Public Works
NSW Water Solutions

Nambucca Shire Council
Integrated Water Cycle Management Strategy
Scenario 4 Analysis Paper (Final)

October 2010

Foreword

This document has been prepared by the NSW Public Works for Nambucca Shire Council. Public Works acknowledges the assistance provided by the staff of Nambucca Shire Council and NSW Office of Water in providing information pertinent to the preparation of this Paper.

The NSW Water Solutions project team members involved in this study were:

- John Stanmore
- Roshan Iyadurai

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1 Introduction

Nambucca Shire Council (NSC) and the local community have (since 2007) been working towards the preparation of an Integrated Water Cycle Management (IWCM) Strategy. The IWCM Strategy is a long term plan (40 years in this instance) and was completed in November 2009 following an extensive broader community consultation process. The IWCM Strategy evaluated four scenarios for future upgrade and management of NSC's water supply and sewerage services and based on a triple bottom line (TBL) analysis identified a preferred scenario. The preferred scenario (referred to as IWCM Scenario 3) was adopted 'in-principle' by NSC at its ordinary Council meeting in November 2009.

The recent global economic event, associated downturn in development activities, and availability of newer data and knowledge meant some of the key input parameters of the adopted scenario have changed prompting NSC to undertake this review. Thus the increased financial constraints on NSC resources and the reduced community affordability prompted NSC to subject the preferred scenario to a Value Management Study (VMS) process (See Appendix F for VMS outcomes). The VMS examined an alternative Scenario (referred to as IWCM Scenario 4) with staging options that addresses all of the IWCM issues while minimising the financial impact. This scenario incorporates a revised capital works program that is timed to suit the projected 1% annual population growth rate. This Paper summarises the findings of this review.

2 IWCM Strategy Scenarios

2.1 Adopted IWCM Strategy Scenario

The IWCM Strategy Scenario adopted by NSC was based on an average population growth of about 2% across the serviced areas. The adopted IWCM Strategy Scenario consists of the following major water supply and sewerage works:

- Update existing and develop new plans and management systems to effectively and sustainably manage the water services into the future;
- Enhanced residential tune-up retrofit program consisting of the Basic residential tune-up retrofit program measures plus additional measures such as micro-irrigation, water efficient washing machine and cistern replacement units targeting 50% of existing residences with 75% rebate from NSC;
- Non-residential water efficiency program targeting both the NSC premises and other high water users;
- Enhanced system leakage reduction program consisting of mains replacement, improved response time, telemetry, metering and pressure management;
- Rain water tank (RWT) refit program targeting 50% of existing homes with 90% rebate from NSC;
- Grey water rebate program targeting 5% of homes with 50% rebate from NSC;
- Upgrade the distribution mains from Wirimbi Junction to Pacific Highway near Nambucca Heads and the PRV north of Nambucca River at Macksville (2025);

- Upgrade the distribution main from South Macksville to Scotts Head (2025);
- Construct a new reservoir and main from each of the urban growth areas (2016);
- 5,000 ML off-river storage on the upper reaches of Bowra Creek with provision in the storage foundation and embankment for future raising to the ultimate capacity of 14,000ML and an additional 40 ML/d borefield capacity along Nambucca River and South Creek;
- Opportunity WTP1 with comprehensive and effective catchment management plan including fencing and river bank stabilisation (up to 4 km), well-head protection and storage management plans and storage aerators and build a 16.75 ML/d WFP in 2023 but allow for the immediate collection of developer charges;
- BASIX compliance with harvesting of roof water into rainwater tanks for all new developments in existing urban areas only;
- Inflow and infiltration reduction measures for high, medium and low priority SPS catchments in all sewerage schemes;
- Optimise current Bowraville sewage plant performance and build a new plant by 2015 (Opportunity B3);
- Optimise current Macksville STP operation by operating at high MLSS during peak load periods and then add a new reactor by 2017 (Opportunity M1);
- Upgrade existing Scotts Head STP capacity to 3,500EP through chemical dosing and adding a reactor in 2011 plus provide a sewer mining plant and reclaimed water reuse system for the south Scotts Head release area for BASIX compliance (Opportunity SH1);
- Upgrade existing Nambucca Heads STP capacity to 18,000EP in stages (10,000EP reactor in 2009 and 3,000EP reactor in 2028) plus provide a sewer mining plant and reclaimed water reuse system for the Valla Urban Growth area for BASIX compliance (Opportunity NH1); and
- Centralised reuse with treated wastewater from the Macksville STP for Macksville Park, High School Playing Fields and Golf course.

The total capital and present value cost of the adopted IWCM strategy scenario over the 40 year planning period was $195.4M and $166.4M respectively. The typical residential bill for water and sewerage was $542 and $685 respectively with developer charges of $9,120 and $9,300 respectively.

2.2 IWCM Strategy Scenario 4

The Adopted IWCM Strategy Scenario (Scenario 3) was reviewed at a Value Management Workshop in May 2010. One outcome from this review was the formulation of an additional IWCM Strategy Scenario, Scenario 4. The key driver for examining an additional Scenario for IWCM was one of affordability and staging of works. Council are constrained financially and were keen to examine an alternative Scenario that addressed all of the IWCM issues while minimising the financial impact. Scenario 4 is outlined below.

- Update existing and develop new plans and management systems to effectively and sustainably manage the water services into the future;

- Enhanced residential tune-up retrofit program consisting of the Basic residential tune-up retrofit program. The rebate offered by NSC over 10 years of the program would be capped at $3.8M;
- Non-residential water efficiency program targeting both the NSC premises and other high water users;
- Enhanced system leakage reduction program consisting of mains replacement, improved response time, improved telemetry, metering and pressure management. The cost of measures to improve leakage performance would be capped at $1M;
- Rainwater tank (RWT) refit program. The NSC expenditure for this program would be capped to $2M assuming tanks were connected to an outside tap and one toilet;
- Upgrade section of the distribution mains from Wirimbi Junction to Kingsworth off take near Nambucca Heads;
- Construct a new reservoir and main for each of the urban growth areas (2016);
- 4,500 ML off-river storage on the upper reaches of Bowra Creek with provision in the storage foundation and embankment for future raising to the ultimate capacity of 14,000ML
- Augment the existing borefield with up to 5ML/d bore capacity on Nambucca River alluvial aquifer and then expand the borefield by adding about 10ML/d of capacity by 2018 by tapping into South Creek alluvial aquifer;
- Implement comprehensive and effective catchment management plan including fencing and river bank stabilisation (up to 4 km), well-head protection and storage management plans and storage aerators and review the need for water filtration plant (WFP) on a regular basis in the future;
- BASIX compliance with harvesting of roof water into rainwater tanks for all new developments in existing urban areas only;
- Inflow and infiltration reduction measures for high, medium and low priority SPS catchments in all sewerage schemes;
- Optimise current Bowraville sewage plant performance and build a new plant by 2025;
- Optimise current Macksville STP operation by operating at high MLSS during peak load periods and then add a new reactor by 2029;
- Upgrade existing Scotts Head STP capacity through chemical dosing and increased aeration and then add a reactor in 2020 plus provide a sewer mining plant and reclaimed water reuse system for the south Scotts Head release area for BASIX compliance;
- Upgrade existing Nambucca Heads STP capacity to 18,000EP in stages (10,000EP reactor in 2009 and 3,000EP reactor in 2030) plus provide a sewer mining plant and reclaimed water reuse system for the Valla Urban Growth area for BASIX compliance; and
- Investigate the possibility of a centralised reuse system with treated wastewater from the Macksville STP for Macksville Park, High School Playing Fields and Golf course, and adjoining wetlands and pastures.

Figure 1 outlines the impact on the Scenario 4 IWCM measures on water demand (annual dry year) and subsequent headwork (storage) requirements.

