Response to the Technical Regulator's Submission to the ICRC Water and Wastewater Price Review

ACTEW
CORPORATION

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ACTEW Corporation Ltd
ActewAGL House
Level 9, 221 London Circuit
CANBERRA ACT 2601
ABN 86 069 381 960

GPO Box 366
CANBERRA ACT 2601
Tel (02) 6248 3111
Fax (02) 6248 3567
www.actew.com.au

Introduction

This paper is provided as a response to the Technical Regulator's submission to the current water and wastewater pricing review by the Independent Competition and Regulatory Commission (ICRC).

ACTEW and ActewAGL believe that assessing the asset management performance of any utility requires a detailed and complete understanding of:

- the assets involved;
- their performance; and
- the asset management strategy adopted.

ACTEW and ActewAGL believe that the Technical Regulator's submission reflects an insufficient understanding of these issues and, further, that engagement with ACTEW/ActewAGL in the preparation of the submission could have overcome many of its shortcomings. .

The following provides a comprehensive analysis of the current asset management systems and specific responses to issues raised by the Technical Regulator.

1. Current Asset Management Systems

The Asset Management System and Processes employed by ActewAGL in managing ACTEW's water supply and sewerage assets are described in detail in the ACTEW Corporation Asset Management Plan, with the current version covering the period 2008/09 – 2027/28. The following provides a background to the characteristics of ACTEW's water and wastewater assets, and a summary of the results of a comprehensive review of asset management planning processes undertaken in 2005 (the AQUAMARK review).

1.1 Water Supply Reticulation Network

The pipe sizes in Canberra's water reticulation system range in nominal diameter from 100 to 900 mm, and the total length of mains involved is approximately 2,760km. There are about 27,500 hydrants and 15,600 stop valves on these mains.

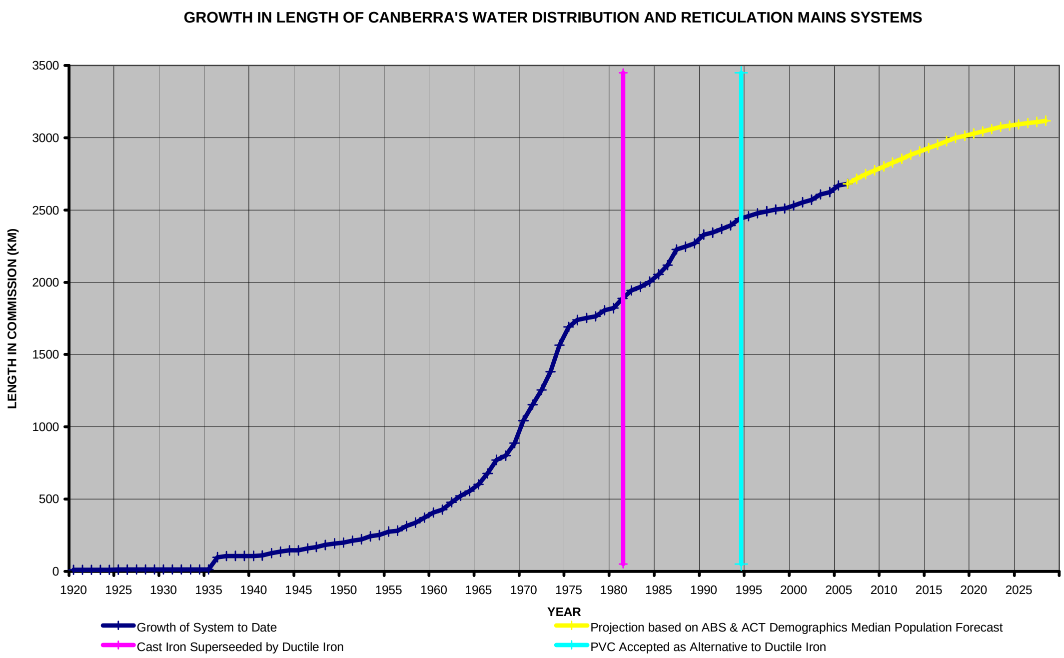
The oldest reticulation mains in Canberra's water supply system were laid around 1915 when water supply was first reticulated in the Canberra area.

The majority of the system, however, dates from the 1960s and 1970s. This was a period of rapid growth in Canberra and this peak in construction activity has resulted in a system that is still relatively new, given the type of materials used in its construction.

