

**Draft Submission by Shoalhaven City Council
Inquiry into the Augmentation of Water Supply for Rural and Regional New South
Wales**

Background – Shoalhaven Water

Shoalhaven City Council has responsibility for water and sewerage services for the Shoalhaven Local Government area. The Local Government area includes 49 towns and villages, scattered predominantly along the coast.

Council exercises water supply and sewerage functions under Division 2 Part 3 Chapter 6 Local Government Act 1993 and therefore acts as a “Local Water Utility” (LWU) in addition to its other local government functions. Council meets these responsibilities and delivers water and sewerage services through Shoalhaven Water, a defined Business Group of Council.

Shoalhaven Water supplies potable water and reclaimed water to a variety of customers in the LGA. It operates a number of water storages and is also reliant on storages owned and operated by WaterNSW (formerly the Sydney Catchment Authority).

About 90% of the LGA’s raw water is pumped from the Shoalhaven River at Burrier approximately 47 km upstream of the ocean estuary outlet. The water is pumped from Burrier to a 3,800 megalitre off river storage dam at Bamarang near Nowra West. The water is then pumped from the dam to Water Treatment Plants at Bamarang and Flatrock. The treated water is then transferred throughout the City.

Some parts of the southern Shoalhaven area are normally served by the Porters Creek Dam west of Milton which supplies the Milton Water Treatment Plant. The plant treats water for the Milton/Ulladulla/Narrawallee/Mollymook/Kings Point/Burrill Lake/Lake Tabourie areas. Bandalong, Manyana, Conjola & Fisherman’s Paradise are supplied from the Northern System, which also supplements the area served by the Milton Water Treatment Plant over peak demand holiday periods or when the operating level in the Porters Creek dam is low.

A fourth treatment plant is located in Kangaroo Valley at Bendeela Pondage and supplies water to the Kangaroo Valley township. This plant is a microfiltration plant and operates using a membrane system.

A 7,600 megalitre storage dam at Danjera acts as an emergency backup supply feed for the Shoalhaven River in times of drought. The combination of Danjera's 7,600 megalitres and the off river Bamarang 3,800 megalitres storage acts to limit the effect of low flows in the Shoalhaven River to provide drought security for the Shoalhaven City water supply system.

The flow in the lower Shoalhaven River is controlled from Tallowa Dam, owned and operated by WaterNSW. Release of water from Tallowa Dam for Shoalhaven use is controlled through a series of agreed protocols between WaterNSW and Shoalhaven Water.

Flows from the Shoalhaven can also be used to supplement Sydney's water supply during a drought. This is achieved by pumping water from Tallowa Dam to Wingecarribee Reservoir in the Southern Highlands. From there it is released and flows down the Wollondilly River to Sydney's Warragamba Dam, or the Nepean River to Nepean and Avon dams, which supply the people of the Illawarra with water.

Rules for environmental flow releases from Tallowa Dam to the lower Shoalhaven River have been implemented by the State Government through the Greater Metropolitan Water Sharing Plan, which came into force on the 1st July 2011.

Shoalhaven Council is the owner of 4 prescribed dams – Bamarang, Cambewarra, Danjera and Porters Creek. Council also supplies reclaimed water to dairy farms and sporting facilities from its 600ML reclaimed water storage at Callalla sewage treatment plant.

Response to Terms Of Reference

Given the possible breadth of the Terms of Reference to this Inquiry, Shoalhaven Council determined to focus on 2 critical aspects of the ToR relevant to the Shoalhaven (items a) and b) of the ToR).

- a) Investigate the requirement for a water equation (demand and supply out to the middle of this century) for rural and regional New South Wales

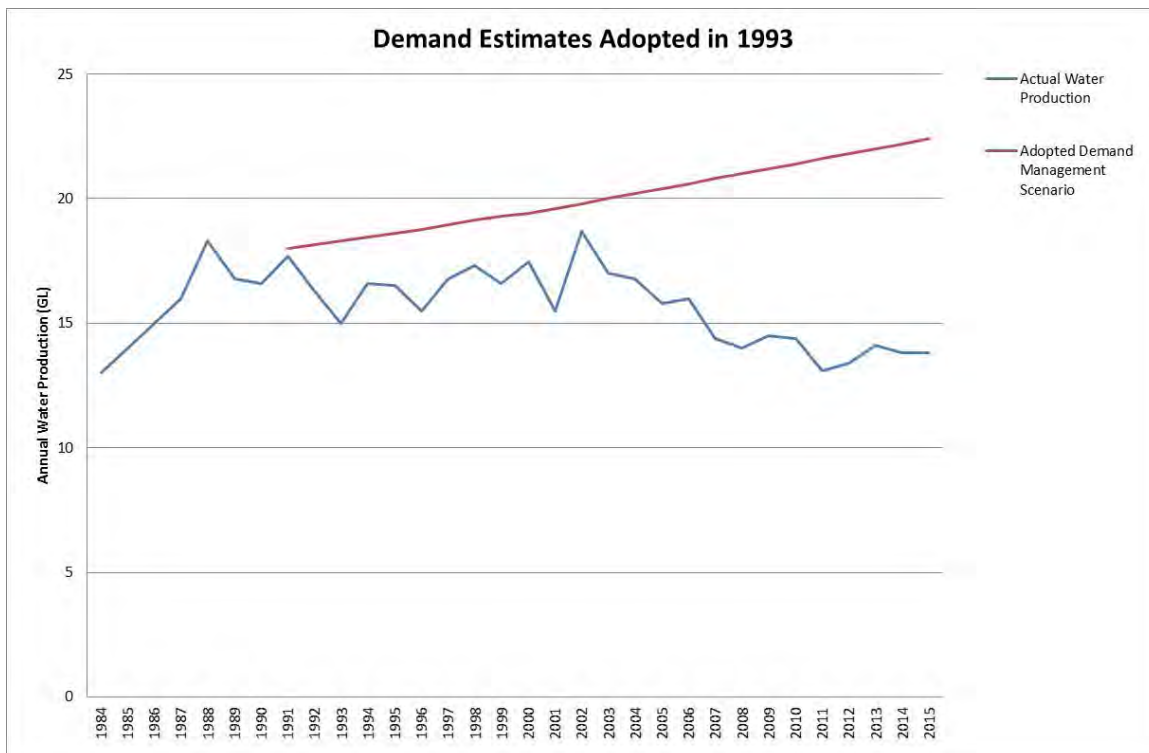
Shoalhaven City Council has been proactive for many years in planning for the security of water supply for the Shoalhaven Local Government Area. Council had negotiated and lobbied the New South Wales State Government for 4 years to provide sustainable outcomes for the Shoalhaven River system. An agreement was finally reached in 2006 that secured water licence entitlements for the Shoalhaven City and provided for positive environmental outcomes.

The mechanisms for Shoalhaven's water security are embedded in Council's extraction licence, the Bulk Water Supply Agreement and the Bulk Water Supply Protocols. The Bulk

Water Supply Protocols are also legislated within the Water Sharing Plan for the Greater Metropolitan Region – Unregulated River Water Sources 2011.

These mechanisms, combined with effective demand management processes have meant that the existing storages within the Shoalhaven system have adequate capacity to meet the demands of the end users.

The graph below shows the actual water demand as the projected demand adopted in 1993 when additional sources of water were being considered.



Clearly since the total system demand is at levels equivalent to the mid 1980s, the previous headworks proposals have not been required.

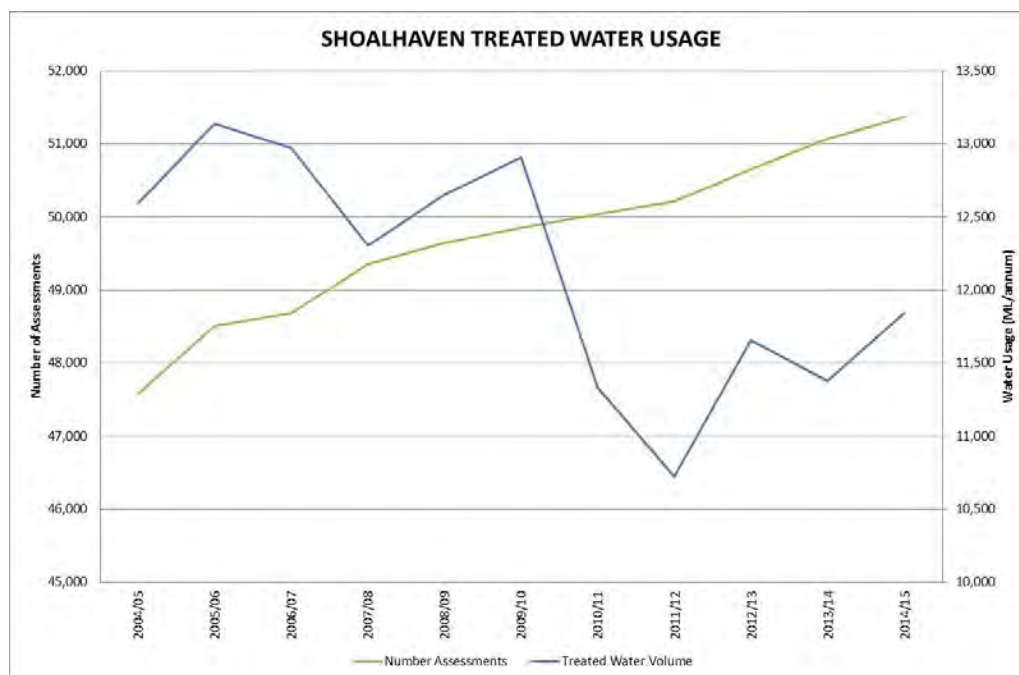
Reductions in total demands have been achieved despite increases in the number of properties connected to the system, as shown in the graph below.

As part of DPI Water's Best Practice Management Shoalhaven Water prepared an Integrated Water Cycle Management (IWCM) Strategy. The strategy identified the preferred options for development of urban water services (water supply, wastewater and stormwater) at Shoalhaven City.

The process taken to develop the IWCM Strategy included:

Consideration of the Concept Study findings and baseline forecasts.

- Development of the long-list of options and assessment criteria for decision making.
- Selection of options for further assessment.
- Detailed options assessment and development of IWCM scenarios.
- Identification of the preferred scenario.



The integrated scenarios incorporate combinations of various demand management measures and an increasing movement towards the integration of water supply, sewerage treatment and stormwater management through cumulative inclusion of rainwater, stormwater, greywater and reclaimed water use. The supply side approach is common to all scenarios, drawing on surface water extractions from the Shoalhaven River, Danjera Creek and Porters Creek, with system capacity requirements sized to suit the town water demands for each scenario.

Council formally adopted its Integrated Water Cycle Management Strategy in June 2008. The focus of Shoalhaven water supply planning is now directed at enhancing the north-south system transfer capacity.

It is therefore considered that appropriate planning has been carried out for the Shoalhaven water supply system. The current protocols as established with the previous

Sydney Catchment Authority are appropriate and provide effective mechanisms to maintain the security of Shoalhaven City Council's Water Supply.

- b) Examine the suitability of existing NSW water storages and any future schemes for augmentation of water supply for NSW

There remains outstanding land tenure by WaterNSW previously acquired for a proposed Welcome Reef Dam on the upper reaches of the Shoalhaven River.

The Welcome Reef Dam project has had a long history.

The Snowy Mountains Engineering Corporation prepared an Environmental Impact Report in 1980 for the (then) Metropolitan Water Sewerage and Drainage Board (the Board). The Welcome Reef project had included a dam on the Shoalhaven River about 70km to the east of Canberra and 30km north of Braidwood. The stated purpose of the dam was to supplement the Shoalhaven transfer scheme to meet increased demand from Sydney.

In 1985 the Board advised Shoalhaven Council that they intended to proceed with the Welcome Reef Dam project, but had deferred the project and it had a tentative completion date of 1999.

Further advice to Council in 1991 put the dam construction commencement as 2002. In 1992 a series of public information sessions were held throughout the affected regions.

At the Council meeting of 23 March 2004, Shoalhaven Council resolved to "reject the proposal to resurrect the Welcome Reef Dam concept."

It is clear from the key strategic water planning documents for Sydney that a new dam on the Shoalhaven River is not required nor is it on a planning agenda from a technical perspective. The following excerpts from the 2004, 2006 and 2010 Metropolitan Water Plans demonstrate this:-

2004 Metropolitan Water Plan

"There is no need for a twelfth dam. Another dam would be very costly from a financial and environmental perspective with an estimated cost of over \$2,000 million for Welcome Reef Dam. The same dam would be very shallow with a large surface area, meaning that evaporation rates would be extremely high and increase the potential for toxic blue-green algae outbreaks. It would take nearly 10 years to build and fill under average conditions and up to 30 years if current drought conditions continue. A new dam would not make the most of the existing infrastructure and so it is far more effective to extend our current system as proposed in this Plan."

2006 Metropolitan Water Plan

“The current Shoalhaven Scheme comprises Tallowa Dam and a system of pumps, pipes and reservoirs which were completed in 1976. The scheme was planned as the first phase of a much larger but now abandoned project (the Welcome Reef Dam) for the specific purpose of capturing water from the headwaters of the Shoalhaven River and transferring it to Sydney to boost supplies when the Sydney storage system fell to low levels.”

2010 Metropolitan Water Plan

“After extensive research, analysis and community consultation important improvements to the Shoalhaven system were announced in March 2007.

