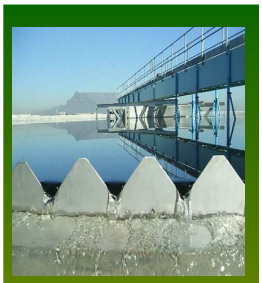


POTSDAM WWTW NEWSLETTER 3

POTSDAM WASTEWATER TREATMENT WORKS:
ENVIRONMENTAL MONITORING COMMITTEE

UPGRADE AND EXTENSION TO THE POTSDAM WASTEWATER TREATMENT WORKS, MILNERTON

NEWSLETTER NO.3 ~ NOVEMBER 2008

1. INTRODUCTION

The Potsdam Wastewater Treatment Works (WWTW) has been undergoing an upgrade from 32 mega litres per day (Mℓ/d) to 47 Mℓ/d. Currently the Plant is receiving an annual average of approximately 37 Mℓ of wastewater daily. Construction began towards the end of 2004 and is scheduled to be completed towards the middle of 2009.

In light of the keen public interest attached to this project, both during the Environmental Impact Assessment (EIA) process and since the initiation of construction, the first two Potsdam Newsletters were circulated in March 2006 and November 2007 to update the I&APs of the project's progress. This third publication aims to build on its predecessors and serves as a further update on the remaining development of the project.

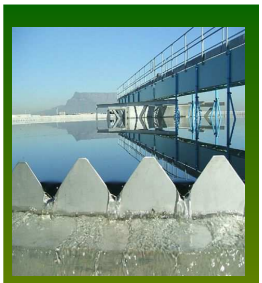
2. GENERAL

The upgrading and extension of the Potsdam WWTW comprises decommissioning the biofilter plant of 15Mℓ and extending the plant capacity to 47 Mℓ/d. The upgrade of the WWTW will result in a much improved effluent quality to meet the standard requirements set by the Department of Water Affairs and Forestry (DWAF).

The 8 Mℓ interim capacity plant which was commissioned in August 2007, to alleviated dependency on the existing biofilter plant and allow developments to continue, is no longer in use as the 30 Mℓ extension has been in operation since April 2008. Phase II of the main extension, which includes the bioreactor, various pumpstations, primary and secondary settling tanks, odour control and dewatering facilities, is now nearing completion.

3. 30 Mℓ PLANT EXTENSION AND UPGRADE TO TREATMENT WORKS

The raw sewage is split between the old (1997) 17 Mℓ/d plant and the new 30 Mℓ,/d plant. The new raw sewage pumpstation pumps the raw sewage to the 3 newly constructed primary settling tanks. The settled primary sludge



from the settling tanks is pumped via the primary sludge pumpstation to the sludge holding tanks before it is dewatered and sent for composting or disposed of to a landfill site. The overflow from the primary settling tanks is discharge to the bioreactor. The newly constructed bioreactor consists of two identical streams each with a capacity of 15 Mℓ/d. The outflow from the bioreactor is settled in secondary settling tanks to separate the treated wastewater from the biomass solids. The underflow is returned to the beginning of the bioreactor as it contains organisms which are responsible for removing impurities from the wastewater. The treated overflow is discharged through a series of maturation ponds before it undergoes UV disinfection and either re-used or discharged to the Diep River.

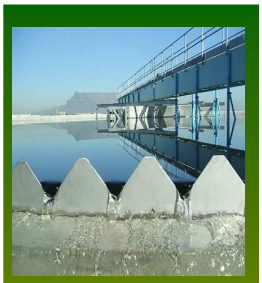
Figure 1: Interim capacity prior to conversion

The tanks, which were used for the interim 8Ml/d capacity, as discussed above, have now been modified to operate as aerobic digester tanks. A certain quantity of sludge which is periodically removed from the bioreactor is thickened and with the use of oxygen further biologically degraded. This procedure is to ensure that the dewatered sludge meets beneficial re-use requirements. The commissioning of these tanks is under way.

The main extension has been operating in the manner described in the first paragraph since April 2008. The biofilter plant has since been decommissioned. However, there is still construction work in progress on site. The sludge dewatering capacity of Potsdam is currently being further upgraded in order to accommodate the increased requirement for solids dewatering.