The condition of the system varies depending on the material, ground conditions, and the age of the system. The present low average failure rate suggests that most of the system is still in good to very good condition. However, there are some localised areas where aggressive ground conditions occur and these are already showing relatively high failure rates.

To date, only a small percentage of the system has been replaced and its age profile still essentially reflects the growth of Canberra. The length and age profile of the water supply network is shown below in Figure 1.

Figure 1: Age Profile of Water Supply Network



1.2 Sewerage Reticulation Network

The length of ACTEW's sewerage reticulation mains as at the end of June 2006 was almost 2730 km. There are about 52,000 maintenance holes on these mains and about 104,000 property branch lines.

Most of Canberra's reticulation mains are laid either in the road verge near the property line or in backyard easements about 1.2 metres from the fence line.

The proportion of mains inside blocks amounts to about 45-50% of the system. Minimising the use of sewer alignments and easements in leased land is an important feature of good service design. The aim of standardised locations for sewer mains is to limit construction clashes with other services and to permit ready location by maintenance crews.

The oldest reticulation mains in Canberra's sewerage system were laid in the early 1920s when the first parts of the city, were built according to any formal plan. The majority of the system, however, dates from the 1960s and 1970s. This was a period of rapid growth in Canberra and it has resulted in a sewerage system that is still relatively new, given the type of materials used in its construction.

To date, only a small percentage of the system has been replaced, and its age profile (see Figures 2 and 3) still, essentially, reflects the growth of Canberra. However, as shown in the figures, based on current forecasts for future growth, significant ageing of the system as a whole will occur over the next 20 years.

The condition of the system varies, depending on the material and quality of construction. In addition, within each group of assets of similar age and material, there can be considerable variation in condition. Poor materials and workmanship affect parts of the system built in the early post-war period and in the 1970s and 1980s.

A major problem in the system is tree root intrusion. This affects a significant number of mains, as well as other elements of the system such as maintenance holes and property branch lines. Tree root intrusion is the largest single cause of service interruptions in the system at present.