These included:

- ***New environmental flow rules for the lower Shoalhaven River (see page 50)***
- ***Changed operation of Tallowa Dam:***
 - ***Water transfers will begin when Sydney’s total dam storage level falls to around 75 percent and continue until total dam storage level rises above 80 percent***
 - ***Water will not be drawn down further than one metre from Tallowa Dam’s full storage level – this will be increased to three metres in times of severe drought (see page 56)***
- ***New infrastructure at Tallowa Dam to allow native fish passage and improve the quantity and quality of water releases downstream for the environment (see case study on this page)***
- ***Upgraded picnic facilities at the dam site.***

The Shoalhaven and Wingecarribee communities were also invited to comment on six options to upgrade the water supply transfer system. The options looked at ways to transfer more water from Tallowa Dam to Sydney and the Illawarra, if required in the future. Several options had

the benefit of protecting the health of the Southern Highlands’ river system by reducing the use of rivers to transfer water between dams.

Based on community feedback, scientific and engineering investigations, and social, economic and cultural heritage assessments, three options were short listed. Further detailed technical investigations of these options have been undertaken. The preferred augmentation option is a tunnel from Burrawang to Avon Dam.

There are significant costs and lead times for the augmentation and a decision on its timing will depend on factors such as future climate predictions and population growth and demand. These factors will be reviewed over the next few years with a view to having an upgraded system built and operational by around 2025.”

Shoalhaven Council therefore submits in the strongest terms that the Inquiry should reject any proposal to resurrect the Welcome Reef Dam project and the Inquiry should find that the land acquired for that purpose is no longer required.



WSAA National Customer Perceptions Survey

Executive Summary

Customer focus is a top priority for Australian water utilities. This means ensuring customer needs and preferences are considered as part of investment decisions, performance indicators and planning for the future. At the heart of this is an understanding of what drives customer value, trust, customer behaviours and the expectations they have for their water utility. In August 2015, the Water Services Association of Australia (WSAA) along with Insync carried out an Australia-wide survey of 5973 customers from 21 water utilities. This survey provided excellent insight into what influences customer value and trust and identified the leading performers among the utilities. The survey also highlighted areas of improvement and will guide a collaborative work program among the utilities on customer indicators, engagement and value.

Key Insights from the Survey

- Value for money, trust and satisfaction with the quality of the drinking water is higher when respondents know that their water utility manages their sewerage services. Improving brand awareness and knowledge of the sewerage services will improve how customers rate the utility.
- Contrary to data collected by the utilities, the respondents who have contacted the utility in the last 12 months only score their utility higher if they are from regional areas. This effect was not demonstrated for most of the urban utilities. There may be some crucial differences in the survey method or context compared to the utility surveys.
- Too much information is better than not enough. The 25% of respondents who think they receive not enough information scored their utility much lower than the 2% that think they receive too much information.
- Middle-aged customers score the utilities lowest for trust, value for money, affordability and quality of services. They are also the group that are most likely to want more information. However, survey data shows that this corresponds with the time of life that individuals are at their "least happy" that accounts for this lower score.
- Different survey methods will give different results. Satisfaction with water quality is highest for respondents older than 65 years. This helps explain why phone research yields higher results as they tend to get older respondents.
- Communication strategies on drinking water quality should be targeted to specific cultural groups where there we can see large differences in drinking the tap water. This in turn affects the scores for trust, value for money, affordability and of course quality of service.
- Concession cards may be too generous with customers on concession cards rating a higher level of affordability than those without a card.
- Older respondents are far less likely to think that climate change is caused by human activity. There is also a geographical difference to this belief. This will influence how we design and carry out any engagement around water security planning.

Headline results

- For trust, value for money, affordability and quality of services water utilities rated similar to electricity and gas but significantly lower than mobile phone, internet providers and Australia Post. But customers rated us higher than local councils. (insert graph)
- Middle-aged respondents scored us the lowest.
- On average, one third of people don't always drink water out of the tap. 13% never drink water straight from the tap. However these figures vary significantly among the utilities.
- People from different cultural backgrounds have different habits when it comes to drinking tap water. 46% of people with a Chinese background do not drink tap water.
- Satisfaction with the water quality was highest in Canberra, Melbourne and Sydney.
- On average 61% of customers were able to correctly name their water utility unprompted.
- Half of all customers did not know that their water utility also looks after their sewerage services. (insert graph)
- On average, only about 20% of customers had contacted the water utility in the last 12 months. Contact increases trust for regional utilities but this was not the case for the urban utilities.
- Our attitudes regarding the building of dams varies by state. More than 50% of respondents in South East QLD and Sydney think that building dams is a solution to our water problems. Some of the regional Victorian areas also scored above 50%.
- Attitudes to climate change vary across demographics and regions. The belief that climate change is caused by human activity decreases with age. It is also lowest in QLD and some of the regional utilities.
- Customers who identify themselves as 'future-focused' have the highest levels of trust while those that identify as 'price focused' are significantly lower. "Price focused" customers also make up 38% of respondents. Uninvolved customers score utilities the lowest for trust (insert graph)
- Only 18% of customers are aware that their water utility offers financial hardship support. But if they are aware of the programs, they score their utility significantly higher for trust, value and most of all affordability.

Purpose of the Survey

This national survey was conducted to:

- determine how water utilities are perceived, particularly in the area of value for money and trust compared to other service sectors
- identify those attributes that influence a customer's perceptions of value for money and trust
- carry out benchmarking of Australian water utilities, identify good performers and share successful strategies
- identify and collaborate on addressing industry-wide gaps
- provide data on customer attitudes, preferences and behaviours to inform WSAA policy work and customer engagement strategies

Water Utility Insights from the Survey

At the end of February 2016 WSAA will run a workshop to discuss the results. The purpose is for members to share their own insights from their results, share successful strategies of the high performers, discuss how we address some of the common gaps across the industry and provide some recommendations for indicators and questions that we can potentially use on an ongoing basis to measure and benchmark our performance. The detailed analysis that forms the bulk of this report was carried out by WSAA with support from Insync. However the utilities also developed their own insights from the survey data in conjunction with their own research

- It highlighted the low level of awareness that the water utility also provides sewerage service
- Value for money was lower than expected. For those utilities that measure VFM, it was useful for them to see that this is a problem for all water utilities.
- They found the comparison to other sectors very valuable since customers are comparing their experience not to other water utilities but providers of similar services. It was interesting to note that water provision has the 2nd lowest VFM score of all the sectors.
- It was useful to have another source of data to see if aligned with the results from the utilities own survey. In some cases where the results did not align, it flagged potential review of the survey methodology.
- Different cultural groups require tailored communication. Utilities also identified the groups that they need target in regards to more research or specialised programs.
- Different perceptions of those in units and those in houses. What drives this?
- Identified some additional questions that they would like to add into their own surveys
- The section on beliefs and how they differ around the country helps with targeting their messages to different demographics and also identifying regions which have similar values and beliefs.

Improvements on the Survey

This was collated from the workshop as well as emails from some of the 100+ member employees that have access to the portal.

- The question about drinking the water 'straight from the tap' needs to be reconsidered as it is ambiguous
- Need a better way to classify regional versus urban respondents
- It would be good to further identify segments based on levels of engagement and involvement

Detailed Analysis

Regional and State Comparison

The survey results showed that there is no one state or region that outperforms all the rest in every category. It appears that there are some factors in play in different states that affect how respondents see their water utility. For example, respondents in NSW and in particular Sydney scored all service providers highly. The recent Choice Consumer Sentiment Survey conducted at approximately the same time (July 2015) shows that NSW is leading the states in positivity with 37% rating the economy as good compared to about a 24% in other states. Similarly, poor scores for some utilities in some cases may be the result of recent restructure, negative publicity or a lower socio-economic customer base. This is supported by the survey results which show that those customers who feel they are comfortable score significantly higher than those that feel they have trouble meeting basic needs.

Metropolitan versus Regional comparison

Most of the regional data is from Victoria and Tasmania, with one regional utility from NSW. While there are likely to have been a minor number of regional respondents from SA and WC, this survey did not allow for making this distinction within a utility.

Some of the differences in respondent characteristics are shown below.

	Metropolitan	Regional
Number of respondents	4422 (74%)	1551 (26%)
Number of utilities	11	10
States	NSW, VIC, QLD, ACT, WA, SA	VIC, TAS, NSW
Holds concession card	41.3%	50.1%
Speaks another language at home	11.4%	5.2%
Financial situation	Live comfortably – 27.2% Don't have enough – 4.5%	Live comfortably – 20.6% Don't have enough – 5.7%
House or unit	House – 71.7% Semi /townhouse – 10.8% Unit – 16.8%	House – 87.8% Semi/ townhouse – 3.2% Unit – 8.4%

In general, customers rated overall quality of products and services higher in metro areas (5.9) compared to regional areas (5.5). Metro customers (7.3) were more satisfied with the quality of their drinking water compared to regional customers (6.9). Metro customers rated affordability and value for money higher as well.

There was not a great deal of difference between the metro and regional areas in regards to thoughts around climate change, though there were particular states where there were clear differences. More people in regional areas believed there were moderate water shortages in their area but level of concern was low and about the same as the metro customers.

Regional customers had a higher level of awareness. They were more likely to know the name of their water utility and were more likely to know that their water utility also managed sewage. Customers of regional utilities who had contacted the utility scored their water utility significantly higher than customers that had not contacted their utility. This was not the case for metro customers. In general customers of the regional utilities who contacted the water utility with an issue were much happier with the resolution than those from metro utilities (6.8 compared to 6.5).

Victoria			
Respondents	2223	Number of utilities	10
Key Influencers			
<ul style="list-style-type: none"> • Large number of regional respondents represented compared to other states • Renters receive a water bill whereas in other states owners receive the water bill 			
In general			
Victorian utilities can be classified as the three Melbourne metropolitan utilities and the regional utilities. They made up 37% of all respondents with most of the regional respondents. Customers in Melbourne score their drinking water high. Regional Victorians have a high level of awareness of their water utility and the services they provide.			
NSW			
Respondents	920	Number of utilities	3
Key influencers			
<ul style="list-style-type: none"> • High number of concession card holders (Hunter and Shoalhaven) • Sydney has one of highest number of people who speak a language other than English at home • Shoalhaven has the largest percentage of customers who identify as 'not having enough to meet basic needs' 			
In General			
NSW on the whole scored quite highly but this is possibly due to the more optimistic outlook of NSW residents and in particularly Sydney. Sydney-siders in particular were quite supportive of dams compared to other capital cities. Sydney was the only city where customers who didn't drink the water stated that health concern with the water was equally high as taste as the reason why they didn't drink the water.			

Queensland			
Respondents	1206	Number of utilities	3
Key influencers			
<ul style="list-style-type: none"> All the customers surveyed were residents of South East QLD SEQ has undergone significant water industry reform over the past few years with new water utilities formed as opposed to council-run utilities Gold Coast Water is still a council run water utility 			
In General			
As a state, the awareness of the water utilities and services they provide was the lowest with a great deal of confusion with council responsibilities. Survey respondents had the lowest level of belief in man-made climate change.			
Tasmania			
Respondents	403	Number of utilities	1
Key influencers			
<ul style="list-style-type: none"> The state has recently gone through a restructure moving from numerous council run utilities, to four utilities and now to one utility, along with the introduction of economic regulation 51% of survey respondents were concession card holders 			
Western Australia			
Respondents	401	Number of utilities	1
In General			
Western Australians scored their water utility highly in comparison to other service providers and they were one of the top performers when benchmarked against other utilities. Customers were strong believers in anthropogenic climate change, most likely due to the fact that Perth is the only city that is reliant on non-rainfall dependent water sources with desalination currently providing approximately 50% of the cities supply.			
South Australia			
Respondents	402	Number of utilities	1
In General			
There is only one water utility in South Australia and it covers urban, regional and rural towns. South Australians have one of the highest ownership of rainwater tanks (52% compared to an average of 30%) and (along with Melburnians) are the least likely to think dams are the solution to water shortages.			

ACT

Respondents	402	Number of utilities	1
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Key influencers

- Highest percentage of respondents that identify as 'comfortable'
- Recently changed their brand

In General

ACT customers are the most satisfied with their drinking water and most likely to drink the water.

Comparison to other Service Providers

Key messages

- Overall utilities scored similar to electricity lower than other service providers but higher than councils.
- There were big differences between states, particularly in comparison to electricity and gas.
- Relative to other providers, utilities scored best overall on trust.
- Relative to other providers, value for money and affordability was the lowest. Possible reasons for this could be the lack of customer choice in their water provider (as with their council). The other factor is that water is a low involvement good. Many people, as demonstrated by the survey have a low awareness of the services actually provided.

Strong Performers

The strong performers have been identified *relative to how they scored to other service providers* rather than just the individual score. Note that the portal ranks utilities based on the latter.

- Sydney and Melbourne (three metros combined) customers scored their water utility higher than gas, electricity and councils for all four questions
- Sydney Water, Goulburn Valley Water, Yarra Valley Water, Water Corporation were the strongest overall performers for this section with Wannon Water (trust) and Shoalhaven (value for money) also scoring reasonably well for particular categories.

Results

Respondents were asked to rate seven different service providers: Electricity, Water, Gas (where applicable), Local Council, Internet provider, mobile phone provider and Australia Post. The respondents were asked their level of agreement (0=strongly disagree, 10 = strongly agree) with a series of statements.

- Taking into account all services delivered by each of the following providers, please rate your level of agreement with "my provides value for money"
- Thinking about the affordability of services delivered please rate your level of agreement with "my delivers affordable services"
- Taking account of all aspects of services delivered, please rate your level of agreement with "my Delivers high quality products and services"
- Thinking about your experience with each of the following providers, please rate your level of agreement with "I trust"

On average water scored above local councils with a very similar score to gas and electricity but significantly lower than internet, mobile phone and Australia Post.

