

A close-up, artistic photograph of a water treatment plant's machinery. The image shows large, curved metal components, possibly part of a filter or aeration system, with water flowing through them. The lighting is dramatic, with strong highlights and deep shadows, creating a sense of movement and industrial scale.

Woodman Point Wastewater Treatment Plant

Annual Report
July 2002 - June 2003

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Introduction



This annual report summarises the environmental and social performance of the Water Corporation's Woodman Point Wastewater Treatment Plant, under its Best Practice Environmental Licence, for the period from July 2002 to June 2003.

It is provided in compliance with the requirements of the Department of Environmental Protection (DEP), in accordance with Section 1.8 of the document 'Best Practice Environmental Licences' (DEP, June 1998).

It is available publicly on the Water Corporation website www.watercorporation.com.au.

It covers an exciting period which has seen the:

- ❖ Commissioning of a \$150 million upgrade to the plant, resulting in enhanced environmental performance.
- ❖ Maintenance of effective community consultation mechanisms throughout this construction period and beyond.

These results reflect the Water Corporation's commitment to continual improvement in the environmental and social performance of its operations, through its Environmental Management and Business Management Systems.

On-going benchmarking and independent audits support continual improvement in achievement of best practice in the management of biosolids, odours and treated wastewater.

The Water Corporation welcomes the feedback of its stakeholders in relation to this report. Please complete the response form (page 14) if you have any comments on the report or its contents.

A handwritten signature in black ink, appearing to read 'M Herbert', written in a cursive style.

Mark Herbert
Business Manager
Wastewater Treatment

September 2003

I Background

The Water Corporation operates 92 wastewater treatment plants across Western Australia.

The Woodman Point Wastewater Treatment Plant, located adjacent to Cockburn Road in the suburb of Munster, is the largest of three plants in the metropolitan area. It treats wastewater from an area bounded by Midland/Kalamunda in the east, Byford in the south and the coast to the west.

In 2002, the \$150 million Woodman Point Environmental Enhancement project was completed, converting the existing primary treatment plant to an advanced secondary treatment plant where nitrogen is removed biologically, significantly reducing the nitrogen loading to the ocean.

The plant is designed to treat up to 160 million litres of wastewater daily, in ways which minimise environmental, health and community impacts.

The plant also produces valuable by-products:

- ❖ Treated wastewater that is suitable for use by industry.
- ❖ Stabilised biosolids for soil enrichment and agricultural use.
- ❖ Biogas, which is used to generate electricity for the plant, by virtue of which the plant is accredited as a 'renewable energy facility'.

Woodman Point was granted a Best Practice Environmental Licence by the Department of Environmental Protection in 2001.

The licence recognises the performance of the plant in meeting its objectives to progressively improve the quality of treated wastewater and to protect public health and the environment from the effects of disposal of treated wastewater.



Figure I.1 Aerial View of Woodman Point Wastewater Treatment Plant

1.1 The Plant and Process

More than 110 000 m³ of wastewater arrives at the Woodman Point Wastewater Treatment Plant every day. It is predominately domestic in origin – coming from household kitchens, bathrooms, toilets and laundries.

When it arrives at the plant, the wastewater is screened via step screens, to remove any large objects (such as paper and rags) before passing through tanks to remove grit (such as sand).

The wastewater then spends approximately one hour in settling tanks to remove settleable solids.

It is then transferred to a secondary reactor with four independent modules. It is first aerated before being settled. The settling process allows the purifying micro-organisms to settle to the bottom of the tank and clean, treated wastewater is then decanted from the top. This treated wastewater is discharged to the ocean into the Sepia Depression.

The solids resulting from the wastewater treatment process are anaerobically digested to produce stabilised biosolids for soil enrichment and agricultural use.

The benefits of the plant upgrade are already being manifested in an improvement in the level of nitrogen being discharged to the ocean with cleaner treated wastewater; and in treated wastewater of a quality suitable for industrial re-use.

There are also community benefits in reduced odour levels as a consequence of the covering of the grit and primary tanks; and improved extraction and treatment processes for odorous gases.