Furthermore, the construction of the inlet works is currently underway. The new inlet works will provide for the increase in treatment capacity and improve the primary treatment of sewage which involves screening and grit removal. Screening is the removal of obtrusive objects which may damage equipment or lead to blockages. Efficient grit removal is necessary to prevent mechanical equipment downstream of the inlet works from being damaged.

The extension of the odour control units on site is also underway (discussed in greater detail below). New odour control units will be provided at the new raw sewage pumpstation and the new and old primary settling tanks which are in general the main sources of odour at wastewater treatment works.



POTSDAM WWTW NEWSLETTER 3

4. ODOUR CONTROL

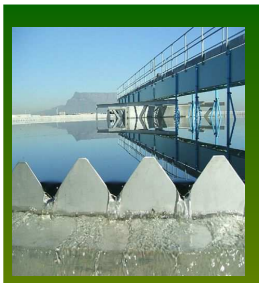
The importance of mitigating odours at Wastewater Treatment Works has increased over the past few years due to the City's commitment to good environmental practice. Historically odours from wastewater treatment were relatively unnoticed but due to the rapid increase in urbanisation the buffer zone (500m) surrounding the treatment site has virtually vanished.

The Potsdam Works was the first WWTW in the City to install the Biocube technology at its Tableview East pump station for the treatment of odours. Specialist advice was sought from America before the technology was installed at a cost of approximately R1.6 million. The unit has demonstrated that it can consistently remove hydrogen sulphide (H_2S) up to 99.5%. The odour is treated biologically instead of with strong oxidising chemicals, making it more environmentally friendly. The unit requires very little operator attention and maintenance is minimal. This form of treatment will be rolled out to treat odours from various locations on the site for odour minimisation.

5. UV DISINFECTION

The Potsdam WWTW was essentially the pioneer for this technology in the Western Cape as it is only the second such installation in the country. The only other such installation is at the Daspoort WWTW in Tswane. The choice of the technology was based primarily on the fact that it is the more environmentally friendly in that it is not a major hazardous installation and it does not produce potentially harmful by-products.

Although the UV disinfection unit at Potsdam was commissioned in 2006, it could not meet the required disinfection rate until the Biofilters were taken out of commission in June 2008 (when the new activated sludge plant capacity was in operation). This was because the Biofilter effluent could not meet the transmissivity specification. June 2008 marked the first time since in the history of the operation of the Potsdam WWTW that all the effluent discharged from it complied with the DWAF legislation.



POTSDAM WWTW NEWSLETTER 3

6. SINGLE DISCHARGE POINT

The two sets of maturation ponds both discharged upstream of the Diep River / Rietvlei confluence. To minimise the negative impact that the effluent may have on the wetland, the maturation flow pattern was re-arranged so that the two separate process streams are combined before the UV disinfection unit and discharged into a final holding pond before overflowing to the Diep River by-pass channel.

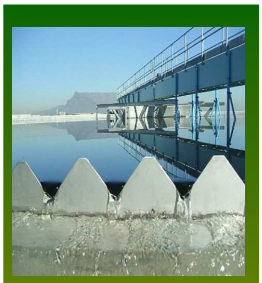
7. INCREASE RE-USE OF EFFLUENT

Before the extension, the Works supplied institutions and industries such as Century City, Caltex, SAPPI, golf courses and several schools with treated effluent for industrial and irrigation purposes. This accounted for 30 % of the summer flow that would otherwise be discharged to the Diep River. Most of the re-use water was abstracted from the Biofilter plant's maturation ponds which meant that some of the customers were not always happy with the water quality and had to treat it further on their premises.

The construction of the de Grendel reservoir and the 800mm supply pipeline built by the Reticulation Branch has extended the re-use capacity to supply several more customers, including farmers in the Durbanville area. Recent (2008) figures indicate that a weekly average of up to 76% of the effluent can be re-used in dry weather. With the new activated sludge reactors now on-line, an improved water quality will be supplied to the City's customers.

8. STANDBY GENERATION

The national electricity crisis has emphasised the need to have contingency plans in place to minimise and prevent environmental pollution as a result of sewage spills or sub standard effluent quality. Previously, the major pump station (Koeberg) feeding the Works did not have standby generation and in the event of a long power outage, the raw sewage will overflow and dicharge into the Diep River as part of the storm water system. The on-site pump station (Tableview East) was also without any back up. Both of these



pump stations are now equipped with standby generation so that the risk of raw sewage overflow to the Diep River System in minimised.

