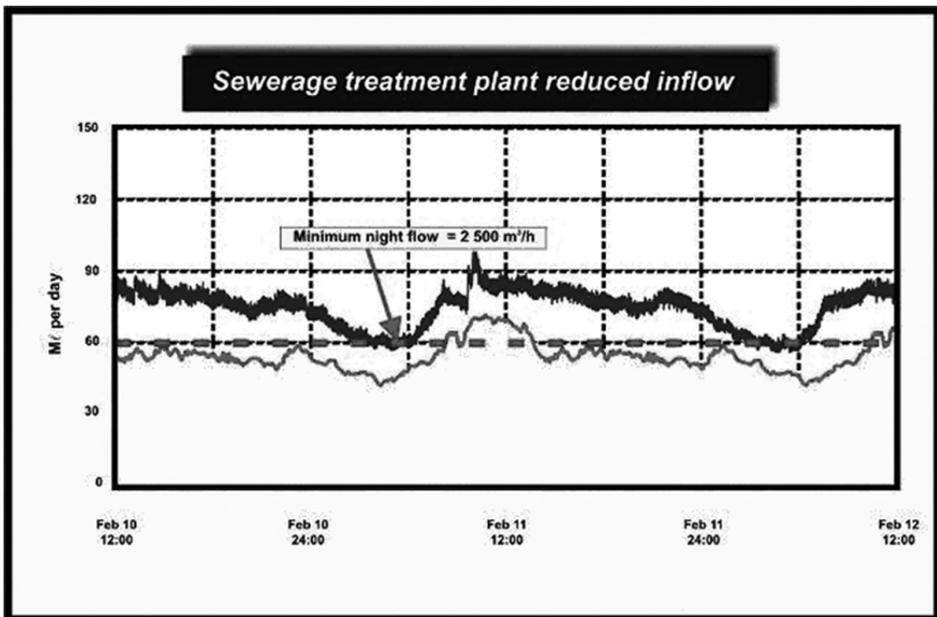


on the sewer flows entering the treatment plant which reduced from 2500m³/h (July 2003) to 1800m³/h (July 2005) as shown in **Figure 4**. As a result of the project the client has gained a reprieve of at least ten years on the upgrading of the water supply and sanitation infrastructure. The reduced pressures have also resulted in a significant reduction in the number of bursts experienced in the area which in turn will prolong the life of the infrastructure.

Identification of bottlenecks in the system

Under normal circumstances with large scale pressure management projects, the system pressures are gradually reduced during the off-peak periods to ensure that some minimum level of service is achieved at the critical point in the system which is the point experiencing the lowest pressure at the time. The critical point can usually be identified from the reticulation layout drawings or from a hydraulic model of the system if such a model is readily available. The critical point is then monitored continuously as the pressure management activities commence.



re 4 : The effect of water pressure reduction on sewer return flows for a 48 hour period

In the case of the Sebokeng/Evaton project, the above process did not proceed to plan and numerous communities complained of low water pressures in areas which theoretically should have had no problems.

On closer examination of the unexpected problem areas, it was found that many of the problems were caused by poor maintenance or inappropriate operation of various boundary valves and/or control valves. In many cases, the boundary valves were left in a semi-open position due to the fact that the operations staff did not know if they should be open or closed.

The operations staff also had the habit of closing sections of pipe in cases where a burst had occurred instead of repairing the burst and reopening the pipeline. This has caused serious bottlenecks in the system which only became apparent when the pressures were lowered. In each case the project team had to cease all further pressure reduction activities and undertake a full investigation involving significant field work to identify and correct all problem valves and/or sections of pipeline in a particular area. Following the corrective measures, it was normally found that the overall level of service to the specific community improved significantly when the system was reinstated to its original configuration.

Identification of problem infrastructure

In addition to the identification of bottlenecks as discussed previously, there were numerous cases where serious problems were found in the basic reticulation infrastructure. One of the most common problems identified was that of “missing” pipes or connections. In several cases it was found that connections from smaller pipes (200 mm or less) had not been made to the bulk mains running through a particular area. In one case, it was found that of the 4 connections shown on the “as-built” plans, only one had in fact been commissioned.

The remaining three connections were sealed with a blank flange plate just before the connection point. In this instance, the community of approximately 3000 residents had been experiencing intermittent supply (water available only during the night-time periods) for almost nine years and had stopped complaining many years ago since nothing was ever done to alleviate the problem. On excavating the three mystery connections and adding the necessary T-pieces (see **Figure 5**), the area was restored to full system pressure on a 24-hour basis for the first time.

Although the additional connections actually increased the water use in the one problem area, it allowed the pressure to the whole of Sebokeng and Evaton to be lowered during the off-peak periods which

more than made up for any small local increase in use during the remaining periods.



Figure 5: Installation of missing “T-Piece” in Sebokeng

The other key problem identified with the infrastructure was the identification of “missing” valves which were not shown on any reticulation drawings but were thought to exist by the project team due to the manner in which the system was responding to the water pressure.