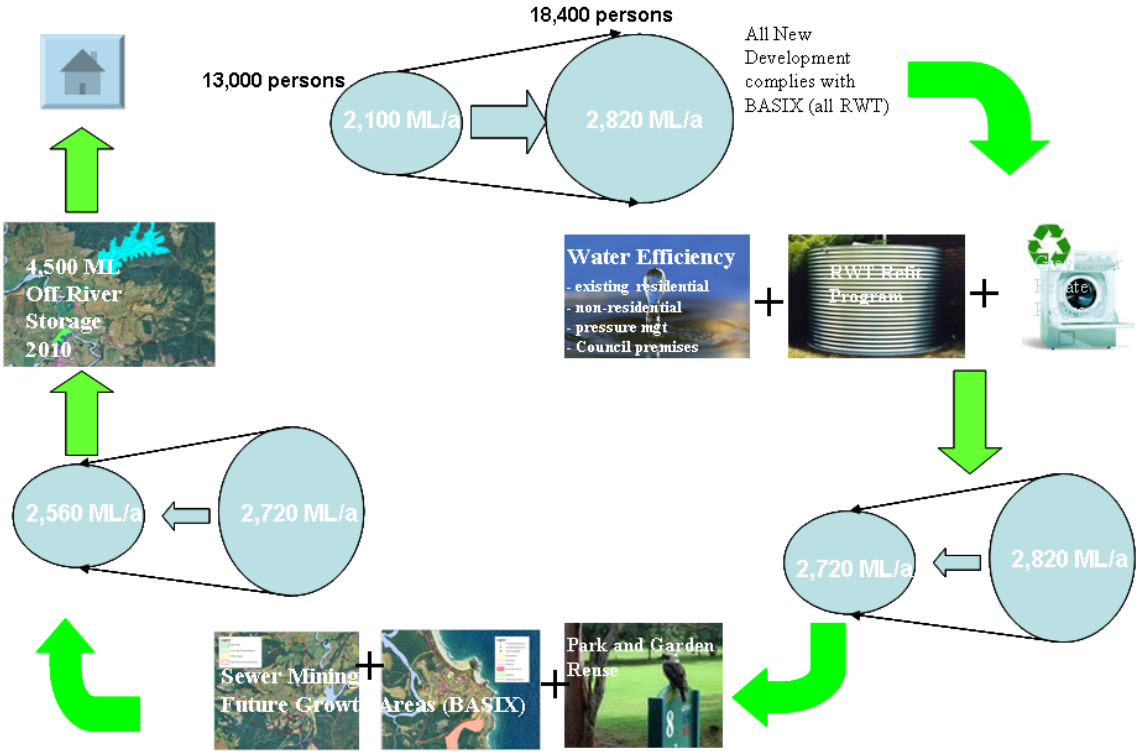


Figure 1 Impact of IWCM Scenario 4 Measures on Water Demand

3 Review of Key Input Parameters

3.1 Population and Tenement Growth

As indicated earlier the annual population growth rate used for the adopted IWCM Strategy Scenario was an average 2%. To establish a coherent IWCM Strategy the location and the rate of growth for each location was established based on the NSC Structure Plan and other NSC planning documents.

It is noted that the NSW Department of Planning recently released population projections for each Statistical Local Area in NSW (including Local Government Areas and Regional Strategy Areas) (Ref. 1). These projections suggest an annual population growth rate of about 0.4% for NSC, a significantly lower growth rate than adopted for the IWCM Strategy. NSC has requested that an annual population growth rate of 1% be adopted for development of this scenario.

Table 1 presents the assumptions used in spatially distributing the future population and development in the 2%, 1% and 0.4% growth rates.

Table 1 Spatial Distribution of Population Assumptions for Each Growth Rate

Future / Existing	Urban Area	2%	1%	0.4%
Future Release	All	Area specific HHS Fixed at 2006 Levels	Area specific HHS Fixed at 2006 Levels	Area-specific HHS decreased in line with regional projections
	Valla Urban Growth Area (was Boggy / Cow Creek)	70% of land in future urban release areas will be occupied over a 20-year time frame (start 2017)	15% of land in future urban release areas will be occupied over a 30-year time frame (start 2017)	10% of land in future urban release areas will be occupied over a 30-year time frame (start 2017)
	South Valla Beach	Removed	Removed	Removed
	South West Macksville	Removed - Growth in the DCP 17 area is considered sufficient to meet Macksville's needs. 70% of 570 lots occupied over 40 years	Removed - Growth in the DCP 17 area is considered sufficient to meet Macksville's needs. 50% of 570 lots occupied over 40 years	Removed - Growth in the DCP 17 area is considered sufficient to meet Macksville's needs. 40% of 570 lots occupied over 40 years
	South Scotts Head	70% of land in future urban release areas will be occupied over a 20-year time frame (start 2017). 100% occupied by 2046.	30% of land in future urban release areas will be occupied over a 15-year time frame (start 2017). 50% occupied by 2046.	20% of land in future urban release areas will be occupied over a 30-year time frame (start 2017).
Existing Urban Areas	All	Area specific HHS Fixed at 2006 Levels	Area specific HHS Fixed at 2006 Levels	Area-specific HHS decreased in line with regional projections
	DA Approved Lots	100% occupancy up over 10 years (start 2008)	80% occupancy up over 20 years (start 2008)	50% occupancy up over 20 years (start 2008)
	Vacant Lots	100% occupancy up over 10 years (start 2008)	80% occupancy up over 40 years (start 2008)	40% occupancy up over 40 years (start 2008)
	Potential Development (un-subdivided land)	70% of land occupied over planning horizon (13 lots / Ha)	30% of land occupied over planning horizon (13 lots / Ha)	10% of land occupied over planning horizon (13 lots / Ha)
	Infill - Redevelopment (Nambucca Heads Only)	200 Units redevelopment over 20 years (start 2009)	200 Units redevelopment over 20 years (start 2009)	200 Units redevelopment over 20 years (start 2009)

The assumptions in Table 1 suggest that with the lower growth rates the footprint of new release areas of Valla Urban Growth Area and South Scotts Head will be smaller than originally anticipated. The demographic and water cycle projections for the 1% growth rate are presented in the main body of this report while Appendix A shows the relevant projections for the 2% and 0.4% growth rates.

Table 2 presents the projected population (for the 1% growth rate) that would be connected to the Nambucca District Water Supply (NDWS) over the next forty years on a spatially distributed scale and the un-serviced population within the NSC Local Government Area that would depend on the water scheme during low rainfall periods.

Table 2 Projected Permanent Population Serviced by the NDWS

1% p.a.									
Population Centre	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville	992	999	1,007	1,016	1,025	1,027	1,027	1,027	0.1%
Macksville	2,705	2,839	3,006	3,173	3,341	3,459	3,551	3,734	1.0%
Scotts Head	804	868	940	1,197	1,343	1,466	1,569	1,775	3.0%
Nambucca Heads	5,984	6,146	6,348	6,550	6,752	6,926	7,092	7,425	0.6%
Valla Beach (existing) + Hyland Park	1,486	1,551	1,631	1,712	1,792	1,852	1,905	2,012	0.9%
Valla Urban Growth Area	0	0	0	232	464	558	651	838	-
Rural	1,069	1,164	1,297	1,417	1,486	1,492	1,499	1,512	1.0%
Total Serviced	**13,040**	**13,566**	**14,229**	**15,298**	**16,204**	**16,779**	**17,294**	**18,323**	**1.0%**
Not Connected	5,179	5,223	5,282	5,354	5,436	5,525	5,614	5,792	0.3%
Shire	**18,219**	**18,788**	**19,512**	**20,653**	**21,640**	**22,304**	**22,908**	**24,115**	**0.8%**

Note – South Scotts Head growth rate is included along with Scotts Head growth rate.

Table 3 presents the projected growth (for the 1% growth rate) in permanent equivalent tenements that would be connected to the NDWS Scheme over the next forty years on a spatially distributed scale. Equivalent tenements (ET) convert residential and non-residential hydraulic loads into a consistent measure.

Table 3 Projected Permanent Equivalent Tenements Serviced by the NDWS

1% p.a.									
Population Centre	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville	435	438	441	445	448	449	449	449	0.1%
Macksviile	1,526	1,669	1,855	2,000	2,093	2,142	2,179	2,255	1.2%
Scotts Head	389	424	467	586	647	701	753	840	2.9%
Nambucca Heads	3,169	3,247	3,346	3,441	3,535	3,615	3,692	3,846	0.5%
Valla Beach (existing)	680	728	778	818	851	874	896	939	1.0%
Valla Urban Growth	0	0	0	97	194	233	272	350	-
Rural (all)	938	951	966	975	981	984	987	993	0.1%
Total	**7,137**	**7,456**	**7,854**	**8,363**	**8,749**	**8,999**	**9,228**	**9,672**	**0.9%**

Table 4 shows the projected equivalent permanent and peak populations (for the 1% growth rate) that would be connected to the sewerage schemes over the next forty years. Equivalent population (EP) converts residential and non-residential biological loads into a consistent measure. EP determines the biological capacity of a sewage treatment plant.

Table 4 Projected Permanent Population Serviced by the Sewerage Schemes

Population Centre	Type	2006	2011	2016	2021	2026	2031	2036	2046	Growth %p.a.
Bowraville STP	Permenent EP	1,207	1,214	1,222	1,231	1,240	1,242	1,242	1,242	0.1%
	Peak EP	1,237	1,244	1,253	1,262	1,271	1,273	1,273	1,273	0.1%
Macksville STP	Permenent EP	3,611	4,029	4,563	4,939	5,165	5,284	5,375	5,558	1.3%
	Peak EP	4,207	4,633	5,175	5,559	5,795	5,920	6,017	6,212	1.2%
Scotts Head STP	Permenent EP	942	1,020	1,121	1,214	1,286	1,340	1,387	1,445	1.3%
	Peak EP	1,867	1,989	2,139	2,282	2,404	2,493	2,559	2,657	1.1%
South Scotts Head Sewer Mining	Permenent EP	0	0	0	186	259	332	406	554	
	Peak EP	0	0	0	186	259	332	406	554	-
Nambucca Heads STP	Permenent EP	9,331	9,633	10,028	10,356	10,639	10,872	11,092	11,533	0.6%
	Peak EP	13,618	14,036	14,486	14,869	15,208	15,486	15,750	16,277	0.5%
Valla Urban Growth Area Sewer Mining	Permenent EP	0	0	0	232	464	558	651	838	
	Peak EP	0	0	0	232	464	558	651	838	-
Total Serviced	**Permenent EP**	**15,090**	**15,897**	**16,934**	**18,158**	**19,054**	**19,628**	**20,153**	**21,170**	**1.0%**
	Peak EP	**20,929**	**21,902**	**23,053**	**24,391**	**25,401**	**26,061**	**26,656**	**27,811**	**0.8%**

Table 5 shows the projected permanent and peak equivalent tenements (for the 1% growth rate) that would be connected to the sewerage schemes over the next forty years.

