

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

### **NEWSLETTER No. 7 February 2007**

#### **EDITORIAL**

Since our last Newsletter No. 6, April 2006, progress has been made on two fronts relative to the Management Committee decision of March 2006 regarding embarking on the topic of small wastewater treatment plant certification as a SWANS-SIG project.

First, Rob Potts (Christchurch) and John Lavery (Rotorua), of Glasson Potts Fowler Limited, produced in September a draft position paper entitled “On-Site Effluent Treatment (OSET): Opportunity and Structure of a National Testing Facility”. This draft has been distributed to the Committee members for comment, and is to be discussed at the next Management Committee meeting being held in Rotorua, late afternoon Tuesday 13 March 2007.

Second, SWANS-SIG has been in discussion with Environment Bay of Plenty (EnvBOP) regarding the future status of the OSET testing facility currently in use at the Rotorua Wastewater Treatment Plant. A SWANS-SIG team is to meet with representatives of EnvBOP, Environment Waikato and Rotorua District Council on 13 March (just prior to the NZ Land Treatment Collective Conference in Rotorua) to discuss the future of the OSET testing facility relative to its potential use as a National Testing Facility. NZWWA headquarters in Wellington is sending SWANS-SIG liaison officer Anna Porter to this meeting to join Ian Gunn (Chair), John Lavery (author of the position paper), and Niki Johnstone [for the manufacturers On-site Wastewater Special Interest Group (OSW-SIG)].

Updates on progress with this project will be provided through subsequent issues of the SWANS-SIG Newsletter.

The other significant event for this year is to be a SWANS-SIG stream at the NZWWA Annual Conference in Rotorua 19 to 21 September. Members are encouraged to respond to the call for papers (below) and also to attend this one-day event within conference, and scheduled for Wednesday 19 September. One day registration will be available, and it is intended the day’s session will be followed late afternoon with a SWANS-SIG AGM, the first since the Christchurch workshop of 2004. Conference will enable us to examine a number of topic areas related to member interests, and the AGM will give members an opportunity to have a say on the current OSET project, and to discuss future activities for the group.

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Editor  
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## **SWANS-SIG MANAGEMENT COMMITTEE**

Current membership consists of:

- Peter Carroll, Hynds Environmental Ltd, Auckland [OSW-SIG];
- Ian Gunn, Auckland UniServices [Chair];
- Ray Hedgland, Fraser Thomas Ltd, Papatoetoe [Secretary];
- Finlay Mason, Palmerston North City Council;
- Dave Miller, Consultant, Palmerston North;
- Rob Potts, Glasson Potts Fowler, Christchurch; and
- Gareth Williams, Innoflow Ltd, Auckland.

The Committee also has the following advisers attached to it:

- Robyn Floyd, Auckland Regional Council;
- Tom Headley, NIWA, Hamilton;
- John Lavery, Glasson Potts Fowler, Rotorua (OSET Project); and
- Anna Porter, Policy and Project Adviser NZWWA, Wellington (SIG Liaison).

The Committee meeting in Rotorua on 13 March will be discussing the OSET project, the one-day stream at NZWWA conference on 19 September, and future planning matters. Contact with the Management Committee may be made through the Chair ([ian.gunn@extra.co.nz](mailto:ian.gunn@extra.co.nz)) or NZWWA ([annap@nzwwa.org.nz](mailto:annap@nzwwa.org.nz)).

## **SWANS-SIG STREAM at NZWWA ANNUAL CONFERENCE – Wednesday 19 September 2007**

### **Technical Papers**

Members are invited to submit abstracts for technical paper contributions for the SWANS-SIG stream direct to NZWWA by 20 April 2007. The general call for papers for the full conference will be issued around 5 March and paper abstracts will be reviewed by the conference Technical Committee following 20 April with authors notified of acceptance around 25 May.

Themes for papers for the SWAN-SIG stream include:

- On-site wastewater systems – case studies in design and practice;
- Small community treatment systems – case studies in design and implementation;
- Decentralised wastewater servicing (planning and/or implementation);
- Natural systems in small wastewater servicing (alternative toilet systems; wetland systems; land application options);
- New technologies in small wastewater and natural systems;
- Management requirements in delivering sustainable servicing solutions.

### **AGM**

The next SWANS-SIG AGM will be held 5:00 pm on Wednesday 19 September immediately following the final session of the one-day conference stream. Details of the agenda will be advised in due course. Consideration is also being given to holding a SWAN-SIG dinner or social function following the AGM.

## **UPDATE on the RESULTS of the ROTORUA ON-SITE EFFLUENT TREATMENT (OSET) TRIALS**

### **Introduction**

On-Site NewZ (the quarterly newsletter and information service for the on-site wastewater industry in NZ) produced in October 2006 a review of the OSET trial results based on the July 2006 report from EnvBOP on the initial testing programme involving five treatment units. A summary of the On-Site NewZ material follows.