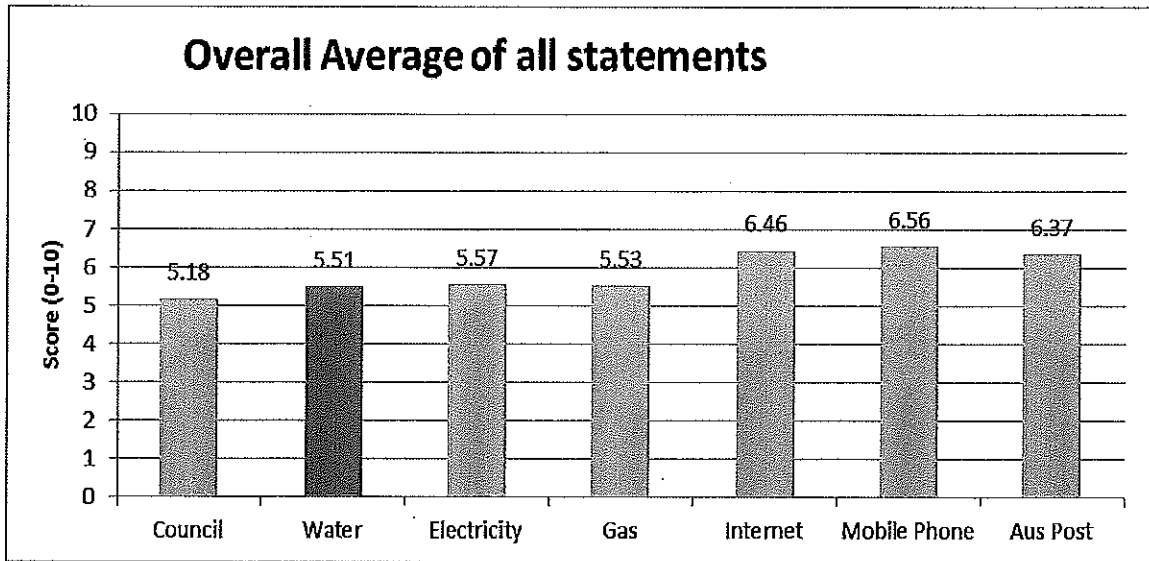


Figure 1: Overall average score for value for money, affordability, trust and quality of products and services

The best scoring category was quality followed by trust.

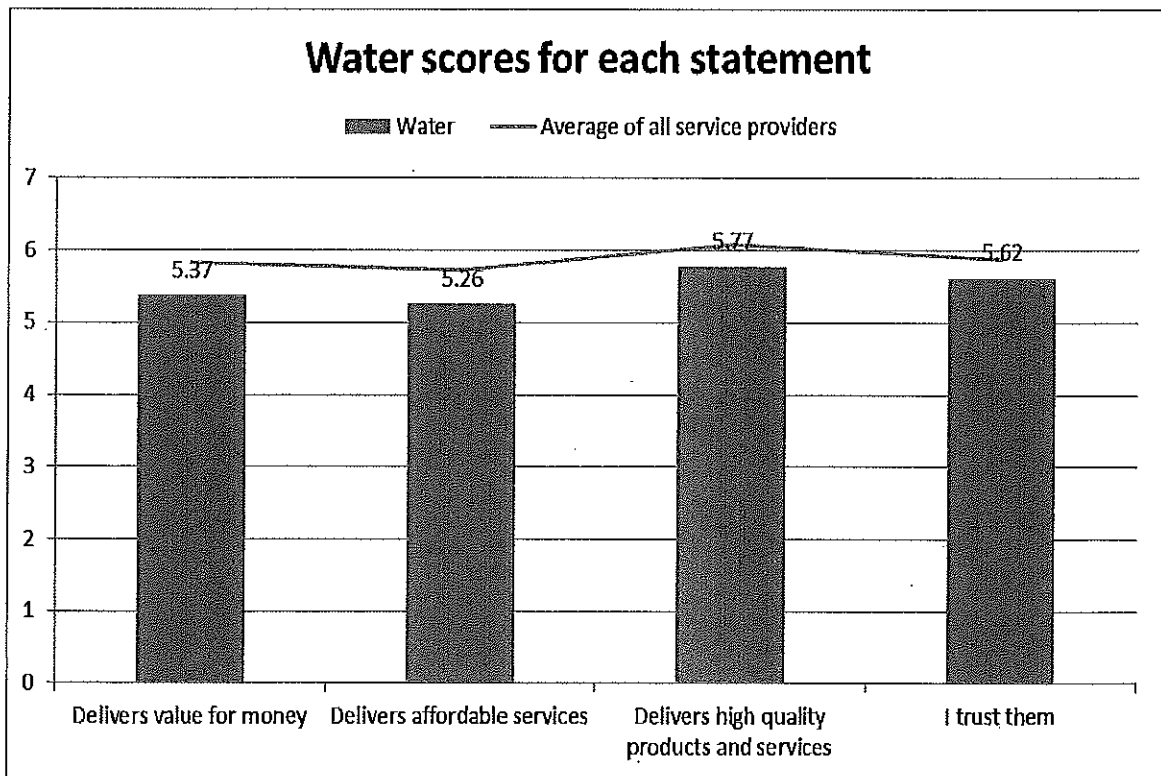


Figure 2 Water scores (out of 10) for each of the statements

However, relative to other service providers, trust is actually the strongest category for water utilities with 5 water utilities (25%) scoring above the average for service providers in their area of operation.

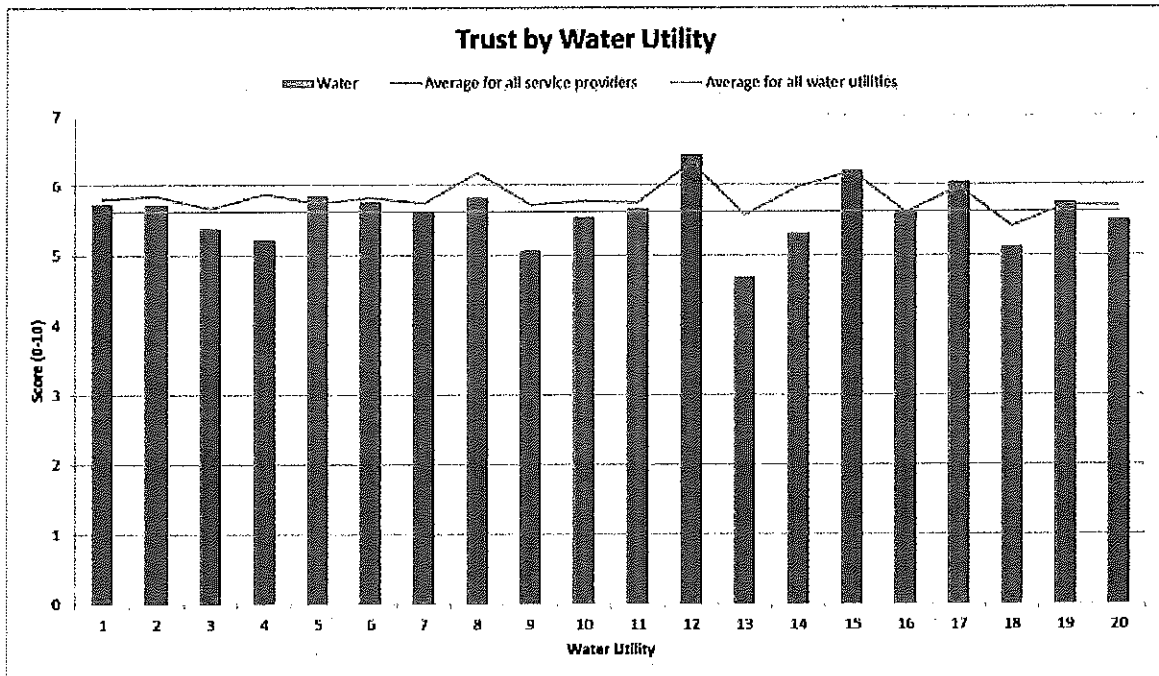


Figure 3 Trust scores by utility

Water Quality

Key messages

- Satisfaction with the quality of the water is a strongly related to trust and value for money.
- On average, two thirds of people drink water directly out of the tap and 87% drink water at least some of the time out of the tap. However these figures vary significantly among the utilities.
- People from different cultural backgrounds have different habits when it comes to drinking tap water. 46% of people with a Chinese background do not drink tap water.

Top performers

- Customers of Icon in the ACT scored their water quality the highest. They also have the highest proportion of customers who drink or sometimes drink the water (95%)
- Satisfaction with the water quality was highest in Canberra, Melbourne and Sydney.

Results

In general the quality of the water was one of the highest scoring attributes for water utilities with an average of 7.2 out of 10. However the results did show significant variation between utilities.

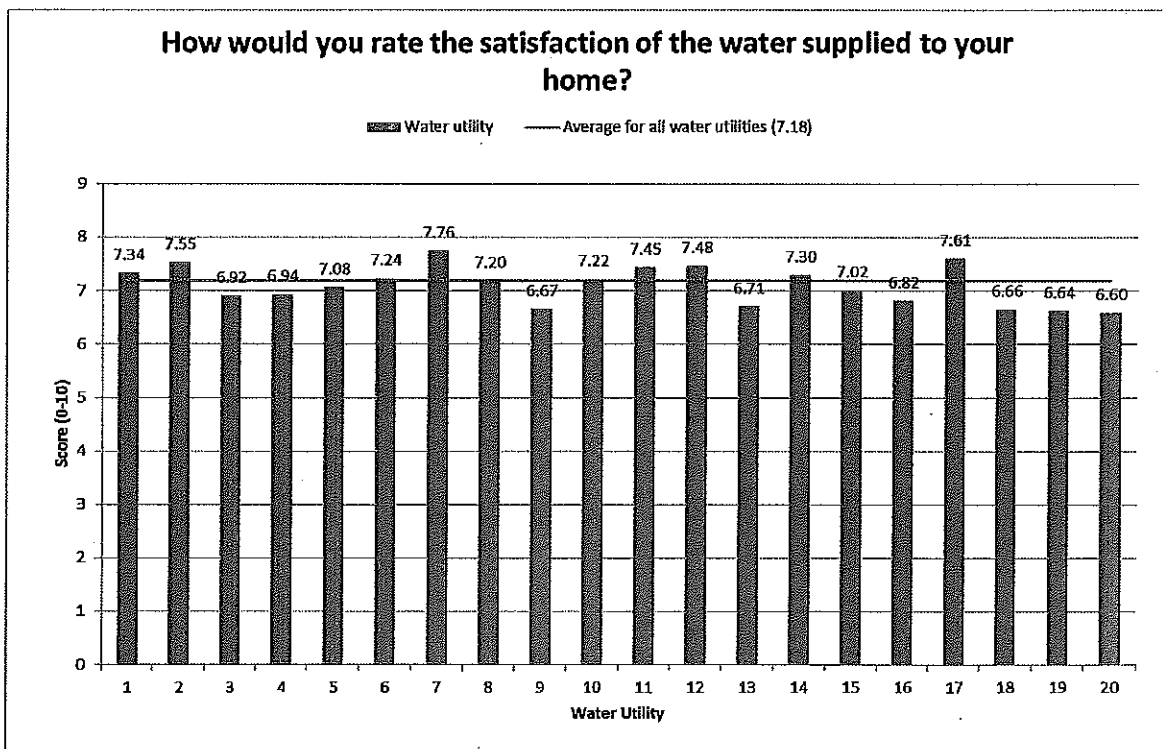


Figure 4 Satisfaction with the water quality

The highest satisfaction rating is for Icon Water in Canberra. Overall satisfaction is higher for urban providers (7.24 out of 10) compared to regional providers (7.02 out of 10).

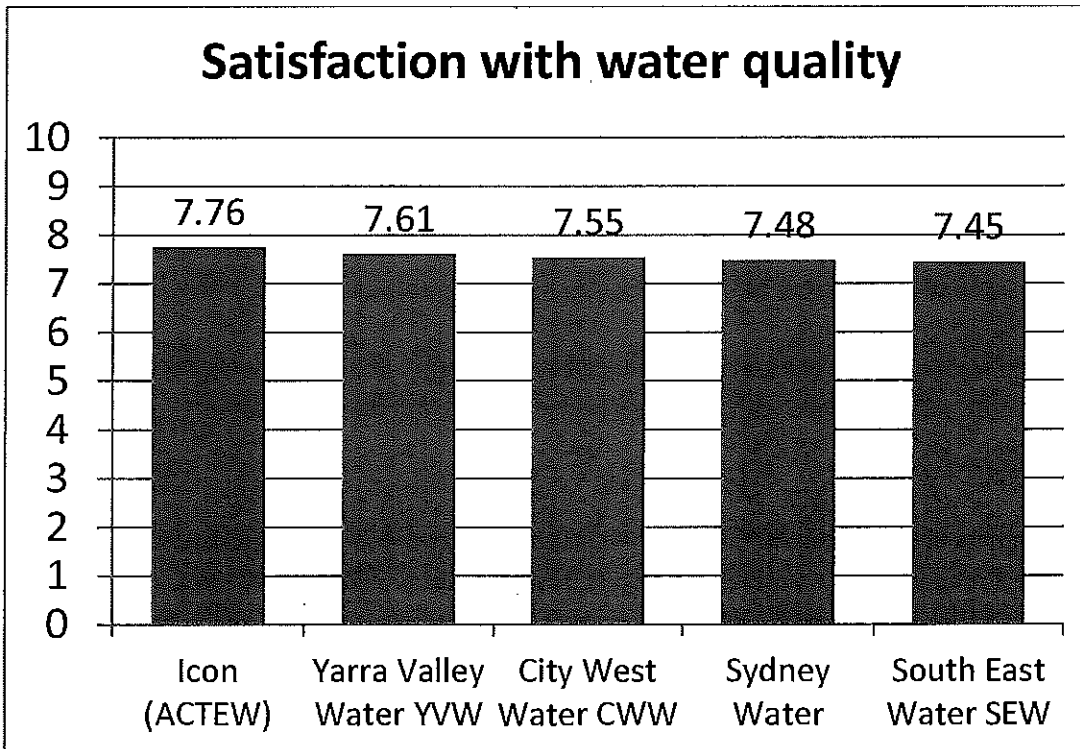


Figure 5: Top five providers in terms of satisfaction with quality of water

There is significant variation across utilities in the percentage of respondents that drink tap water.

