard of the water in the lakes. The animals have a number of the same pathogens that affect people and are defecating onto the ground and it travels into streams and down to the lakes rather than going through a wastewater treatment system.

#### **Microbiological improvements**

- Campylobacter, Salmonella, Giardia, Cryptosporidium, Shigella and Yersinia are all present in cattle, which defecate into waterways or onto open land where it can run-off into waterways after rainfall (not into wastewater treatment systems)
- McAllister and Topp (2012): *“approximately 243 of the 616 pathogens (39%) currently known to infect livestock are also infectious to humans (Cleaveland et al., 2001). These zoonotic pathogens are also twice as likely to be associated with emerging human diseases. Outbreaks that have been linked to contamination of water with livestock manure, such as Canada's largest waterborne disease outbreak in Walkerton, Ontario, in 2000 (Hrudey et al., 2002) or the adulteration of spinach in the United States in 2006 (Jay et al., 2007), do not fade from the public's memory”*

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## Alternative Option 3 – Urine Separating Toilets

Slide 24

### Alternative Option 3 – Urine Separating Toilets

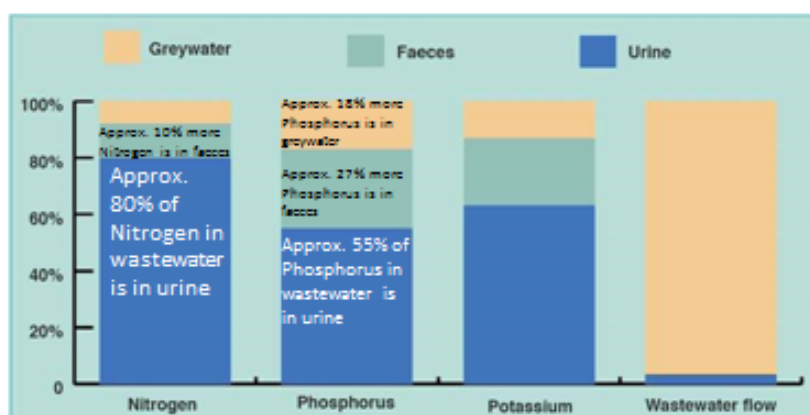


- Install urine-separating flushing toilets
- Collect the urine in on-site tanks
- A contractor removes the urine before the tanks are full
- The urine can be spread on farms outside of the Lakes' catchment as an excellent fertiliser
- Several local authorities in Sweden encourage or mandate urine separation in rural and urban areas to improve lake and marine water quality

Another option is separation of urine at source, which is the only place to separate it, and that is at the toilet. There are dry composting toilets which separate urine and Slide 24 is a flushing toilet which separates urine. The poos go in the back and the urine goes in front. On average 70% of it goes into a community situation according to studies that have been done. Dr Shoemack had an example of how people who are enthusiasts can perform better; they seem to get more urine in the right hole, but on a fairly disinterested community 70% is the number (Slide 25).

### Sources of N & P in wastewater

Slide 25



Urine separating toilets realistically capture approx. 70% of urine in community use, so 56% nitrogen reduction and 38.5% phosphorus reduction can be achieved simply by capturing urine from these toilets. Further N & P reductions occur in septic tanks and the soil.

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It is something that is done in Sweden in a variety of scales. There are whole municipalities that either have mandated this or put incentives in. They collect the urine and spread it on the farms or take it out of their catchment. They do it to improve the quality of the lake water or close marine environment and it is very successful. The farmers are very willing to have this because it replaces expensive fertiliser. The urine accounts for 80% of the nitrogen. There is 10% in the faeces, 10% in the grey water, slightly less phosphorus but still 55%, the majority of these nutrients are in the urine. If it can be collected it is a cheap, effective way of getting hold of those nutrients and can be transported out of the catchment to somewhere where they are useful instead of looking at them as a problem.

I have done some back of the envelope calculations and we will not spend too much time on them as they need to be done properly and independently. My assumptions have ended up with it costing about \$2.7 million in capital cost, 10% of the cost of the first option of reticulating back to Rotorua. The operating cost is a little bit higher but still less. These back of the envelope calculations will need to be done again by somebody independent doing all of the calculations on the same basis. It is still 38 times more expensive than buying a farm, but 25 times cheaper than the old reticulation team as I calculated it. These figures speak for themselves. Even if they are wrong I still think that they will be in the right order, cheapest for farm, slightly more expensive for collecting urine, more expensive again for reticulation.

- Landed costs including GST per Worstman Ecology EcoFlush toilet \$420
- Installation \$280
- 1000L plastic tank \$399 one-off retail price
  - Plastic Rotational Moulding Company, Penrose
  - 1.5L urine per person per day plus small amount of flush water
  - tank capacity is 100 days
- Installation \$400?
- Subtotal Say 10L/day per household, means \$1,499 installed, one toilet (\$2,199 two toilets)
- No consent cost for collection
- Consent required for discharge?
- Other sizes should be considered
  - Small and swappable, so tank is carried away on a flatbed truck and an empty tank is left behind
  - Large and pumpable, so liquid transport truck can pump out and transport (Could possibly also share tanks between properties)

#### **2012 ISUZU FORWARD TANKER - Clevedon Truck Sales**

- 3780L tank
- 210hp pump
- \$64,999 + GST

Similar older trucks from \$20,000 on TradeMe

- e.g. 10,000L tanker truck \$45,000

Labour and fuel

Spread/spay boom attachment cost?

Cost to deliver to farm (labour and fuel to distribute – free to deliver now? with expectation that farms will pay for urine fertiliser in future)

- Fertiliser cost \$3.34/kg/P, \$1.70/kg/K, (Dairy NZ Nutrient Cost Calculator)
- Peak Phosphorus modelled for 2034 (Cordell, D., Drangert, J-O. and White, S, *The Story of Phosphorus: Global food security and food for thought*, Global Environmental Change Journal, 2009)

Or just figure on it costing in the same ballpark as getting a septic tank pump out or water delivery

- \$350 per annum per household?
- Can choose larger or smaller tanks, or shared tanks to get best efficiency
- (remember: \$1499 initial cost)

Capital cost

- \$1499 x no. properties (1000) = \$1.5m
- Call it \$2.7m to account for extra toilets = **10% cost of Standard Option 1**

