

# On-site Effluent Testing Where to from Here We can't sit Stool

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# Take Home Messages

The On-site Effluent Treatment (OSET) Testing Facility is a great tool to compare WWTPs and assess them against the NZ standards

The WWTP systems rarely go the whole test period without needing operator input. Other factors about the WWTP set-up and management also need to be taken into account

The OSET national testing facility needs buy-in from all Councils that approve on-site systems in order to prevent inappropriate systems becoming standard.

# Outline of Presentation

Overview of the OSET Testing Facility

Funding and Issues Going Forward

Update on Results

Food for Thought

Where to From Here?

# OSET NTP Facility

Operating since 2005 – initially for N reduction capability for Rotorua (15 mg/L) and Taupo catchments (25 mg/L)

At that time 35 companies were marketing on-site systems – many claiming to meet the N targets

Water NZ SWANS took over management in 2008 and made it a national facility, with focus on meeting AS/NZS1546.3:2008

Testing runs for 9 months from October to July, receiving 1,000 L/d in 2 doses. Sampling starts in Week 9 until Week 35, then a high load week, then 3 more weeks

Analysed for BOD, TSS, TN,  $\text{NH}_4\text{-N}$ ,  $\text{NO}_3\text{-N}$ ,  $\text{NO}_2\text{-N}$ , TP, Alkalinity, pH, FC and Power

30 Plants now been tested. Some designed for larger load.

# Funding and Issues Going Forward

	Suppliers	Councils (DC)	Unitary Authority (UA)	Regional Council (RC)
Funding per trial	\$22,000 (\$28,000 in 2017)	\$1,500	\$3,000	\$5,000
What for?	Direct costs, Rental from RDC, Lab costs	PAG and MAG (technical management and auditing)		

Additional funding historically provided by Auckland City Council, Bay of Plenty Regional Council and Rotorua District Council

Council funding partners receive:

Full detailed reports → can **compare results** → set **local rules** (i.e. maintenance) and **make decisions** on which systems are stable and suitable to meet the requirements of their District/Region;

Comparative report that compares the WWTP to all the systems *in that trial*



# Funding Issues .....

Current Funding Partners:

6 of 11 RCs – **55%**

9 of 73 DCs – **12%**

1 of 5 UAs – **20%**

Total funding \$46,500

**Doesn't cover cost of Technical Manager,  
yet alone auditing and reporting costs**

# Funding Issues .....

Number of Plants Tested:

2005/06 – 2013/14 – 7 (max)

2014/15 – 2016/17 – 3 or 4

***At current numbers, loss is \$18,000/yr***

Option 1 → Suppliers pay more than \$30,000 per unit

Option 2 → Additional Councils need to become funding partners

Option 3 → **No one cares so lets pack-up and go home – real!!**

# Funding Issues ....Way Forward?

Non funding partners Councils will only have access to limited information through the Water NZ Website

Councils that are funding partners will receive full reports identifying which systems failed the AS/NZS1546.3:2008 criteria, what their grading was, what issues they had during the test, their standard deviation (stability)

Currently no statutory requirement for systems to be put through the OSET testing facility, or satisfy the AS/NZS1546.3:2008 requirements

Should there be a Central Government requirement to make all systems meet AS/NZS1546.3:2008 before being installed in NZ and DCs and RCs only provide consents/permits to those systems that satisfy the requirements.



# Results Update

Indicator Parameters	Median	Std Dev	Rating	Rating System				
				<i>A+</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
<b>BOD (mg/L)</b>	5	3.5	<b>A</b>	<5	<10	<20	<30	≥30
<b>TSS (mg/L)</b>	8	4.6	<b>A</b>	<5	<10	<20	<30	≥30
<b>Total Nitrogen (mg/L)</b>	40.7	2.5	<b>D</b>	<5	<15	<25	<30	≥30
<b>NH<sub>4</sub>- Nitrogen (mg/L)</b>	17	3.7	<b>C</b>	<1	<5	<10	<20	≥20
<b>Total phosphorus (mg/L)</b>	4.2	0.4	<b>B</b>	<1	<2	<5	<7	≥7
<b>Faecal Coliforms (cfu/100 mL)</b>	163,000	80,900	<b>D</b>	<10	<200	<10 <sup>4</sup>	<10 <sup>5</sup>	≥10 <sup>5</sup>
<b>Energy (kWh/d) (mean)</b>	0.2	0.05	<b>A</b>	0	<1	<2	<5	≥5