With the Potsdam upgrade standby generation has been installed to operate other critical process units including the raw sewage pump station and the UV disinfection unit.

9. NEW ACTIVATED SLUDGE REACTORS

The continued operation the Biofilters, which treated approximately half of the influent to the Works, was the major reason of the non-compliance of the treated effluent. They had to be replaced with more suitable treatment facilities. The two new Bioreactors are designed to biologically remove phosphorous and can each treat up to 15 Mℓ/d. This has essentially given the Works increased treatment capacity, up to 47 Mℓ/d. The flow diversion has now alleviated some of the load onto the older activated sludge plant, which has also shown some performance improvement.

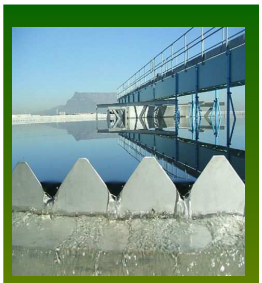
10. EFFLUENT QUALITY

Tables 1 and 2 summarise the average performance of the Bioftiler Plant and the Activated Sludge Plants (ASP) respectively.

Table 1: Average performance of Biofilter Plant from Jan 01 – Apr 06

		Biofilter Plant	**Effluent standard requirement**
Sampling period		**Jan/01 – Apr/06**	
		Average	
COD	mgCOD/l	91	< 75
Ammonia	mgN/l	11	< 10
Nitrate	mgN/l	5.0	< 15
Phosphate	mgP/l	6.0	< 1.0
Total SS*	mgTSS/l	23	< 25
Ecoli		$3.1x10^5$	$< 1.0x10^3$

*Total SS = Total suspended solids



It is clear from Table 1 that the effluent quality produced by the biofilters prior to the treatment works upgrade did not meet the effluent standard requirements.

Table 2 indicates a notable improvement in the effluent quality produced by the 30 Mℓ ASP extension – which replaced the Biofilter Plant.

Table 2: Average performance of the ASP 97 and ASP 08

		ASP 97	ASP 08	Effluent standard requirement
Sampling period		**Jan/07 – Nov/08**	**May/08 – Nov/08**	
		Average	Average	
COD	mgCOD/l	58	44	< 75
Ammonia	mgN/l	1.6	0.3	< 10
Nitrate	mgN/l	3.3	3.7	< 15
Phosphate	mgP/l	1.8	3.4	< 1.0
Total SS*	mgTSS/l	17	13	< 25

The major public concern over the past few years has been the high *E.coli* levels in Milnerton Lagoon which is used heavily for recreational purposes. The graph below shows the 4 stages of the construction period (2004 to present) in relation to the *E.coli* concentrations.

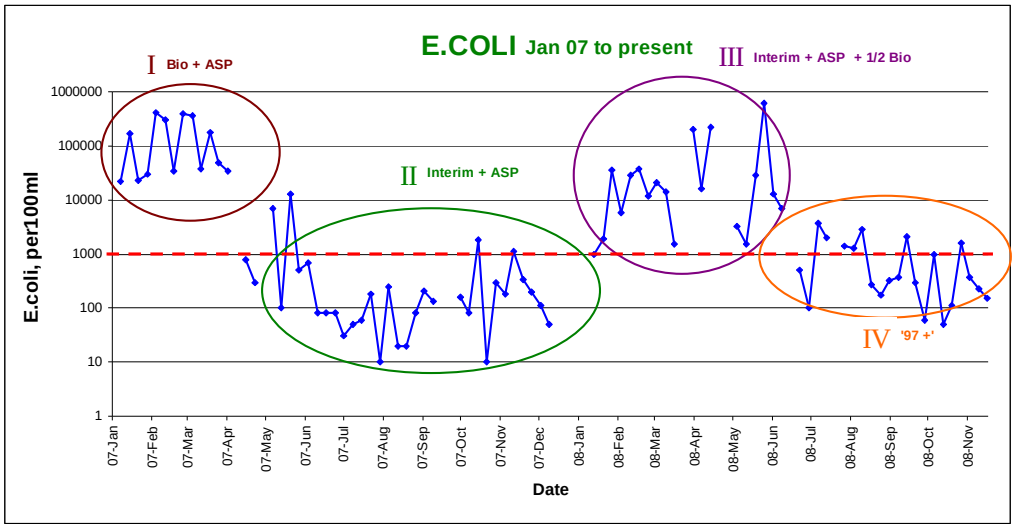
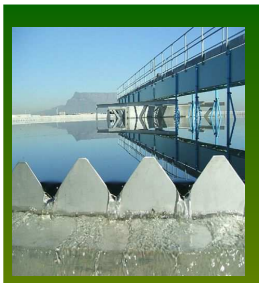


Figure 2: *E.coli* concentrations from the Potsdam WWTW combined final effluent

The circle indicating Stage IV is the area to focus on for the rest of the critical treatment parameters (TSS, COD, ammonia, nitrate & phosphate) shown in the graphs that follow. In each case, the red line indicates the DWAF limit for these parameters.