Operating cost

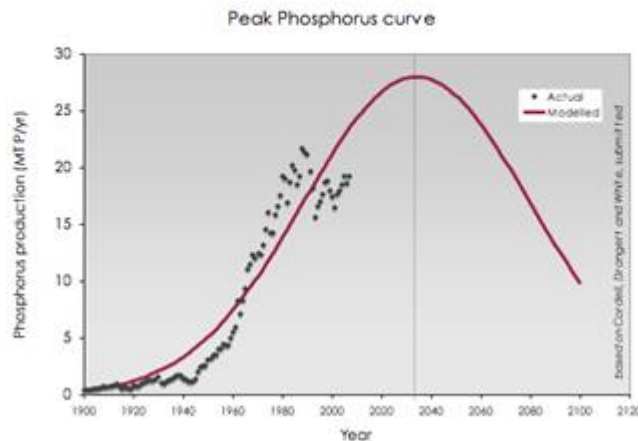
- \$350x1000 = \$350,000 = **58% of cost of Standard Option 1**

Back of envelope calculations for Rotomā

- \$191/kg/N/yr
- **38 times more expensive than buying a farm (\$5/kg/N/yr)**
- **25 times cheaper than the Manawahe reticulation scheme (\$4684/kg/N/yr)**
  - CBC calcs for Environment Court evidence based on scheme servicing Rotomā only
  - (Was for Rotomā only because of minimal impact of septic tanks in Rotoiti and Rotoehu as a percentage of total impact)

One of the reasons for doing it other than the problem at hand is that we are going to reach peak phosphorus in about 20 years at which point phosphorus will become expensive and we need it to grow food (Slide 29). Within the life of resource consents we may find that the resource we have been collecting and giving to farmers for free suddenly shows that those costs go out the window and it is a net benefit.

## Alternative Option 3 – Urine Separating Toilets



Slide 29

## Alternative Option 4 – Targeted Upgrades plus Improved Management

### Fix public toilets

- Identified in Lake Rotomā Action Plan as a concern
- Visitors were responsible for more impact than residents
- RDC were to *“review the adequacy of the existing public toilet facilities (taking into account any anticipated increase to visitor numbers) and to develop a strategy for the consistent provision of appropriate facilities”*

### Introduce WOF scheme (or similar) for on-site systems

- Inspections
  - Advice
  - Bylaw requiring pump outs
  - Repairs if needed
  - Upgrades to secondary or tertiary on-site or cluster systems if and when failing
- Cost estimated at \$35 per inspection when a WOF scheme was proposed as a national environmental standard (Ministry for the Environment, 2008)

**Consider upgrading major contributors: schools, sports clubs, campgrounds, Marae?**

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Another alternative would be looking at the systems already there, finding which ones have problems and target repairs, maintenance programmes, upgrades and if necessary an expensive new system for properties that are failing. Do we have a warrant of fitness scheme or something similar for failing systems? There are a variety of options around, warrant of fitness, bylaws or just education programmes. It is better to prevent things before they happen. This has been introduced for the pump outs. But to make on-site systems work well in a difficult area there must be more oversight which is not necessarily expensive to do. They must work well. Those that do not can be upgraded. If they cannot upgrade on-site then cluster systems for small areas is an option where they have difficulties like high ground water.

### **Alternative Option 5 – Composting Toilets**

#### **Install composting toilets**

- Could work well to reduce nutrient and microbiological impacts (especially in conjunction with other options)
- Would require a collection system as with urine separating toilets
- But would probably pose cultural issues for Maori around transfer of solids out of rohe
  - E.g. transfer to existing vermiculture processing site in Kawareau (which currently takes biosolids from Rotorua) and from there to forestry/farms out of the catchment
- May pose cultural issues for some people around acceptability of use of composting toilets

I am a big fan of composting toilets but for the purpose of reducing nutrients they do not do as much as urine separation and require transfer out of the catchment, which is exactly the same issue as reticulation. I understand that transference of urine out of the catchment is culturally acceptable; transferring of the composted solids is not.

### **Alternative Option 6 – Cluster Treatment**

#### **Install cluster treatment systems**

- E.g. Biolytix systems costed in Environment Court proposal at similar price to on-site systems
- But: subsidy may be available
- A good companion option to
  - Option 3 Urine separating toilets
  - Option 4 Targeted upgrades plus Improved Management
- In locations where on-site systems are found to be failing subsequent to WOF inspections?
- Or for all properties if desired to avoid on-site discharges and individual household responsibility for operation and maintenance

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For the option of cluster treatment we could go for the very expensive MBR scheme or for a less expensive Biolytix system and it would need to have urine separation. As far as I am aware no on-site or small scale system will do a very good job of reducing nutrients unless the urine is taken and will always come off second best to a larger plant. Taking the urine out solves that problem.

### **Alternative Option 7 – Stop Using Phosphate in Household Detergents**

- Laundry detergent
- Dishwasher detergent
- Fire retardants added to fabrics
- Very low cost through education and/or if retailers will comply
- Also ammonia for cleaning = N

We could reduce phosphorus through an education scheme or some way of twisting the arm of retailers to ensure that they do not sell products which contain phosphorus which people use for washing and it goes straight through the system. That would be effective!

### **Mix ‘n Match**

- Combine elements of Options 1-7
- E.g. buy a farm, fix public toilets, install urine separating toilets, implement a WOF scheme, encourage shops to sell low-or-no phosphate detergents, then for any failing systems consider:
  - - Cluster schemes
    - Individual treatment system repairs or upgrades (secondary or tertiary)
    - Composting toilets
- E.g. urine truck operators could also perform monitoring and maintenance of wastewater system

The overall thought is that probably we need to mix and match. It may be that certain areas need an expensive cluster system but probably most of the on-site systems could be upgraded where there are problems, or made to work as they are, requiring the urine separation to reduce the nutrients. This requires a warrant of fitness scheme. It is an overall package and perhaps harder to make happen. There may be consenting issues, but it would be a good idea. Working from that basis the problems are solvable.

Finally my key points are to look at ways to improve the water quality by reducing the nutrient and micro-biological impacts. The most clear cut way of doing that is not a sanitation option, it is to buy a farm and turn it into lifestyle blocks. Do not be hasty to jump to a sewerage scheme. Let us not be led by the goals of the workshop title and name of the committee. Think about improving water quality and sewage is one option. Thank you.

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### **Key Points & Suggestions**

- Lots of ways to improve water quality by reducing nutrient and microbiological impacts. The most clear-cut is not a sanitation option
- Don't be too hasty to jump to a sewerage scheme to take advantage of a subsidy which may lead to higher initial costs despite the subsidy, higher costs of operation, lesser reductions in nutrients and an ill defined reduction in poorly-quantified microbiological contamination
- Do costings as cost per kg of nutrient avoided/diverted  
S/kg/N/yr  
\$/kg/P/yr  
RRWQSC

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## Session 3

### Questions

*Kate Graham, Tamatea Street:* My question was about the OSET systems and whether or not they can be used in all the different areas. Because we are at Hinehopu, Lake Rotoiti, between the lake and a very beautiful wetland, there is obviously lots of water and our properties are fairly wet. I wonder whether or not the OSET systems function in that situation.