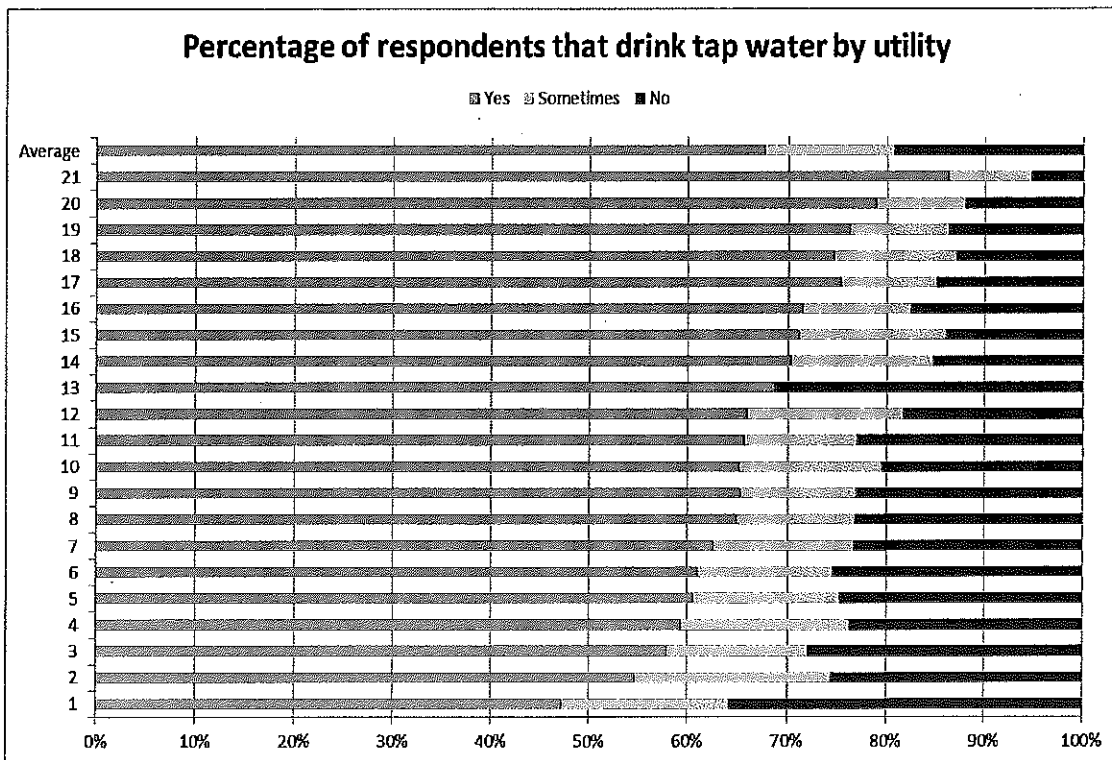


Figure 6 Responses to "do you drink water straight out of the tap"

For those that do not (or only sometimes) drink water out of the tap, the most commonly reason provided is taste (57%), followed by potential health risks (30%). There are some notable exceptions. In one city, both taste and health scored equally high (46%).

Cultural background also makes a difference. Those respondents that speak Chinese at home are least likely to drink the water whereas those in India are most likely.

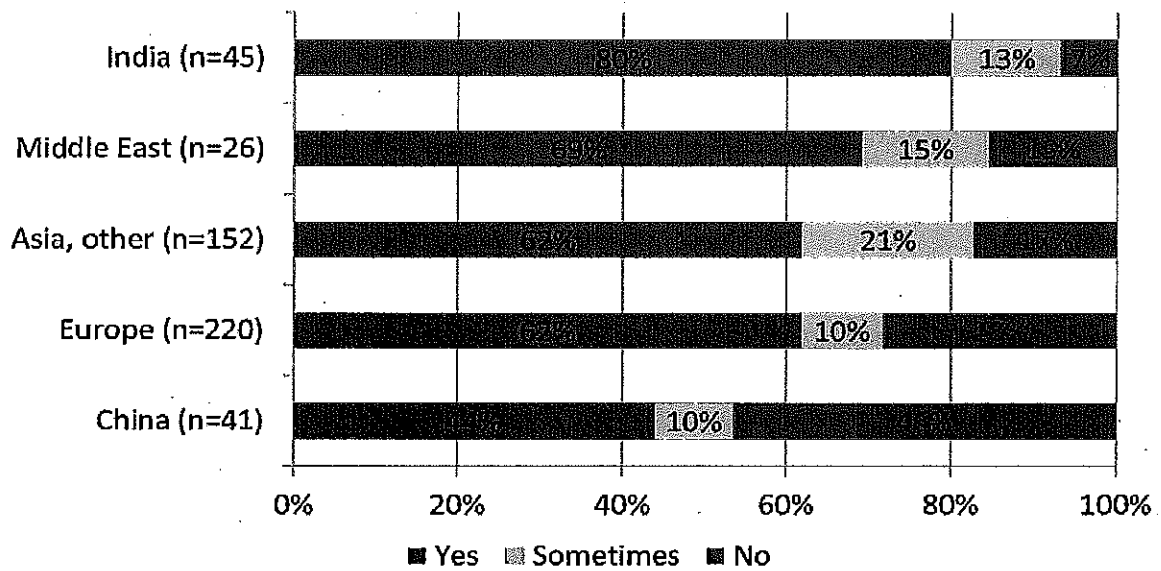


Figure 7 Drink tap water by cultural background

Awareness

Key messages

- Awareness of brand and the services provided is important. Those utilities that had a high level of awareness scored their utility higher for satisfaction with drinking water quality.
- Customers who were aware that their water utility offered financial hardship programs scored their water utility significantly higher for affordability as well as the other attributes.

Top Performers

- Regional water utilities, in particular Regional utilities generally had the highest level of awareness with 80% (Wannon Water) and 75% (Coliban and Gippsland Water)

Results

Knowing who your water utility is, the services they provide and programs to assist those customers experiencing financial hardship were on average lower than expected. There is a relationship between awareness and satisfaction levels of respondents with customers who knew their water utility provided sewerage services also scoring the utility higher for trust, value for money and the quality of drinking water.

About half of respondents didn't realise that their water utility also removed and treated their sewage. The best for any utility by far was about 83% (Wannon Water) with other Victorian regionals also scoring well. The Melbourne retailers and Water Corporation were the best of the capital cities with awareness of about 60%. Those utilities that are councils or are council owned had the lowest level of awareness with most respondents thinking that the council looked after sewage.

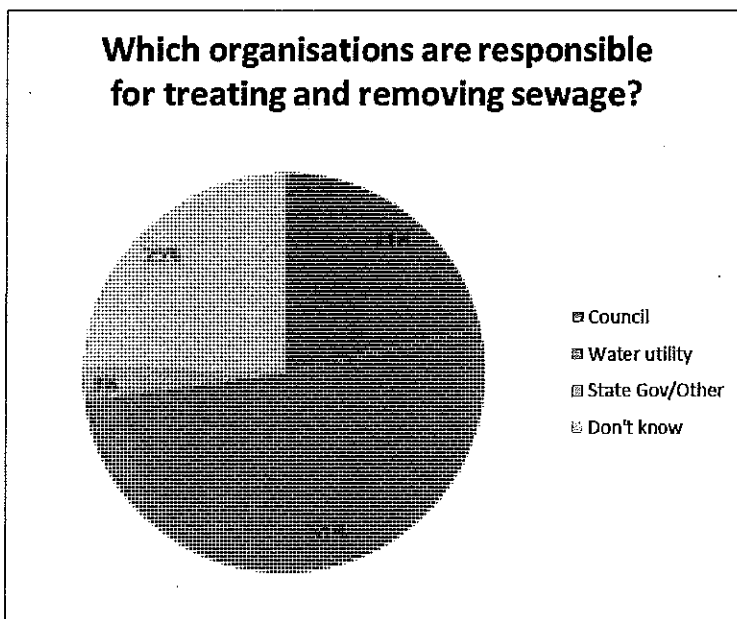


Figure 8: Who is responsible for treating and removing sewage?

Respondents were asked to type in the name of their water utility. On average 61% of respondents could unprompted correctly name their water utility. Regional utilities generally had the highest level of awareness with 80% (Wannon Water) and 75% (Coliban and Gippland Water)

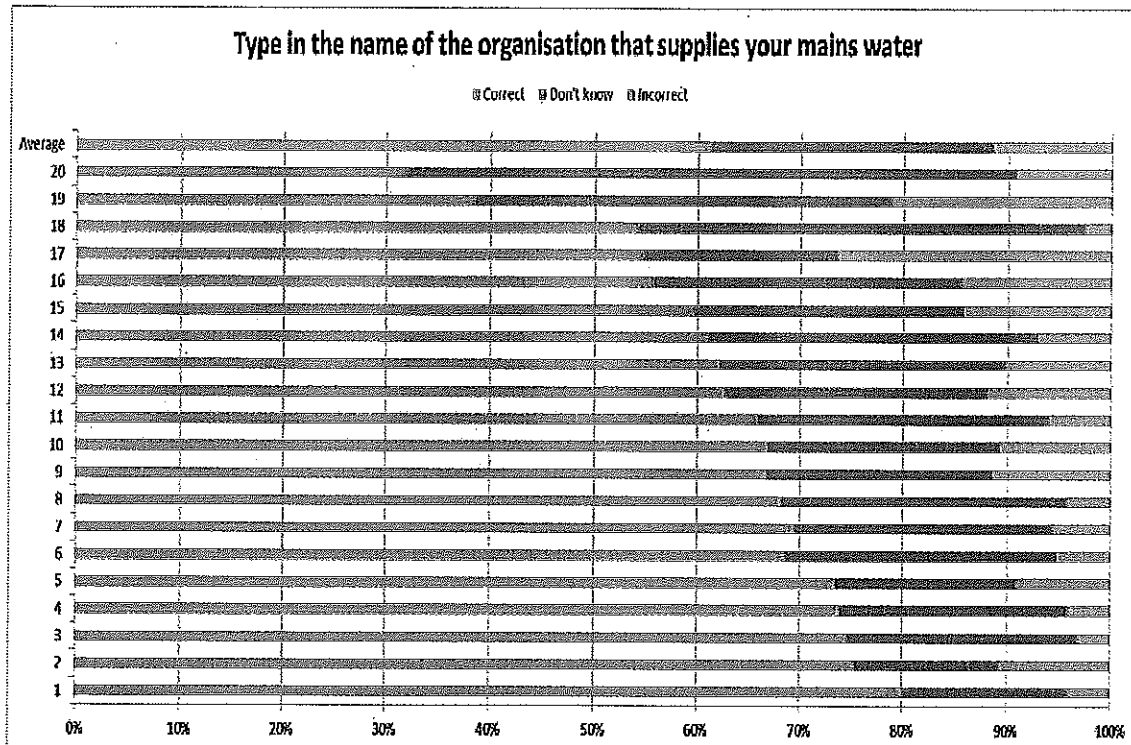


Figure 9 Respondents who could name their water utility

45% of respondents correctly identified their local council as being responsible for stormwater management but 24% still believed it was the responsibility of the water utility.

Awareness of financial hardship programs was on average low at 18%. However those that were aware of these programs scored the utility higher for trust, quality, value for money and most significantly for affordability.

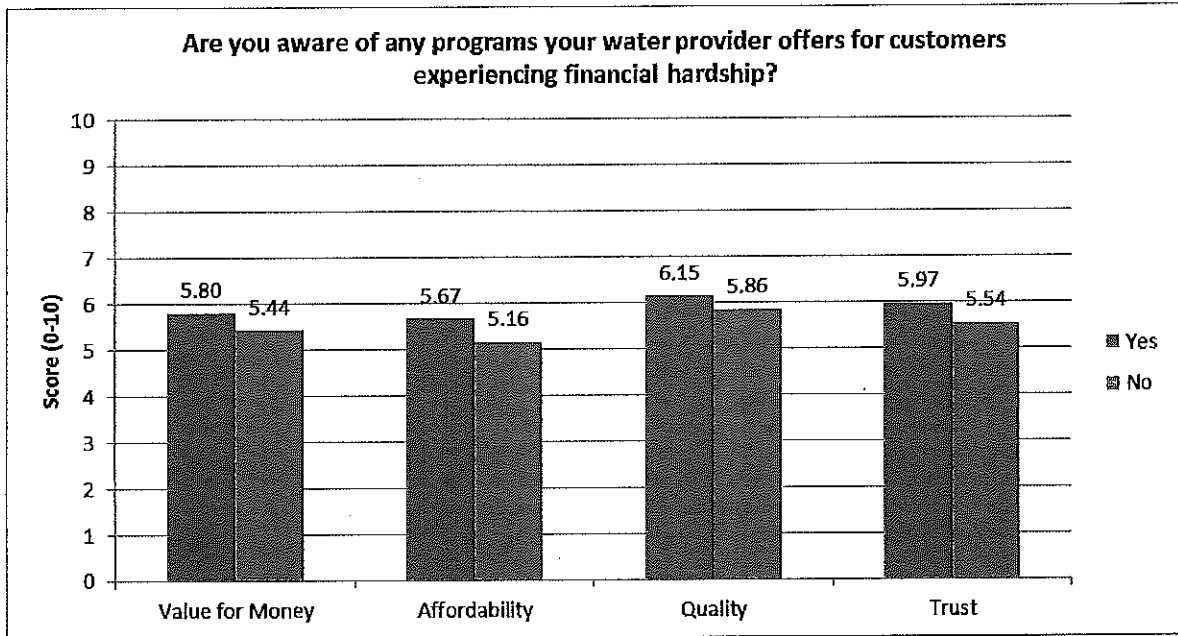


Figure 10 Awareness of financial hardship programs versus trust, value, affordability and quality

There is a relationship between awareness and how a customer perceives their water utility. For example, those customers who knew that their water utility did sewage services scored the quality of the water higher. They also had higher levels of trust and value for money. Increasing brand awareness also increased the way the customer scored the utility.