## **Background**

With the progress in on-site domestic wastewater treatment technologies of recent years both Environment Bay of Plenty (EnvBOP) and Environment Waikato (EW) have recognised that opportunities exist for using the nitrogen reduction capability of advanced “on-site effluent treatment” (OSET) systems to assist in controlling potential adverse effects on sensitive water bodies, particularly the lakes in the Rotorua and Taupo areas. Both regional councils have produced or proposed environmental limits for effluent quality from on-site wastewater treatment units discharging to land application systems of:

- EW (Lake Taupo Catchment): 25 g/m<sup>3</sup> Tot-N
- EnvBOP (Rotorua Lakes): 15 g/m<sup>3</sup> Tot-N

During 2005 EnvBOP and EW along with Rotorua District Council set up a testing facility at the Rotorua Wastewater Treatment Plant. The primary objective of the testing programme was to see if selected advanced OSET systems could meet the EnvBOP regional rule limit of 15 g/m<sup>3</sup> and to determine what factors might inhibit nitrogen reduction.

Five companies took part in the first phase of testing throughout some 55 weeks during 2005/2006. In August 2006 Environment Bay of Plenty released its report on this first stage of the testing programme as:

### **Nitrogen reduction trials of advanced on-site effluent treatment systems,**

Environment Bay of Plenty Environmental Publication 2006/12, July 2006.

A copy may be down loaded from:

[www.envbop.govt.nz/media/pdf/Nitrogen.pdf](http://www.envbop.govt.nz/media/pdf/Nitrogen.pdf)

## **Nitrogen Reduction Performance**

It became evident early in the sampling that the individual units were taking time to develop good nitrogen removal capability, and it was some 14 to 16 weeks before treatment operations had stabilised. The median values of total nitrogen in effluent for the period 16 to 55 weeks is compared below with the treatment unit specifications provided by each of the five companies:

<u>Company</u>	<u>Advanced OSET unit</u>	<u>Tot-N g/m<sup>3</sup></u>	
		<u>Specification</u>	<u>Test median</u>
(a) Smith & Loveless	-MicroFAST 0.5	≤ 10	23
(b) Hynds Environmental	-Hynds Lifestyle	≤ 25-30	20
(c) Oasis Clearwater	-Oasis 2000 (membrane)	≤ 10	25
(d) Innoflow Technologies	-Orenco AdvanTex <sup>®</sup> AX20	<25	13
(e) Devan Blue	-Devan Blue <i>DB9000 NRS</i>	--	--

The initial Devan Blue test unit had no nitrogen removal specification, and was replaced with a new unit, the *DB9000 NRS* after 34 weeks. Insufficient results were available to include in the August 2006 report, although ongoing testing has shown the unit to be performing well.

The report concludes that only the Orenco AdvanTex<sup>®</sup> AX20 was able to meet the 15 g/m<sup>3</sup> level for a consistent period. All other units met that level from time to time, but fluctuating results ranged up and down between 30 g/m<sup>3</sup> and 15 g/m<sup>3</sup> while the AX20 was always below 25 g/m<sup>3</sup> (the EW limit) from week 16, and always below 15 g/m<sup>3</sup> (the EnvBOP limit) from week 30.

## **Treatment Performance Ranking**

Although the focus of the OSET testing programme was directed to determining the nitrogen reduction capability of the five treatment plants, other effluent quality parameters were recorded. Table 3 in the EnvBOP report sets out average characteristics of influent and effluent over five weekly periods from weeks 16 to 55 when treatment levels had stabilised. Deductions can be made from these averages re overall treatment unit performance and general effluent quality.

In order to make relative comparisons between the performance of individual treatment units, a grading system compiled by On-Site NewZ as per the following table can be used.

Class	Effluent Quality Performance Classification	BOD <sub>5</sub> g/m <sup>3</sup>	TSS g/m <sup>3</sup>	FC cfu/100ml	Tot-N g/m <sup>3</sup>
<b>D</b>	Partial Secondary	>40	>60	NA	NA
<b>C</b>	Relaxed Secondary	30 to 40	45 to 60	NA	>60
<b>B</b>	Secondary	20 to 30	30 to 45	NA	40 to 60
<b>BB</b>	Improved Secondary	15 to 20	15 to 30	400 to 1,000	20 to 40
<b>A</b>	Advanced Secondary	10 to 20	10 to 20	30 to 400	15 to 20
<b>AA</b>	Tertiary	5 to 10	5 to 10	10 to 30	10 to 15
<b>AAA</b>	Advanced Tertiary	<5	<5	<10	<10

An On-Site NewZ inspection of the test results for each of the five treatment units for weeks 16 to 55 has evaluated the spread of these results in terms of the effluent characteristics in the above Classification table, and assigned the following Performance Classes:

Company	Treatment Plant	BOD <sub>5</sub> Class	TSS Class	FC Class	Tot-N Class
(a) Smith & Loveless	MicroFAST 0.5	A+	A+	C	BB
(b) Hynds Environmental	Hynds Lifestyle	AA+	AA	B	A-
(c) Oasis Clearwater	Oasis 2000 (membrane)	AA+	AA+	A+	BB
(d) Innoflow Technologies	Orenco AdvanTex <sup>®</sup> AX20	AAA	AAA	B	AA
(e) Devan Blue	Devan Blue	--	--	--	--

The Devan Blue *DB9000 NRS* was installed 35 weeks into the testing programme, and the Oasis 2000 10 weeks. The test results for weeks 50 to 55 for Devan Blue (from the time that treatment stabilised) are thus insufficient to provide a performance classification in the table above. The A+ faecal coliform Performance Classification for the Oasis 2000 reflects the effectiveness of membrane filtration in removing microorganisms. In terms of the technologies used, the Orenco AdvanTex<sup>®</sup> AX20 is a textile “packed bed reactor” unit, whereas the other systems utilise aerated activated sludge processes.