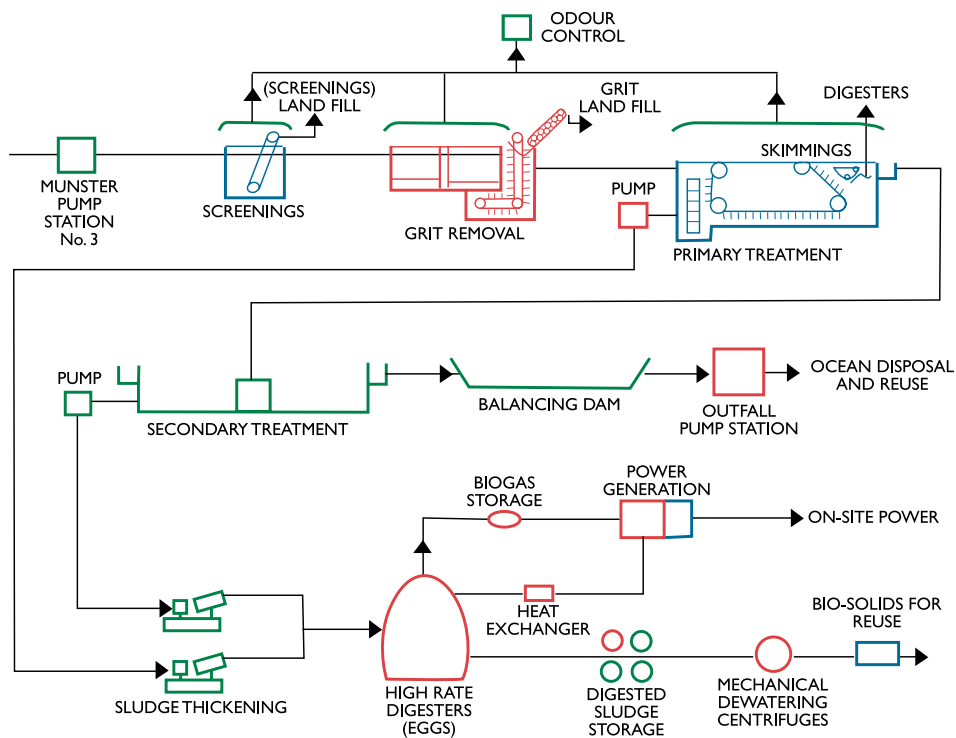


Figure 1.2 Production Process at Woodman Point Wastewater Treatment Plant

2 Summary of Plant Activities

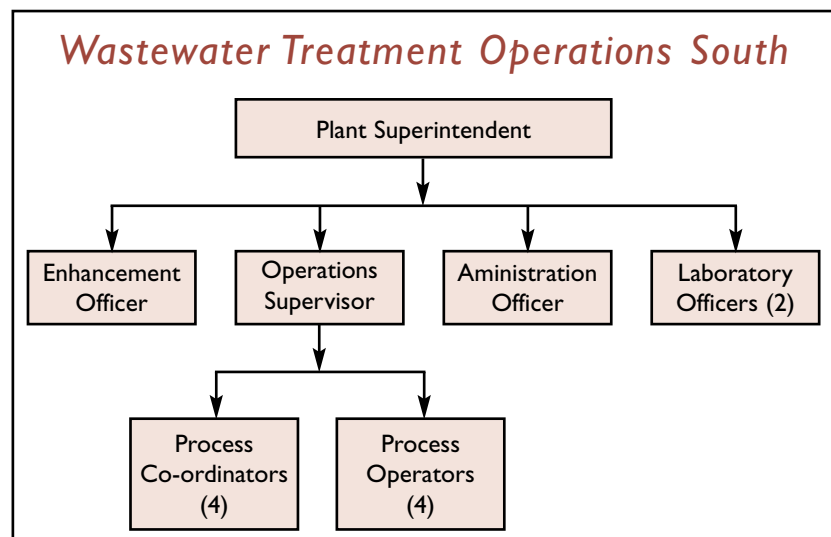
2002-2003

During the reporting period:

- ❖ Operation and optimisation of the plant processes continued.
- ❖ Offsite disposal of screenings and grit to approved landfill continued.
- ❖ Biosolids were removed from site to controlled farms for future re-use.
- ❖ Planning was conducted for the Kwinana Water Re-use Plant, designed to re-use some 20 million litres per day of secondary treated effluent.
- ❖ Re-vegetation works were on-going and will be further developed throughout the year ahead.

3 Roles and Responsibilities

The organisation chart for the Woodman Point Wastewater Treatment Plant (right) shows the structure and roles of personnel.