Table 5 Projected Permanent Equivalent Tenements Serviced by the Sewerage Schemes

1% p.a.										
Sewerage Scheme	**Type**	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville STP	Permenent ET	445	448	451	455	458	459	459	459	0.1%
	Peak ET	447	450	453	457	460	461	461	461	0.1%
Macksville STP	Permenent ET	1,408	1,572	1,782	1,932	2,024	2,073	2,110	2,185	1.4%
	Peak ET	1,550	1,716	1,927	2,080	2,175	2,224	2,263	2,341	1.3%
Scotts Head STP	Permenent ET	393	427	471	512	543	567	586	611	1.4%
	Peak ET	632	680	738	794	840	873	899	936	1.2%
South Scotts Head Sewer Mining	Permenent ET	0	0	0	76	106	136	166	227	-
	Peak ET	0	0	0	76	106	136	166	227	-
Nambucca Heads STP	Permenent ET	3,930	4,060	4,227	4,369	4,492	4,594	4,691	4,884	0.6%
	Peak ET	4,862	5,021	5,199	5,351	5,485	5,595	5,699	5,908	0.5%
Valla Urban Growth Area Sewer Mining	Permenent ET	0	0	0	97	194	233	272	350	-
	Peak ET	0	0	0	97	194	233	272	350	-
Total Serviced	**Permenent ET**	**6,176**	**6,507**	**6,931**	**7,440**	**7,818**	**8,061**	**8,285**	**8,716**	**1.0%**
	Peak ET	**7,491**	**7,866**	**8,318**	**8,854**	**9,259**	**9,522**	**9,761**	**10,222**	**0.9%**

3.2 Growth in Urban Water Use and Discharge

The expected increase in population would correlate to a growing demand for water, which will consequently result in an increase of treated wastewater and urban stormwater.

Table 6 shows the projected average year and dry year demands for both the adopted IWCM Strategy Scenario (Scenario 3) and the additional IWCM Strategy Scenario (Scenario 4) based on the 1% growth numbers in Table 2 and Table 3.

Table 6 Projected Annual Demands for the NDWS

Year		2006	2011	2016	2021	2026	2031	2036	2046
Average Year (ML)	Scenario 3 - 1%	1,875	1,756	1,746	1,861	1,981	2,052	2,111	2,179
	Scenario 4 - 1%	1,875	1,792	1,811	1,927	2,038	2,108	2,169	2,254
Dry Year (ML)	Scenario 3 - 1%	2,124	2,013	2,018	2,141	2,268	2,344	2,408	2,486
	Scenario 4 - 1%	2,124	2,042	2,068	2,197	2,319	2,397	2,464	2,561

Figure 2 shows the projection of Dry Year Demand based on the numbers in Table 6.

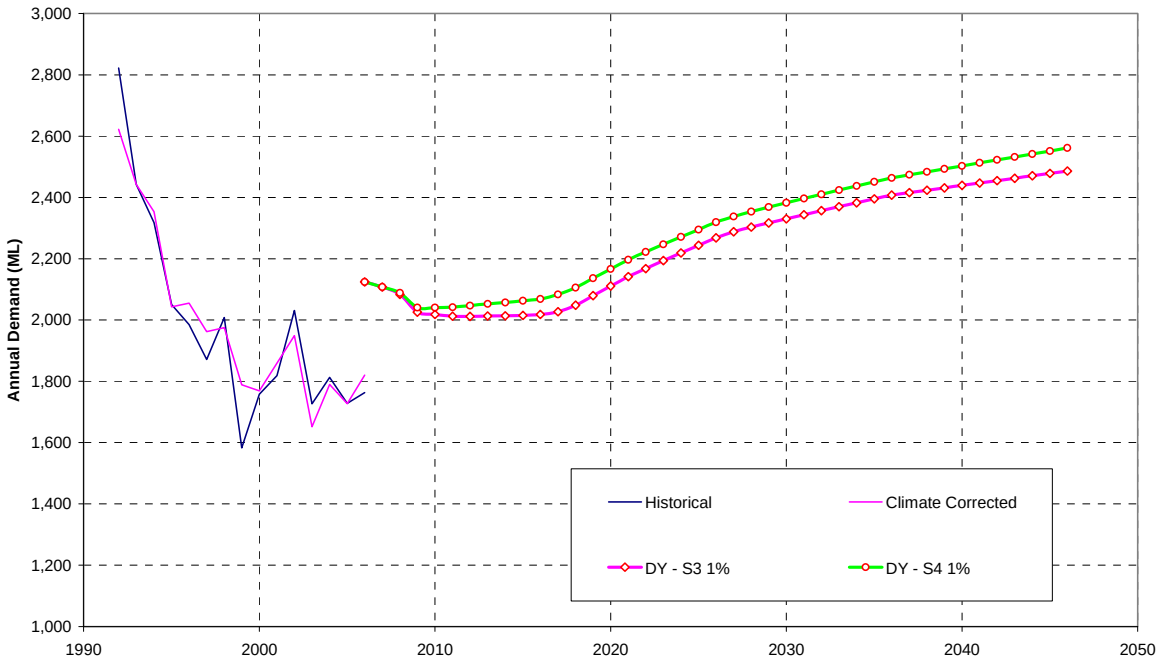


Figure 2 Projected Dry Year Demands

Table 7 shows the projected peak day demand for both the adopted IWCM Strategy Scenario (Scenario 3) and the additional IWCM Strategy Scenario (Scenario 4) based on the growth numbers in Table 2 and Table 3.

Table 7 Projected Peak Day Demands for the NDWS

Year	2006	2011	2016	2021	2026	2031	2036	2046
Scenario 3 - 1%	11.44	10.92	10.80	11.28	11.95	12.34	12.66	13.26
Scenario 4 - 1%	11.44	11.11	11.31	11.88	12.47	12.83	13.13	13.74

Table 8 shows the wastewater flows for both the adopted IWCM Strategy Scenario (Scenario 3) and the additional IWCM Strategy Scenario (Scenario 4) based on the growth numbers in Table 4 and Table 5.

Table 8 Projected Wastewater Flows for all Sewerage Schemes

Year		2006	2011	2016	2021	2026	2031	2036	2046
Scenario 3 - 1%	Inflow	1,686	1,618	1,508	1,513	1,598	1,647	1,694	1,775
	Reuse	118	120	112	121	131	137	142	152
	Discharge	1,568	1,498	1,396	1,392	1,466	1,510	1,552	1,623
Scenario 4 - 1%	Inflow	1,686	1,628	1,523	1,530	1,609	1,658	1,707	1,789
	Reuse	118	121	114	125	136	141	147	158
	Discharge	1,568	1,507	1,409	1,405	1,473	1,517	1,560	1,631

3.3 Infrastructure Implications

3.3.1 Stream Flow and Water Supply Headwork Sizing and Staging

Historically the combined South Creek and Nambucca River flows were recorded at Lane Bridge near Bowraville at the vicinity of the tidal limit. The flows recorded on this gauge (referred to as 'old gauge') together with flows synthesised using standard rainfall-runoff techniques was used in sizing the Nambucca District Water Supply headwork on a secure yield basis. However, in view of the concerns about the old gauge data due to it's tidal influence and sedimentation, NSW Office of Water (NOW) in the last three years has installed a new river flow gauge on Nambucca River upstream of the borefield and has indicated its intention of using the new gauge as the 'reference gauge' for all future river flow management. It is noted that unlike the old gauge at Lane Bridge which has many years of data and measures both the flows from Nambucca River and South Creek, the new gauge only has about three years of data and measures the flow in Nambucca River only.

In view of NOW's intention to use the new gauge as the 'reference gauge' and as secure yield analysis requires about 100^{+} years of data it became necessary to develop a relationship of the flows between the old and new gauges using the available data. Accordingly further hydrological analysis was undertaken to quantify (which is not easy due to uncertainties and lack of overlapping data) the flow contribution from Nambucca River arm. The hydrological analysis shows a wide range (53-85%) of potential stream flow contribution from the Nambucca River arm upstream of the Bowraville borefield (see Appendix C for details).

In view of the wide range it is recommended that the initial scheduling of the headwork upgrade be based on the relative catchment size of both the catchments as shown below and further monitoring and measurement of flows be undertaken at both gauges to further refine the flow characteristics and contribution from both the catchments. Appendix C also shows the infrastructure requirements at the headwork if the share of stream flow produced from the Nambucca River were closer to 80%.