# Results Update ....

Systems tested in Trials 9 and 10 were, in no particular order:

CleanStream TXR-1, Biocycle 8000, BioKube Venus, Devan Integra S-15, Biolytix BioPod, RX Plastics Airtech 9000, Ecocycle Fusion, Oasis Series 2000, Wright Protec 10000

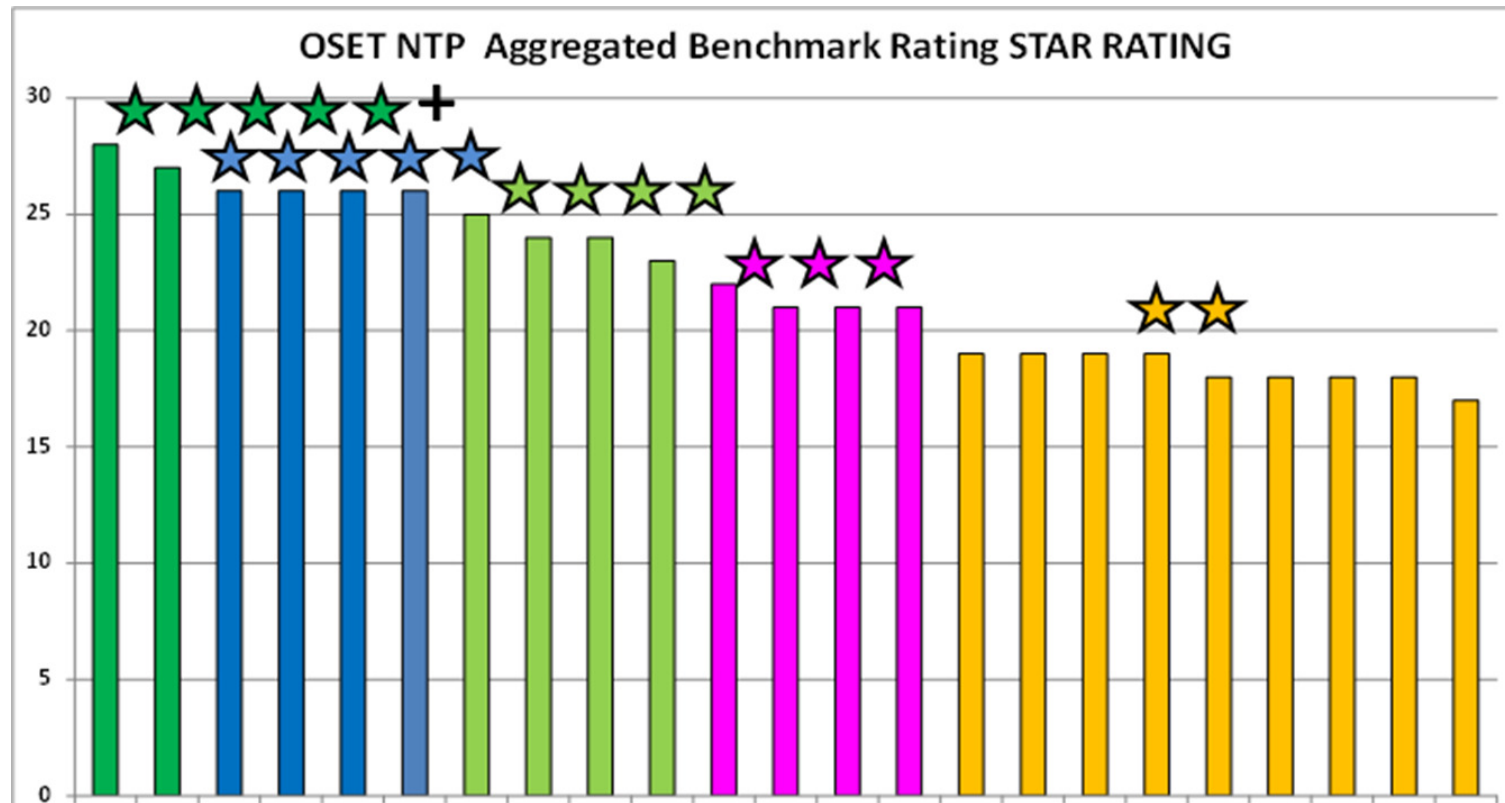
The results from these 8 units are provided in the following tables. They have been given random numbers