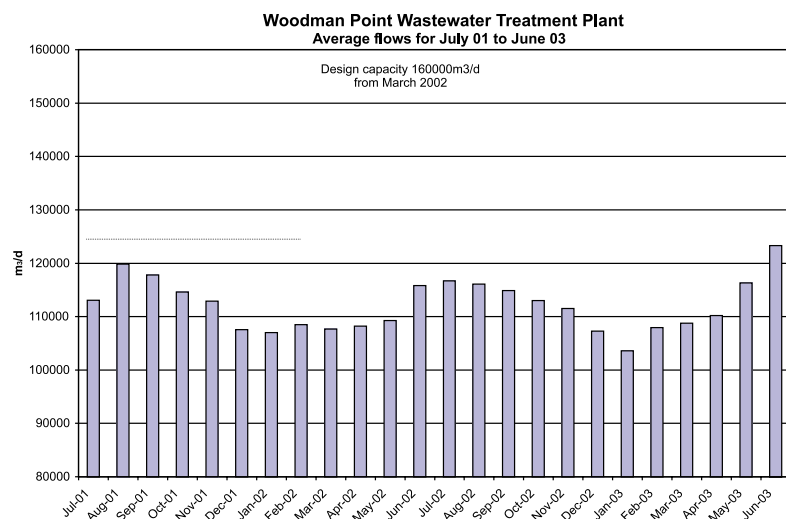


4 Total Flows

2001-2003

The design capacity for Woodman Point Wastewater Treatment Plant is now 160,000m³ per day. During the year July 2002 and June 2003, the plant inflow averaged 112,426m³ per day.

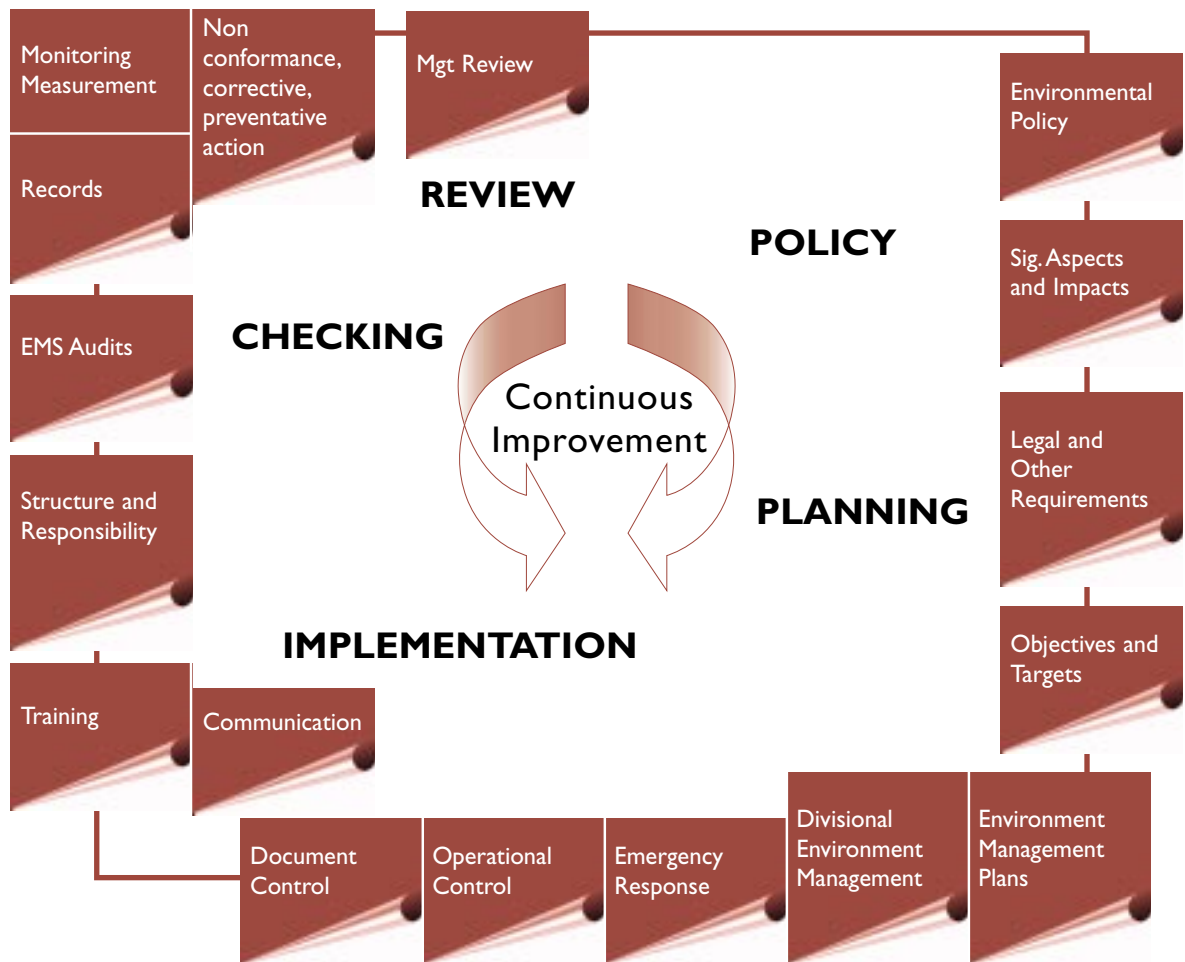
The Woodman Point Wastewater Treatment Plant produced 5,726 dry tonnes of biosolids for the year. The plant achieved 100% re-use of biosolids dewatered cake for the third consecutive year.