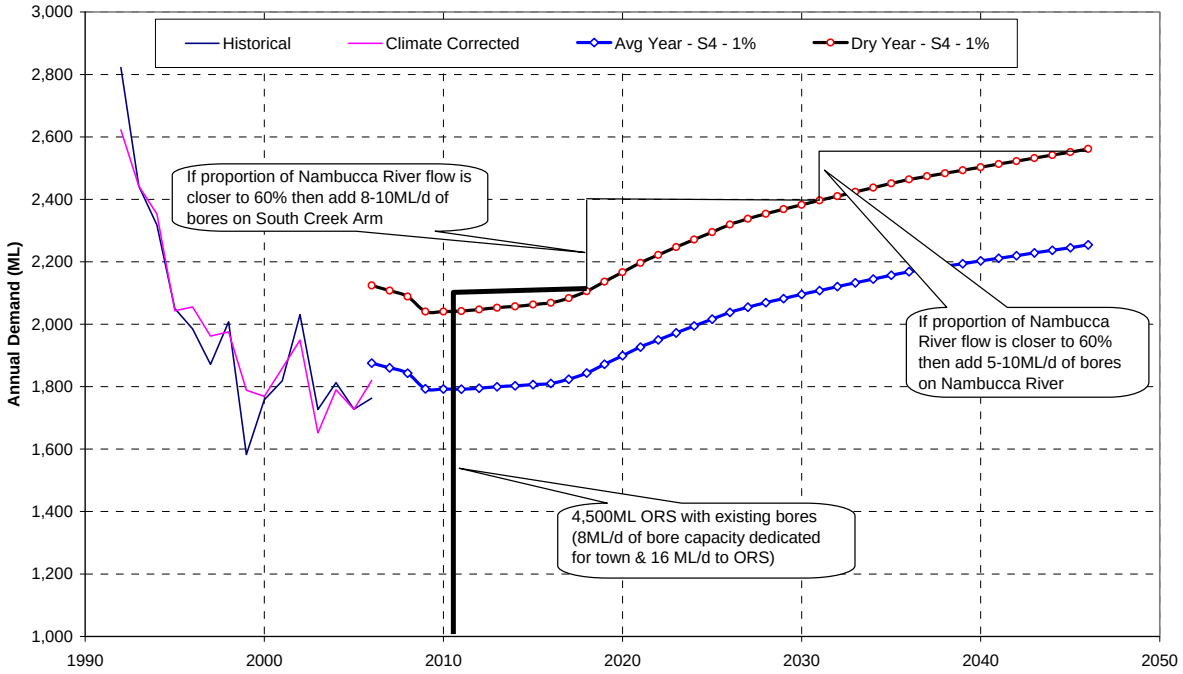


Figure 3 Scheduling of Headwork Upgrade

It is also recommended that the off-river storage (ORS) be built such that the foundation and embankment is capable of being upgraded to 14,000 ML. This gives a sufficient buffer against future risks e.g. climate change, population growth, environmental requirements, etc.

3.3.2 Security of Supply Design Criteria

As discussed in the IWCM Strategy security of supply is a measurement of the reliability of the water supply headwork, in this case the Bowraville alluvial borefield, during drought periods. Supply security or 'secure yield' is considered to be adequate when reasonable customer demands can be met on most occasions without restrictions. The NSW Government has defined 'secure yield' as the maximum supply rate that can be maintained by the supply system without exceeding the '5/10/20' rule (NSW Government, Water Supply and Sewerage Management Guidelines, 1991). Analysis of restricted demands during recent droughts suggests that due to increased uptake of water efficient fixtures/appliances, decrease in water wastage and use, it is becoming harder to achieve the anticipated 20% reduction in demands with restrictions, referred to as 'demand hardening'. In view of 'demand hardening' and anticipated increases in evapotranspiration due to climate change, Office of Water (NOW) is revising the secure yield rule to 5/10/10. Council at the Value Management workshop adopted the revised rule and hence the headwork size and staging proposed in Figure 3 above are based on this revised secure yield rule.

3.3.3 Adaptation to Climate Change

The impact of climate change on the water supply headwork and on the sewerage system was outlined for the preferred Scenario 3 in the IWCM Strategy. Although no further analysis of the impact of climate change was undertaken for this Scenario 4, the impacts are expected to be similar. It is however noted that the NOW Pilot Study using the proposed "Draft Secure Yield and Climate Change Guidelines - 2010" has shown (albeit for a 5,500ML ORS and 40ML/d borefield to storage transfer rate) that secure yield actually increases slightly under a climate change scenario in the Nambucca.

One of the main drivers for developing Scenario 4 was to find an acceptable means of reducing the overall cost of the IWCM strategy over 40 years and in particular the initial cost of the ORS and borefield, in an endeavour to address strategy affordability concerns and financial impact on ratepayers. As a result NSC is proposing to secure its water supply based on the previous 100^{+} years of climate data, acknowledging that there is what Council considers an acceptable level of risk that the infrastructure could require upgrading earlier than designed as a result of climate change impacts.

As recommended elsewhere in this report, the building of the ORS with capability in the foundation and embankment to upgrade to 14,000ML in the future is Council's key risk management strategy as insurance against climate change. This risk management approach provides Council with a vastly improved level of water security that can be managed during emergencies and the ability to develop with confidence a drought contingency strategy with potentially higher demand reduction measures to accommodate the progressive increase in climate change impacts. Furthermore this approach provides NSC sufficient lead-time to develop a longer term headwork strategy in the future incorporating emerging scientific knowledge on climate change, data on stream flows and demands and state of the art adaptation measures.

3.3.4 Sewage Treatment Plant Sizing and Staging

Figure 4 to Figure 7 inclusive show the projection of biological loads at the existing sewage treatment plants (STP) as well as the proposed sewer mining facilities at the Valla Urban Growth Area and South Scotts Head respectively. The projection of biological load (EP) determines the need for treatment capacity upgrade, and this is also displayed in Figure 4 to Figure 7 inclusive.