# Results Update ....

Trial 9									
Unit	BOD5	TSS	TN	NH <sub>4</sub> -N	TP	FC	Energy	Meet AS/NZS	Operator Input
<b>1</b>	A+	A+	D	A	B	C	A	Y	<b>Y</b>
<b>3</b>	B	C	D	D	B	D	B	<b>N</b>	<b>Y</b>
<b>4</b>	A	C	D	A	B	C	A	Y	<b>Y</b>
<b>5</b>	B	A	D	D	B	C	A	Y	<b>Y</b>
<b>6</b>	A	B	D	C	B	D	A	Y	

Trial 10									
Unit	BOD5	TSS	TN	NH <sub>4</sub> -N	TP	FC	Energy	Meet AS/NZS	Operator Input
<b>7</b>	A	A	D	C	B	D	A	Y	<b>Y</b>
<b>8</b>	A+	A+	B	A+	B	C	B	Y	
<b>9</b>	A	B	D	C	B	C	B	<b>N</b>	<b>Y</b>

# Results Update ....



Trial 9 & 10 No.

8

1

6

7

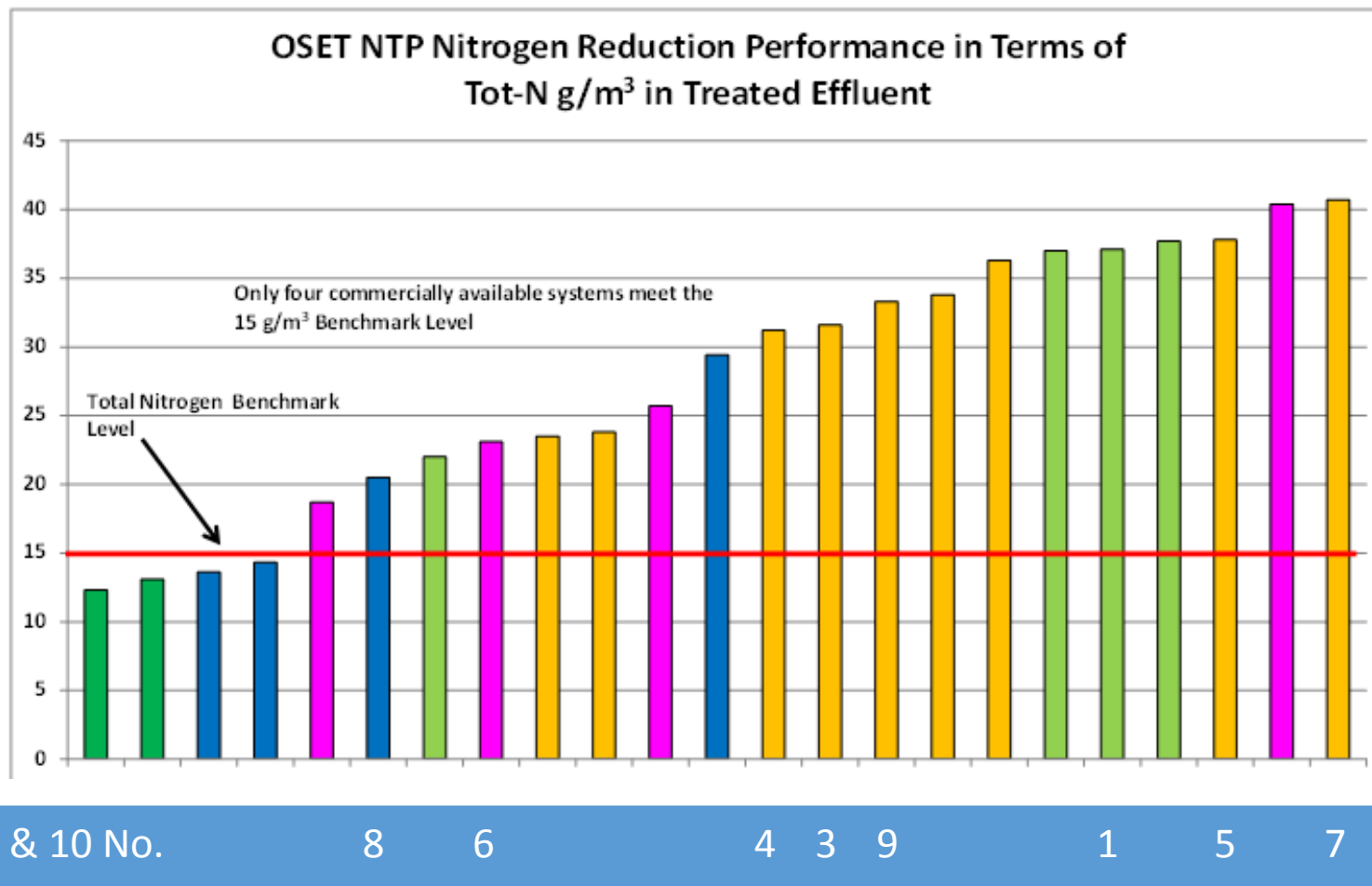
3

5

9

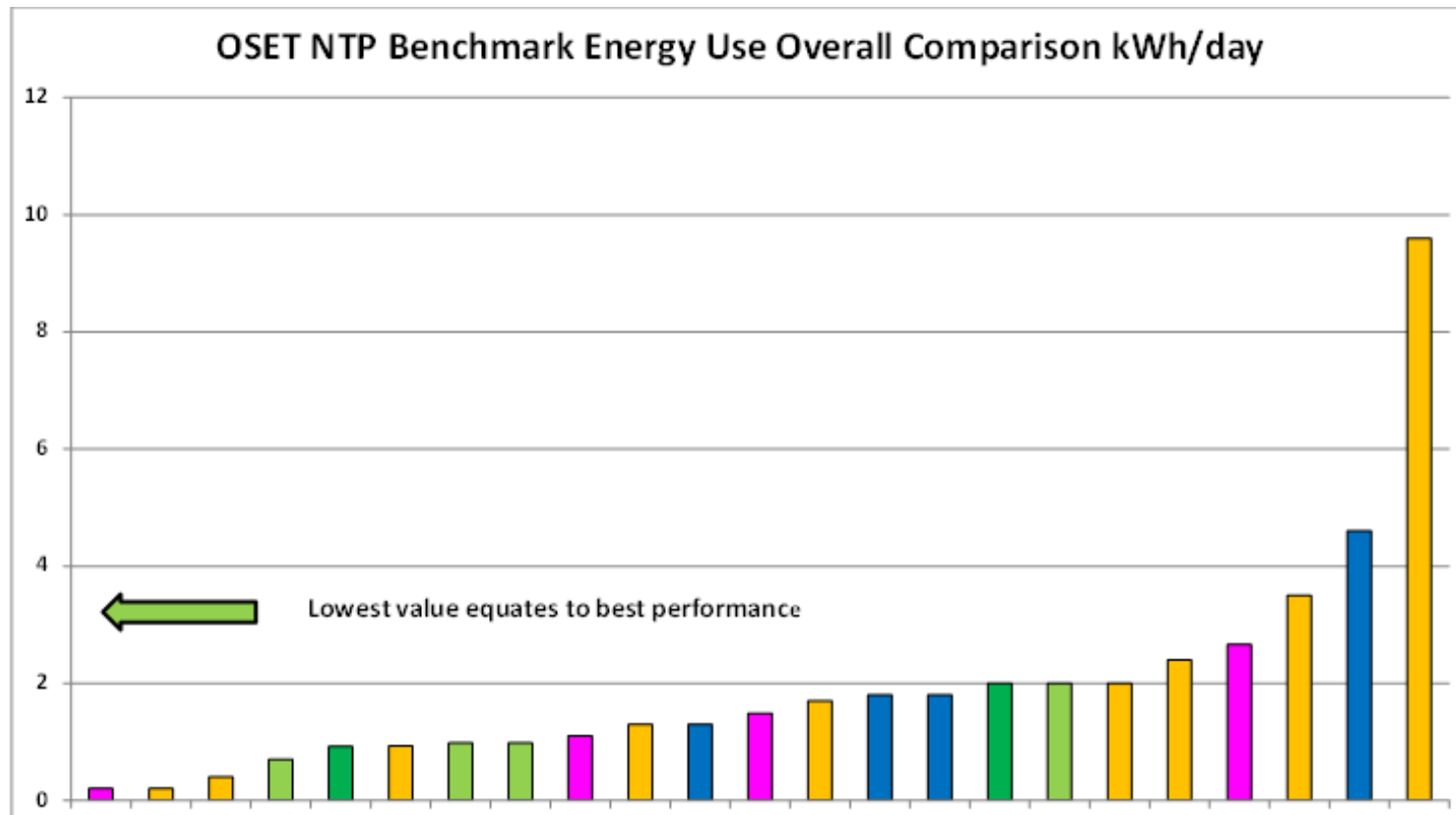
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# Results Update ....





