

## **NZWWA SWANS-SIG – Small Wastewater and Natural Systems Special Interest Group**

### **NEWSLETTER No. 10 February 2009**

#### **EDITORIAL**

Management Committee representatives have been working throughout 2008 in getting SWANS-SIG's major project underway, that is the setting up of a National On-site Effluent Testing Facility (OSET TestFac). The formal establishment process was completed in December 2008 with the signing of a Memorandum of Understanding between Environment Bay of Plenty (EBOP), Rotorua District Council (RDC), NZWWA and SWANS-SIG. A background to the establishment process is provided in this issue along with a summary of the test results for Trails 1 to 3 carried out in the original regional test facility under the auspices of EBOP and RDC. Trial No. 4 currently in progress is the first under the oversight of the National OSET TestFac.

A key element of the testing and performance certification process for on-site domestic wastewater treatment units is the auditing of test results. This is being carried out by SWANS-MAG, the management and auditing group set up by SWANS-SIG. SWANS-MAG was appointed following a Management Committee meeting in July 2008, and has now commenced work on developing the auditing process using the Trail 3 test results from 2007/2008.

SWANS-SIG is again participating in the NZWWA annual conference programme with a one-day specialist stream. The Management Committee confirmed at its July 2008 meeting that NZWWA conference participation should continue as a regular annual activity. Notice re the conference timetable is provided below.

The Management Committee welcomes Dr James Sukias of NIWA in Hamilton to its membership. James replaces Dr Tom Headley who has left NIWA for Europe. He provides an important link with the natural systems area within SWANS-SIG.

Ian Gunn  
Editor  
[ian.gunn@xtra.co.nz]

## **ESTABLISHMENT of the NATIONAL ON-SITE EFFLUENT TREATMENT TESTING FACILITY (OSET TestFac) – an UPDATE**

**Background:** Newsletter No. 9 of April 2008 provided an overview of the OSET testing facility set up in 2005 at the Rotorua District Council (RDC) wastewater treatment plant to assess the nitrogen reduction performance of on-site wastewater treatment units in meeting Environment Bay of Plenty (EBOP) and Environment Waikato regional plan requirements for nitrogen discharge limits to sub-surface soakage systems draining to the Rotorua Lakes catchments and the Lake Taupo catchment. SWANS-SIG interest in having this regional venture adapted to act as a national testing facility was then outlined along with the proposal for a three strand testing and performance assessment regime.

**Regional OSET Trials 2005 to 2008:** The function of the original facility has been testing the nitrogen reduction capacity of ex-factory domestic treatment plants providing on-site wastewater servicing for coastal and lakeside communities in the Bay of Plenty and Waikato regions. RDC provides sampling and laboratory services as well as the site and wastewater for testing. EBOP manages the facility, gathers and analyses the test data, and issues performance certificates to manufacturers in respect of those treatment units meeting the test criteria. Three trials have been carried out to date as follows:

- Trial 1 (2005/06): Seven treatment units.
- Trial 2 (2006/07): Seven treatment units.
- Trial 3 (2007/08): Four treatment units.

Following experience gained with hardware and monitoring systems during Trials 1 and 2, and in anticipation of the establishment of a national testing programme, RDC upgraded the facility July to September 2007 prior to commencement of Trial 3 with new effluent delivery systems and monitoring controls.

**National OSET TestFac:** Progress on setting up the National OSET TestFac has proceeded apace since April 2008 as follows:

- April 2008: Grant towards establishment funding received from the Water Services Managers Group (WSMG) of NZWWA.
- May 2008: Representatives of EBOP, RDC, NZWWA and SWANS-SIG set up an Advisory Group to provide governance oversight of the TestFac under a Memorandum of Understanding (MOU). It was agreed to set up a panel of specialists as a SWANS-SIG Management and Auditing Group (SWANS-MAG) to undertake the benchmarking and performance auditing procedures. A Rotorua based Technical Manager was appointed to oversee the OSET TestFac activities including ongoing RDC operation and monitoring of the facility and EBOP database management and test results reporting.
- June 2008: A Ministry for the Environment (MfE) grant was received to enable development of testing protocols and auditing procedures.
- July/August 2008: SWANS-SIG sets up a five person SWANS-MAG comprising representatives of SWANS-SIG, EBOP and RDC together with two independent specialists.
- November 2008: Trial 4 commences.
- December 2008: MOU between Advisory Group members finalised.
- February 2009: SWANS-MAG performance auditing of Trial 3 results commences.