*Terry Long:* As a general practice OSET systems in the form in which they are traditionally installed into either soak holes or shallow soakage trenches will not work where there is a high water table. There are two options, one is a mound which would be raised and planted but it looks unsightly. The other option is a fully isolated bed, so it would have a liner in it; it would have media in it and then planting. For people in that situation it is the only option.

*Kate Graham:* How big does the bed have to be Terry?

*Terry Long:* It is related to wastewater flows and a calculation would be based on the potential occupancy of the dwelling, the numbers of bedrooms, etc., typical flows where there are water saving devices. Doing some maths will give the bed or mound area.

*Kate Graham:* When it comes out it is usually what?

*Terry Long:* Well, 3 bedrooms, 5 persons at 180 litres per person per day, so  $5 \times 8 = 40,900$  litres. Apply it at 35 millimetres per day to a base area for a mound, it is something like 80 square metres, so a big mound that will occupy your front yard.

*Tomairangi Fox, Kawerau:* I thought I would bring it up. This is the first time I have heard about Option 2 with the treatment plant. It is right next to Tuhourangi Marae in Spencer Ave and I would suggest it be taken out. Not only that, the wastewater goes through the Tasman effluent plant; to a clarifier, it goes to wastewater and into the Tarawera River. The solid waste is taken away by one of the members of the public for worm farming. To get to the Kawerau area you have to go past the Whakatane District Council, an area where I am, on the border of Kawerau and the Whakatane District Council. The lands around there belong to people from Tuwharetoa and are very sacred to us, the same as what our fellow cousins here are saying about their lands. Kia ora.

*Unidentified speaker:* I want to address a point that Mary raised in respect of the costings for Mourea. The policy has moved on since then. There is no longer a connection fee. The indicative costs per household that Greg put up are for everything except if it is necessary to upgrade the electrical system in the dwelling. It is everything from the gully trap, or from outside the drip line of the dwelling to the grinder pump and right through to the wastewater treatment plant, including the building consent fee for work done on the property. One cost for everything.

*Don Atkinson:* Two things I want to clarify. Firstly in respect of the proposed lifestyle blocks and conversion of the farm, I understand that in the Rotoma catchment both farms are low intensity and have signed up to maintaining that position. I also understand that lifestyle blocks have little saving as far as both nutrients being omitted to the lake. So the only way one could achieve the target is to convert the whole catchment to bush or forestry. Is that correct?

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*Craig Brown:* Yes I do not recall the research I quoted but it was done by a group of illustrious people like NIWA and AgResearch. The cost of \$5 per kilogram of nitrogen saved was based on buying a farm, dividing it into lifestyle blocks and then selling it. I assume it was based on the assumption that people would use that lifestyle block like any other lifestyle block.

*Don Atkinson:* Could I suggest that if they had bought a dairy farm and converted it to lifestyle blocks that might be possible, but that option is not available in both catchments.

*Craig Brown:* They also looked at the cost of converting the same farm to forestry and native bush. From the top of my head forestry was \$18 instead of \$5 per kilogram of nitrogen and native bush was a bit more. Those conversions are possible and it was a dairy farm that they based those calculations on.

*Don Atkinson:* I can assure you that you are well out in the numbers. I am closely involved with the Rotorua catchment work.

Another matter of clarification that would help in my understanding is that of the cost of the different schemes on a subsidised basis. There are variable costs depending on which way they go. Some advantage Rotoiti one way, some advantage Rotoma the other way. At the end of the day we are dealing with a scheme and I cannot understand why the community is not offered an equal value cost on a subsidised basis across the whole community. Why would you want to divide it into different regions and costs? I appreciate there is a behind the scene calculation that needs to be made, but I would have thought to get the best outcome from this scheme we need to look at this as one scheme and one cost to all of the community.

*Greg Manzano:* That would be the ideal outcome if we have a scheme that is common for both communities. The reason behind the difference is the application of subsidies as they are presented. Rotoma has a cap of \$4.46 million and Rotoiti has a 50% subsidy with no cap. That is where the differences are. There are different subsidies from the Bay of Plenty Regional Council which is about \$1.9 million on Lake Rotoiti and \$2.2 on Rotoma. Don't quote me on the numbers but there are differences and it is also a function of the number of properties. Ideally when we come to a final point maybe we can decide whether we communalise this scheme and apply all the subsidies into an approved scheme and apply it across the board. That is a policy decision to be done by the politicians with input from the stakeholders.

*Mary Stanton:* Kia ora, Rotoiti and Rotoma, you have so many options to decide on, which one you are going to choose? I say if we are going to move forward it would be for your benefit to choose one of these schemes and go ahead and do the job with the support of all Ngati Pikiao and Te Arawa, I wish you all the best. I want to also mention if you are looking at development this is one of your utility services, the other one is a water supply. Once you get those two together you can go into full development of your land. I listened to my old man saying, 'what's the use of Maori land if you can't do anything with it?' That is a huge question mark. I am going to ask this question now because a lot of the people in Rotoma and Rotoiti are pensioners and will find it hard to pay for the scheme they may be looking for. Could you please explain to them how they can make payments not on a one base payment but spread over time. We found that very important to us when it came to paying for the scheme, kia ora.

*Fred Whata:* We are looking for options – property, land. Look around this room this afternoon and most trustees here are of the lands they proposed in the first place. Here is

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my land, do you want to build a plant on it? It does not go any further than that. I ask you to call a meeting of the trust down at Rotoiti if you want to move forward on this matter. You are looking for land now. I believe you cannot go to Kawerau. There are obstacles in your way with pumping it to Rotorua and talking about wahi tapu - it is full of it. So the option - move forward to Ngati Pikiao, to the trust down at Rotoiti and Rotoma. Who knows he might come your way and offer you the land to build a plant. Not for one but for both. Which is the dearest - Number 1 or Number 2 Option? It is not until you go before the trust and they agree then the cost can be worked out which is the cheapest. So that answers all your questions. No rera Tena Koe

*Ian McLean:* Kia ora Fred, thank you for that. That is the next stage. The first thing has to be for the Technical Advisory Group to recommend a shortlist of options.

*Kepa Morgan:* I think Mr Chairman with all due respect that where we are at this stage is probably a reflection of the planning and set up of this workshop. It is not good practice in an engineering sense or any other sense. The reason being that we have not sat down and identified the issues, we never set any targets and all of a sudden we are talking about what the solutions should be based on in some presentations that I could drive a bus through.

