

## **EXISTING OVERFLOW POND, INTERIM MEASURES AND PERMANENT WORKS FOR THE PREVENTION OF SEWAGE OVERFLOWING AT - AND AROUND THE PENTZ STREET SEWAGE PUMPING STATION IN WELLINGTON**

### **1 BACKGROUND**

#### **1.1 Location and History**

The Pentz Street Sewage Pumping Station is located approximately 100m east of Distillery Road (R44 Divisional Road) opposite the entrance to the Wellington Golf Club. An existing overflow pond, estimated to be in existence prior to 1978, is also located on the western side of Distillery Road opposite the entrance to the golf club.

It is estimated that, prior to 1978, the existing overflow pond and two pumping stations, one dedicated to domestic sewage and the other to industrial sewage, were constructed. At the time the Golf Course and Club House had not yet been constructed.

#### **1.2 Problems experienced with the Pumping Station**

This pumping station services the sewage drainage area of Wellington, north of Champagne Street, which amounts to approximately 75% of the total Wellington drainage area. Sewage draining to the pumping station is pumped to the Wellington Waste Water Treatment Works for treatment.

In the past some minor overflowing of sewage occurred at the pumping station, possibly once or twice a year. As part of the original pumping station, an overflow pipe to the existing overflow pond was constructed as preventative measure for the overflowing of sewage; the total system compliant to legislative requirements.

In the recent past the problem of overflowing has escalated in the number of overflowing events and the quantity of sewage overflowing during such events. Drakenstein Municipality has experienced problems not only with the overflowing of the pumping station, but also manholes overflowing near the pumping station.

Flooding mostly occurred during heavy or prolonged rainfall events.

#### **1.3 Contributory factors for the overflowing of sewage**

It is envisioned that surcharging and overflowing of sewers and the pumping station in Wellington is mainly caused by infiltration of rain water into the sewer reticulation network.

Due allowance for possible storm water infiltration was made in establishing peak design flow, however actual flows (as much as five (5) times the peak design standard) are being experienced in winter months. The excessive surcharge could mainly be attributed to (i) illegal storm water disposal into the sewer system and (ii) increased infiltration as a consequence of an ageing sewage system.

Furthermore problems with overflowing at the pumping station also occurred due to failing infrastructure. As stated earlier the existing infrastructure is nearing the end of their service life. Breakages of the existing rising mains and mechanical problems with the pumps in the pumping station have also contributed to overflowing at the pumping station.

#### **1.4 Actions taken previously to prevent the overflowing of houses or pollution of the Berg River**

##### **1.4.1 Construction of overflow ponds**

The Pentz Street Sewage Pumping Station had an overflow structure which consisted of a 450mm diameter sewer which was constructed from the Pumping Station sump, under Distillery Road to an overflow pond on the western side of Distillery Road.

The overflow pond functions as a temporary storage reservoir to store peak volumes of sewage which cannot be pumped away immediately due to the limited pumping capacity of the pumping

station? Sewage would be temporarily stored in the pond until such time as the peak flow has subsided and the sewage could be pumped back to the pumping station. This is usually less than 24h.

This sewage was in the past pumped back to the pumping station by means of a return rising main and a portable pump.

#### 1.4.2 Programme to reduce the infiltration or illegal release of storm water into the sewer network

Drakenstein Municipality instituted many programmes in an attempt to obviate storm water disposal into the sewer network. This has not been effective as the policing of the release of storm water into the system is problematic and residents rather opt to subject themselves to illegal practice than having their properties flooded.

#### 1.4.3 Upgrading and replacement of old sewers

Drakenstein Municipality is continuously replacing existing old sewers by means of traditional open excavation method or by employment of enhanced technological methods such as pipe cracking.

#### 1.4.4 Further studies and approval of funding

Consulting Engineers were appointed to identify measures to be taken to prevent overflowing of manholes and the pumping station and the subsequent pollution of storm water systems and ultimately the Berg River.

Following the investigation phase, preliminary designs were undertaken. Preliminary investigations confirmed the need for new infrastructure which would replace the existing infrastructure nearing the end of its service life. Interim measures, also referred to as interim emergency measures, were also identified. The design of the interim measures was undertaken as it was acknowledged that the permanent works, which would alleviate the situation entirely, will take considerable time to complete. It was the intention to at least provide the interim measures before the winter in 2010, to prevent possible overflowing and consequent pollution.

Drakenstein Municipality reprioritized their engineering capital budget to approve an amount of approximately R 60 million over the next three years for this specific project.

Furthermore, construction of the permanent works would be subject to environmental approvals.

## 2. ENVIRONMENTAL AUTHORISATIONS

### 2.1 **Existing overflow pond**

The National Environmental Management Act (NEMA) was promulgated in 1998. Prior to this date no environmental authorizations were required to construct sewage overflow ponds. The existing overflow pond was therefore legally constructed compliant to prevailing statutory requirements.

As part of the interim measures the pond was cleaned and the intention is to fence off the pond.

### 2.2 **Proposed interim measures and permanent works**

In accordance with the NEMA and the recently promulgated National Environmental Management Waste Act (NEM: WA), the construction of the proposed permanent works, which would alleviate the situation, may not commence without an environmental authorisation.

The Municipality therefore commissioned an environmental consultant to perform a full Environmental Impact Assessment (EIA) in terms of the NEM:WA, expected to be completed by end of 2010.