Trial 3 was the final in the series initiated and managed by EBOP in assessing the nitrogen reduction performance of treatment units aiming for certification for installation in the Rotorua Lakes area of the Bay of Plenty region.

Trial 4 now under way is the first under the oversight of SWANS-MAG. However, the Trial 3 test results are being evaluated by SWANS-MAG under the OSET TestFac performance auditing procedures with a view to national benchmarking of the four treatment units. This is in addition to EBOP certification for those units which meet the total nitrogen performance standard of 15 g/m<sup>3</sup> for use in the Rotorua Lakes area.

\*\*\*\*\*

## **OSET TESTING FACILITY in ROTORUA – TRIAL RESULTS 2005 to 2008**

**Introduction:** Environment Bay of Plenty (EBOP) has now posted the results of the three trials in its OSET testing programme 2005 through 2008 on its web-site. The summary page reference is:

[www.envbop.govt.nz/Land/Rotorua-Lakes-Catchment.asp](http://www.envbop.govt.nz/Land/Rotorua-Lakes-Catchment.asp)

The summary page sets out the list of treatment units for each trial along with the measured power consumption for treatment process operation (plus in most cases irrigation pump power) and equivalent annual power cost. Links on the web-site lead into the detailed report for each treatment unit. Those units meeting the Rotorua Lakes Catchment total nitrogen effluent quality performance standard of equal to or less than 15 g/m<sup>3</sup> are highlighted.

EBOP notes that the trial testing site operated by the Rotorua District Council (RDC) at the city's wastewater treatment plant has now made the transition to a national test facility under oversight of the Small Wastewater and Natural Systems Management and Auditing Group (SWANS-MAG). The Trial 3 test results reports are available on the web-site, but EBOP's final certification of two of the four treatment units tested is to await SWANS-MAG review and assessment.

**Overview of Test Results – Trials 1 to 3:** Examination of the posted reports from EBOP enables the effluent quality results for the tested treatment units to be summarised as below. Highlighted values indicate compliance with the EBOP 15 g/m<sup>3</sup> standard.

### **Trial 1 (2005/2006)**

Treatment Unit	Effluent Quality			
	Ave BOD g/m <sup>3</sup>	Ave TSS g/m <sup>3</sup>	Ave Tot-N g/m <sup>3</sup>	Median Tot-N g/m <sup>3</sup>
Devan Blue DB9000 NRS	--	--	--	--
Hynds Lifestyle	3.2	5.2	20	20
Innoflow Advantex AX20	1.6	2.4	13	13
Oasis Membrane MBR	3.4	4.0	27	25
S&L MicroFAST 0.5	8.0	8.4	25	23
Biolytix BF6 2500 PAT	5.5	4.4	41.5	41.1
Supertreat SB440 (N12)	1.8	5.5	12.1	12.4

The results for Tot-N above have been extracted directly from tabulated data in the relevant reports where the averages/medians are based on 16 samples taken at 6 day intervals over 96 days. The compliance requirement for Tot-N is that 14 of the 16 samples must be equal to or less than 15 g/m<sup>3</sup>. Both Innoflow Advantex AX20 and Supertreat SB440 (N12) met the EBOP compliance requirement.

The averages for BOD and TSS have for Hynds, Innoflow, Oasis and S&L been extrapolated from the weeks 16 to 55 data tables, and therefore are best ‘estimate’ assessments of plant performance over weeks 16 to 55 of the test regime. The Biolytix and Supertreat BOD and TSS are reported values based on three one week periods of sampling at two month intervals. Devan Blue results only covered weeks 37 to 55, and thus were of insufficient number to enable useful conclusions to be made.