The new acitivated sludge plant was optimised and is performing very well in terms of meeting the phosphate requirement. However, there is a slight increase in Phosphate during the effluent passage through the maturation ponds which sometimes causes the combined final effluent to just tip over the 1 mgP/l mark.



POTSDAM WWTW NEWSLETTER 3

On going forward, we have to pay close attention to the Stage IV monitoring of the *E.coli* and phosphate concentrations in particular.

11. BUDGET

The project is now in its 6th financial year with a total of R235.77million of the budget having been spent thus far. This represents 82.65% of the total budget available for the project.

There are a number of contracts currently in preparation that will further upgrade the Works as follows:

- The construction of a new dewatering plant to increase the sludge handling capacity of the plant.
- The construction of a new inlet works to increase and improve the screening process.
- The installation of odour control measures as part of the current main extension contract.

13. ENVIRONMENTAL CONSIDERATIONS

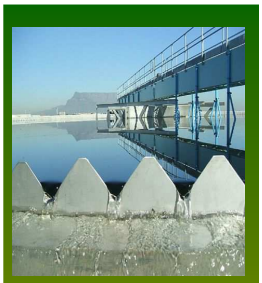
The Record of Decision[1] issued by the Department of Environmental Affairs and Development Planning (DEA&DP) attached various conditions to the authorisation. Most importantly, the City of Cape Town was required to keep Interested and Affected Parties (I&APs) informed by constituting an Environmental Monitoring Committee (EMC) and to develop and implement an Environmental Management Plan (EMP) for the construction phase:

The Potsdam EMC was constituted in July 2004, and comprises the following:

- City of Cape Town;
- Ward Councillors;
- Friends of Rietvlei;
- Table View Residents Association;
- Milnerton Residents Association;
- Milnerton Ridge Residents Association;
- Parklands Homeowners Association;
- Wildlife and Environment Society of South Africa;
- Representative for developers;
- Representative for effluent re-users;
- DEA&DP;
- The Department of Water Affairs and Forestry (DWAF); and
- The Environmental Control Officer (ECO), who also acts as Chair and fulfils the secretarial functions of the EMC.

The role of the EMC is to monitor and report to the City of Cape Town, DEA&DP, DWAF and their organisational constituents on the construction activities associated with the upgrading and extension of the Potsdam WWTW, in terms of the environmental requirements set in the Record of

[1] *As amended by the appeal.*



POTSDAM WWTW NEWSLETTER 3

Decision and the EMP. Since its constitution, the EMC has held 18 meetings, the frequency of which has been dictated by the EMC members.

As per the requirements of the Record of Decision, an EMP was compiled and approved by the DEA&DP. The EMP takes the form of a series of environmental specifications that are integrated into Tender Documentation for each contract.

ANA[2] were appointed as the Environmental Control Officer (ECO) for the construction phase, and are responsible for monitoring day-to-day compliance by the various Contractors with the requirements of the EMP. The ECO reports on a monthly basis to the City of Cape Town, the EMC and DEA&DP. As per the requirements of the Record of Decision and good practice, the ECO and EMC will continue to monitor compliance with the environmental requirements.

14. THE WAY FORWARD

The Phase II Main Extension of the Potsdam WWTW is nearing completion (expected completion date is mid-2009).

I&APs will be kept informed on a quarterly basis by projects newsletters issued by the City of Cape Town. However, should more frequent or detail information be required, I&APs should feel free to contact their representatives on the EMC or the ECO (Michael Mangnall or Tinka Shapiro Tel: (021) 481 2400, Email: enviro@shands.co.za).

[2] ANA is a joint venture comprised of ASCH, Ninham Shand and Africon. Tinka Shapiro and Alec Lambert from the Ninham Shand Environmental Discipline Group are acting as the ECO.