Figure 2: Growth of Canberra's Sewerage Reticulation System

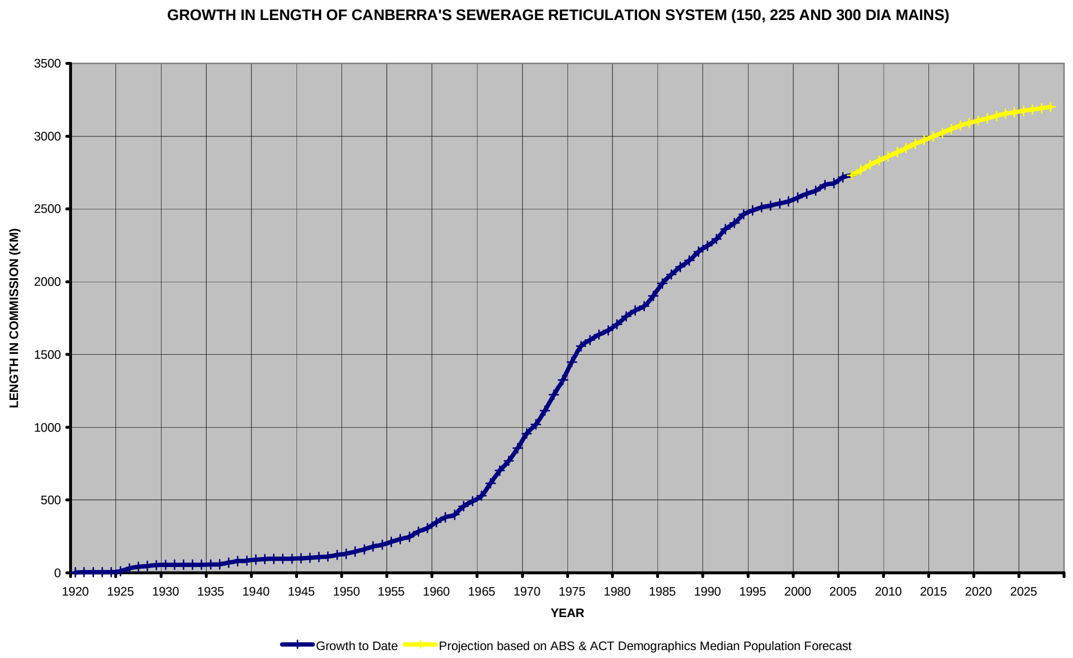
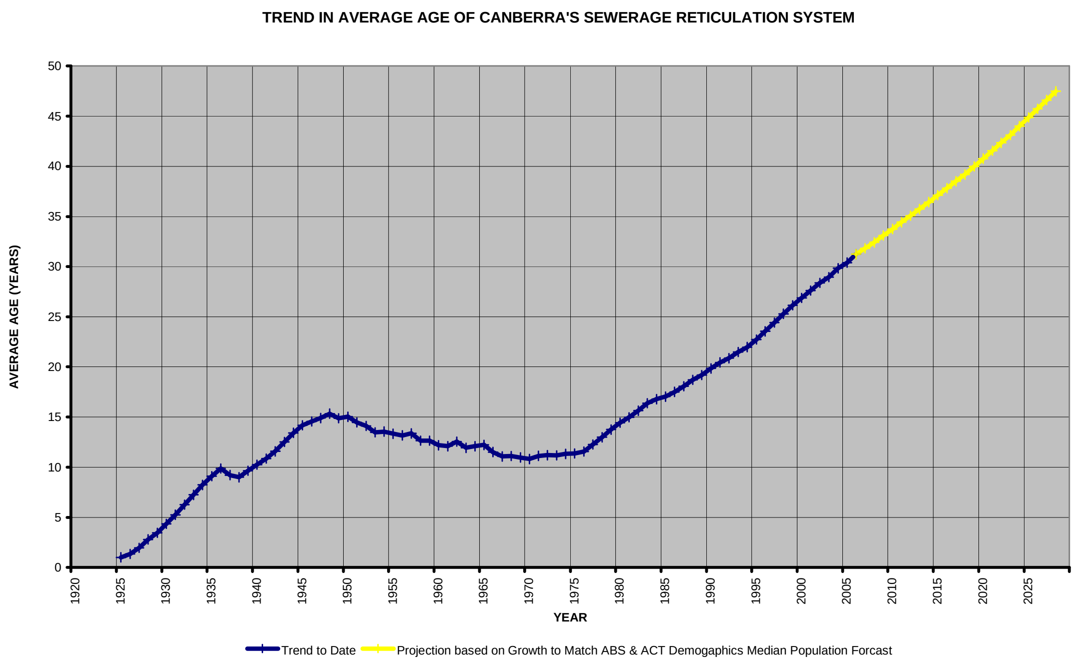


Figure 3: Average Age of Canberra's Sewerage Reticulation System



1.3 The AQUAMARK Review

In December 2005, ActewAGL completed a detailed review of its asset management processes using the WSAA Asset Management Self Assessment (AQUAMARK) tool. This tool is based on an asset management framework that provides a basis for:

- the identification of gaps and opportunities for asset management process, data and information system improvement; and
- benchmarking the status of asset management processes, data and information systems between participating WSAA members.

The WSAA Asset Management Framework is structured into seven key functional areas:

1. Corporate Policy and Business Planning
2. Asset Capability Planning
3. Asset Acquisition
4. Asset Operation
5. Asset Maintenance
6. Asset Replacement and Rehabilitation
7. Business Support Systems

Approximately 1,000 measures across these seven functional areas were scored. An asset management profile was produced and then independently audited by WSAA accredited auditors from Hunter Water Australia Pty Ltd.

This profile, when compared with similar profiles from other participating water utilities around Australia and New Zealand, gives an indication of the relative position and performance of ActewAGL within the industry. Two cohorts of water utilities, reflected below in Figures 4 and 5, were used for this comparison:

- those with customer numbers between 35,000 and 150,000; and
- those with customer numbers between 150,000 and 500,000.

With approximately 140,000 customers, ActewAGL technically belongs in the first cohort. However, as a larger city utility, it is often more appropriate to compare itself with utilities in the second cohort.