5 Environmental Performance

- ❖ There has been a marked improvement in the plant's environmental performance this year, following the commissioning of the plant upgrade in 2002 (the 'Woodman Point Environmental Enhancement Project').
- ❖ There is strict adherence to the Water Corporation's environmental policy and management system.
- ❖ Staff at the plant remain committed to efficient and effective provision of wastewater treatment and disposal services, with minimal disturbance to the local environment and ocean.

5.1 The Water Corporation's Environmental Management System



5.2 Environmental Policy

Site Environmental Policy

Wastewater South

"We recognise our corporate social responsibility by adding value to our business through balanced community and environmental investment."

Environmental Policy

The Water Corporation is committed to efficient and effective water, sewerage and drainage services. We will meet all legislative, regulatory and other requirements relevant to the water industry and minimise adverse impacts on the environment.



Environmental Principles

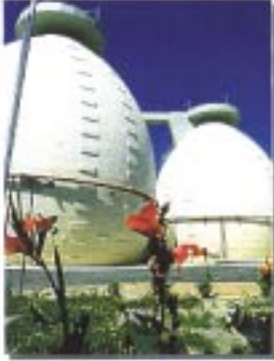
We will work towards:

- Integrating environmental considerations into asset planning, design, construction, operational and decommissioning processes;
- Developing our environmental expertise, both as a foundation for excellence in our environmental performance and as a source of advantage for our customers and our business;
- Developing environmental awareness, responsibility and skills in our employees, contractors and suppliers through targeted education and training programs;
- Informing, consulting and cooperating with external stakeholders and the community;
- Monitoring, measuring and reporting our environmental performance to employees, stakeholders and the community;
- Developing and implementing, where practicable, resource efficiency, waste reduction and recycling programmes throughout the Corporation;
- Promoting the efficient and environmentally sound use of resources; and
- Promoting, contributing to and undertaking research and development targeted at improved environmental and commercial outcomes, including cost-effective reuse of effluent and biosolids.

Michael Pekarinski
 Superintendent Wastewater South
 27th November 2002

Review responsibility: This policy will be reviewed annually by Superintendent Wastewater South, Bulk Water and Wastewater Division.
 Version Date: 27/11/02 File Number: [F:\WWT\101] File Name: SP\WWT-01.pdf



The Water Corporation established the Woodman Point Wastewater Treatment Plant in 1965 to satisfy community needs for essential sewerage services: i.e. collection, effective treatment and safe disposal of the wastewater generated by the population of the southern Perth metropolitan area.

At the Woodman Point Wastewater Treatment Facility we will:

- Comply with environmental licences and conditions;
- Continue to maintain and improve a business management system consistent with ISO 9002, incorporating an environmental management system consistent with ISO 14001;
- Balance the environmental needs of our people, neighbours, customers, stakeholders and the community with our business;
- Operate the treatment plants and maintain the Septa Depression Ocean Outlet Landfill in a manner that will minimise the impact on the community;
- Maintain a high quality of wastewater treatment by operating the treatment plants effectively and monitoring its performance;
- Minimise power usage on site;
- Produce biosolids which can be beneficially reused;
- Keep all bins covered and tanks clean to minimise attraction to birds and vermin;
- Keep the site and boundary rubbish free, maintain fences and supervise landscaping and cleaning contracts to maintain a high standard of visual amenity;
- Conserve, where possible, the remaining flora and fauna;
- Participate in the National Pollution Inventory process.