We need to look at the issues, identify the targets we plan to do and then come up with solutions that address those targets. Not solutions that are chasing after a subsidy from Wellington. The subsidy will be available for clusters if they service over 100 people. Any cluster that has a school or a Marae included will comply with that. So the subsidy is not the driver and it does not have to be reticulation. There are far superior solutions; they have not been given a fair hearing. I recommend you throw out the option to Kawerau because that would never fly. There are many problems politically to get that one over the line. You throw out the one back to Rotorua because the treatment plant is not compliant anyway. The fifth option presented by District Council, throw that away because the prices and the costs associated with that were over exaggerated. That leaves us with 3, 4 and 6 plus the options put up by Craig Brown.

Now to consider the options put up by Craig Brown openly and transparently we need to look at real solutions. But first we need to identify issues and targets to achieve. Otherwise we are going to jump straight to the point that Council were at last time and it will be back in the Environment Court. You know how it will end because Craig Brown's second slide said that there was a very poor argument made for reticulation in the first place. The Environment Court says that when they make a decision another time they will look at the previous decision and wonder why District Council is heading down the same pathway. It seems to me to be a circular process that is not open to the real issues. I have a list of cultural issues that these different solutions need to address but they have not even been talked about today. I would like your opinion please?

*Ian McLean:* Thank you Kepa, you would like to do it differently, ka te pa that is fine. This is the way the Steering Committee decided to approach it and why we gathered together and proceeded this way. What you have been saying in fact is the next stage we want to move onto now, in smaller groups. There are a lot of people here who have not had much to say, you and others have had a fair chance and I thank you for the contribution. But there are other people here and we want them to make their contribution. If the small groups come back and agree with you, then we will stop or go in a different direction ka te pai. But the next stage in the process is to gather in smaller groups to work through the issues and give the people who have not had much chance to say anything a chance to speak.

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*Kepa Morgan:* Is it not useful to review the cultural issues that were raised in the Environment Court when the decision was made that the last proposal was not going to happen? I think that would be useful for most of the people here have not been involved in the Ngati Pikiao analysis.

*Ian McLean:* We have in this room Kaumata whom I believe will direct us on cultural matters in the small groups and let their voice be heard. I propose that we now move into the smaller groups as per the programme.

*Bruno Gardiner:* One question to Greg. It is about connecting up all the properties, what about the vacant ones?

*Greg Manzano:* The current policy as it stands is for the vacant sections to be provided with a connection when they develop. Deputy Mayor Donaldson might correct me if there are any changes.

*Dave Donaldson:* That is the current policy, if the workshop felt that there should be a change in that policy it would be up to the workshop to make a recommendation to the District Council.

*Joe Tahana:* My question relates to farms and guardianship. Most of the farms in Lake Rotoiti and Lake Rotoehu actively guard stewardship of their lands and waterways. That stewardship is recognised with a certificate that says Rule 11 applies to their land. I ask why has Rule 11 not been applied to Lake Rotoma for a consistent approach across all of those catchments that contribute to water quality?

*Andy Bruere:* That is a very good question Joe. Rule 11 is on 5 of our lakes and does not include Rotoma and people have concern about that here today. It is something that I have impressed upon our planners for probably 5 or 6 years now. The Council has moved to put in place an investigation as to what rules are best suited to each of those different lake catchments. One of the reasons why they have delayed putting a rule on Lake Rotoma for example is to avoid having the cost of putting individual rules on each lake when perhaps a more global approach to those rules might be appropriate. I think that is in process now.

*Ian McLean:* Thank you. We need to ensure in these groups that we have some Pakeha, some Maori and some people from the Councils, so I am asking your indulgence as to what we do now. There are not too many representatives of the community other than Iwi here, I would ask two of you to go to that corner, two to the back and two here. Would you stand up and move please, we are moving into groups now.

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**ROTOMA ROTOITI SEWERAGE STEERING COMMITTEE  
(RRSSC)  
WORKSHOP OPTIONS**

**Issues for Groups to consider:**

**What Options do you strongly favour?**

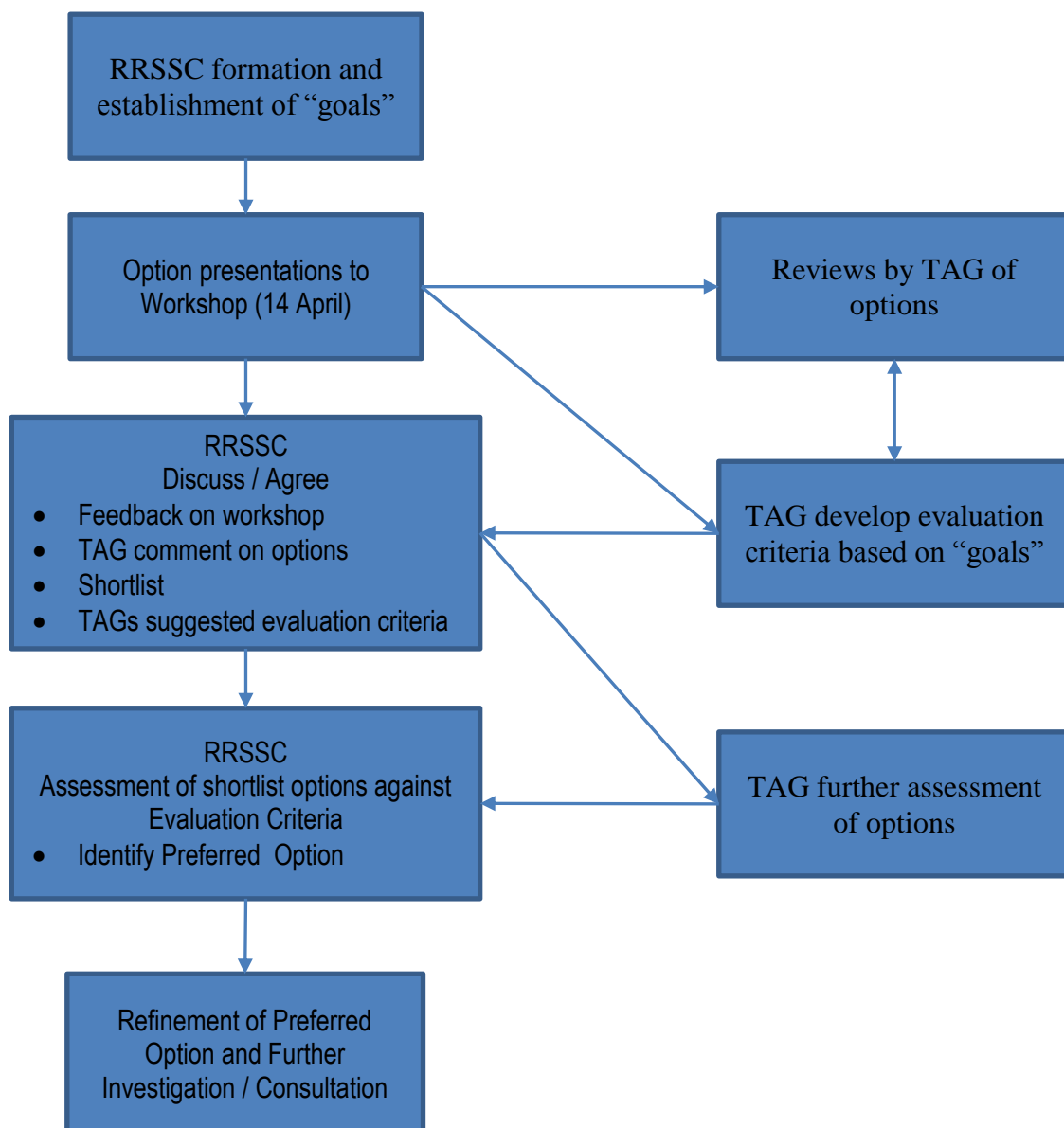
**What options do you strongly feel should be rejected?**