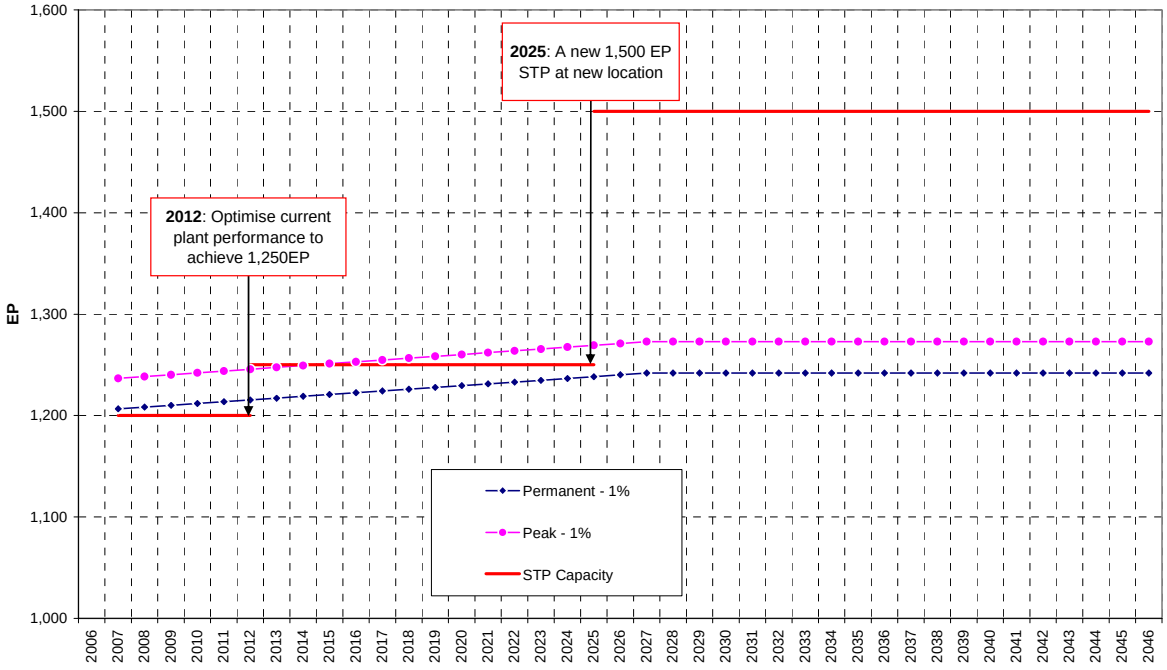


Figure 4 Projected Biological Load for Bowraville STP

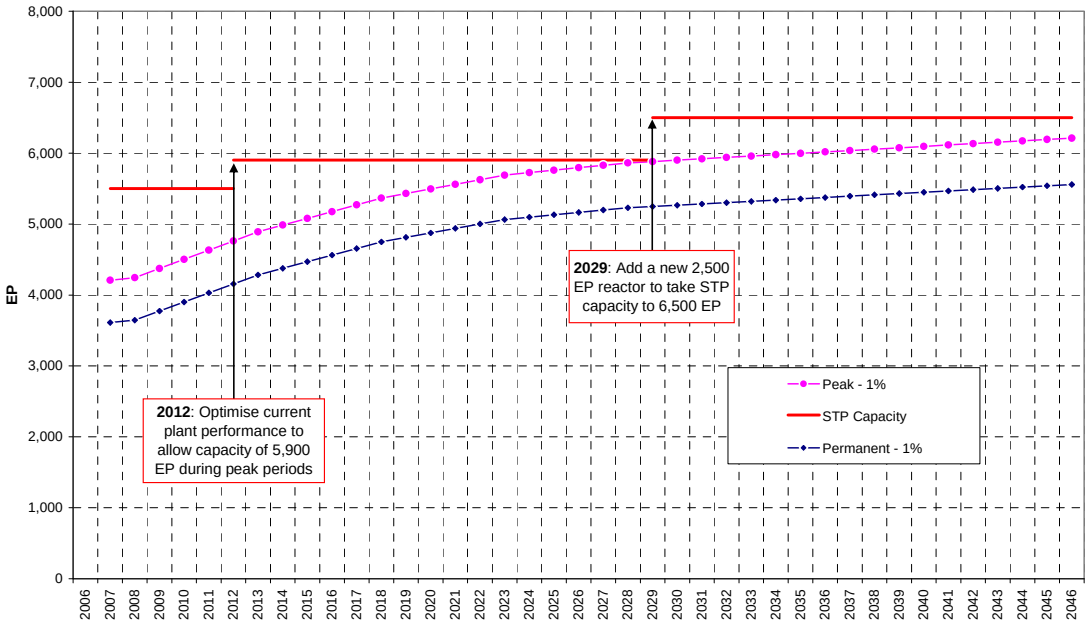


Figure 5 Projected Biological Load for Macksville STP

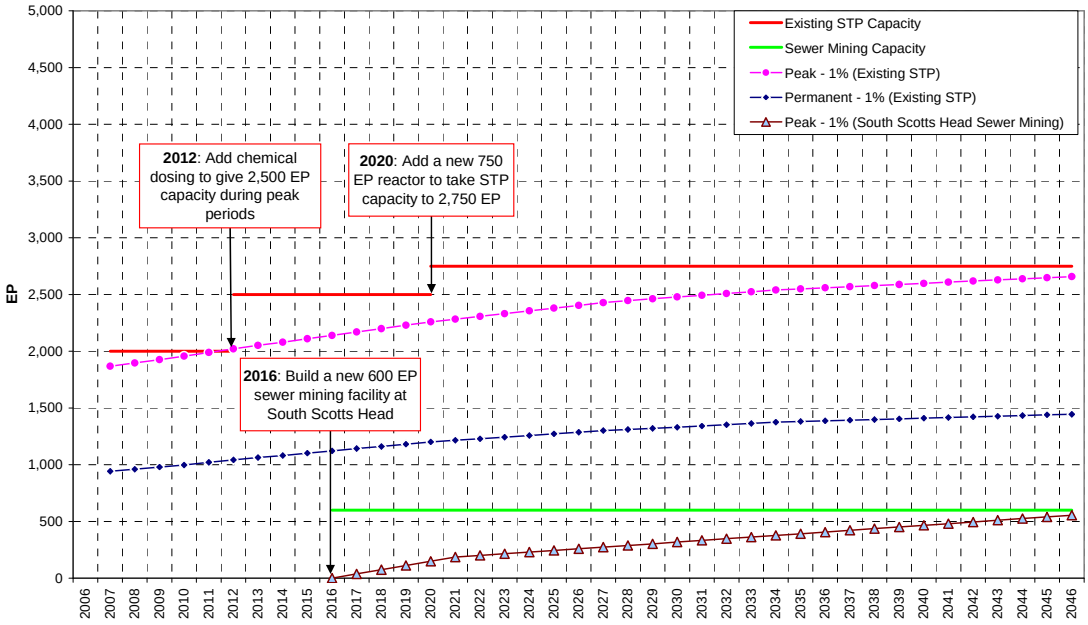


Figure 6 Projected Biological Loads for Scotts Head STP and Sewer Mining at South Scotts Head

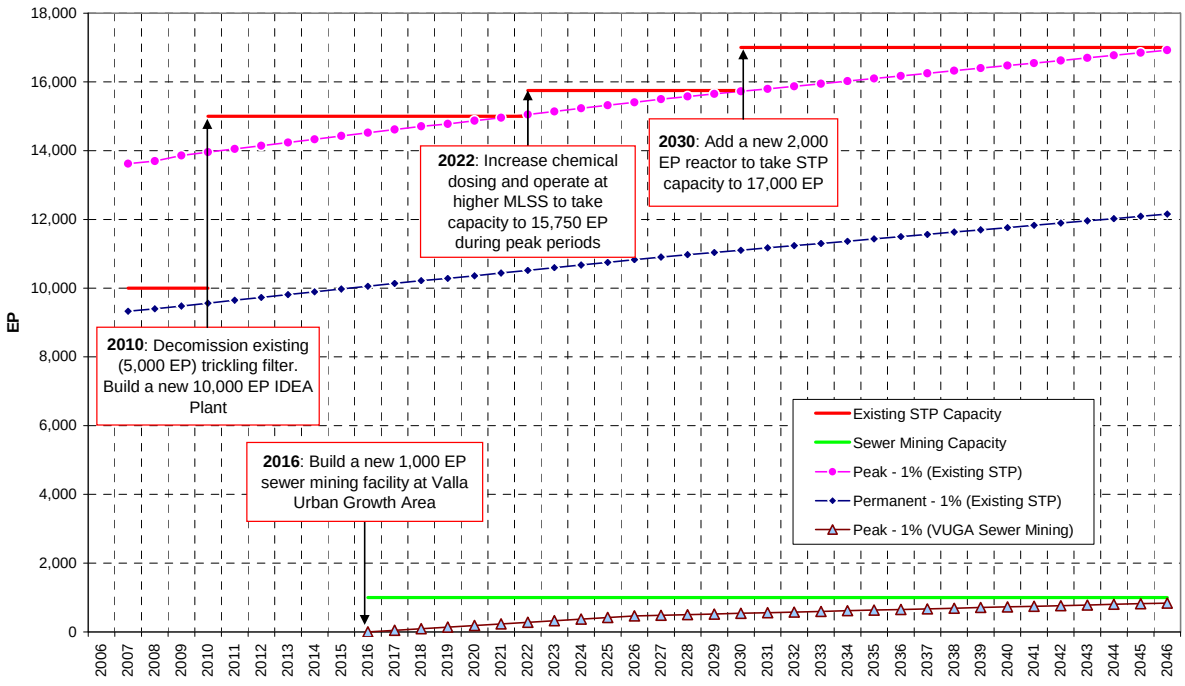


Figure 7 Projected Biological Loads for Nambucca Heads STP and Sewer Mining at Valla Urban Growth Area

4 Present Value and TBL Assessment

4.1 Present Value Analysis of IWCM Scenarios

Table 9 presents the summary of the estimated total cost of capital outlay and the present value of the capital and the operating, maintenance and administration (OMA) cost estimates over the 40 years for the water supply service in each IWCM scenario based on 2009/10 dollars. The costing details are presented in Appendix B.

Table 9 Summary of Capital and Present Value Costs for the IWCM Scenarios – Water Supply Service Component

Scenario	Total Capital Cost (over the 40 years)	Present Value of Capital Cost @ 7%	Total Present Value @ 7%
Scenario 3 – 2%	105.4M	68.3M	89.3M
Scenario 3 – 1%	85.3M	58.6M	79.6M
Scenario 4 – 1%	67.5M	51.2M	60.9M

Table 10 presents the summary of the estimated total cost of capital outlay and the present value of the capital and the operating, maintenance and administration (OMA) cost estimates over the 40 years for the sewerage service in each IWCM scenario based on 2009 dollars. The costing details are presented in Appendix B.

Table 10 Summary of Capital and Present Value Costs for the IWCM Scenarios – Sewerage Service Component

Scenario	Total Capital Cost (over the 40 years)	Present Value of Capital Cost @ 7%	Total Present Value @ 7%
Scenario 3 – 2%	84.3M	60.4M	77.2M
Scenario 3 – 1%	71.5M	48.6M	62.6M
Scenario 4 – 1%	69.3M	43.3M	57.3M

4.2 Typical Residential Bill Assessment of IWCM Scenarios

Table 9 and Table 10 show the annual typical residential bill (TRB) and developer charges for the water supply and sewerage services respectively.

Table 11 Annual TRB and Developer Charges of IWCM Scenarios – Water Supply

Scenario	Developer Charges per ET from 2009/10 Onwards ($)	40-Year Capital and Renewal Cost ($M)	Present Value of Capital & Renewal Cost ($M)	Typical Residential Bill from (09/10) ($)	Internal Funding for New Capex during next 5 Years ($M)	External Borrowing for New Capex during next 5 years ($M)
Scenario 3 – 2%	9,120	122.1	73.3	542	9.6	30.0
Scenario 3 – 1%	10,665	100.0	62.9	673		25.0
Scenario 4 – 1%	9,510	79.4	55.3	495	7.8	20.0

Note – As requested at the VMS the energy prices in Scenario 4 have been increased by about 18% p.a. for first 3 yrs and thereafter by about 4% p.a. for future forecasts. The TRB for Scenario 4 assumes subsidy/government grant of $16.1M for the forecast period.

Table 12 Annual TRB and Developer Charges of IWCM Scenarios – Sewerage

Scenario	Developer Charges from 2009/10 Onwards	40-Year Capital and Renewal Cost ($M)	Present Value of Capital & Renewal Cost ($M)	Typical Residential Bill from (09/10) ($)	Internal Funding for New Capex during next 5 Years ($M)	External Borrowing for New Capex during next 5 years ($M)
Scenario 3 – 2%	9,300	116.6	71.5	685	14.3	20.0
Scenario 3 – 1%	10,820	99.3	60.0	683		25.0
Scenario 4 – 1%	11,818	100.1	52.3	687	8.6	0.5

Note – As requested at the VMS the energy prices in Scenario 4 have been increased by about 18% p.a. for first 3 yrs and thereafter by about 4% p.a. for future forecasts. The TRB for Scenario 4 assumes subsidy/government grant of $4.7M for the forecast period.