The Woodman Point Wastewater Treatment Plant Environmental Policy (above) guides the approach of its management and staff to environmental responsibility and performance.

It includes all of the concepts described in the DEP document 'Best Practice Environmental Licences' of June 1998 (1.2 Environmental Policy).

It has been effectively communicated with all staff at the plant, is prominently displayed on the site and is publicly available.

5.3 Significant Aspects and Impacts

The following section summarises specific environmental performance objectives, actual performance and targets for critical and significant issues relating to the Woodman Point operation.

5.3.1 Biosolids Management

The system for biosolids treatment involves state-of-the-art digestion facilities, with the recovery of biogas to generate power to the Woodman Point Wastewater Treatment Plant.

The Woodman Point Wastewater Treatment Plant produces biosolids of a high quality such that they are suitable for direct land application.

The sludge is stabilised using high-rate anaerobic digesters, providing a minimum of 20 days' detention. This process was recognised with a WA Engineering Excellence Award and Energy Efficiency Award in 2000 and is an integral part of the plant's ISO 9001 and 14001 management systems.



Bio-solids help increase crop production.

All biosolids are mechanically dewatered and then provided for agricultural re-use, subject to a rigorous quality-assurance system and backed by targeted research, to ensure maximum benefit and minimal adverse environmental impact.

Objectives

To ensure that 100% of biosolids produced at the Woodman Point Wastewater Treatment Plant are re-used for land application in accordance with the biosolids guidelines, with the exception of emergency situations as notified to the DEP.

Performance

- ❖ The Woodman Point Wastewater Treatment Plant produced 5,726 dry tonne of biosolids for the period July 2002 to June 2003.
- ❖ One hundred per cent of these biosolids was applied to agricultural land as a total nitrogen and phosphorus fertiliser replacement for the production of cereal crop at six agricultural properties located in the Victoria Plains and Moora Shires.
- ❖ Biosolids are analysed weekly.
- ❖ Ground water monitoring indicates no negative impacts as a result of this re-use program.

Future Initiatives

Our aim is to continue monitoring of Woodman Point biosolids and to continue to locate suitable re-use sites.

5.3.2 Collection of Biogas and Use in Power Generation

Objective

To reduce greenhouse gas emissions and produce renewable energy.

Performance

- ❖ The plant is accredited under the 'Renewable Energy (Electricity) Act 2000' as a consequence of its generation of renewable energy using gas produced in the treatment process.
- ❖ The egg-shaped anaerobic digesters produce approximately 16,000m³ of biogas per day.
- ❖ The gas is cleaned and used in spark ignition engines to generate electricity. This electricity is used on the site to meet the plant's power needs.

Future Initiatives

The on-going objective is to increase use of renewable energy by consumption on site, reducing our reliance on traditional energy sources.

5.3.3 Traffic Issues

Objective

To ensure that the removal of biosolids and other transportation requirements, result in no incidents and minimal disturbance to local residents.

Performance

- ❖ Biosolids are transported in covered trucks with sealed tailgates to re-use sites. During July 2002-June 2003, 10 - 12 trucks a week left the plant carrying biosolids for re-use in other areas.¹

¹ In addition, three trucks a week entered the plant to supply chemicals for use in odour-management processes.

- ❖ The transport of biosolids is subject to standard transportation requirements and the Water Corporation's Transport Contingency Manual guidelines.
- ❖ The impact of these traffic movements on local residents and businesses is considered to be negligible.
- ❖ The traffic volume down Russell and Cockburn Roads, combined with the location of the industrial area south of the plant, testifies to the fact that trucking activity is part of the usual daily activity in the area.



5.3.4 Jervoise Bay Groundwater Remediation Project

Objective

To reduce the flow of nitrogen-rich groundwater into Jervoise Bay. Further, to remediate the contaminated groundwater plume which was partly caused from biosolids leaching from the air-drying process, used at the plant between 1966 and 1998.

This project, a partnership initiative between the Water Corporation and the then-Department of Commerce and Trade, aims to reduce the nitrogen loading into the Jervoise Bay Northern Harbour.

Performance

- ❖ A series of groundwater bores, with an average extraction rate of just under 2,900m³/d for 2002/2003, continue to contribute positively to this initiative.
- ❖ The groundwater extraction project continues to reduce the flow of nitrogen into Jervoise Bay and reduces the risk of algal blooms in the harbour.