Following checks on the accuracy of test flows to each unit of Trial 1 it was found that variable flow patterns had occurred throughout the trial period and that several units were loaded at flow rates below the programmed 1,000 litres/day. This clearly brings into question the reliability of Trial 1 test results in comparing performances of individual treatment units.

### **Trial 2 (2006/2007)**

Treatment Unit	Effluent Quality			
	Ave BOD g/m <sup>3</sup>	Ave TSS g/m <sup>3</sup>	Ave Tot-N g/m <sup>3</sup>	Median Tot-N g/m <sup>3</sup>
Bio-Microbics MicroFAST 0.9	9.8	26	27.3	26.5
Devan Blue DB9000 NRS	6.1	14	18.8	18.6
Hynds Lifestyle “Ultimate”	2.9	7.0	13.0	12.7
Reflection Textile EW	1.3	3.0	16.8	17.0
RX Plastics Airtech 9000 NR	3.0	4.0	10.7	10.6
RX Plastics Airtech 9000	12.1	11.0	31.8	31.7
Waipapa Tanks Econo-Treat P-10-2	5.1	9.0	16.1	16.2

The results above have been extracted directly from tabulated data in the relevant reports. Tot-N data relates to the 16 samples over 96 days, and BOD and TSS relate to averages over three one week periods of sampling at two month intervals.

To deal with the issue which arose in Trial 1 of ensuring reliable test flows, for Trial 2 a number of changes were made at the testing facility including improved flow metering, more frequent coarse flow filter cleaning, data logging and telemetry systems, and an automated alarm system.

### **Trial 3 (2007/2008)**

<b>Treatment Unit</b>	<b>Effluent Quality</b>			
	<b>Ave BOD g/m<sup>3</sup></b>	<b>Ave TSS g/m<sup>3</sup></b>	<b>Ave Tot-N g/m<sup>3</sup></b>	<b>Median Tot- N g/m<sup>3</sup></b>
Biocycle 6300	14.4	34.0	29.8	29.2
Innoflow Advantex AX20	4.3	10.0	15.8	16.9*
Oasis S2000	2.7	5.0	13.3	13.1*
Waipapa Tanks	3.6	10	12.2	11.9

The results above have been extracted directly from tabulated data in the relevant reports (as per Trial 2 results).

Prior to commencement of Trial 3, RDC relocated the trial site and upgraded the flow delivery system to ensure that highly controlled influent flows could be delivered to each test unit. This ensured that any uncertainties regarding the accuracy of input flows which arose during Trials 1 and 2 were removed. A 500 litre dose tank is dedicated to each of the test unit locations, with the daily 1,000 litre flow delivered in two 4.5 hour duration doses of 500 litres each. These doses are discharged uniformly throughout 6:30am to 11:00am and 3:30pm to 8:00pm.

However, on day 15 of the 96 day Tot-N assessment period and two weeks prior to the start of the third week-long sampling and testing period for BOD and TSS, an unexplained “dump” of effluent occurred to all treatment units with 500 litres draining rapidly from each dose tank direct to each of the four test units. The implications of this for interpreting the test results is to be examined by SWANS-MAG under the National OSET TestFac auditing process, following which EBOP is to finalise its Tot-N compliance assessment of the Innoflow and Oasis systems. The test record shows apparent de-stabilisation of the treatment performance due to the 500 litre “dump” which is of greater variation in some treatment units (those marked \*) than others of the four units in Trial 3.

**[Editor’s Note:** This item has been adapted from On-Site NewZ, Issue 09/1 January 2009]

\*\*\*\*\*

### **SWANS-SIG STREAM at NZWWA 51<sup>st</sup> ANNUAL CONFERENCE and EXPO “WATER 2020” Rotorua Energy Events Centre, 23 – 25 September 2009**

Paper abstracts are being sought for presentation in the one day SWANS-SIG Conference stream dealing with research and practice in small community wastewater and natural systems. The overall conference theme is “From Fragmentation to Efficiency” with a focus on achieving more efficient and sustainable management frameworks than are currently the case.