Table 11 shows that the typical residential bill (TRB) of Scenario 4 water component would have to increase by about $124 from the current annual level of $371, which is significantly lower than the increases predicted in Scenario 3. The lower TRB in Scenario 4 is due to the lower upfront capital cost associated with the ORS and borefield.

Table 12 shows that the typical residential bill (TRB) of Scenario 4 sewerage component would have to increase by about $272 from the current annual level of $415.

Analysis suggests that the water and sewerage TRB is sensitive to annual borrowing interest rate and the borrowing interest rates are highly variable depending on the period of loan. For instance a 1% increase in the borrowing interest rate could increase the total TRB by about $50. In view of this it is recommended that NSC evaluate alternative borrowing and risk management options in addition to the traditional long term (30 years) borrowing options from a financial institution.

As requested at the VMS the option of staging the increase in TRB over a period of years was briefly reviewed by increasing the borrowings to meet the revenue shortfalls to pay for the upfront capital costs. Given the current and forecasted lending environment a staged increase to TRB may not be the appropriate direction for NSC as this has the potential to further increase the borrowing interest rates and consequently the TRB.

4.3 Triple Bottom Line Analysis of IWCM Scenarios

Table 13 Summary of TBL Analysis

Scenario	Environmental Score	Social Score	Environmental and Social Score (ESS)	Present value @ 7% ($M) – Water and Sewer	ESS / PV	Rank
Scenario 3 – 2%	4.08	4.56	8.63	$182.60	0.0473	3
Scenario 3 – 1%	3.65	4.06	7.71	$157.80	0.0489	2
Scenario 4 – 1%	3.59	4.06	7.65	$131.30	0.0583	1

Table 13 shows that although Scenario 4 has the lowest ESS score, it is ranked ahead of Scenario 3 (1% & 2% growth rates) due to its lower present value cost. The scoring details are included as Appendix E.

5 Scenario Implementation

Table 14 provides the time frame associated with the Scenario 4 – 1% IWCM scenario. This time frame was used to project the cash flow in the financial modelling. The actual time frame however would depend on funding availability and the extent of work involved in subsequent investigation, community consultation and environmental impact assessment stages. Reporting years have been chosen when the sum of the infrastructure capital cost is greater than $1M. Appendix D shows the implementation of major works for Scenario 3 under 2% and 1% growth rate respectively.

Table 14 Integrated Scenario 4 – 1% Timeframe for Implementation of Major Works Greater than $1M

Scenario	System	Infrastructure	Year Required	Total Capital Cost ($M)
Integrated 4 – 1%	Water Supply	WTP1 – Implement a comprehensive and effective catchment management plan including fencing and river bank stabilization (up to 4 km). Implement a well-head protection plan and storage aerators and storage management plan. HW1 - Build an off-rive storage of 4,500 ML capacity and augment borefiield with up to 5ML/d capacity in Nambucca River alluvial aquifer	2010 (expected to be complete by end 2013)	$50.2
		Construct new 0.5 ML reservoir south of Scotts Head to service Urban Release area Construct 150mm main to supply new reservoir from replacement Scotts Head Trunk main near the existing Scotts Head reservoir Construct a new 0.7 ML reservoir on the Western side of the Valla Urban Growth Area Construct 150mm main from the Nambucca trunk main at the Pacific Highway to the new Valla Urban Growth Area Reservoir Construct a booster pumping station in the new main (servicing the Valla Urban Growth Area Reservoir) with a capacity of approximately 8.5 L/s @ 15m head South Scotts Head Recycled Water Scheme (Pump station, rising main and storage) Valla Urban Growth Area Recycled Water Scheme (Pump station, rising main and storage)	2016	$5.5
		Investigate a centralize Reuse Scheme from Macksville STP (parks and gardens) Expand borefield by adding about 10ML/d of capacity by tapping into South Creek alluvial aquifer	2018	$8.2
		Replace 375mm AC main from Wirimbi Junction to Pacific Highway with 450mm main	2030	$3.5
	Wastewater	Opportunity NH1 – Upgrade Nambucca Heads STP to 15,000 EP (10,000 EP Reactor) Upgrade Nambucca Heads SPS (1, 3, 6, 7 and 8) Upgrade Valla Beach SPS (5 and 7) New Macksville SPS (DCP17 – SPS 15)	2010 (all works in progress)	$21.2
		Option B3 – Optimise Bowraville STP operation and dose with coagulant chemicals Opportunity SH1 – Add chemical dosing facility to treat an additional biological capacity of up to 2,500 EP during peak periods Opportunity M1 – Optimise current Macksville STP operation New Macksville SPS (DCP17 – SPS 16) (year 2011) Increased emergency storage at Macksville SPS2 and SPS3 Upgrade Macksville SPS 4 and 13 (year 2015)	2012-15	$2.5
		Opportunity SH1 – New Sewer Mining Plant for South Scotts Head New South Scotts Head Urban Growth Area SPS Opportunity NH1 – New Sewer Mining Plant for Valla Urban Growth Area Opportunity NH1 – Upgrade inlet works at Nambucca Heads STP New Valla Beach SPS (7b and Valla Urban Growth Area)	2016	$16.5
		New overflow tank and rising main extension at Macksville SPS 16 South Nambucca Heads Sewer Augmentation	2017	$3.3
		Upgrade Macksville SPS 10 rising main New Macksville SPS (Nursing Home) Opportunity SH1 – Upgrade Scotts Head with an 750 EP Reactor	2020	$6.6
		Opportunity M1 – New 2,500 EP Macksville Reactor with tertiary filters	2029	$8.8
		Opportunity NH1 – New 2,000EP Nambucca Heads Reactor	2030	$6.7

6 References

1. NSW Department of Planning 2009. NSW Statistical Local Area Population Projections, 2006-2036
2. Commerce 2003. Nambucca District Water Supply – Drought Emergency Response Strategy. NSW Department of Commerce Report No. DC03058, April, 2003.
3. Commerce 2003. Nambucca District Water Supply – Drought Management Plan. NSW Department of Commerce Report No. DC03059, September, 2003.
4. Commerce 2007. Nambucca Integrated Water Cycle Management strategy – Stage 2 Strategy Study: Task 3 Paper Total Water Cycle Source and Needs Forecasting, December 2007.
5. Commerce 2007. Nambucca Integrated Water Cycle Management strategy – Stage 2 Strategy Study: Task 2 Paper Historical Demand Analysis, October 2007.
6. Commerce 2008. Nambucca Integrated Water Cycle Management strategy – Stage 2 Strategy Study: Task 5 Paper Bulk supply Analysis, October 2008.
7. Commerce 2007. Nambucca Integrated Water Cycle Management strategy, November 2009.

Appendix A Projections for other Growth Rates

A.1.1 Water Supply Population

2% p.a.									
Population Centre	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville	992	1,009	1,031	1,036	1,036	1,036	1,036	1,036	0.1%
Macksville	2,705	3,038	3,454	3,712	3,953	4,041	4,129	4,306	1.5%
Scotts Head	804	1,148	1,579	2,043	2,200	2,358	2,464	2,677	5.8%
Nambucca Heads	5,984	6,368	6,848	7,140	7,385	7,630	7,875	8,366	1.0%
Valla Beach (existing) + Hyland Park	1,486	1,710	1,990	2,085	2,135	2,186	2,236	2,336	1.4%
Valla Urban Growth Area	0	0	0	1,089	2,178	3,050	3,921	3,921	-
Rural	1,069	1,164	1,297	1,417	1,486	1,492	1,499	1,512	1.0%
Total Serviced	**13,040**	**14,438**	**16,199**	**18,523**	**20,374**	**21,793**	**23,160**	**24,151**	**2.1%**
Not Connected	5,179	5,223	5,282	5,354	5,436	5,525	5,614	5,792	0.3%
Shire	**18,219**	**19,661**	**21,481**	**23,877**	**25,810**	**27,318**	**28,774**	**29,943**	**1.6%**

0.5% p.a.									
Population Centre	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville	992	993	995	996	998	1,000	1,001	1,005	0.0%
Macksville	2,705	2,814	2,939	3,053	3,177	3,242	3,270	3,326	0.6%
Scotts Head	804	871	948	1,109	1,221	1,285	1,300	1,331	1.6%
Nambucca Heads	5,984	6,051	6,129	6,198	6,275	6,336	6,393	6,507	0.2%
Valla Beach (existing) + Hyland Park	1,486	1,517	1,552	1,584	1,619	1,642	1,662	1,703	0.4%
Valla Urban Growth Area	0	0	0	136	272	327	381	490	-
Rural	1,069	1,152	1,259	1,343	1,403	1,409	1,415	1,426	0.8%
Total Serviced	**13,040**	**13,398**	**13,821**	**14,420**	**14,966**	**15,240**	**15,423**	**15,788**	**0.5%**
Not Connected	5,179	5,232	5,306	5,393	5,477	5,566	5,656	5,835	0.3%
Shire	**18,219**	**18,630**	**19,127**	**19,813**	**20,443**	**20,806**	**21,079**	**21,623**	**0.5%**