Future Initiatives

Continued use of the groundwater extraction bores over the next few years will ultimately reduce the nitrogen plume to environmentally acceptable levels.

5.3.5 Treated Wastewater Management and Disposal

The recently commissioned Woodman Point Environmental Enhancement project has significantly improved the plant's capacity to provide advanced secondary treated wastewater to industry for re-use.

The current method of disposal is via discharge into the Sepia Depression, 4.2km off the coast. An outlet diffuser is located at this point. It is designed to minimise the concentration of the treated wastewater in the seawater. The outlet is situated approximately 20m under the surface, so the treated wastewater is diluted 100 times before it reaches the surface.

Any effects of this disposal on the marine environment are measured under the Water Corporation's PLOOM project (Perth's Long-Term Ocean Outlet Monitoring Program).

PLOOM includes detailed monitoring of water quality, wastewater quality, phytoplankton, periphyton and benthic (sea floor) habitats. It affords a comprehensive monitor on the influence of treated wastewater discharges to Perth's coastal waters. It has shown no evidence of any harmful effects on the receiving marine environment or beaches over the past 10 years.

Objectives

- ❖ To reduce the amount of nitrogen discharging into the Sepia Depression.
- ❖ To reduce the number of pathogens (as measured by indicator Colony Forming Units) and the metals discharged.

Performance

All the effluent from the plant was discharged through the Sepia Depression Ocean Outlet, 4.2km offshore.

The chart below shows the total combined flows to the Sepia Depression from the Water Corporation's Woodman Point and Point Peron facilities.

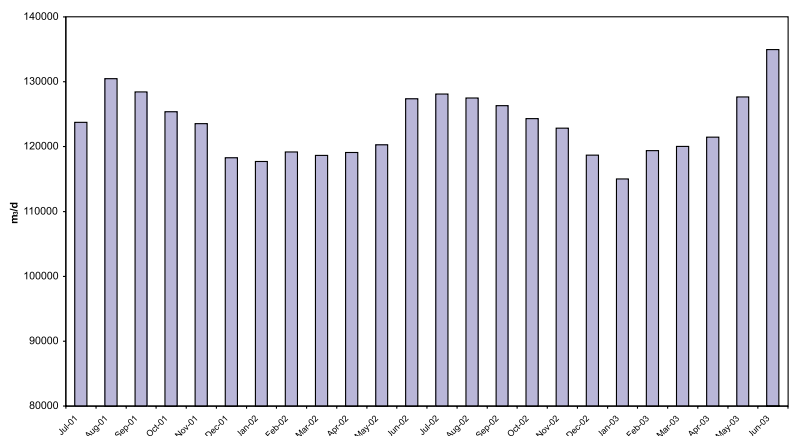


Figure 1.5 Combined Flows into the Sepia Depression for July 2001 to June 2003

The nutrient loading in the discharge into the Sepia Depression has significantly reduced since the commissioning of the Woodman Point Environmental Enhancement project.

The average daily load for phosphorus in the effluent discharged to the marine environment was 1,183kg per day during the reporting period.

The average daily load for nitrogen in the effluent discharged to the marine environment was 1,778kg per day for the whole year.

Future Initiatives

We aim to continue to investigate re-use opportunities and to ensure that any marine disposal to our oceans continues to have minimal impact on the marine environment.

In 2004, the Kwinana WaterLink initiative will get underway, allowing the Plant to supply treated wastewater for industry use in the Kwinana area. This will result in a decrease in the volume of treated wastewater discharged to the ocean.

5.3.6 Odour Management

Objectives

- ❖ To manage odour emissions such that odour concentrations at the edge of the area to the East of Lake Coogee (zoned Urban Deferred) do not exceed five odour units for 99.5% of the time (three-minute average), with a goal of not exceeding two odour units for 99.5% of the time (three-minute average).
- ❖ To maintain good housekeeping at the plant to minimise odour and to minimise attraction to birds and vermin.

Performance

The Works Approval for the Woodman Point Environmental Enhancement project required the Water Corporation to reduce the plant's overall odour impact in comparison with that existing prior to the upgrade.

Inlet channels, screens and primary tanks (the most odorous areas of the plant) are now covered and the totally sealed new Munster Main Pump Station – with a 200m buffer – now provides an additional separation between residents and the plant.

Further, the odours from pre-treatment and primary treatment areas are now extracted and treated in two chemical odour scrubbers.

As a result of these changes, the plant is now effectively managing odour levels and there is a correspondingly low level of complaints from neighbours.