Figure 4: AQUAMARK Profile Cohort 1 (35,000 – 150,000 customers)

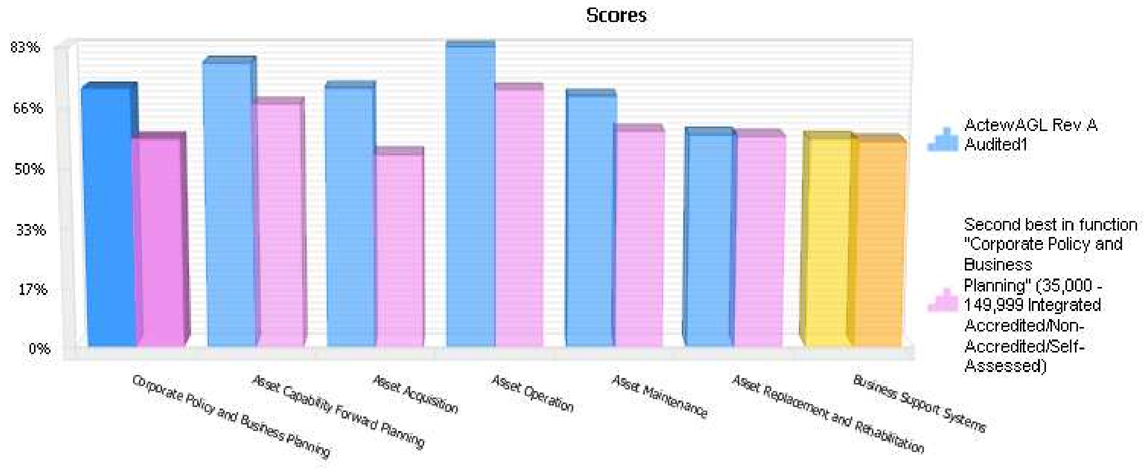
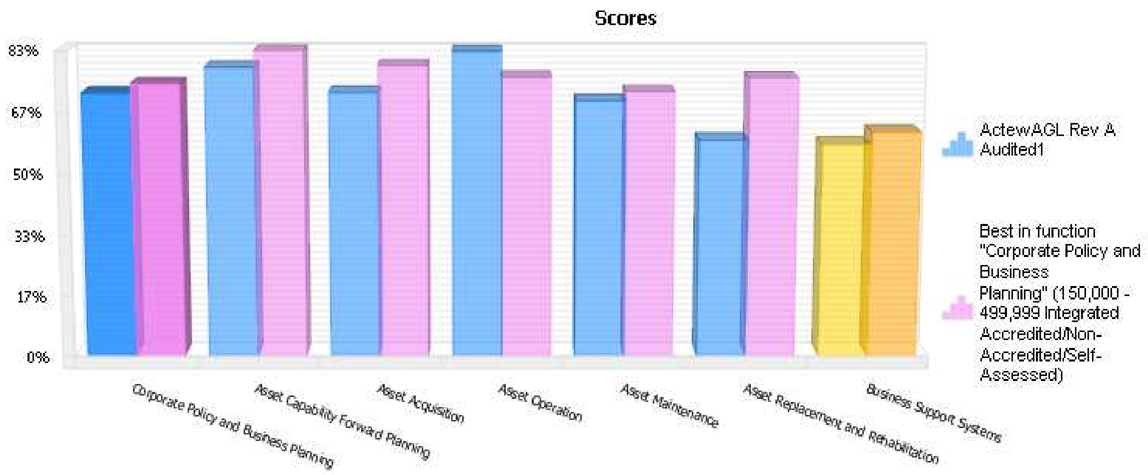


Figure 5: AQUAMARK Profile Cohort 2 (150,000 – 499,999 customers)



The AQUAMARK results show that in cohort 1 (that is, among utilities of a similar size) ActewAGL is the best performing utility in every function measured. In cohort 2 (that is, major city utilities) ActewAGL is the best in asset operation and close to the best in all other functions.

These results should provide confidence both to the Technical Regulator and the ICRC that ACTEW's asset management practices result in an approach to asset management that is consistent with good industry practice.

2. **Networks Serviceability and Upkeep**

2.1 Water Supply Reticulation Network

The Technical Regulator's submission reflects an incomplete understanding of the industry norms with regard to water reticulation management as well as to the data provided by WSAA and their definitions. The following provides an overview of the water reticulation management strategies employed by ActewAGL. ACTEW reiterates its concern that the Technical Regulator decided not to engage with ACTEW and/or ActewAGL on these matters.