**What further information is required?**

**Do you agree with the way ahead?**

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## **ROTOMA / ROTOITI SEWERAGE SCHEME THE WAY AHEAD OPTIONS DEVELOPMENT & AGREEMENT**



### LEGEND

RRSSC – Rotoma / Rotoiti  
Sewerage Scheme  
Committee

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## Session 4

### ***Report Back Options favoured or not favoured***

#### **First Group**

*Don Atkinson:* Our group firmly supported Option 3 with reservations which I will take you through, but let me start from a positive position. The combined lakes' disposal area was believed to be the most cost effective because land would be available to service the facility, clearly a key requirement. There were concerns raised about wahi tapu associated with Ruato Bay which need to be addressed and may require other alternatives for that place.

The Kawerau option was discounted principally because of wahi tapu considerations and concerns about the length of the pipeline. The Rotorua option was similarly discounted because of the length of the pipeline again going all the way back into Rotorua. The potential for septic sewerage to erode these very long pipelines was raised as a significant issue.

Option 4 - each lake dealing with their own waste - was discounted because the requirement to build and manage two stations was considered more costly. It would be better to find one block of land. However there were concerns about the ability to find the appropriate land around the Lake Rotoiti shores.

Option 5, the clustered sewerage system, was more complex but the general concept of the total cluster was ruled out principally because of cost. We then looked at Option 6, the OSET plants, and recognised that while cost effective there were a significant number of properties where individuals were unlikely to manage the systems appropriately, so that was discounted.

Option 7, which came to the table today, treats the urine separately. There was a lack of understanding of this concept and it needed further research and information. It may be an alternative to some areas which cannot be fully serviced by the proposed Option 3.

So overall there was very strong support for Option 3. The ones that we strongly felt should be rejected are at the extremity and the clusters. We ran out of time to give consideration to the way ahead.

*Mary Stanton:* I want to congratulate Don. I think he has done very well in presenting what we spoke about.

*Gary Husband:* We were concerned that we had not been given information about some of these alternatives – composting toilets, other forms of OSET systems and so on. Could that be included in the way ahead without taking the time to stop again? I first heard from someone in the Rotorua District Council in about 2001 that a sewerage scheme was going to be in place in 2003. I am still waiting and it is awkward because we live in Tamatea Street on the lowest section in the street and we cannot use our septic tank. We are not holiday stayers, we live there. Let's get on with it.

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*Ian McLean:* Thank you, the point is well made and hopefully the process ahead will allow these options to be fully considered and still move expeditiously.

## **Second Group**

*Kepa Morgan:* Kia ora tatou. We looked at the issues and technical explanations and clarifications and also felt that the solutions around alternatives were not very well understood or presented this morning. The first one was cost, accurate capex and opex. Regarding the six options presented by RDC, it would be grossly inaccurate to make decisions based on the estimates for clusters in Option 5. There is no way you could rely on those numbers.

Flush and forget was a point that was made in our group. There was a great desire for people not to have the problem of looking after their own systems, the intention being that these be dealt with by somebody else. We have gone over cultural implications in previous forums of relevance here. The first one – no solid waste transfer out of the rohe. No paru going from Rotoiti anywhere else; no paru going from Rotoma anywhere else, to minimise and eliminate pipes going through, over, under lakes and streams, to avoid wahi tapu with reticulation and disposal and to avoid mixing human waste and water. We saw that happening in Christchurch after the earthquake where raw sewage was discharged into the Avon River for over a week. Marae should have standalone capability for tangihanga and Civil Defence disaster response, which must be a real advantage provided by one of the options. We would minimise the impact upon the environment, and local government responsibility for the outcome is a requirement. The disposal of collected urine was raised as an issue as there are regulations that would have to be complied with.

The question was asked whether clusters can be designed to be eligible for subsidies. If the Biolytix unit and the urine separating toilet is an example, it is the same as a grinder pump sitting on the person's property, with reticulation occurring after that. There is no difference. If Biolytix is a pre-treatment, just like a grinder, and then a reticulation system takes the flow from there, providing it services 100 people, then you get over the line in terms of the subsidies. This would be easy if you include a marae or a school,

We explained what urine separating toilets were and how they worked and discussed the size of tanks and where they might be located and whether they were for single houses or for multiple. We talked about Biolytix, how it worked, worms, contaminant fumes that come through and that they are more resilient than any other system that I know of. Petrol, for instance, going through an MBR or the small packaged plants that were mentioned will wipe that system out, but not for Biolytix. They cope well with that and intermittent use is a strength of Biolytix and in terms of the size of the footprint.

We talked about RDC sponsoring a fact finding trip to Waiheke which would include wine tasting. Water table implications were raised regarding Tamatea Street where the water table is very high and how the systems work in those situations. We talked about what happens in a disaster, grinder pumps are fine but as soon as you lose electricity it will back up. The question of serviceability in disaster recovery was raised and some of these systems do have the capacity to operate after a severe disaster. If Christchurch had dry composting toilets or Biolytix, most of the homes that had those would have been operational after the earthquake. How long will it run with electricity? We need to know those answers. We talked about MBR, SBR, BNR – these are all high tech solutions usually for providing drinking water for communities.

We discussed what that meant in terms of cost and servicing and maintenance operation. We talked about RDC's comparison study which had a Biolytix included at Sulphur Point.

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The measure of the performance of the Biolytix is probably not relevant, but it was treating an eastern sector wastewater stream that was highly mixed with industrial waste in it as well. What we are talking about with Biolytix is that the faeces in the water are separated immediately after flushing the toilet, so a totally different waste stream. Given that the Biolytix almost complied down here with that very unusual loading, in the situation that we have in the rohe it is likely to outperform anything else.

The last one is that Doctors' Point involves a pipe through the lake which caused some confusion but it has a pipe going under the water on the bed. The complementarity of holiday homes and permanent residents was raised. Grinder systems are similar to Biolytix but the effluent from each is totally different. A grinder pump produces a brown sludge but Biolytix ends up with a good effluent stream. Terry Long visited systems that do not work well in Tauranga and will tell us what is going on there.