# Results Update ....



Trial 9 & 10 No.

7 5

4 1

3 8 6 9

# Food for Thought

Designed to address **BOD** and **TSS** to satisfy AS/NZS

**Nitrogen Reduction???** ~~Simplicity~~  
→ Complexity (more input) → Failure

*KISS* (Keep It Simple Stupid)

Number of failures at OSET alarming – and that is with best foot forward??

Focus → the protection of *Public Health*

*NOT on Nitrogen (apart from in specific nitrogen sensitive areas)*

# Stool Hungry?

*“Is Nitrogen from on-site systems really that critical?? Or should we be returning the focus to public health, with design for low BOD and TSS so that the discharge area is not compromised, with an emphasis on nutrients only in areas that are very nitrogen sensitive??”*

**Note that you need 7 D grade N (40 mg/L) WWTPs with drip irrigation systems/ha to be equivalent to 18 kg N/ha/yr**

# Where to – stop going through the Motions

**ADD TO OSET REPORT** → an audit on the installation?

→ general comments on equipment type/robustness?

→ comments on plant reliability during the trial?

→ comments on management/operation manual?

**+ Grading of these Overall OWMS aspects**

***As a consequence, the Industry might raise the quality of their products, installation procedures and their maintenance requirements – can't be bad thing***

**Remember, it is the bad ones that impact on the reputation of the whole On-site industry**

# Where to – Strand 2

## Implementing a “Strand 2” – Field Assessment

→ **Difficult!!** (Variability in usage and users)

Oasis approached 15 homeowners; 7 sites were monitored with population ranging from 2 to 5 people/household with different conditions, diets and antibiotic use

Comments from the trial were: The programme requires a dedicated Manager; Buy-in from property owners; Reliable monitoring system



# Strand 2 Results?

Results are generally consistent and generally meeting AS/NZS standard

One higher result occurred on the same day for most plants – sampling change??

If Strand 2 is to be rolled out across NZ, it will require a rigorous and sound programme to effectively serve the needs and wider interests of the end users, regulators and industry.

98 Boundary Rd 62 Boundary Rd 63 Swannanoa Rd

10

At this stage the OSET-MAG consider Stand 2 too difficult and believe the focus should be on improving Stand 1

# The sharp end.... The wipe

25 of 30 plants tested have met the AS/NZS standard

This is good as what they are designed to do

*I'm gonna go back*

They need to continue to be designed for this (KISS) as complex systems need more input, have more mechanisms to fail & create more sludge

Failure leads to soil pore blockage which leads to public health risk

OSET trials highlighted poor reliability of advanced systems. To counter, OSET-MAG want to assess the wider system installation and operation and grade these

# The sharp end.... The Flush

18 of 89 Councils assist as funding partners!!

The results should widely available but like many things, they are not valued unless paid for?

The On-site community needs to lobby their Councils to be funding partners so that they know what systems will work in their area

# L W E Environmental I m p a c t

## THANKS

Advice AEE Agricultural Analysis Application Approachable Assessments Assimilation Assistance **Biosolids** Capability Client Communications Communities Compliance  
Compost **Consents** Consultation Contamination Coordinate Council Cultural Current Data Degradation **Design** Detention Developments  
**Discharges** Documentation Drafting E. coli Ecosystems Effects Engagement Environment Equipment Evidence Excellence Experienced Expert Facilitating Farming Feasibility  
Fieldwork First-flush Fit-for-purpose Flooding Fun Geology Graphs Greywater Groundwater Guidelines Handbag Hazardous Hydraulics Innovation Interpretation Investigation  
**Irrigation** Land Landfills Landscape Land-treatment Leaching Lodge **Management** Metals Microbiology **Modelling** Monitoring  
NES **Nitrogen** **Nutrients** Onsite Optimisation Organics Overseer Papers Pathogens Phosphorus Plain-english **Plans** Preparation Presentations  
Project Quality Relevant Remediation Reports Research Review **Sampling** Scientific Septage Sludge **Soil** Solutions Spreadsheets Standpipes Stormwater Strategy  
Support Surface Water Sustainability Systems Team Testing Timely **Treatment** Validation **Wastewater** Water Water-balance Waterways