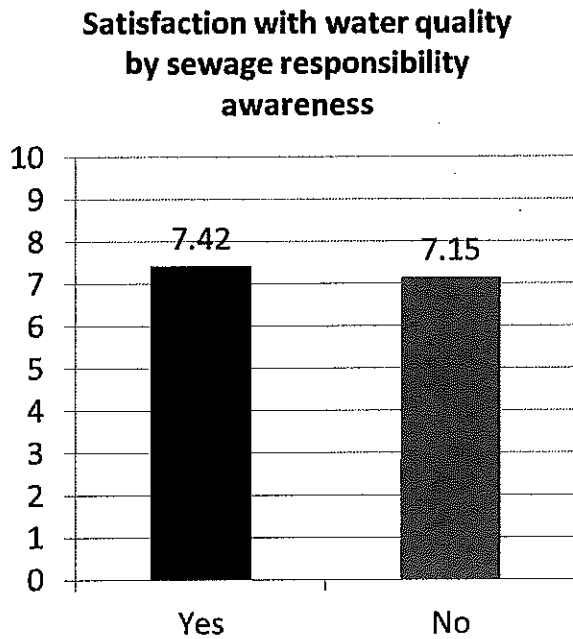


Figure 11: Satisfaction versus Sewage responsibility awareness

Appendix 1: Regional Classification

	Utility	Classification	Comments
1	Barwon (Geelong)	Regional	
2	Central Highlands Water	Regional	
3	City West Water CWW	Metro	
4	Coliban Water (Bendigo)	Regional	
5	Gippsland Water	Regional	
6	Gold Coast Water (QLD)	Metro	
7	Goulburn Valley Water (Shepparton)	Regional	
8	Hunter Water	Metro	Covers some regional areas but most customers in metro centre of Newcastle
9	Icon (ACTEW)	Metro	
10	Queensland Urban Utilities (QUU)	Metro	
11	SA Water	Metro	Covers whole state of SA but most customer in metro areas
12	Shoalhaven	Regional	
13	South East Water SEW	Metro	
14	South Gippsland Water	Regional	The results have been excluded from peer comparison due to small number of responses
15	Sydney Water	Metro	
16	TasWater	Regional	Covers metro centres but these are closer to regional centres than capital cities
17	Unitywater	Metro	
18	Wannon Water	Regional	
19	Water Corporation (WA)	Metro	Covers whole state of WA but most customers in metro areas
20	Western Water (Sunbury Vic)	Regional	
21	Yarra Valley Water YVW	Metro	

Appendix 2: Survey Methodology

While no survey methodology is perfect, WSAA chose an online survey where respondents were paid for their responses and were not aware of who was sponsoring the survey. This method was chosen to hopefully reach a broader demographic and ensure that we were not surveying individuals with a high knowledge, or vested interest in the water industry.

- This survey was carried out using Insync as the consultant and SSI as a global panel provider.
- Survey questions were developed by WSAA and Insync in consultation with several water utilities
- Survey was completed online
- Respondents were paid for carrying out the survey
- Respondents were not aware of who was sponsoring the survey. Only after the comparison questions with other sectors did it become obvious that it was a survey about water utilities
- Respondents were sourced using a panel provider with a requested number in each of the utility area of operations
- There were 5973 responses in total, statistically robust
- All respondents were over 18
- Survey selected for respondents who were connected to a centralised system and paid a water bill

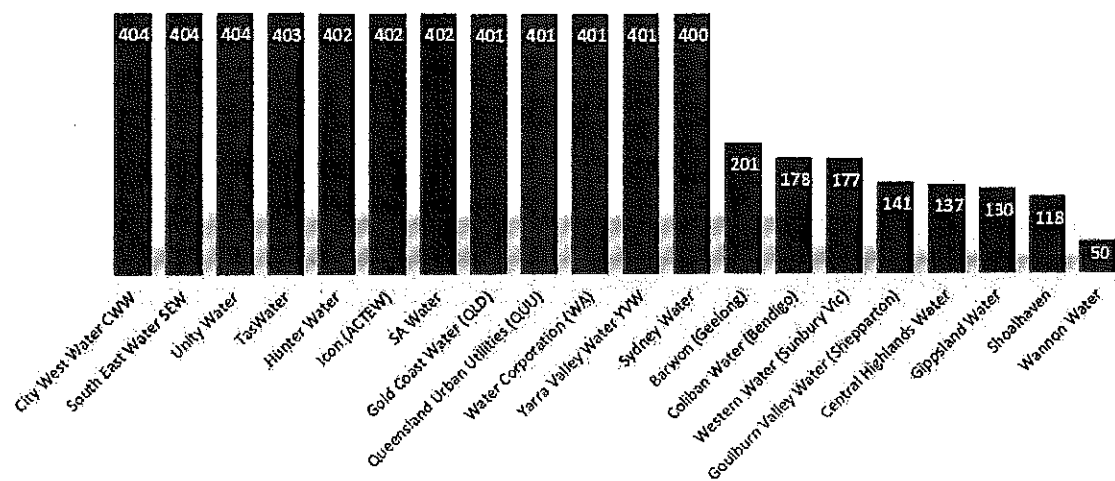


Figure 12 Number of respondents by utility

Shoalhaven City Council

TBL Sewerage Performance

2014-15

SEWERAGE SYSTEM - Shoalhaven City Council serves a population of 81,200 (41,870 connected properties) and has 13 sewage treatment works providing advanced secondary treatment. The system comprises 127,710 EP treatment capacity (Intermittent Extended Aeration (Activated Sludge), Trickling Filter and Membrane Biological Reduction), 217 pumping stations (661 ML/d), 228 km of rising mains and 989 km of gravity trunk mains and reticulation. 21% of effluent was recycled (Indicator 27) and the treated effluent is discharged to land river and ocean.

PERFORMANCE - Residential growth for 2014-15 was 0.9% which is similar to the statewide median. Shoalhaven City Council achieved 100% implementation of the outcomes required by the NSW BPM Framework. The 2015-16 typical residential bill was \$772 which was above the statewide median of \$697 (Indicator 12). The economic real rate of return was 3.9% which was greater than the statewide median (Indicator 46). The operating cost per property (OMA) was \$500 which was above the statewide median of \$420 (Indicator 50). Sewage odour complaints were less than the statewide median of 0.8 (Indicator 21). Shoalhaven Council reported 10 Category 2 (limited impact) public health incidents. Council did not comply with the SS requirements of the environmental regulator for effluent discharge. The current replacement cost of system assets was \$700M (\$14,800 per assessment), cash and investments were \$8M, debt was \$38M and revenue was \$46.7M (excluding capital works grants). Council paid a dividend of \$1.276M.

IMPLEMENTATION OF OUTCOMES REQUIRED BY THE NSW BEST-PRACTICE MANAGEMENT (BPM) FRAMEWORK

(1) Complete current strategic business plan & financial plan	YES ¹¹	(2e) Pricing - DSP with commercial developer charges	Yes
(2) (2a) Pricing - Full Cost Recovery without significant cross subsidies	Yes	(2f) Pricing - Liquid trade waste approvals & policy	Yes
(2b) Pricing - Appropriate Residential Charges	Yes	(3) Complete performance reporting (by 15 September)	YES
(2c) Pricing - Appropriate Non-Residential Charges	Yes	(4) Integrated water cycle management strategy	YESC ¹¹
(2d) Pricing - Appropriate Trade Waste Fees and Charges	Yes	IMPLEMENTATION OF ALL OUTCOMES	100%

TRIPLE BOTTOM LINE (TBL) PERFORMANCE INDICATORS

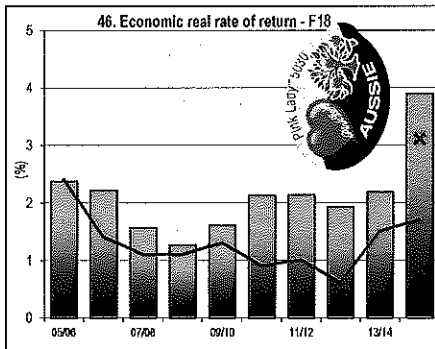
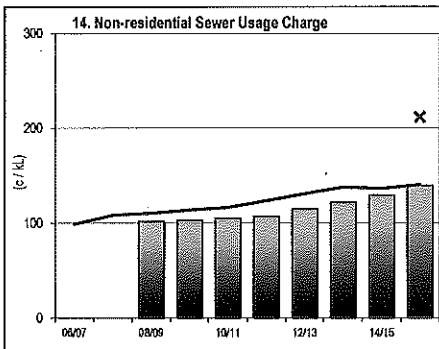
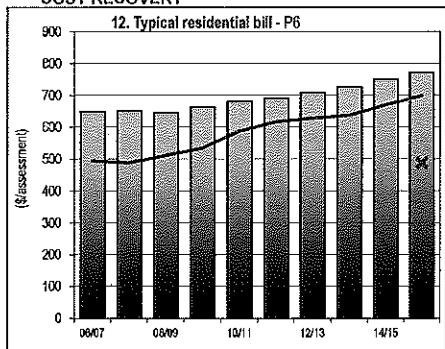
UTILITY	CHARACTERISTICS	NWI No.	Description	Units	LWU RESULT	RANKING			MEDIANS	
						>10,000 properties	All LWUs	Statewide	National	
SOCIAL	CHARGES & BILLS	C5	1 Population served: 81,200		Cal 1	Col 2	Col 3	Col 4	Col 5	
						Note 1	Note 2	Note 3	Note 4	
		C8	2 Number of connected properties: 41,870							
		C6	3 Number of residential connected properties: 39,900	Number of assessments: 47,250						
		A6	4 New residences connected to sewerage (%)	%	0.9	5	3	1.0		
		W18	5 Properties served per kilometre of main	Prop/km	34			38	40	
			6 Volume of sewage collected (ML)	ML	9,387			5,200	6,640	
			7 Renewals expenditure (% of current replacement cost of system assets)	%	0.1	5	5	0.5		
			8 Employees per 1000 properties	per 1,000 prop	2.1	5	4	1.6		
		P4	Description of residential tariff structure: access charge/prop; independent of land value							
		P4.1	11a Residential access charge for 2014-15 (\$/assessment)	\$ 2014-15	750	3	4	669	620	
			11 Residential access charge for 2015-16 (\$/assessment)	\$ 2015-16	772	3	4	697		
		P6	12a Typical residential bill for 2014-15 (\$/assessment)	\$ 2014-15	750	3	4	669	667	
			12 Typical residential bill for 2015-16 (\$/assessment)	\$ 2015-16	772	3	4	697		
			13 Typical developer charge for 2015-16 (\$/equivalent tenement)	\$ 2015-16	8,340	2	1	5,100		
			14 Non-residential sewer usage charge (c/kL)	c/kL	140	4	3	150		
		F6	15 Revenue per property - Sge (\$)	\$/prop	1120	2	1	882	947	
			16 Sewerage Coverage (% of Urban Population with Reticulated Sge Service)	%	97.8	3	2	97.9		
		E3	17 Percent of sewage treated to a tertiary level (%)	%	88	4	4	97	91	
			18 Percent of sewage volume treated that was compliant (%)	%	94	4	4	100		
			19 Number of sewage treatment works compliant at all times		12 of 13					
			21 Odour complaints per 1000 properties	per 1,000 prop	0.1	2	3	0.8		
		C11	22 Service complaints - sewerage per 1000 properties	per 1,000 prop	0.4	1	1	6	1	
		C16	23a Average sewerage interruption (minutes)	min	60	1	1	95	102	
			25 Total days lost (%)	%	4.0	4	4	3.1		
		W19	26 Volume of sewage collected per property (kL)	kL/prop	224	3	4	238	214	
		W26	26a Total recycled water supplied (ML)	ML	1,710	2	1	520	1,580	
		W27	27 Recycled water (% of effluent recycled)	%	21	2	2	10	15	
		E8	28 Biosolids reuse (%)	%	100	1	1	100	100	
			30 Energy consumption - sewerage (kWh/ML)	kWh/ML	900	3	4	790		
			31 Renewable energy consumption (% of total energy consumption)	%	0	2	1	0		
		E12	32 Net greenhouse gas emissions - WS & Sge (net tonnes CO2 equivalents per 1000 properties)	t CO2	440	4	4	410	393	
			33 90 th Percentile licence limits for effluent discharge: BOD 40 mg/L; SS 40 mg/L							
			34 Compliance with BOD in licence (%)	%	100	1	1	100		
			35 Compliance with SS in licence (%)	%	94	5	5	100		
		A14	36 Sewer main breaks and chokes (per 100 km of main)	per 100km main	11	2	2	35	17	
			37a Sewer overflows (per 100 km of main)	per 100km main	20	3	5	10		
		E13	37b Sewer overflows reported to environmental regulator (per 100km of main)	per 100km main	0.8	3	4	0.9	0.5	
			39 Non res & trade waste % of total sge volume	%	15	4	3	20		
			43 Revenue from non-residential plus trade waste charges (% of total revenue)	%	14	4	4	18		
			44 Revenue from trade waste charges (% of total revenue)	%	0.9	4	3	2.0		
		F18	46 Economic real rate of return - Sge (%)	%	3.9	1	1	1.7	3.0	
			46a Return on assets - Sge (%)	%	3.4	1	1	1.3		
			48a Loan payment per property - Sge (\$)	\$/prop	181	3	2	110		
		F24	48b Net profit after tax - WS & Sge (\$'000)	\$'000	20,770	1	1	2340	7,120	
			49 Operating cost (OMA) per 100 km of main (\$'000)	\$'000	1,730	3	4	1,720		
		F12	50 Operating cost (OMA) per property (\$) (Note 9)	\$/prop	500	4	4	420	400	
			51 Operating cost (OMA) per kL (cents)	c/kL	223	4	4	193		
			52 Management cost per property (\$)	\$/prop	188	4	5	160		
			53 Treatment cost per property (\$)	\$/prop	134	2	3	145		
			54 Pumping cost per property (\$)	\$/prop	89	4	4	72		
			55 Energy cost per property (\$)	\$/prop	32	1	2	37		
			56 Sewer main cost per property (\$)	\$/prop	51	3	3	51		
		F29	57 Capital Expenditure per property - Sewerage (\$)	\$/prop	300	2	2	204	217	