Neil pointed out that what BOPRC are really interested in at the end of the day is how to lower the nutrient rates/loadings into the lakes, so they are open to solutions that will achieve that.

*Phill Thomass:* Kepa helped us understand the cluster and dry composting systems. As a group we underperformed because we did not come up with any consensus or debate the merits of the various systems overall. We were just getting to grips with understanding the dry composing. We would like to see the Steering Group nail down some more accurate pricing and work towards finding out if a cluster system based on dry composing would qualify for subsidy.

*Ian McLean:* Thank you, Kepa, and your group, I am sure it will be possible to arrange an environmentally friendly bike trip to Waiheke Island. It is useful that the groups have taken different approaches, because when we come together we throw it all in the pot together in the same boil-up.

## **Third Group**

*Jim Bradley:* Our group went around the houses but came to a consensus and that is no mean feat in such a short time. I reminded the group that the committee has a set of goals that are on the back of the programme and they will be further developed by the Technical Advisory Group and the committee, and they set out some of the issues.

We started first with a general round the table discussion about the issues; consequently we interchanged these as we discussed the options. We looked first at the cultural aspect of going to Kawerau which came through especially from a representative from there. Discussed further from the points made this morning were: the treatment plant at Kawerau is beside the marae; moving raw human sewage out of one rohe to another and the very significant one of miscarriage products. That was supported by other tangata whenua members in the group. Along similar lines is the Tarawera Water Catchment Plan currently under review and it has some significant policy instruments in it.

We then talked about being all in this together. If we are to have a system it is one scheme. From the discussion this morning and the question Greg was asked about policy matters, the way costs are split is driven substantially by subsidy for the community type schemes. It was pointed out that part of Lake Rotoiti is already serviced and why not be part of the same scheme, although at the end of the day the costs might not come through that. Consistency, approach and fairness of the issue were a very important consideration for our group.

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We then looked at Options 3 and 4 and there was total agreement around the group that Rotoma and Rotoiti could come together as one scheme. Consequently this would lead to a choice of Option 3, or Option 4 with the two different separate treatment and disposal areas. There seemed to be no significant difficulties in that, particularly from a cultural point of view. Coming back to the Rotorua Treatment Plant it was seen as an acceptable possibility and the fact that reticulation from part of Rotoiti is already going there.

The possibility of a Rotoehu scheme and whether that should be opened up again was raised. I of course have come late into this and looking at the area one wonders if a public health is an issue or not? I know decisions have been made but should that be opened up for further consideration?

There was a detailed discussion about Doctors' Point and the way the piping would or would not cross the small estuary, or go around it, which has cultural considerations in terms of crossing under or going around water. Then we got into a bit of engineering. There was very little favour for Option 5, the cluster scheme. That is a very expensive one on the estimates that have been done to date using the MBR and seen as a no go simply because of the cost.

We were fortunate to have Craig in the group to elaborate further as Kepa's group did on the urine separation, the cluster approach and the Biolytix, or some similar form on-site. We need to be careful at the process of not getting too involved with respect to individual trade names but keeping concepts there so that things are all on a level playing field. Craig further explained to us the system and the fact that the grey water goes through the Biolytix or equivalent. Craig elaborated on the microbiological treatment. They are bugs that Dr Phil Shoemack talked about this morning and the limitations on this type of treatment in respect to those and nitrogen removal. Of course 70% of people get it about right when they go to the urine separating loo. Nitrogen goes out in the urine collection system.

There are also issues about sludge management and the need for sludge collection with these types of treatment plants. We also said in this type of system not only the microbiological but the public health issues need to be looked at. There is also the impediment of high ground water table and of course the nutrient issues. So there is quite a bit to do about what happens with the discharge from this system in the catchment, particularly near the lake edge.

With land use change – in the basket of options that Craig put up - there seemed to be difficulties with finding suitable farmland. There was no support for the lifestyle type approach and we ran out of time discussing it. Finally, the key issue that came up with the individual OSET option was that it is not subsidised, and there are some very significant subsidies available providing everything falls into place.

That was a potted history but we are not only going on the bikes to Waiheke, we are going a lot of other places too. It would be good to do a tour of different alternative treatment plants (and of course the associated discharge) before the decision. It is the discharge, the disposal, the eco-system re-entry are important.

*Bruno Gardiner:* Just one thing about Option 5, the cluster scheme, where we threw it out, but we will also look at other possibilities. It is not gone; we want to investigate it again.

*Jim Bradley:* Yes I confirm that. Greg put on the table this morning the possibility of relooking at this one. Already today many of us have got a better understanding, but Option 5 was out.

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*Craig Brown:* I want to clarify a couple of things. We talked about how in these treatment plants the microbiological treatment continues in the soil. If we work it on a cluster basis as per the MBR clusters we assume that we can find a suitable place to discharge and therefore deal with the microbiological impact. That has to be an important component. You could not discharge it to a high ground water table next to the lake, but because you are working in a cluster you can find somewhere else for it.

Another point was the intensity, there was no support for lifestyle blocks, but we talked about planting trees and there seemed to be some support for that. Leo do you want to talk about whether some other land use change into forestry would be alright?

*Leo Meharry:* There was a suggestion that land should be bought by BOPRC, retired, and split up for lifestyle blocks. It was not supported. The farmers would be paid to remove stock to improve their run off into the lake. However we understand that the two farms that are on the east side did not greatly affect the lake and there is good planting filtration around the lake there, and lagoons, planted on both sides. I did not quite understand why people were advocating buying those farms, but we did talk about finding some land to put a treatment plant on. We pointed out the people to approach if the treatment plant was to be on Maori land in the Rotoiti area.

*Jim Bradley:* To summarise, our group had high support for Option 3, the single treatment plant and disposal in the area, also for Option 4 with the two treatment plants but not as much as Option 3. Also some support for the possibility of coming back to Rotorua and doing some further investigation on the cluster option as an alternative to the high expensive cluster.

*Kepa Morgan:* The Balclutha Council had to upgrade their wastewater treatment systems and used a model based on the Biolytix system where they naturally re-configured their wastewater treatment plant.

*Jim Bradley:* I can elaborate very briefly: it was the Clutha District Council that did three small schemes with that type of process for small oxidation pond upgrading. It was not Balclutha.

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## Open Forum

*Ian McLean:* From what I have heard from the group the Kawerau option was heavily discounted and would not seem to be regarded as worthy of support. Is there any dissent on that? No dissent. What we are doing now will go to the TAG to chew over. They will come back to us if they think we have missed something big.