Notwithstanding this, the Municipality also committed to the immediate construction of the interim measures to alleviate overflowing as far as possible. These interim measures did not require environmental authorisation in terms of NEMA and NEM: WA as the works only entailed the rehabilitation of the existing infrastructure.

### 3. INTERIM MEASURES

The interim measures under construction to alleviate flooding during peak periods include the following:

- Lowering of the existing overflow pipe to the existing overflow dams to a level below the lowest manhole covers in the vicinity of the pumping station,
- Rehabilitation of the existing overflow pond and the construction of a clay lining,
- Refurbishment and upgrading of the existing pumps in the pumping station to ensure operation at optimal levels,
- Construction of additional overflow pipes from existing sewers along Distillery Road to the overflow pond; and
- Constructing a new return rising main to the pumping station.

#### 3.1 Existing pipe to overflow ponds and new overflow pipes

The overflow pipe of the pumping station was lowered to a level below the cover level of the lowest manholes in the vicinity of the pumping station to prevent overflowing of sewage at these manholes.

Three additional overflow pipes were also constructed from the existing outfall sewers along Distillery Road, to obviate bottlenecking of flow at the existing overflow pipe and consequentially also prevent overflowing of sewage at manholes in these existing sewers.

#### 3.2 Existing overflow pond and refurbishment of existing pumps

As stated above the pond was rehabilitated by constructing a clay lining and cleaning the pond.

A new suction pipe was also constructed for pumping sewage from the overflow pond back to the pumping station, once the peak flow has subsided.

The pumps within the existing pumping station were also refurbished. This refurbishment was done to ensure that the pumps operate at optimal levels, thereby pumping the maximum amount of sewage possible. Furthermore the refurbishment will reduce the risk of mechanical failure of pumps and thereby reduce the risk of overflowing of sewage.

### 4. LONG TERM MEASURES (PERMANENT WORKS)

The long term measures to be employed to alleviate overflowing during peak periods include the following:

- Construction of a new pumping station,
- Construction of two new rising mains from the new pumping station to the Wellington Waste Water Treatment Works (WWTW),
- Construction of an enclosed overflow dam at the new pumping station,
- Re-alignment of various sewers to the new pumping station; and
- Construction of an overflow/balancing dam at the Wellington WWTW to attenuate peak flows

**As stated above, all the long term measures require an EIA which is expected to be completed by the end of 2010**

#### 4.1 New pumping station

It is envisioned that a new pumping station will be constructed on the eastern side of Distillery Road, which will be designed with sufficient pumping capacity to reduce the risk of overflowing. The position of the proposed pumping station is shown on the attached drawing (0770/REP/02).

#### **4.2 New Rising Mains to Wellington WWTW**

It is proposed that two new rising mains be constructed from the new pumping station to the Wellington WWTW to convey the new design peak flow.

The existing rising mains are nearing the end of their service life.

#### **4.3 New enclosed overflow pond at the new pumping station**

It is envisioned that an enclosed overflow pond will also be constructed next to the new pumping station to reduce the risk of overflowing even in the event of pump failure.

#### **4.4 New balancing Dam at Wellington WWTW**

It is also proposed that a new overflow/balancing dam be constructed at the Wellington WWTW which will attenuate the peak flow from the new pumping station before releasing it to the Wellington WWTW to ensure that the capacity of the WWTW is not exceeded.

## 5. CONCLUSION AND REMARKS

### 5.1 Pollution of the Berg River

The pollution of the Berg River is and has been of great concern to Drakenstein Municipality. To this end the Municipality actively participated and engaged in the proceedings of the Berg River task team formed by the Premier of the Western Cape. Various studies were undertaken relating to the prevention of pollution of the Berg River. The Municipality is currently upgrading the Paarl WWTW at a cost of approximately R 150 million and has provided approximately 5 000 families, living in informal areas, with basic services.

Various diversion structures were constructed in highly polluted storm water channels to divert polluted storm water to the WWTW for treatment and preventing it discharging into the Berg River.

The Municipality continuously engages with the Deciduous Fruit Trust and the upper Berg River Irrigation Board on ways to reduce pollution and on water quality matters.

The importance of the Berg River to the greater western part of the Western Cape is well documented and appreciated by Drakenstein Municipality.

The Municipality undertook to prevent pollution of the Berg River as far as possible in the interim by constructing the interim emergency measures and permanently by constructing the permanent works as soon as possible.

### 5.2 Existing overflow pond

As the Municipality is committed to the reduction of pollution of the Berg River, the rehabilitation of the existing overflow pond was in urgent need. Once the envisaged permanent works are commissioned, the need for the overflow pond can be re-evaluated, which could well lead to the abolishment there-of.

### 5.3 Construction of new infrastructure

As the existing pumping station and rising mains are nearing the end of their service life, the need for new infrastructure is apparent.

Construction of the new pumping station, rising mains and enclosed overflow pond will reduce the risk of overflowing of sewage as well as provide sufficient capacity for the future.

### 5.4 Public Participation

As stated above rain water infiltration into the existing sewer network is one of the main causes for sewage overflows and the need for the existing overflow pond. If the residents of Wellington can refrain from releasing storm water into the sewage system the risk of overflowing can be reduced.

A concerted effort is therefore also required from the community not to release storm water into the sewer network of Wellington.

**ANNEXURE A:  
LONG TERM MEASURES:  
NEW RISING MAINS AND BALANCING DAM:  
DRAWING NO 0770/REP/02**