2.1.1 Maintenance Strategy

Besides preventative maintenance on the valves and hydrants attached to water valves, there is no maintenance that can be undertaken on the buried pipes. Condition assessment techniques used for larger distribution and bulk mains are not generally cost effective for reticulation mains. In view of the low level of risk involved with failures in reticulation mains, the primary approach in their maintenance is *run to failure*. This approach is common within the industry and is followed as long as:

- it remains economical to continue repairing failures; and
- failure rates do not compromise customer service levels.

2.1.2 Performance

ActewAGL monitors several aspects of the network to allow it to assess the maintenance strategies undertaken as well as revise the strategies if required.

Ageing of reticulation system assets is reflected in an increasing trend in failure rates. At present the increase is only gradual, and it appears that, overall, failure rates in Canberra's water reticulation system remain below the current industry average in Australia. It is expected, however, that parts of the system will eventually need replacement, and the system performance is monitored to ensure continuity of service in future years as the system ages and assets approach the end of their effective lives.

The figures in Table 1, while indicating the performance of the water network over the last seven years, must be interpreted with caution as the definition of what constitutes a "main break" was changed three times by WSAA over this period. The reason the WSAA rate/100km increased significantly in 2005/06 is that leaks of hydrants, valves, maincocks and other fittings were included in the mains break data from that time. The significant increases in the figures under hydrants, valves, maincocks and other fittings is again due to data gathering methodologies introduced following changes to the WSAA definitions. In assessing comparative data between utilities, the potential for some to have continued reporting under the earlier definition past the changeover date cannot be discounted

Table 1: Water Network Performance

Year	Length of mains km	Breaks and Leaks					WSAAfacts Rate/100km	Mains only Rate/100km
		Mains	Fire Hydrants	Valves & Fittings	Main Cocks	Total		
2000-01	2933	464	48	1	26	539	18.38	15.82
2001-02	2948	406	60	8	87	553	18.76	13.77
2002-03	2964	588	98	11	83	780	26.32	19.84
2003-04	2985	636	53	24	71	784	26.26	21.31
2004-05	3013	518	100	29	71	718	23.83	17.19
2005-06	3057	605	373	425	185	1588	51.95	19.79
2006-07	3007	535	385	342	164	1426	47.42	17.79

ActewAGL has undertaken further analysis of mains failures that resulted in customer interruptions and the results are found in Table 2.

Table 2: Water Network Performance – ActewAGL Analysis

Year	Length of Mains	Breaks and Leaks Counted					Rate/100 km Mains Only
		Mains	Hyd-rants	Valves & Fittings	Main Cocks	Total Reported	
2000-01	2933	464	48	1	26	539	15.82
2001-02	2948	406	60	8	87	561	13.77
2002-03	2964	588	98	11	83	780	19.84
2003-04	2985	636	53	24	71	784	21.31
2004-05	3013	518	100	29	71	718	17.19
2005-06	3057	605	373	425	185	1588	17.63
2006-07	3007	535	385	342	164	1426	15.93

If the “mains only” data are used, and hydrants, valves etc are excluded as separate assets, a more stable picture is apparent. This indicates that the main break rate is below the “20/100km threshold” advocated by ACTPLA.

Here, the conclusions of the Technical Regulator can be called into question using simple analysis. ACTEW/ActewAGL would have provided such an analysis, had it been requested.