Secondly, the high tech OSET septic tanks and Option 5 of MBR clusters had little support. I am asking whether there is a difference of opinion they can raise that. We will do them separately then. The MBR clusters appear to be regarded as too expensive by those who looked at them.

*[Inaudible comment]*

*Unidentified speaker:* Can I comment? You cannot eliminate that because there are some houses that cannot hook onto the system. You have the OSET requirements and there are houses that will not get access to any of the systems so it cannot be ruled out.

*Ian McLean:* Point taken and well made. OSET may be needed at some places, but as a solution for the whole of the area it was not regarded with favour, OK?

You favoured it, for the whole area? OK, we will note that there are some who consider that, but most people did not.

On the question of what was favoured, Option 3 of Rotoma and Rotoiti together appeared to be pretty well favoured. There was some concern over Rotoma and Rotoiti coming together but some believe there was no difficulty from a cultural perspective in them being together. What is the view of the whole group please?

*David McKenzie:* I know you are saying that Option 3 was favoured, but the perspective in our group was that it was considered culturally viable and could be an option, but not that it was favoured above any other.

*Francis Turner Curtis:* Phil spoke earlier to say that it was more of an information giving session that we had around the Biolytix system. We did not really get to vote or talk about whether we thought Option 3 was favoured. We might have skimmed over it quickly, but personally I think for our marae the most favourable option is what Kepa brought through this afternoon. I would like to see if we could have more information on what Kepa has to offer and what is happening up at Waiheke before we go and do our wine tasting.

*Ian McLean:* Kia ora, we will taihoa a moment and come to those options, but some groups did have a chew on it and it seemed that of the first 6 options that RDC put forward Options 3 or 4 were the ones which were more favoured. Is that right? Anybody disagree? No disagreement.

We will then move on to the urine separation and Biolytix. There was a very strong feeling that the groups wanted to know more about this to see how it worked and more information and analysis. Does that sum up what the feeling was?

*Dave Donaldson:* And Ian whether the subsidy would apply?

*Ian McLean:* Yes and whether the subsidy applies to these or not.

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So those are the options. Option 1 – there seemed to be mixed views on it partly because of particular problems it creates with wahi tapu and with technical problems. Am I correct in understanding this was what came from the groups? Anything else on the options?

The point was made from one of the groups that we want a single scheme, that we want to co-operate together and we want fairness. There is the issue of Tamatea Street and other low lying areas where the need is not academic or theoretical or what happens to the lake in 20 years' time. In that sense there is physical urgency to move ahead.

The question was raised of Rotoehu. The Steering Committee have agreed not to pursue Rotoehu unless either RDC or the local people at Rotoehu want to. Now does the workshop see that differently? No dissent?

*Terry Long:* We have talked about a problem at Tamatea Street and in Otautu Bay there is Tumai Road which has much of the same problems. We cannot discount it, but we have not actually engaged with that section of the community and said, 'Hey you've got a real problem here'. They may be saying, 'Oh we'll be fine'. I do not see it that way. I am pleased to hear the people from Tamatea Street saying, 'We've got a problem, we recognise it'. Tumai Road residents have not recognised it yet.

*Willy Emery:* Are we saying that we are going to leave the door open for the Rotoehu people at Kennedy Bay and Otautu Bay because there is no one here from there?

*Davey Gardiner:* There are shareholders here.

*Willy Emery:* I understand that Davey but there are a lot of home owners there and I think we should consider leaving the door open.

*Ian McLean:* Willy has put a good question to us – Should we as a group agree that as far as the scheme is concerned the door should be left open to the two settlements, Kennedy Bay and Otautu Bay? Would this group feel that if the people there should change the views that they have so strongly expressed, then we would have no objections with their joining in. Is there any dissent to that? No dissent, there is agreement on that.

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## **Open Forum**

### **Further information required**

*Ian McLean:* There was one issue earlier and that related to RDC, I made a note somewhere, what were we going to ask you Dave?

*Dave Donaldson:* Was it infrastructure on leasehold land?

*Ian McLean:* I think that question would be fair to put to you. At the Environment Court there was a lack of clarity as to the Council's position on building sewerage treatment plants on leasehold land. That lack of clarity was commented on by the judge in strong terms. There is not much land other than leasehold land in the area we are talking about. We should ask RDC for clarification on the policy and make it clear that facilities can be based on leasehold land.

*Dave Donaldson:* The RDC does already have a policy on what is called vital infrastructure on leasehold land. This Wednesday we are opening a \$450,000 toilet block on leasehold land at Waipa Valley. It is a case of the terms of the lease and whether that lease is affordable by the community who have to pay the operating costs. A scheme like this could be ring fenced to the community that it services and can they live with the cost of the lease? That would be the decision. I am only one vote of 13 elected members, but it would be wrong of a Council to impose an unaffordable lease on a community. I guess that is the test but straight out, 'No we don't build infrastructure on leasehold land', but we have done it and the precedent has been set. If you want clarity of that policy it has to go before our Strategy Policy and Finance Committee for a clear ruling.

*Ian McLean:* As a Steering Committee we are going ahead knowing that one or more of the options would require facilities on leasehold land.

*Dave Donaldson:* That was the intention as the Environment Court judge quite rightly pointed out. There was a lease being considered. I was not on Council at that time so I cannot comment, but the feedback I got was that it was unaffordable on the people who would have to pay the operational costs that the lease would be part of.

*Ian McLean:* We are better to let sleeping dogs lie as far as the issues of the Court are concerned. Clarification of this issue from RDC would be desirable, is there agreement on that?

*Joe Tahana:* Thank you Ian, it would be desirable to get clarification. I still have an outstanding claim with the Human Rights Commission in relation to RDC's policy that excluded Maori land. If RDC is changing their position that is wonderful, I would like some clarification on it please.

*Mary Stanton:* I own a property which is Maori lease land and I have a sewerage system. It is No 1 Okawa Bay Road; one of the last properties to be included in the Mourea sewerage scheme because we could not connect to the main road and that was the closest point. We disputed it because it meant we had to go down the hill and thrust through the land to the bottom of Mourea, Okawa Bay Road, and put our sewage into the road connected at the bottom of the hill. They came up with this magnificent costing and I refused to pay it. I said, 'No way'. I have this scheme down at Mourea which is costing so much money and in Okawa Bay I have another house and I looked at comparisons. I said to them, 'I'm not going to pay three times as much as what you want', and we got our way in the end, kia ora.

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*Kepa Morgan:* I mentioned last week that I had concerns with the process, and during the meeting, but we seem to be suddenly jumping to solutions. I do not think we have given full hearing to the issues that we need to address, or even come up with a design brief for the solutions so that they can be compared on apples for apples basis. We need to rethink this.

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## ***The Way Ahead***

*Ian McLean:* Can you taihoa a minute because that is what we are going to talk about next.