There are clearly opportunities for members of SWANS-SIG to outline via paper presentations the opportunities for and examples of integrated management systems for both on-site wastewater as well as decentralised and distributed wastewater servicing options.

Papers on technology innovation across all areas of small wastewater systems including wetland and land treatment would also be welcomed.

Conference **Key Dates** are:

11 February Abstracts open  
3 April Abstracts close  
20 May Authors advised of selection (and of date in July receipt of manuscripts)  
5 June Registrations open  
24 July Poster summaries close  
14 August Final manuscripts due (with any corrections)  
11 September PowerPoint presentations due

To submit an abstract go to [www.nzwwa.org.nz](http://www.nzwwa.org.nz), Events, and the 51<sup>st</sup> Annual Conference links.

\*\*\*\*\*

## **CONFERENCES**

### **Report on On-site and Decentralised Sewerage Conference, 12 – 15 October 2008, Benalla, VIC “Coming Clean: Sustainable Backyards and Beyond”.**

Hamish Lowe of Duffill Watts Consulting Group in Palmerston North was one of the small group of NZ participants in this three day event, and has provided the following report.

**Background:** The Australian Wastewater Association in conjunction with Victoria EPA and Environmental Health Australia ran a conference in Benalla, Victoria from 12<sup>th</sup> to 15<sup>th</sup> October 2008 dealing with decentralised and small scale community wastewater systems.

**Topics covered:** There were approximately 56 papers presented covering a range of issues from risk assessment, water recycling, grey water management, urine separation, regulatory development and public health issues. The conference heard from the keynote speaker of George Tchobanoglous and several other prominent wastewater specialists around Australia. Delegates came from a mixture of State regulators, County regulators, County health protection officers, consultants, researchers and system proprietors.

The main convenor of the conference was Sarah West who is now the manager for Onsite Wastewater Development and Regulation for the Victorian EPA. She did an amazing job of bringing together a range of expertise and coordinating the papers into relevant streams.

**Who was there:** The conference was attended by approximately 240 people from around Australia, with delegates from America, South America and New Zealand.

Andrew Dakers, EcoEng Limited, Gerald Lilley, Innoflow Technologies Limited and Hamish Lowe, Duffill Watts Limited were three people that attended from New Zealand. Hamish presented a couple of papers including a paper prepared with Sandy Ormiston on behalf of The New Zealand Land Treatment Collective on the status of Decentralised Wastewater Management and Technology in New Zealand. Gerald Lilley presented a paper about the Jacks Point project in Queenstown.

Copies of the presentations presented are available from AWA. If further information is needed about the papers presented please contact Hamish Lowe at Duffill Watts Ltd.

**Reuse of Water Theme for NZLTC 20<sup>th</sup> Anniversary Conference, Taupo 24 to 27 March 2009**

This year's 20<sup>th</sup> anniversary conference is on the topic of "Recycling of Water" which is aimed at exploring new strategies, technologies and services in the area of reuse of water. The on-site and small wastewater treatment sector is again participating with several manufacturers providing sponsorship support.

The programme is drawing on Australian experience in this increasingly important area of interest with the keynote speaker being Dr Darryl Stevens, coordinator of Horticulture Australia's Recycled Water Use program. Dr Stevens has also participated in the National Environmental Council production of the Australian Guidelines for Water Recycling. The second Australian contributor is Dr Robert Patterson of LanFax Labs, NSW, who is well known as the organiser of the On-site '99 to '07 series of biennial on-site wastewater conferences held at the University of New England in Armidale. His topic is "Water Recycling as an Opportunity for Real Resource Management", and will be delivered as an after dinner address.

Wednesday 25<sup>th</sup> and Thursday 26<sup>th</sup> March comprise technical sessions at the Suncourt Motorhotel and Conference Centre, with Friday 27<sup>th</sup> set aside for field trips to effluent land application and treatment systems in the Taupo area. See [www.scionresearch.com/nzl原因](http://www.scionresearch.com/nzl原因) for registration details.

\*\*\*\*\*