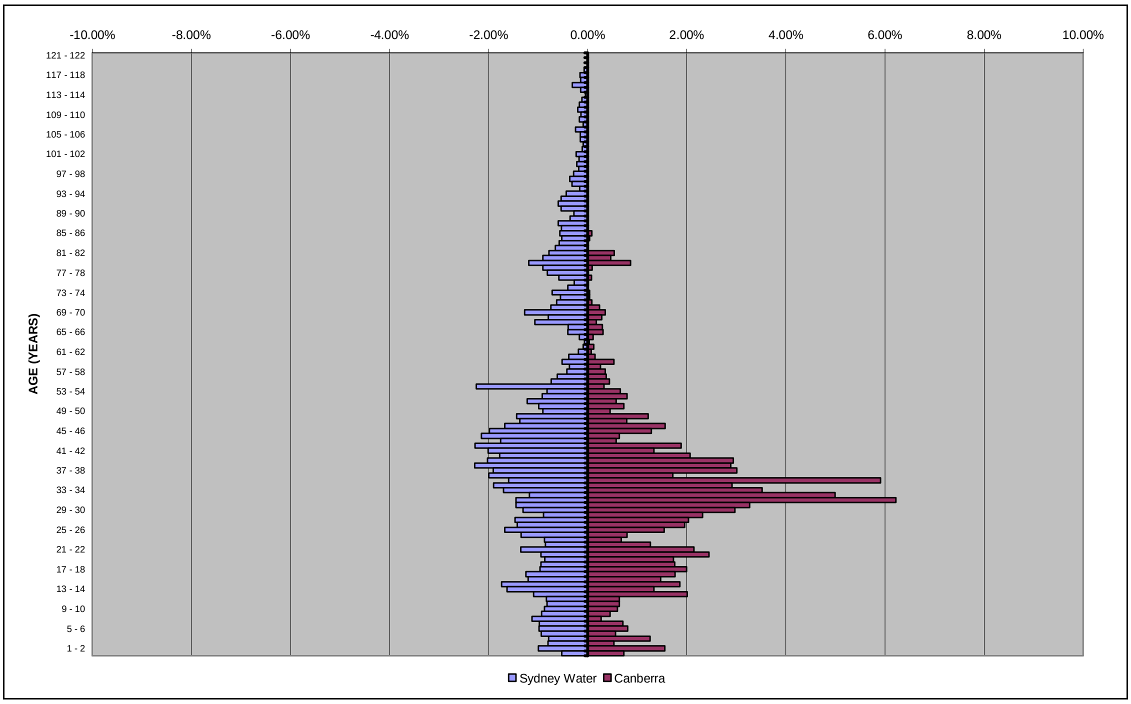
ActewAGL is closely monitoring the performance of pipes in the water supply network but believes that the approach of focusing solely on a *threshold* does not reflect good asset management. Instead, ActewAGL's focus is on a combination of asset criticality, whole of life costs and impacts on customer service levels. The pipe replacement programme detailed in the current Asset Management Plan (2008/09-2027/28) has been established on expected replacement needs from current performance trends, with the annual replacement projects being developed from more detailed assessments against these criteria. Where certain classes of pipe, such as Asbestos Cement pipes, are considered in need of replacement, they will be identified and programmed as required. This may result in the replacement programme being larger in some years than in others. For example, ACTEW inherited water mains from the period 1965-1981 that are responsible for a significant component of the trend in pipe breaks.

The Technical Regulator's analysis also revealed that 90% of *hotspots* occurred within easily identified, specific locations in North and South Canberra, and appear to be associated with a specific cohort of pipe – cast iron with tylon joints used between 1965 and 1981. It is difficult to more closely define the pipes affected,except to note that the main suburbs affected were gazetted between 1966 and 1975.

The Technical Regulator provides an incomplete analysis of the extent of mains renewal in the ACT compared with Sydney Water and Yarra Valley Water.

Comparisons with other cities must be interpreted cautiously as Canberra's age profile and pipe material mix is quite different from, say, Sydney or Melbourne. For example, Sydney has a significant percentage of pipes up to 30 years older than Canberra's (see Figure 6). Both Sydney and Melbourne also have a much higher proportion of Asbestos Cement pipes that have been the focus of their replacement programmes over the last few years. Again, it is stressed that by engaging with ACTEW/ActewAGL, these matters could have been easily clarified.

Figure 6: Age Profiles, Sydney versus Canberra



2.2 Sewerage Reticulation Network Assets

The Technical Regulator has concluded that the major issue of concern for ActewAGL is sewer chokes caused by tree root intrusion and has also supported the strategy developed by ACTEW/ActewAGL to address this issue. However, it is debatable whether the prescription of increased maintenance alone will reduce the sewer chokes as stated by the Technical Regulator. ACTEW and ActewAGL consider that a combination of increased maintenance, including root foaming, and pipe renewals would most effectively contribute to the reduction in sewer chokes.

2.2.1 Maintenance Strategy

Generally the risk involved in failure of sewer reticulation mains is low. The primary approach in their maintenance is *run to failure*, **as long as**:

- it remains economical to continue repairing or correcting failures;
- failure rates do not compromise customer service levels; and
- a failure would not cause surcharge into a house or other building.