If there is nothing more on the options or issues arising from those we then come to the way ahead. The proposal for the way ahead is summarised on the back page of your questions and it involves the Technical Advisory Group which is being set up. Some nominations have been made and it has to be formally set up and that will be in a meeting after this workshop. The Technical Advisory Group would do two things, one is develop an evaluation criteria based on the goals, review the options, put those together and come back to us with feedback on the workshop, comment on the options, a shortlist and their suggestion of an evaluation criteria. We are putting two steps together because there are all sorts of external forces giving urgency to move towards making a decision. One step is the development of evaluation criteria based on the goals which the Committee has accepted and the second is a review of the options and then report back to us. At that stage there would be short listing. We would go back again to the TAG and they would evaluate an assessment of the short list options and identify a preferred option and then that would be refined and go out for further consultation. That is the proposed process.

*Kepa Morgan:* Where is the development of the evaluation?

*Ian McLean:* Second box on the right hand side.

*Kepa Morgan:* Oh you are running off a different sheet I think.

*Ian McLean:* If you had had that other sheet in front of you at the workshop Kepa you might have seen it.

*Kepa Morgan:* Ok, no I was looking at that one.

*Joe Tahana:* Another thing you should put as your Steps Forward which I will raise on behalf of Ngati Pikiao is that we go back to the Ministry of Health, reconfirm the subsidy that they propose to give out to this scheme, and even extend it out by another 6 months to a year. It gives the Technical Advisory Group a bit more time without any pressure because our deadline is June this year 2014, only another 3 months to make a decision.

*Unidentified speaker:* We have two months to confirm the decision and go back to the Ministry of Health with an option. We may get there but let's go back to them and say, 'Hey let's extend it out a bit more, be more reasonable and sensible. We are trying our hardest but RDC is slowing us up.' Something along those lines. We need some space and 2 months is putting a lot of pressure on this and the Technical Advisory Group. The point I am making is give it a go and they can only say no.

*Ian McLean:* I think we can leave that to the Technical Advisory Group and RDC to manage. The letter from the Ministry was very strong saying – This is it, there were 40 schemes in the country and you are one of the last 3. It is the only one that has not come up with an option yet. Use it or lose it, and that summarises the letter. So the point is well made and it has to be managed quite carefully. We have to show some indications of progress.

The other point about clarification on the precise conditions of the subsidy is worth exploring. Any comments or suggestions about the proposed way ahead?

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*Kepa Morgan:* Just a recommendation, picking up on Craig's comment at the beginning of his presentation. He suggested the Rotoma Rotoiti Sewerage Steering Committee was driving the solution before we had had a chance to look at the issues. I liked his suggestion that we make it the Rotoma Rotoiti Nutrient Reduction Steering Committee, or Water Quality Steering Committee. Something that talks about what we really do as the objective, which is improving the water quality of the lakes. As you said leave some things in the past, it may be a good way of moving on. It would cement the commitment too from different parties to support whatever the TAG and Steering Committee came up with.

*Ian McLean:* Thank you, it would have been much better if we had called it 'The Sewerage Scheme'. I must plead guilty to the naming and it was not with any bias, but the point is well made and maybe we could put a subtitle in there. The name is out there and being used but if we put a subtitle in recognition to the point you made we may be able to take it into account.

*Craig Brown:* If you take that deal on board it would be better to frame the goals around water quality as opposed to selecting amongst the options for the sewerage scheme. That would be the change to make.

*Ian McLean:* The problem is that we have not got a brief for that, nor a brief to redo the Lake Rotoiti or Rotoma Action Plan, nor have we got a brief to renegotiate the deal done between Te Arawa Trust, RDC and EBOP and Ministry for the Environment on Rotoiti. If we come to the conclusion that is the way to go kai te pai, we have to go that way. But to put that in our objectives somehow would be beyond our brief.

*Greg Manzano:* Can I give some clarifications? If we are going this way we have to change the terms of reference of the committee. We already have approved terms of reference of the committee so if we alter we have to go back to square one.

*Neil Oppatt:* Yes I sit on the Te Arawa Strategy Group and I believe that when we talk about sewerage what we are talking about is a particular amount of reduction through the management of properties' effluent. Put this way I do not think there is anything today that I would find a conflict with, or that any of my colleagues on the Strategy Group would find a conflict with. It is still based on the nutrient reduction targets and that is all I have heard today,

*Phill Thomass:* Being on the Steering Group I would like to comment that we are looking at water quality issues, but we are also looking at public health for the people using the scheme and in terms of public health we are looking specifically at sewage.

*Ian McLean:* Any other comments? With those comments and suggestions taken into account is the group in general agreement with the way ahead options as presented, anybody against? Ok that is wonderful.

If in the work of the TAG or the Steering Committee it looked as though there was clearly a best option I would be encouraging the Committee to pursue it no matter what needed changing, if it was clearly the best option. I would personally feel for all their sakes what we want is the best option and pursue that. But I think we will get into trouble if we raise that at the moment.

So that is the conclusion of the workshop except for one thing and that is the closing. Immediately the workshop closes would the Steering Committee remain behind and we will work through two issues relating to the TAG.

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*Joe Tahana:* Prior to Willy closing our workshop I want to extend our thanks to you Ian, you have done a wonderful job today. I know it is not an easy job standing up here in front of everybody and your wonderful job highlights why we have you here as chairman in the first place.

*A Kaumatua:* Kia ora tatou. In the blessing of God Almighty, The Father, The Son and The Holy Spirit be with us all now and forever, aki aki aki Amene. Kia ora tatou.

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## ***Summary of Points of Agreement of the Workshop***

### **The Options**

1. Of the Options 1-4, 3 and 4 were the more favoured.
2. Option 2 to Kawerau was heavily discounted and would not seem to be regarded as worthy of support.
3. Option 3 of Rotoma and Rotoiti together was well favoured, but not necessarily favoured above others. Some including kaumatua considered that it was culturally viable.
4. Option 5 of MBR clusters had little support because they were regarded as too expensive.
5. High tech OSET septic were seen as being necessary where access to other systems is not possible; but otherwise had support from a minority.
6. Of the options with urine separation or Biolytix, the workshop wanted more information and analysis, and whether the subsidy would apply.

### **Other issues**

7. A single scheme is wanted, with co-operation and fairness.
8. Some areas are so low-lying that their problem needs to be solved urgently.
9. The door should be left open to Kennedy Bay and Otautu Bay.
10. Should approach the Ministry of Health, for extension of subsidy by another 6 months.
11. Word *sewerage* in title of the Steering Committee is too restrictive: not just reticulated schemes to be considered.
12. *The Way Ahead* was generally agreed.

### **Further information required**

13. RDC policy of building on leasehold land.