NOTES:

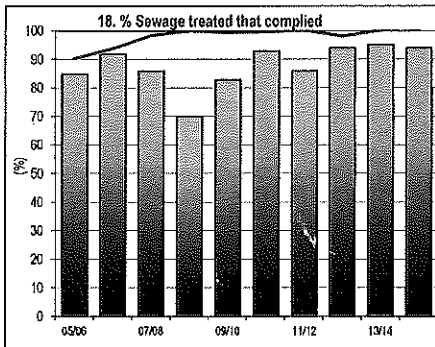
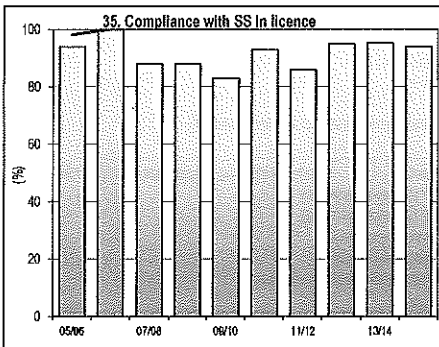
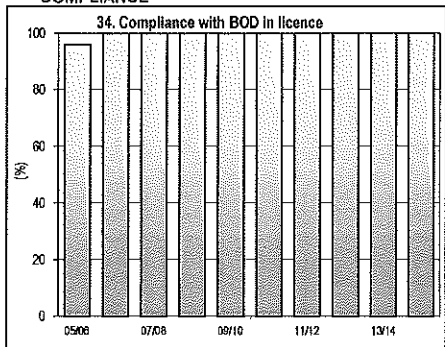
- Col 2 rankings are on a % of LWUs basis - best reveals performance compared to similar sized LWUs (ie. Col 1 is compared with LWUs with >10,000 properties).
- Col 3 rankings are on a % of LWUs basis - best reveals performance compared to all LWUs (ie. Col 1 is compared with all LWUs). - see attachment.
- Col 4 (Statewide Median) is on a % of connected properties basis- best reveals statewide performance (gives due weight to larger LWUs & reduces effect of smaller LWUs).
- Col 5 (National Median) is the median value for the 75 utilities reporting sewerage performance in the National Performance Report 2014-15 (www.bom.gov.au).
- LWUs are required to annually review key projections & actions in the later of their IWCM Strategy and financial plan and their Strategic Business Plan and to annually 'roll forward', review and update their 30-year total asset management plan (TAMP) and 30-year financial plan.
- Non-residential access charge - \$772, proportional to square of meter size. Sewer usage charge - 140 c/kL.
- Non-residential and trade waste volume was 15% of total sewage collected.
- Non-residential revenue was 14% of revenue from access, usage & trade waste charges, indicating fair pricing of services between the residential and non-residential sectors.
- Compliance with Total N in Licence was 100%. Compliance with Total P in Licence was 100%.
- Operating cost (OMA)/property was \$500. Components were: management (\$188), operation (\$200), maintenance (\$58), energy (\$32), chemical (\$7) & effluent/biosolids (\$17).
- Shoalhaven City Council rehabilitations included 0.2% of its sewerage mains and 0.3% of its service connections. Renewals expenditure was \$73,000/100km of main.
- As Council's IWCM Strategy is over 6 years old, it will need to prepare a new 30-year IWCM Strategy, financial plan and report in accordance with the July 2014 IWCM Check List (www.water.nsw.gov.au).

(Results shown for 10 years together with Statewide Median and 2014-15 Top 20%)

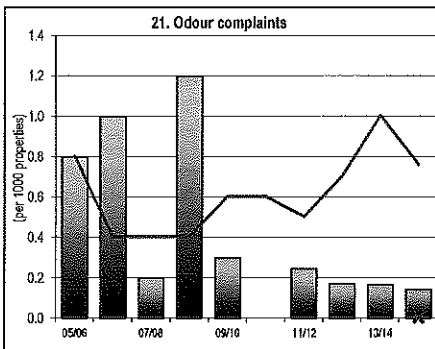
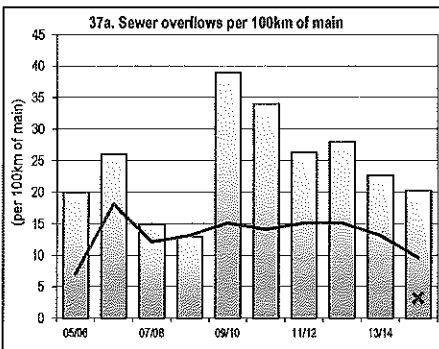
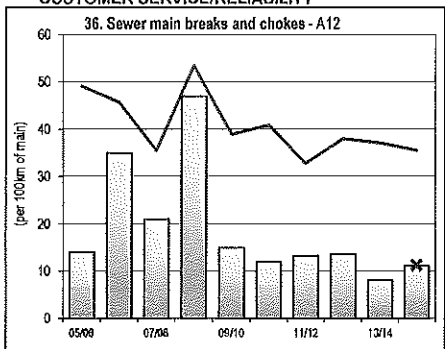
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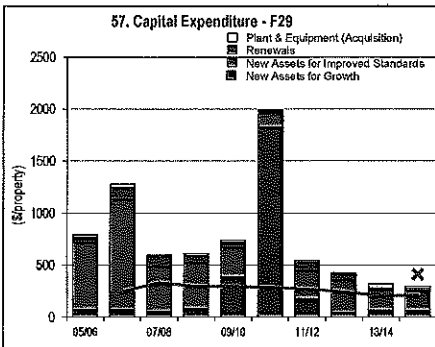
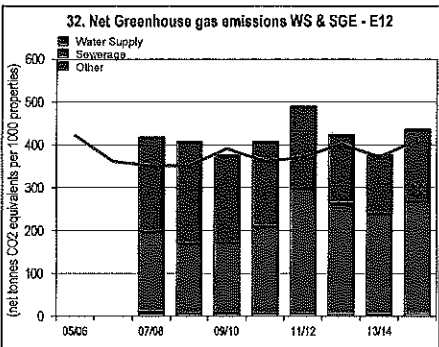
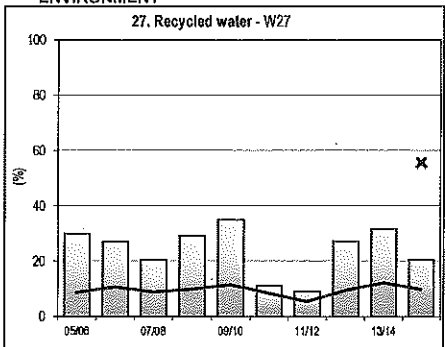
COMPLIANCE



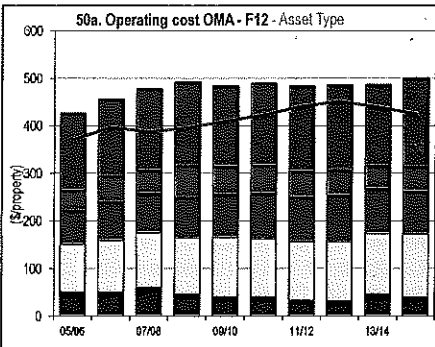
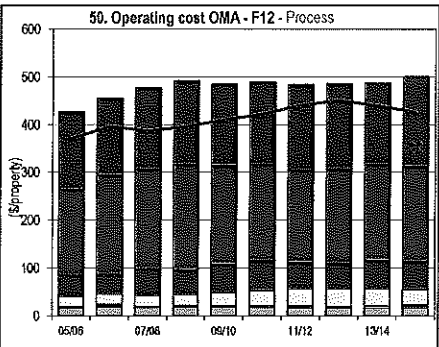
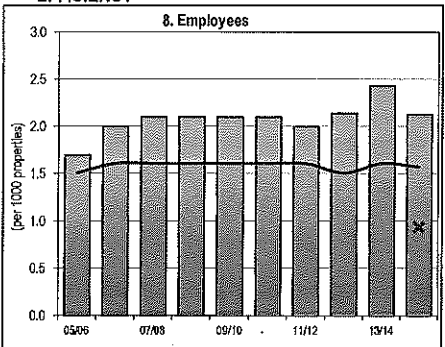
CUSTOMER SERVICE/RELIABILITY



ENVIRONMENT



EFFICIENCY



NOTES:

1. Costs are in Jan 2015\$ except for graphs 12 and 14, which are in Jan 2016\$.

LEGEND
 State Median for all years
 Top 20% for 2014-15

Shoalhaven City Council TBL Water Supply Performance 2014-15

WATER SUPPLY SYSTEM - Shoalhaven City Council serves a population of 89,100 (47,150 connected properties). Water is drawn from the Porters Creek, Kangaroo River and Shoalhaven River to supply townships from Berry and Kangaroo Valley in the north to Lake Tabourie in the south. Bamarang, Cambewarra, Danjera and Porters Creek Dams have a total storage capacity of 13,360 ML. The water supply network comprises 2 conventional water treatment works (103 ML/d), 1 microfiltration works at Kangaroo Valley (1.3 ML/d) and 1 direct filtration (10.5 ML/d), 38 service reservoirs (192 ML), 26 pumping stations, 115 ML/d delivery capacity into the distribution system, 481 km of transfer and trunk mains and 1064 km of reticulation. 85% of water supplied is potable and 15% nonpotable (1% recycled). The Northern areas are fully treated and the Southern areas are unfiltered (chlorinated).

PERFORMANCE - Shoalhaven City Council achieved 100% implementation of the outcomes required by the NSW BPM Framework. The 2015-16 typical residential bill was \$315 which was much less than the statewide median of \$593 (Indicator 14). The economic real rate of return was similar to the statewide median (Indicator 43). The operating cost (OMA) per property was \$276 which was much less than the statewide median of \$400 (Indicator 49). Water quality complaints were negligible compared to the statewide median of 3 (Indicator 25). Compliance was achieved for microbiological water quality (100% of the population, 4 of 4 zones compliant), chemical water quality and physical water quality. There were no failures of the chlorination system or the treatment system. Shoalhaven City Council reported no water supply public health incidents. Current replacement cost of system assets was \$621M (\$12,100 per assessment). Cash and investments were \$39.2M, debt was \$0.2M and revenue was \$27M (excluding capital works grants).

IMPLEMENTATION OF OUTCOMES REQUIRED BY THE NSW BEST-PRACTICE MANAGEMENT (BPM) FRAMEWORK

(1) Complete Current Strategic Business Plan & Financial Plan	YES ¹²	(3) Sound water conservation implemented	YES
(2) (2a) Pricing - Full Cost Recovery, without significant cross subsidies	Yes	(4) Sound drought management implemented	YES
(2b,2c) Pricing - Appropriate Residential Charges	Yes	(5) Complete performance reporting (by 15 September)	YES
(2d) Pricing - Appropriate Non-residential Charges	Yes	(6) Integrated water cycle management strategy	YES ¹²
(2e) Pricing - DSP with Commercial Developer Charges	Yes		100%