In addition to the above, where failure rates are high:

- CCTV inspections are carried out to assess pipe condition;
- Preventive maintenance (root foaming and planned jet rodding) may be undertaken to control root intrusion, or mains scheduled for repair, rehabilitation or replacement, depending on their condition;
- Failure rates in the system as a whole, and in individual manhole-to-manhole sections, are monitored on an ongoing basis to assist in developing a structured inspection and preventive maintenance programme;
- At locations where failures have resulted in surcharges in houses or buildings, repairs or system replacements are undertaken to minimize the risk of a repeat.

2.2.2 Performance

Table 3 provides a breakdown of the level of performance of ACTEW's sewer reticulation mains in 2004/05 and 2005/06:

Table 3: Sewer Reticulation Service Performance

Performance Indicator	Target	2004/05	2005/06
Reticulation: Mains Breaks & Chokes / 1000 properties	< 35	28.5	23.1
Mains Breaks & Chokes caused by tree roots (%)		94.7	90.8
House Branch: Breaks & Chokes / 1000 properties		15.0	13.4
Breaks & Chokes caused by tree roots (%)		90.1	86.0
Total Reticulation Breaks & Chokes / 1000 properties	< 50	43.5	36.5
Average Wastewater Break/Choke Repair Time		30 mins	34.7 mins

For comparison, table 4 shows the performance of some other utilities against these indicators for 2005/06:

Table 4: Sewer Reticulation Service Performance Comparison

Performance Indicator	ACTEW	GCW	Brisbane	HWC	YVW	SA Water
Reticulation:						
Mains Breaks & Chokes / 1000 properties	23.1	2.3	4.3	12.8	5.7	7.9
Mains Breaks & Chokes caused by tree roots (%)	90.8	24.0	65.0	84.5	71.4	78.0
House Branch:						
Breaks & Chokes / 1000 properties	13.4	2.9	3.5	14.1	11.2	38.5
Breaks & Chokes caused by tree roots (%)	86.0	48.0	57.1	74.5	65.7	85.0
Total Reticulation Breaks & Chokes / 1000 properties	36.5	5.2	7.8	26.9	16.9	46.4
Average Wastewater Break/Choke Repair Time	34.7 mins	Not provided	2.8hrs	2.6hrs	Not provided	Not provided

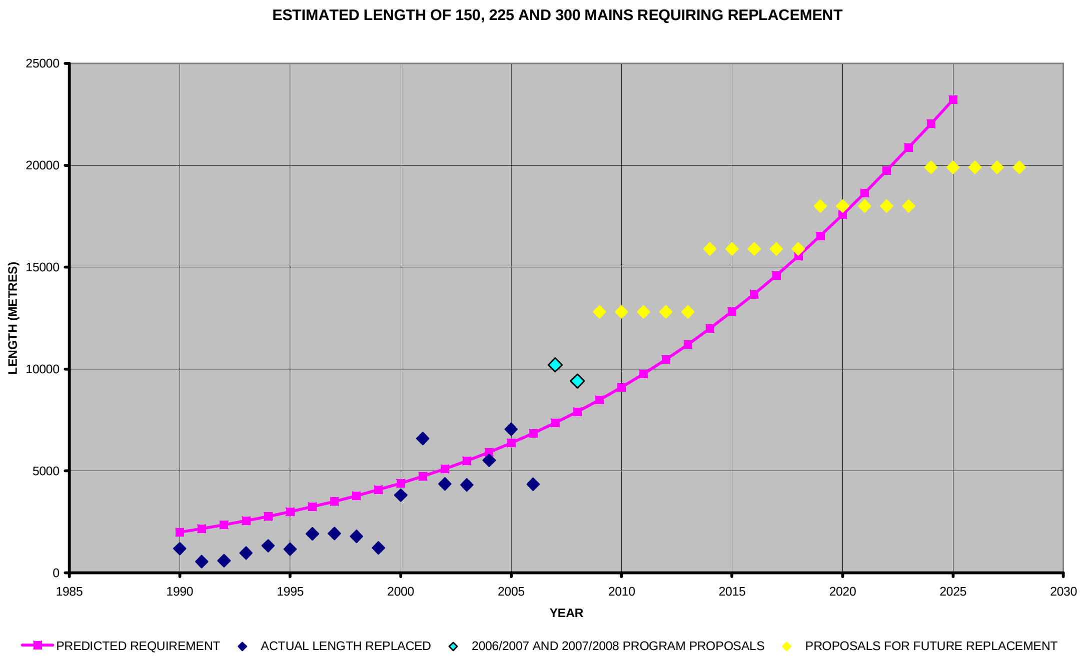
(from National Performance Report 2005-06 NWC & WSAA)

The data in Table 4 show that ACTEW's sewerage system has one of the highest blockage rates in the country, with the highest percentage caused by tree roots. The reasons for this are not fully understood, but are believed to be largely a result of a combination of the location of the sewers (both in backyards and street verges), the materials used (concrete and clay pipes) and the fact that a large part of the network was constructed in the 1960s and 1970s during a boom period when construction standards were not rigorously enforced.