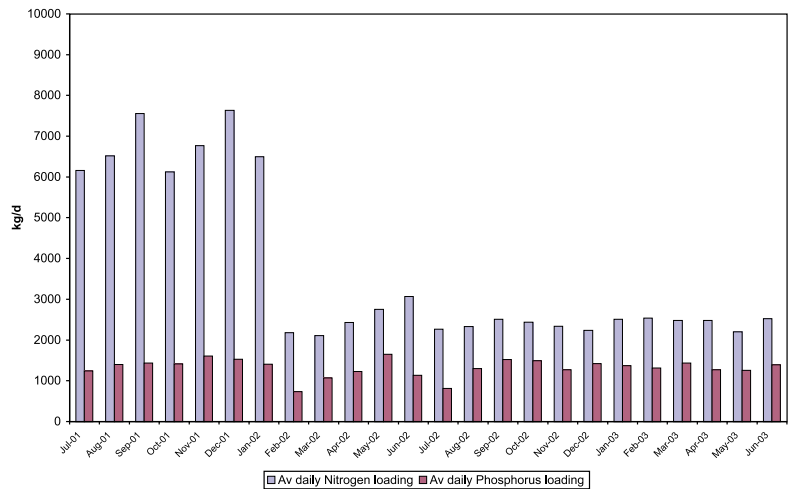


Figure 1.6 Sepia Depression Nutrient Loading July 2001 to June 2003

A total of six odour complaints was received at the plant during the reporting period but only one was validated as originating from the plant. The other complaints were related to the drying-out of Lake Coogee.

Since early 2001, the Corporation has been investing substantially in understanding all aspects of odour generated from wastewater treatment processes and the nature of odour impacts in the community. We now have a much better understanding of the effects of odour emissions, land form and climate on the resulting odour footprint.

Future Initiatives

Optimising the odour scrubbers and modelling will ensure that the odour footprint is defined and monitored effectively.

5.3.7 Other Amenity Issues

Objectives

To keep the site and boundary rubbish free, maintain fences and a high standard of visual amenity.

Performance

No amenity complaints have been received during the reporting period.

The plant occupies 82 hectares adjacent to Cockburn Road, in a natural bushland setting that makes it unobtrusive for local residents and passing traffic.

Future Initiatives

On-going weed control and revegetation on the site will ensure that the current amenity standards are maintained.

5.4 Training

Environmental awareness training is available to all personnel at the plant.

The courses offered include an on-line 'Introduction to Environmental Awareness'; 'Environmental Management System Implementation'; and 'Contracts and Environmental Issues'.

All personnel have completed at least one level of environmental training.

Team meetings allow for further learning opportunities. On-going environmental improvements, environmental aspects and impacts outcomes, weed control progress and effluent control status are discussed.

5.5 Incidents and Emergency Response

5.5.1 Objectives

- ❖ To regularly test emergency response and preparedness.
- ❖ To achieve zero incidents that may impact on the environment.

5.5.2 Performance

Desktop exercises were conducted in November 2001 and March 2002. They tested contingencies for fire, explosion and a chemical spill.

There were no reportable incidents in the period 2002 to 2003. However, biosolids classification raised an area of concern as Pathogen and Contaminant Grade determines the overall classification of each batch of biosolids.

Biosolids suitable for direct land application should achieve a minimum Pathogen Grade 'P3' and Contaminant Grade 'C2'.

Biosolids produced at the Woodman Point Wastewater Treatment Plant have achieved Grade C2 and P3 with the exception of seven occasions, six of which were recorded between February and March 2003 (ref: 'Western Australian Guidelines for Direct Land Application of Biosolids and Biosolids Products 2002').

A review and assessment of the methodologies used for pathogen classification was conducted by the Corporation in the latter part of the year.

The main findings of the investigation revealed pathogen assessment was influenced by the performance of current technologies and that there is a natural variation in digestion performance. Hence it was recommended that a geometric mean of seven samples be used for pathogen grading (thermo-tolerant coliforms) as intended by the US EPA 503 regulation.

5.5.3 Future Initiatives

We will ensure that incident response procedures are continually kept up-to-date and tested.

5.6 Benchmarking and Audit

We received a Best Practice Licence from the DEP after a benchmarking exercise was completed in 2001 with other similar treatment plants from around the world.

We were shown to be among the 'best in class' when compared with other top-performing organisations from Australia, Singapore, South Africa and North America.