IMPLEMENTATION OF ALL OUTCOMES

TRIPLE BOTTOM LINE (TBL) PERFORMANCE INDICATORS

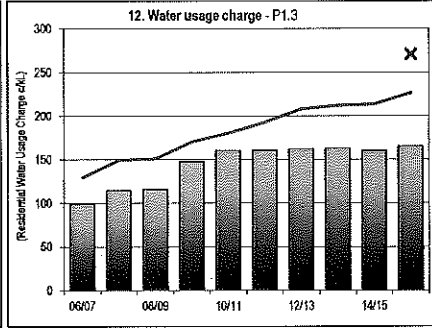
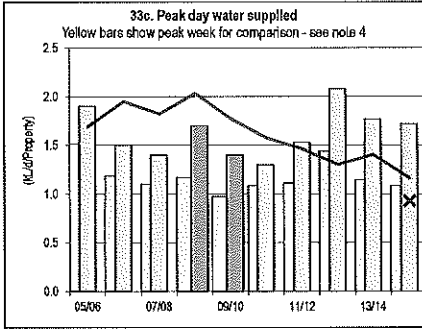
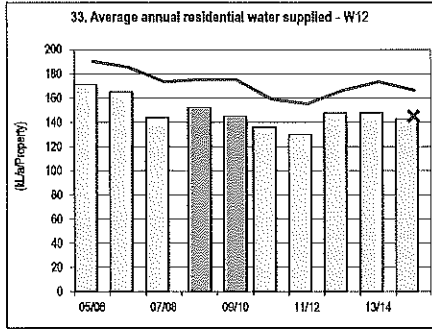
Category	Indicator	Description	Unit	LWU RESULT	RANKING			MEDIAN		
					>10,000 properties	All LWUs	Statewide	National		
NW1 No.					Col 1	Note 1	Note 2	Note 3	Note 4	
					Col 1	Col 2	Col 3	Col 4	Col 5	
UTILITY	C1	1 Population served:	89100							
	C4	2 Number of connected properties:	47150							
		3 Residential connected properties (% of total)		%	92				92	
		4 New residences connected to water supply (%)		%	1.5	2	2	1.1		
	A3	5 Properties served per kilometre of water main		Prop/km	31			31	34	
		6 Rainfall (% of median annual rainfall)		%	151	1	1	116		
	W11	7 Total urban water supplied at master meters (ML)		ML	14,200			7,000	9,060	
		8 Peak week to average consumption (%)		%	155	4	3	141		
		9 Renewals expenditure (% of current replacement cost of system assets)		%	0.4	3	3	0.4		
		10 Employees per 1000 properties		per 1,000 prop	1.4	3	2	1.4		
SOCIAL	P1	Residential tariff structure for 2015-16: two part; independent of land value; access charge \$80								
	P1.3	12a Residential water usage charge for 2014-15 for all usage (c/kL)		c/kL (2014-15)	160	5	3	213	165	
		12 Residential water usage charge for 2015-16 for all usage (c/kL)		c/kL (2015-16)	165	5	3	226		
	P3	14a Typical residential bill for 2014-15 (\$/assessment)		\$ (2014-15)	309	1	1	588	589	
		14 Typical residential bill for 2015-16 (\$/assessment)		\$ (2015-16)	315	1	1	593		
		15 Typical developer charge for 2015-16 (\$/equivalent tenement)		\$ (2015-16)	6,600	2	2	5,900		
	F4	16 Residential revenue from usage charges (% of residential bills)		%	75	1	2	72	66	
	F5	17 Revenue per property - water (\$/property)		\$/prop	570	5	5	827	681	
		18 Water Supply Coverage (% of Urban Population with reticulated WS)		% of population	99.2	4	2	99.5		
		18a Risk based Drinking Water Management System (DWMS)?		Yes/No	Yes					
		19 Physical compliance achieved? Note 10		Yes/No	Yes	1	1			
		19a Chemical compliance achieved? Note 10		Yes/No	Yes	1	1			
	H4	19b % population with chemical compliance		% of population	100	1	1	100		
		20 Microbiological (E. coli) compliance achieved? Note 10		Yes/No	Yes	1	1			
	H3	20a % population with microbiological compliance		% of population	100	1	1	100	100	
	ENVIRONMENTAL	C9	25 Water quality complaints per 1000 properties		per 1,000 prop	0.5	2	2	3	2
		C10	26 Water service complaints per 1000 properties		per 1,000 prop	0.5	2	1	6	0.5
C17		27 Incidence of unplanned interruptions per 1000 properties		per 1,000 prop	78	5	5	24	91	
C15		28 Average duration of interruption (min)		min	135	3	4	133	117	
A8		30 Number of water main breaks per 100 km of water main		per 100km	8	3	2	9	13	
		31 Drought water restrictions (% of time)		% of time	0	1	1	0		
		32 Total days lost (%)		%	2.5	2	3	2.9		
W12		33 Average annual residential water supplied - STATEWIDE (kL/property)		kL/prop	143	1	1	166	181	
		33a Average annual residential water supplied - COASTAL LWUs (kL/property)		kL/prop	143	2	2	150		
		33b Average annual residential water supplied - INLAND LWUs (kL/property)		kL/prop				225		
A10	34 Real losses (leakage) (L/service connection/day)		L/connection/day	90	4	4	60	76		
	35 Energy consumption per Megalitre (kiloWatt hours)		kWh/ML	709	3	4	700			
	36 Renewable energy consumption (% of total energy consumption)		%	0	1	1	0			
E12	36a Net greenhouse gas emissions - WS & Sge (net tonnes CO2 equivalents per 1000 properties)		t CO2	440	4	4	410	393		
ECONOMIC	F17	42 Current replacement cost per assessment (\$)		\$/assessment	12,100	4	4	16,400		
		43 Economic real rate of return - Water (%)		%	1.7	2	2	1.8	1.9	
		44 Return on assets - Water (%)		%	2.3	1	2	1.0		
	F22	45 Net Debt to equity - WS & Sge (%)		%	-1	3	2	-1	11	
	F23	46 Interest cover - WS & Sge			>100	1	1	4	2	
		47 Loan payment per property - Water (\$)		\$/prop	6	4	3	69		
	F24	47b Net profit after tax - WS & Sge (\$'000)		'000	20,770	1	1	2340	7120	
		48 Operating cost (OMA) per 100km of main (\$'000)		'000	860	1	1	1,320		
	F11	49 Operating cost (OMA) per property (\$/prop) Note 8		\$/prop	276	1	1	400	455	
		50 Operating cost (OMA) per kilolitre (cents)		c/kL	92	2	2	129		
		51 Management cost (\$/prop)		\$/prop	129	2	2	141		
		52 Treatment cost (\$/prop)		\$/prop	45	3	2	58		
		53 Pumping cost (\$/prop)		\$/prop	22	2	2	31		
	54 Energy cost (\$/prop)		\$/prop	17	3	2	18			
	55 Water main cost (\$/prop)		\$/prop	50	1	2	74			
F28	56 Capital Expenditure (\$/prop)		\$/prop	218	3	2	155	163		

NOTES:

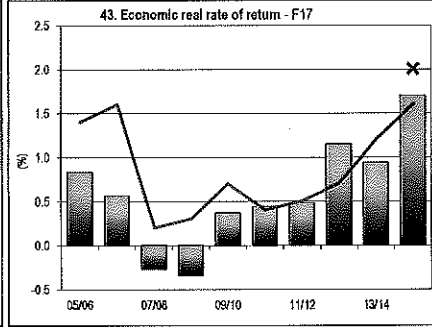
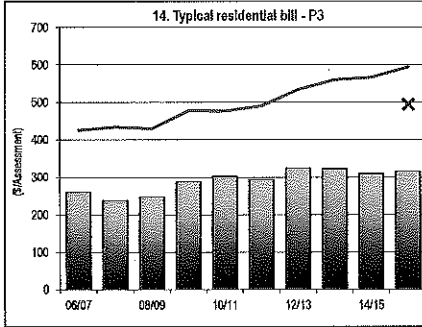
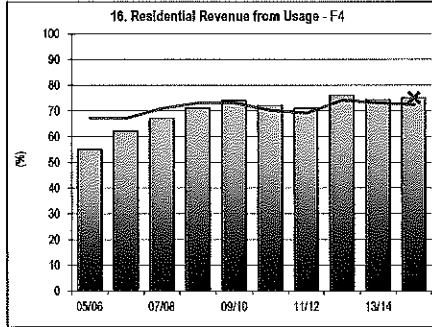
- Col 2 rankings are on a % of LWUs basis - best reveals performance compared to similar sized LWUs (ie. Col 1 is compared with LWUs with >10,000 properties).
- Col 3 rankings are on a % of LWUs basis - best reveals performance compared to all LWUs (ie. Col 1 is compared with all LWUs).
- Col 4 (Statewide Median) is on a % of connected properties basis - best reveals statewide performance (gives due weight to larger LWUs & reduces effect of smaller LWUs).
- Col 5 (National Median) is the median value for the 76 utilities reporting water supply performance in the National Performance Report 2014-15 (www.bom.gov.au).
- LWUs are required to annually review key projections & actions in the later of their IWCM Strategy and financial plan and their Strategic Business Plan and to annually 'roll forward', review and update their 30-year total asset management plan (TAMP) and 30-year financial plan.
- 2015-16 Non-residential Tariff: Access Charge based on Service Connection Size (40mm: \$320), Inclining Block ; Usage Charge 165c/kL.
- Non-residential water supplied was 38% of potable water supplied excluding non-revenue water.
- Non-residential revenue was 32% of annual rates and charges, indicating fair pricing of services between the residential and non-residential sectors.
- The operating cost (OMA) per property was \$276. Components were: management (\$129), operation (\$80), maintenance (\$36), energy (\$17) & chemical (\$13).
- Rehabilitations included 1.2% of water mains, 0.67% of service connections and 8.4% of water meters. Renewals expenditure was \$164,000/100km of main.
- Compliance with ADWCG 2011 for drinking water quality is shown as "Yes" if compliance has been achieved (Indicators 19, 19a & 20).
- Shoalhaven City Council has 8 fully qualified water treatment operators who meet the requirements of the National Certification Framework.
- As Council's IWCM Strategy is over 6 years old, it will need to prepare a new 30-year IWCM Strategy, financial plan and report in accordance with the July 2014 IWCM Check List (www.water.nsw.gov.au).

(Results shown for 10 years together with Statewide Median and 2014-15 Top 20%)

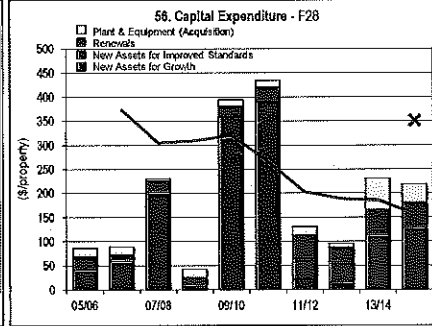
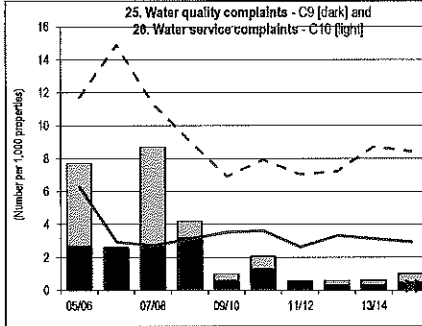
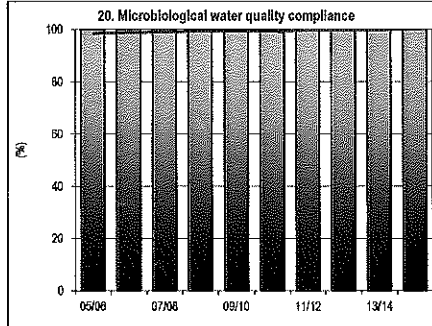
RESIDENTIAL USE/REVENUE FROM USAGE



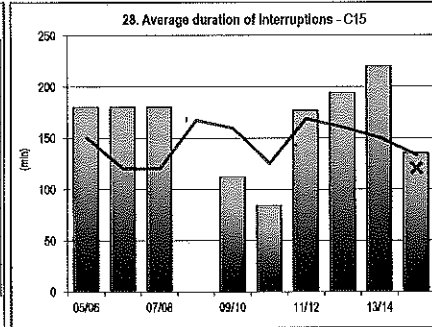
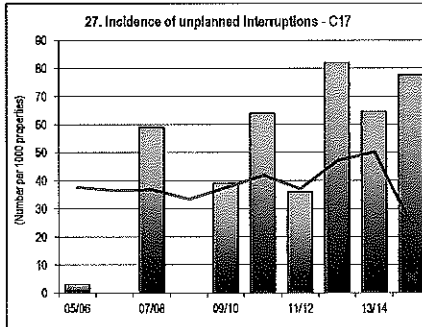
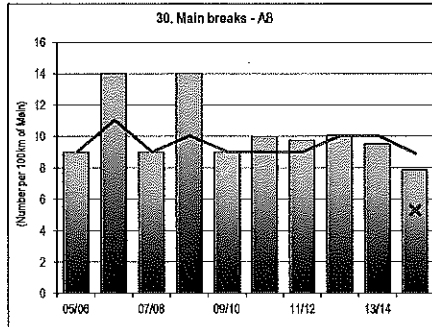
COST RECOVERY



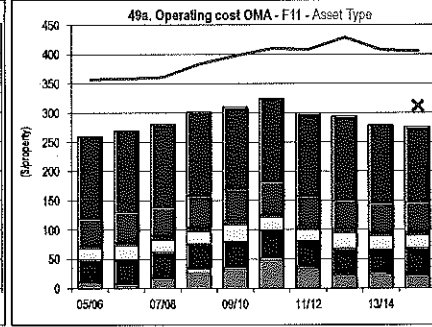
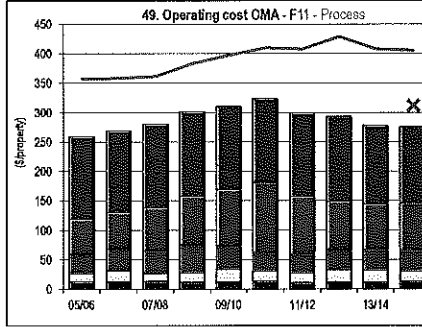
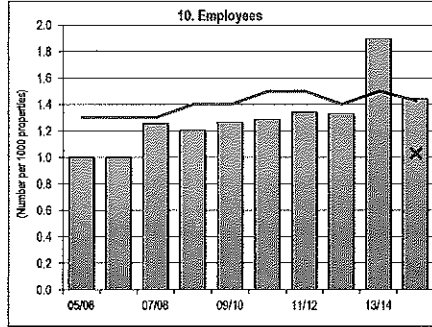
WATER QUALITY/CUSTOMER SERVICE/CAPITAL EXPENDITURE



RELIABILITY



EFFICIENCY



NOTES:

- Costs are in Jan 2015\$ except for graphs 12 and 14, which are in Jan 2016\$.
- Microbiological water quality compliance 1999-00 to 2003-04 was on the basis of 1996 NHMRC/ARMCANZ Australian Drinking Water Guidelines for E. coli; from 2004-05 to 2010-11 compliance was on the basis of the 2004 NHMRC/NRMMC Australian Drinking Water Guidelines (ADWG) and for 2011-12 to 2014-15 compliance was on the basis of the 2011 ADWG.
- Indicators 33 and 33c - Green shading of bars shows % of time Drought Water Restrictions applied in each year.
- Indicator 33c - Yellow bars show Peak Week Water Supplied for comparison with Peak Day Water Supplied shown in green.