ActewAGL's management approach is a combination of preventative maintenance, using planned jet rodding, CCTV inspections and cleaning and root foaming together with an increasing programme of sewer pipe replacement.

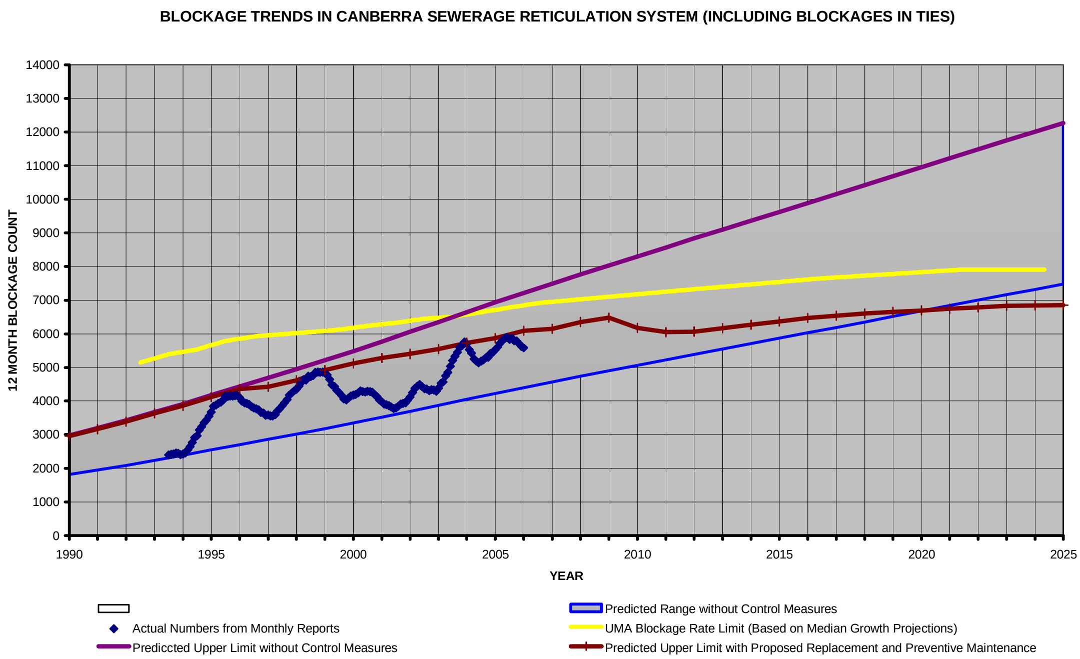
Replacement is aimed at dealing with those parts of the system that are in poor structural condition and can no longer be maintained to provide an acceptable level of service. Quantities for this programme have been estimated from the lengths, age and effective life profiles determined for each type of main in the system (see Figure 7). A considerable increase in the length to be replaced is evident over the next 20 years. This reflects the ageing and deterioration of the system. Replacement of ties and, where necessary, the rebuilding of maintenance holes is included in the pipe replacement costs.

Figure 7: Estimated Length of Sewer Requiring Replacement with time



It is anticipated that this strategy of combining asset replacement with increased preventative maintenance will achieve a reduction in the overall blockage numbers with time, as shown in Figure 8 below.

Figure 8: Projected Sewer Blockage Numbers With Time



The band and upper limit lines in Figure 8 show the projected trend “without control measures” indicating the expected trend if there were to be no asset replacement or preventive maintenance. The band shows the range within which the blockage count can vary due to climatic conditions. The red line shows the predicted upper limit for blockages with the proposed replacement and preventative maintenance programmes, while the yellow line is the UMA KPI target (<50/1000 properties) assuming median growth projections. This indicates that the proposed management strategy should ensure that the blockage rate stays well below the target.