The focus of the benchmarking study was management of biosolids and treated wastewater.

Independent auditing by Quality Assurance Services in January 2001 and August 2001 resulted in the achievement of AS/NZS ISO 9001 and AS/NZS ISO 14001 quality endorsement for our plant.

Our DEP Licence requires that we conduct an audit of compliance with the best practice criteria and associated key performance criteria at least once every three years, as described in the document on 'Best Practice Environmental Licences' (DEP, June 1998).

6 Social Performance and Community Liaison

The Water Corporation recognises the importance of communicating openly with its stakeholders, and of consulting effectively with communities on which its operations impact.

Both on the Corporate and plant levels, the organisation maintains effective community consultation processes which are designed to identify and respond to community concerns and opinions on matters relating to environmental and social impact.

These processes include:

- ❖ The maintenance of vigorous community liaison groups at the local level.
- ❖ Regular surveying of community sentiment.
- ❖ Provision of response mechanisms such as a complaints hotline.
- ❖ On-going provision of information via facility tours, the Water Corporation website, direct mail, media advertising and publicity.

6.1 Stakeholder Involvement

During this reporting period, we have continued to engage our neighbours and other stakeholders and have continued to refine our approach to meeting community expectations.

6.1.1 Community Reference Group

A Community Reference Group was established by the WA21 Alliance during the construction of the plant upgrade in 2002 and has been maintained.

The group meets bi-annually under the chairmanship of the Water Corporation's Business Manager Wastewater Treatment, Mark Herbert. The meetings are designed as a discussion forum for neighbours and other community stakeholders – to exchange information about developments at the plant and to hear about and address any inquiries and concerns.

The group met three times during this period – in October 2002, in November 2002 and in April 2003.

The November 2002 meeting was an extraordinary meeting called to discuss the handling by the plant of non-hazardous biological waste that previously went to the Brookdale Liquid Waste Plant. The wider community was also briefed and asked for feedback on this matter via a series of local newspaper advertisements and briefings for community stakeholders.

Matters raised for discussion in regular meetings continued to centre on plant performance, walkways, cycle paths, beautification of adjacent areas, containment of odours and visual amenity.

Local residents are welcome to tour the plant and are advised of this via communication tools such as the regular plant newsletter.

6.1.2 Public Information

Regular newsletters, plant tours and local sponsorships continued during this period.

One copy of the Water Talk newsletter was produced and widely distributed in the community. The newsletters are designed to keep stakeholders informed about Woodman Point Wastewater issues. They cover topics such as school tours, developments at the plant and reports on odour management initiatives.

The names and contact telephone numbers of the Woodman Point Community Reference Group members are provided (with their permission) for the information of readers.

Educating school children and university students about wastewater treatment is an important step in ensuring that future generations continue to protect the environment by conserving water and disposing of waste materials safely.

The Woodman Point tour facility for primary, secondary and tertiary students was upgraded this year and it is intended that all tours will be directed to the Woodman Point plant while construction works are being undertaken at the other two metropolitan wastewater treatment plants in Subiaco and Beenyup.

6.1.3 Schools Program

In November 2001, South Coogee Primary School was recognised as a WaterWise School through the Water Corporation's WaterWise Schools Program.

This partnership has grown and strong links have been forged between Water Corporation representatives and the school community. The partnership is engaged in a joint tree-planting initiative to take place over a decade, which will result in the enhancement of the local environment.

6.2 Inquiries and Complaints

The Water Corporation operates a 24-hour Customer Complaint hotline (13 13 75), supported by formal systems for registering, documenting and responding to stakeholder inquiries and complaints.

Work instructions have been established to guide the management of customer complaints.

These written procedures and guidelines require that a record is maintained which includes a location map, date and time of the complaint, wind directions and strengths, investigation procedures and confirmation that a response was provided to the person making the complaint.

Response must be within 24 hours of receipt and this has been achieved consistently in the last few years.

6.3 Occupational Health and Safety

We are committed to providing a safe and healthy work environment for all people associated with our activities. We support the vision of an injury and disease-free workplace.

Our plant employs approximately 20 staff and contractors. We achieved a 17-year milestone this year with no Lost Time Injuries.

Feedback

We would welcome your feedback on our performance in 2002-2003 or the style, content and structure of this report.

If you have any comments, please write to:

Report Feedback

Woodman Point Treatment Plant

Lot 9, Russell Rd

Munster WA 6166

Or email: wastewater@watercorporation.com.au