Another aspect of the testing programme was that several systems experienced operating or installation problems during the trials, with consequential impacts on effluent quality. Only the Hynds and Orenco AX20 units were unaffected by such problems.

One question that remains is, how well are existing treatment units working under field conditions? There are many hundreds of on-site domestic wastewater treatment units already in operation throughout the country, most of which pre-date the models currently under ex-factory testing at Rotorua. The question of assessing their performance is still one that has to be addressed.

### **INDUSTRY WIDE CONSULTATION on UNIT STANDARDS for ON-SITE WASTEWATER MANAGEMENT TRAINING**

Graeme Sawyer, Manager, Water Industry Training, advised in January as follows on progress in developing the unit standards.

“As you may be aware, Water Industry Training is developing unit standards in the area of **designing an on-site domestic wastewater management system**, as a result of industry demand. These unit standards are now in final draft form and we would welcome any comments you would like to make on their content.

The six Unit Standards which have been drafted were created as a result of a number of meetings with a group of industry experts, and included members who currently run training programmes  
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in this field, representatives from regional and district councils, scientific & health experts, effluent management services & equipment suppliers and the Plumbing, Gasfitters and Drainlayers Industry Training Organisation.

A diverse and widespread range of stakeholders were included in the development, in an attempt to produce a framework for training that would represent a high quality standard, and could be trusted by the entire On-Site wastewater community as an appropriate “benchmark” of training or competency. The process was co-ordinated by ourselves – Water Industry Training is part of the Agriculture ITO, and we have Government accredited “scope” to develop NZQA qualifications and set training standards in consultation with the Water & Wastewater industries.

The packaging of these unit standards into a qualification will take place once they have been registered on the New Zealand Qualifications Authority website, in mid 2007. More information on the qualification structure will be published on Water Industry Training’s website as it becomes available.

If you wish to be contacted when the resulting NZQA Qualification is registered, please let us know by return email or via the link below. However, the primary purpose of this email is to inform you & your colleagues of this qualification development, and to encourage your active participation by way of **providing feedback on the drafted unit standards**. To view the on-site wastewater management unit standards go to - <http://www.waterit.ac.nz/oswwm>”.

[Editors Note: Although comments were sought on the draft unit standards by 9 February, feedback can still be sent in to the Water IT Development Facilitator, Kathryn Henderson, [kathrynh@agricultureito.ac.nz](mailto:kathrynh@agricultureito.ac.nz)., and Graeme is also happy to discuss any questions related to the standards (call him on 027 444 1748).]

## **CONFERENCES**

### **NZ Land Treatment Collective (NZLTC), Rotorua, Wednesday 14 March to Friday 16 March 2007.**

Although early registrations closed Monday 26 February, late registrations will be received up until Conference commences. Contact [nzltc@ensisjv.com](mailto:nzltc@ensisjv.com).

The draft programme for the two days of conference papers as well as the technical tour on Friday 16 March is available on the NZLTC website [www.ensisjv.com/nzltc](http://www.ensisjv.com/nzltc). There is a good selection of technical presentations on SWANS-SIG topics, and the Friday tour covers the OSET testing facility at the Rotorua Wastewater Treatment Plant.

### **On-site '07, Armidale NSW, 24 to 28 September 2007**

This 5<sup>th</sup> conference in the biennial series has as its theme “Innovation and Technology for On-site Systems”. Around 48 papers on a wide range of on-site wastewater treatment and management topics have been accepted for presentation during this 3 day (plus one day field trip) event. For details of programme and registration information, go to [www.lanfaxlabs.com.au/onsite07](http://www.lanfaxlabs.com.au/onsite07).

### **2<sup>nd</sup> IWA –ASPIRE Conference and Exhibition, Perth WA, 28 October to 1 November 2007**

This conference on Water and Sanitation in the Asia Pacific Region has the theme “Opportunities, Challenges and Technology”. Papers in small wastewater and natural systems have been called for (although abstracts were due 15 December 2006). For conference details and updated information go to [www.awa.asn.au/events/aspire](http://www.awa.asn.au/events/aspire).

### **8<sup>th</sup> Specialised Conference on Small Water and Wastewater Systems, Kumaraguru College of Technology, Coimbatore, India, 6 to 9 February 2008**

Abstracts are being called for up until 15 June 2007. For conference details go to [www.kct.ac.in/small2008](http://www.kct.ac.in/small2008).

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