LEGEND

State Median for all years

Top 20% for 2014-15

X

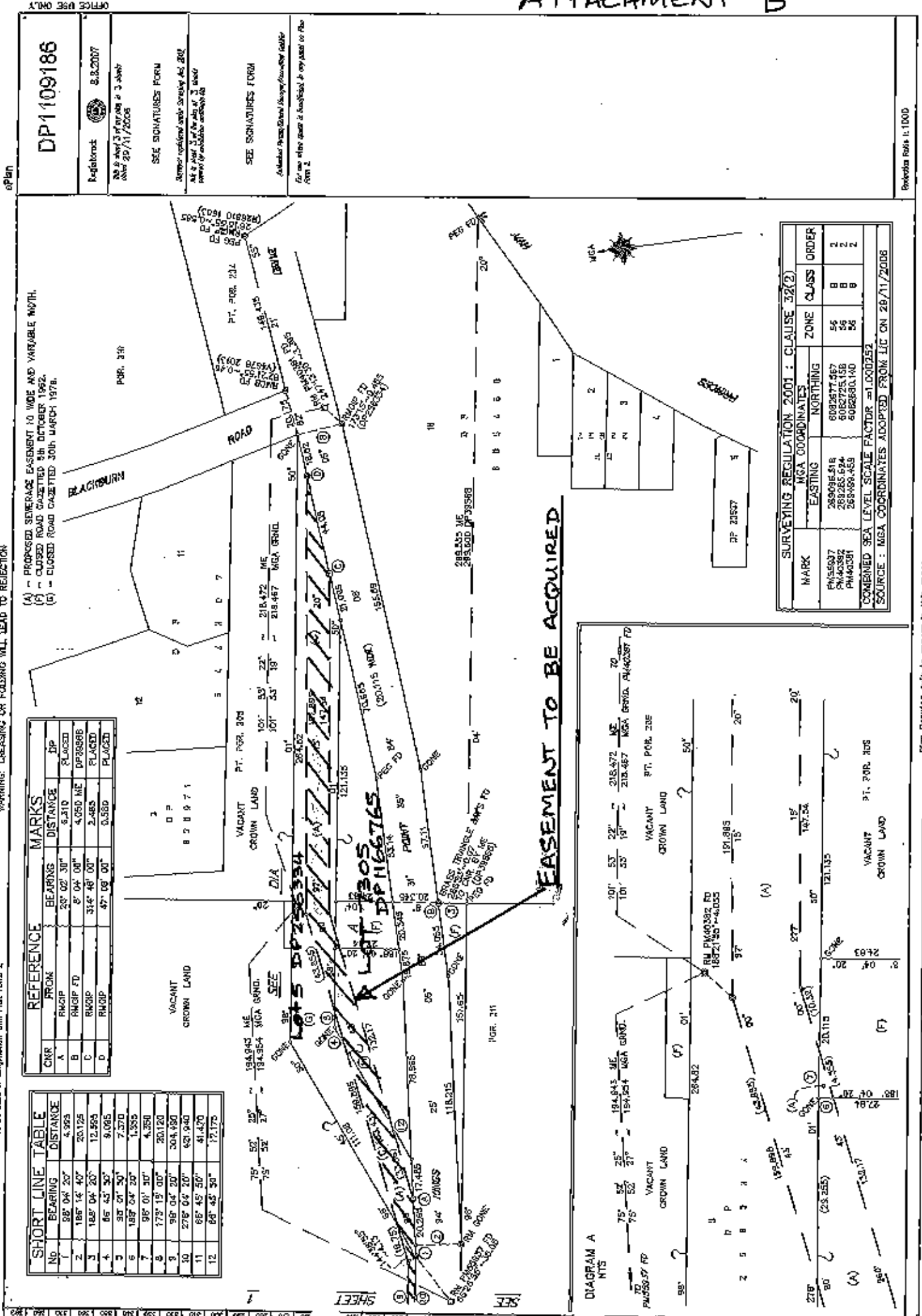
0 - 30% 30-50% >50% of time

ATTACHMENT 'B'

PLAN F-UKM 3

To be used in conjunction with Plat Form 2.

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION



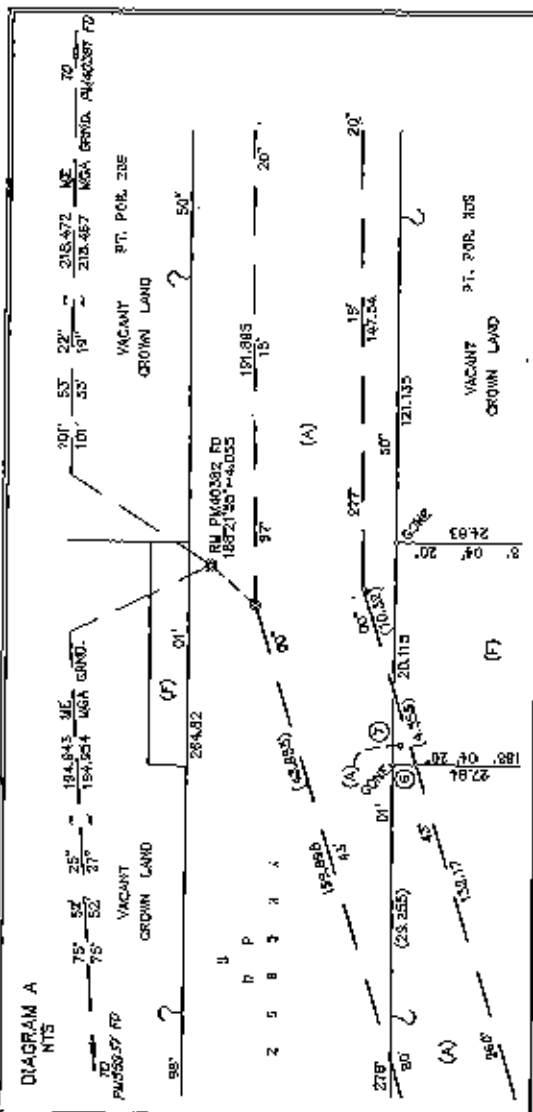
REFERENCE MARKS

CNR	FROM	BEARINGS	DISTANCE	IP
A	RM/CP	28° 02' 30"	5.510	PLACED
B	RM/CP	8° 04' 08"	4.050 ME	DP3898B
C	RM/CP	31° 48' 00"	2.485	PLACED
D	RM/CP	47° 08' 00"	0.350	PLACED

SHORT LINE TABLE

NO	BEARING	DISTANCE
1	88° 04' 20"	4.995
2	188° 14' 40"	20.125
3	188° 04' 20"	12.895
4	85° 43' 30"	9.065
5	188° 04' 20"	2.370
6	188° 04' 20"	1.955
7	98° 01' 30"	4.350
8	173° 15' 00"	20.120
9	98° 04' 20"	304.980
10	278° 04' 20"	631.940
11	68° 45' 50"	41.470
12	68° 45' 50"	17.175

EASEMENT TO BE ACQUIRED



SURVEYING REGULATION 2001 : CLAUSE 32(2)

MARK	MGA COORDINATES		ZONE	CLASS	ORDER
	EASTING	NORTHING			
PM55937	2890916.816	6082977.467	56	B	1111
PM43387	2892885.624	6082753.138	56	B	1111
PM40381	2884689.458	6082600.190	56	B	1111

COMBINED SEA LEVEL SCALE FACTOR = 1.000252
SOURCE : MGA COORDINATES ADOPTED FROM LIC ON 28/11/2008

DP1109186

Register No. S.S.2007

SEE SIGNATURES FORM

SEE SIGNATURES FORM

SEE SIGNATURES FORM

SEE SIGNATURES FORM

SEE SIGNATURES FORM

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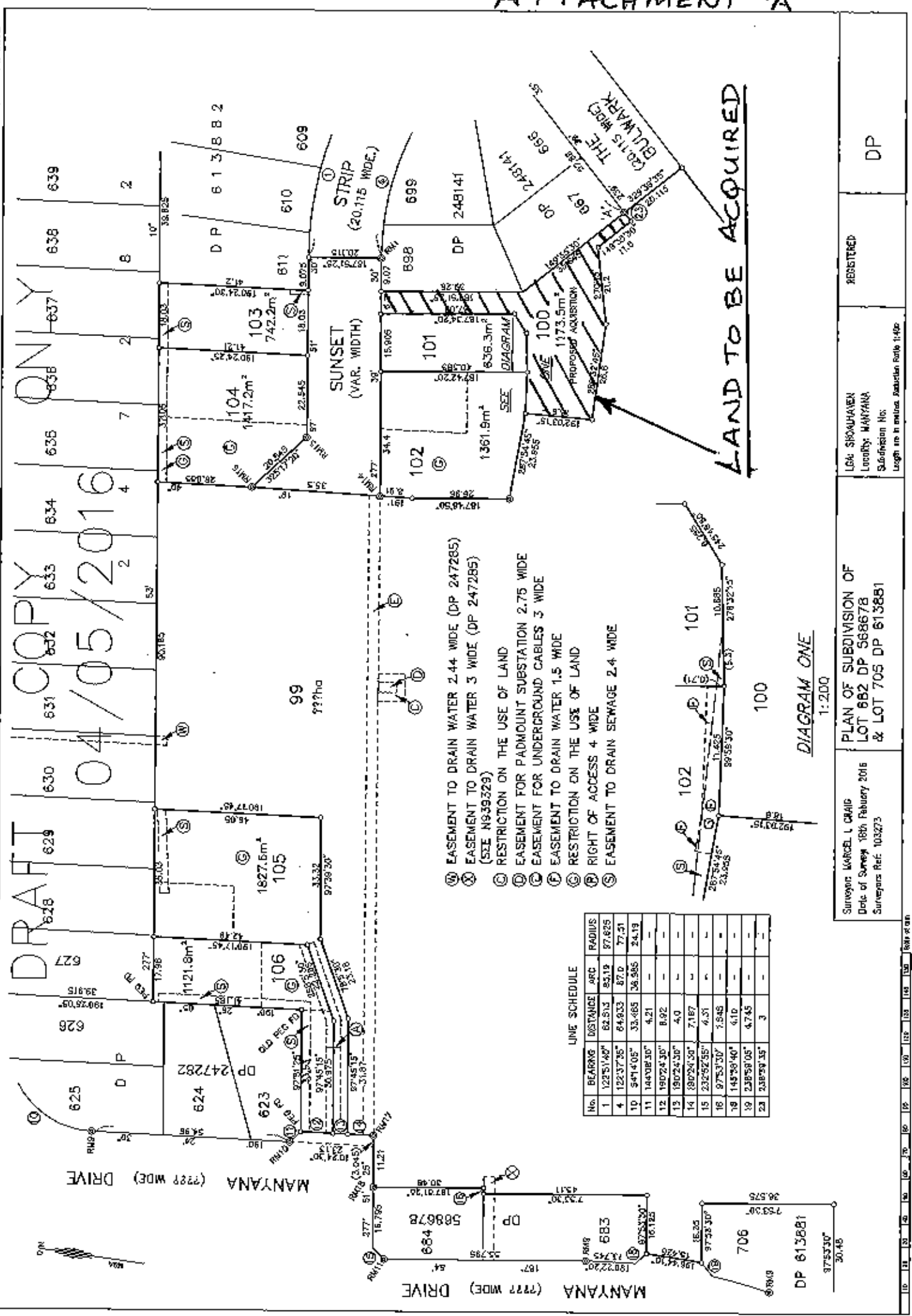
Reference No. 11000

Plan Drawing only to appear in this space

WARNING: CREASING OR FOLDING WILL LEAD TO REJECTION

PLAN FORM 2

Sheet 2 of 2 sheets



- ① EASEMENT TO DRAIN WATER 2.44 WIDE (DP 247285)
- ② EASEMENT TO DRAIN WATER 3 WIDE (DP 247285) (SEE N949329)
- ③ RESTRICTION ON THE USE OF LAND
- ④ EASEMENT FOR PADMOUNT SUBSTATION 2.75 WIDE
- ⑤ EASEMENT FOR UNDERGROUND CABLES 3 WIDE
- ⑥ EASEMENT TO DRAIN WATER 1.5 WIDE
- ⑦ RESTRICTION ON THE USE OF LAND
- ⑧ RIGHT OF ACCESS 4 WIDE
- ⑨ EASEMENT TO DRAIN SEWAGE 2.4 WIDE

LINE SCHEDULE

No.	BEARING	DISTANCE	ARC	RADIUS
1	123°51'42"	62.513	83.19	87.625
4	122°37'35"	84.803	87.0	77.31
10	54°4'05"	33.485	28.985	24.19
11	144°08'30"	4.21	-	-
12	190°24'30"	8.92	-	-
13	150°24'30"	4.0	-	-
14	180°24'30"	7.187	-	-
15	232°52'55"	4.51	-	-
16	97°53'30"	7.845	-	-
18	145°59'40"	4.10	-	-
19	238°58'05"	4.745	-	-
23	338°59'35"	3	-	-

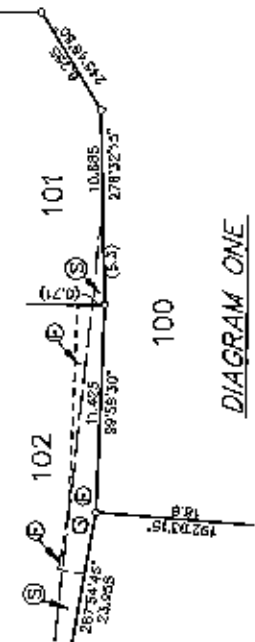


DIAGRAM ONE
1:200

LAND TO BE ACQUIRED

Surveyor: MARCEL L CRAIG Date of Survey: 18th February 2016 Surveyors Ref: 103273	PLAN OF SUBDIVISION OF LOT 682 DP 568678 & LOT 705 DP 613681	LOK SHAMHARI Locality: MARYANA Subdivision No. Length in m unless indicated: 1:400	REGISTERED DP
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10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000