A.1.2 Water Supply Equivalent Tenements

2% p.a.									
Population Centre	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville	435	442	451	453	453	453	453	453	0.1%
Macksviile	1,526	1,770	2,059	2,187	2,261	2,299	2,340	2,423	1.5%
Scotts Head	389	546	742	943	1,009	1,083	1,131	1,221	5.4%
Nambucca Heads	3,169	3,370	3,598	3,735	3,848	3,961	4,074	4,301	0.9%
Valla Beach (existing)	680	792	923	969	989	1,009	1,029	1,069	1.4%
Valla Urban Growth	0	0	0	455	910	1,274	1,638	1,638	-
Rural (all)	938	952	967	977	983	986	990	996	0.2%
Total	**7,137**	**7,872**	**8,740**	**9,718**	**10,453**	**11,065**	**11,655**	**12,100**	**1.7%**

0.5% p.a.									
Population Centre	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville	435	435	436	437	437	438	439	440	0.0%
Macksville	1,526	1,658	1,827	1,950	2,025	2,051	2,063	2,086	0.9%
Scotts Head	389	428	474	548	595	629	639	652	1.7%
Nambucca Heads	3,169	3,203	3,245	3,279	3,314	3,343	3,369	3,422	0.2%
Valla Beach (existing)	680	714	747	768	782	792	800	816	0.5%
Valla Urban Growth	0	0	0	65	130	156	182	234	-
Rural (all)	938	951	965	974	980	982	985	990	0.1%
Total	**7,137**	**7,390**	**7,694**	**8,020**	**8,263**	**8,391**	**8,476**	**8,640**	**0.5%**

A.1.3 Wastewater Population

2% p.a.									
Population Centre	**Type**	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville STP	Population	992	1,009	1,031	1,036	1,036	1,036	1,036	1,036	0.1%
	EP	1,207	1,224	1,246	1,251	1,251	1,251	1,251	1,251	0.1%
Macksville STP	Population	2,580	2,913	3,329	3,587	3,828	3,916	4,004	4,180	1.6%
	EP	3,611	4,228	5,011	5,477	5,778	5,866	5,954	6,130	1.7%
Scotts Head STP	Population	801	1,146	1,576	1,671	1,682	1,693	1,704	1,726	2.9%
	EP	942	1,317	1,780	1,879	1,890	1,901	1,912	1,934	2.6%
South Scotts Head Sewer Mining	Population	0	0	0	369	515	662	757	948	-
	EP	0	0	0	369	515	662	757	948	-
Nambucca Heads STP	Population	7,371	7,979	8,739	9,127	9,422	9,717	10,012	10,602	1.1%
	EP	9,331	10,015	10,886	11,319	11,614	11,909	12,205	12,795	0.9%
Valla Urban Growth Area Sewer Mining	Population	0	0	0	1,089	2,178	3,050	3,921	3,921	-
	EP	0	0	0	1,089	2,178	3,050	3,921	3,921	-
Total Serviced	**Population**	**11,744**	**13,047**	**14,675**	**16,879**	**18,661**	**20,074**	**21,434**	**22,413**	**2.3%**
	EP	**15,090**	**16,785**	**18,923**	**21,384**	**23,226**	**24,639**	**25,999**	**26,978**	**2.0%**

0.5% p.a.									
Population Centre	**Type**	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville STP	Population	992	993	995	996	998	1,000	1,001	1,005	0.0%
	EP	1,207	1,208	1,210	1,211	1,213	1,215	1,216	1,220	0.0%
Macksville STP	Population	2,580	2,688	2,814	2,928	3,052	3,117	3,145	3,201	0.6%
	EP	3,611	4,004	4,496	4,818	5,002	5,066	5,094	5,150	1.1%
Scotts Head STP	Population	801	868	945	1,014	1,090	1,117	1,132	1,162	1.1%
	EP	942	1,040	1,148	1,222	1,298	1,325	1,340	1,370	1.1%
South Scotts Head Sewer Mining	Population	0	0	0	92	129	165	165	166	-
	EP	0	0	0	92	129	165	165	166	-
Nambucca Heads STP	Population	7,371	7,469	7,582	7,683	7,795	7,879	7,957	8,111	0.3%
	EP	9,331	9,505	9,730	9,876	9,987	10,072	10,149	10,304	0.3%
Valla Urban Growth Area Sewer Mining	Population	0	0	0	136	272	327	381	490	-
	EP	0	0	0	136	272	327	381	490	-
Total Serviced	**Population**	**11,744**	**12,019**	**12,335**	**12,850**	**13,336**	**13,604**	**13,781**	**14,135**	**0.5%**
	EP	**15,090**	**15,757**	**16,583**	**17,355**	**17,900**	**18,169**	**18,346**	**18,699**	**0.6%**

A.1.4 Wastewater Equivalent Tenements

2% p.a.									
Sewerage Scheme	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville STP	445	452	461	462	462	462	462	462	0.1%
Macksville STP	1,408	1,653	1,963	2,151	2,274	2,311	2,347	2,421	1.8%
Scotts Head STP	393	557	759	802	807	812	817	826	2.8%
South Scotts Head Sewer Mining	0	0	0	151	211	271	310	388	-
Nambucca Heads STP	3,930	4,226	4,601	4,792	4,925	5,059	5,193	5,460	1.0%
Valla Urban Growth Area Sewer Mining	0	0	0	455	910	1,274	1,638	1,638	-
Total Serviced	**6,176**	**6,888**	**7,784**	**8,814**	**9,590**	**10,189**	**10,767**	**11,195**	**2.0%**

0.5% p.a.									
Sewerage Scheme	**2006**	**2011**	**2016**	**2021**	**2026**	**2031**	**2036**	**2046**	**Growth %p.a.**
Bowraville STP	445	446	447	448	449	449	450	452	0.0%
Macksville STP	1,408	1,563	1,761	1,901	1,982	2,012	2,025	2,050	1.1%
Scotts Head STP	393	437	488	528	565	578	585	598	1.3%
South Scotts Head Sewer Mining	0	0	0	43	60	77	77	78	-
Nambucca Heads STP	3,930	4,005	4,105	4,178	4,234	4,276	4,314	4,392	0.3%
Valla Urban Growth Area Sewer Mining	0	0	0	65	130	156	182	234	-
Total Serviced	**6,176**	**6,451**	**6,801**	**7,162**	**7,419**	**7,548**	**7,633**	**7,804**	**0.7%**

A.1.5 Annual Water Supply Demands

Year		2006	2011	2016	2021	2026	2031	2036	2046
Average Year (ML)	Scenario 3 - 2%	1,875	1,796	1,840	2,119	2,337	2,491	2,633	2,714
	Scenario 3 - 1%	1,875	1,756	1,746	1,861	1,981	2,052	2,111	2,179
	Scenario 4 - 1%	1,875	1,792	1,811	1,927	2,038	2,108	2,169	2,254
	Scenario 3 - 0.5%	1,875	1,733	1,691	1,748	1,822	1,861	1,886	1,912
Dry Year (ML)	Scenario 3 - 2%	2,124	2,106	2,232	2,438	2,634	2,781	2,920	3,006
	Scenario 3 - 1%	2,124	2,013	2,018	2,141	2,268	2,344	2,408	2,486
	Scenario 4 - 1%	2,124	2,042	2,068	2,197	2,319	2,397	2,464	2,561
	Scenario 3 - 0.5%	2,124	1,985	1,954	2,011	2,089	2,131	2,158	2,194

A.1.6 Peak Day Water Supply Demands

Year	2006	2011	2016	2021	2026	2031	2036	2046
Scenario 3 - 2%	11.44	11.32	11.81	13.15	14.44	15.36	16.24	16.75
Scenario 3 - 1%	11.44	10.92	10.80	11.28	11.95	12.34	12.66	13.26
Scenario 4 - 1%	11.44	11.11	11.31	11.88	12.47	12.83	13.13	13.74
Scenario 3 - 0.5%	11.44	10.83	10.56	10.78	11.20	11.42	11.55	11.77

A.1.7 Wastewater Flows

Year		2006	2011	2016	2021	2026	2031	2036	2046
Scenario 3 - 2%	Inflow	1,686	1,706	1,689	1,764	1,903	2,003	2,106	2,187
	Reuse	118	121	114	175	264	309	355	355
	Discharge	1,568	1,585	1,575	1,589	1,639	1,693	1,751	1,833
Scenario 3 - 1%	Inflow	1,686	1,618	1,508	1,513	1,598	1,647	1,694	1,775
	Reuse	118	120	112	121	131	137	142	152
	Discharge	1,568	1,498	1,396	1,392	1,466	1,510	1,552	1,623
Scenario 4 - 1%	Inflow	1,686	1,628	1,523	1,530	1,609	1,658	1,707	1,789
	Reuse	118	121	114	125	136	141	147	158
	Discharge	1,568	1,507	1,409	1,405	1,473	1,517	1,560	1,631
Scenario 3 - 0.5%	Inflow	1,686	1,606	1,487	1,476	1,532	1,557	1,579	1,610
	Reuse	118	120	112	113	118	120	123	127
	Discharge	1,568	1,486	1,376	1,363	1,413	1,437	1,456	1,483

Appendix B Scenario 4 Costing

Nambucca Shire Council

Summary of Financial Modelling for IWCM Scenario 4 – 2009/10

(October 2010)

Modelling Assumptions:

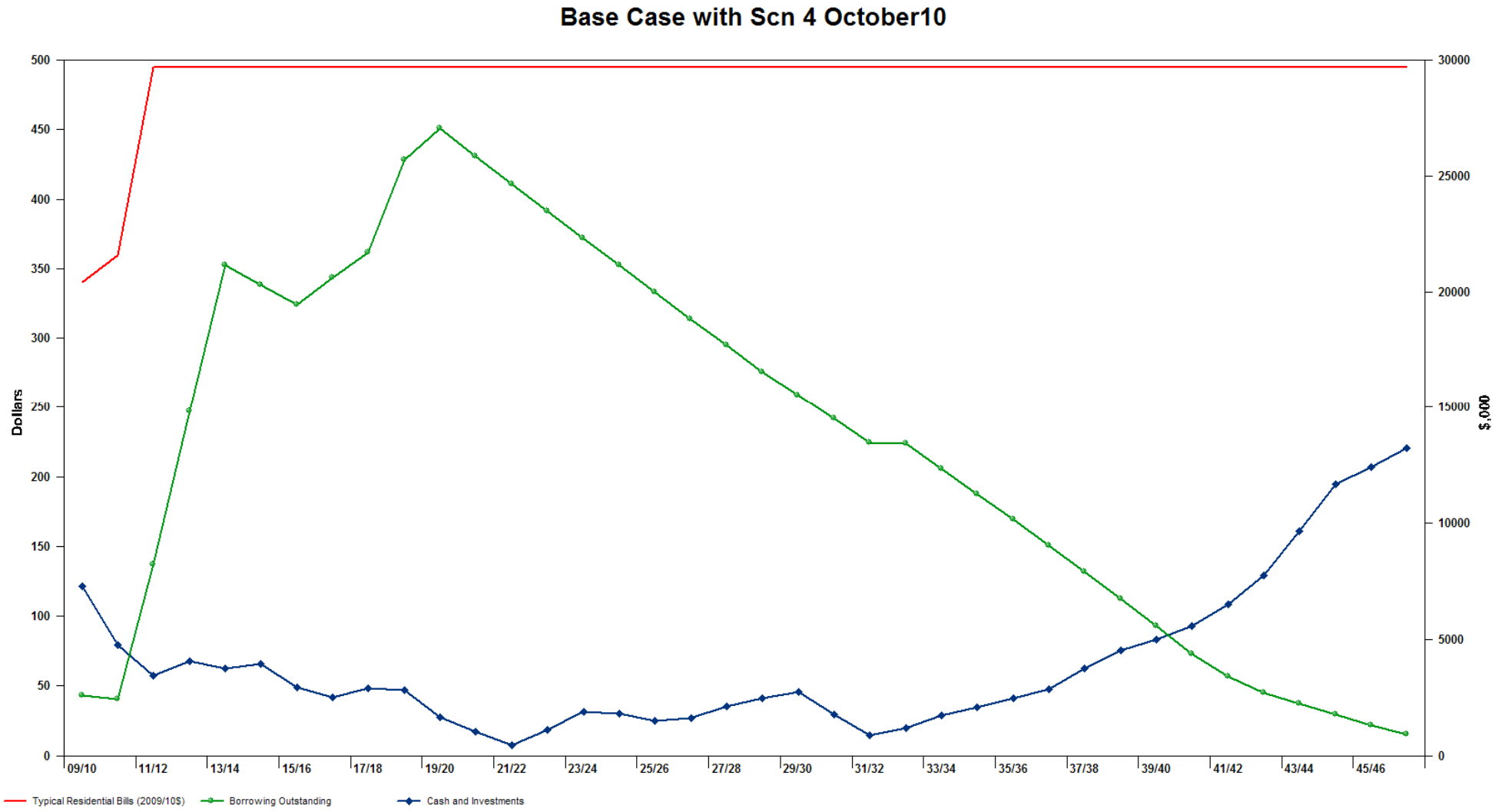
	Assumption/Value/Source	
Historical Data	Nambucca Shire Council, special schedules for 1 July 2008 to 30 June 2009.	
Financial Data	Average annual long-term inflation rate: 3.0% Annual Investment Interest Rate: 5.5% Annual Borrowing Interest Rate: 9.0%	
Demographic Data	Long-term Average Annual Assessment Growth Rate	
	Residential: 0.7%	Non-Residential: 0.7%
	Number of Vacant Assessments: See attachment	
	Number of Assessments	
	Residential: See attachment	Non-Residential: See attachment
	Proportion of Pensioner Assessments: 30.13%	
Charges Data	Annual Residential Water Charge 2010/11	
	Access Charge for 20mm connection: $73	Usage Charge: $1.49/kL
	Annual Residential Sewerage Charge (2010/11): $415 p.a.	
	Current Developer Charges (2010/11): $4,490/ET (water); $4,163/ET (sewer)	
	Future Developer Charges: Refer to Table below	
	Current Annual water TRB: $371 (based on annual average residential water consumption of 200 kL) Current Annual sewerage TRB: $415	
	Future TRB: Refer to Table below	

	% Of Access Charge for Vacant Assessment: 25%	
	Pensioner Rebate: $87.50	
Opening Balances	Outstanding Loan (2009): $2.7 M (Water); $ 5.3 M(Sewer)	Cash: about $8.8 M (Water); $ 9.6 M(Sewer)
OMA Cost	Existing: about $1.2M. Also refer to Section xx	
Revenue Splits	(Residential : Non-residential) 65:35 (Water); 69:31 (Sewer).	
Minimum Working Fund	$ 0.5 M each for water and sewer funds	

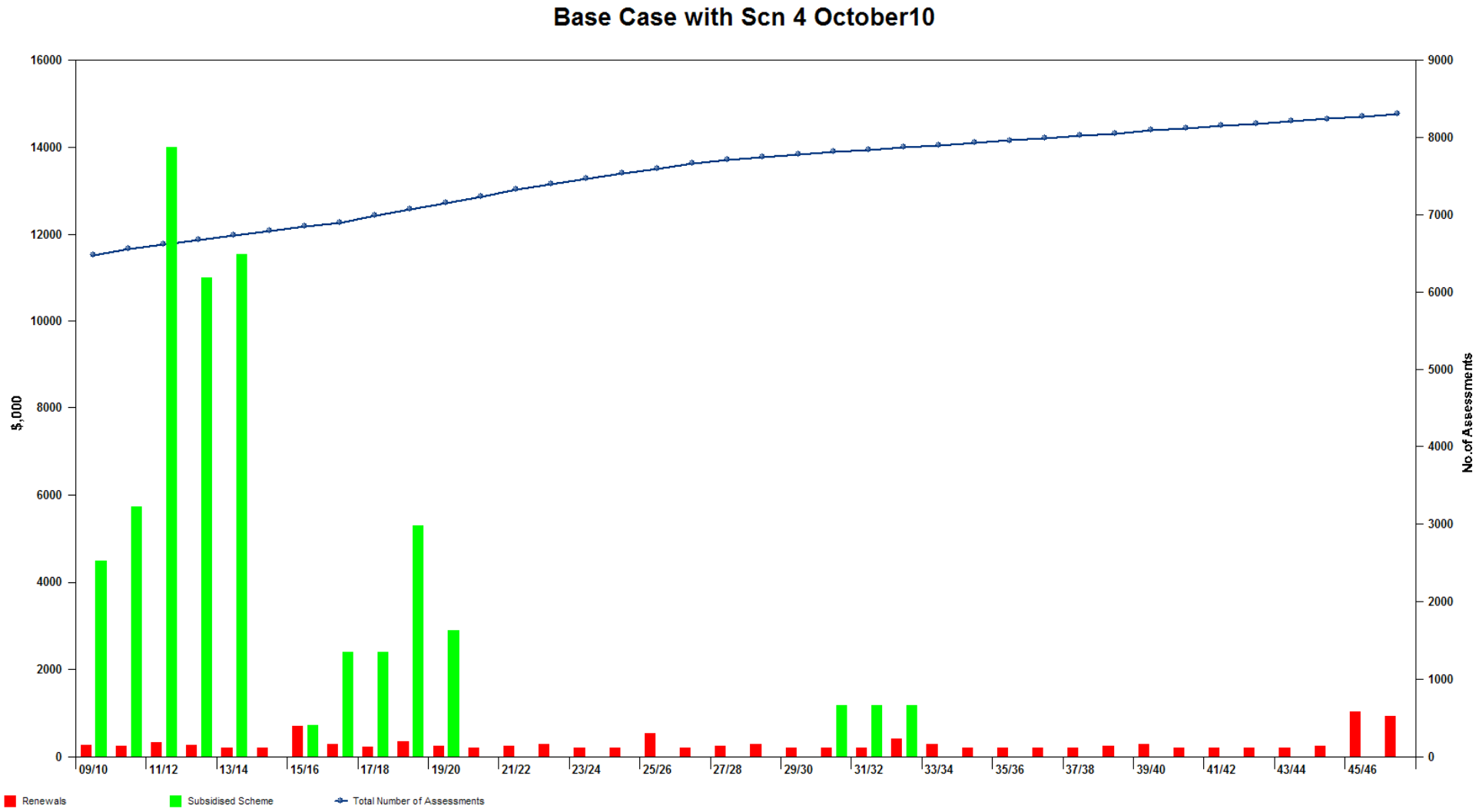
Historical Data – Water Supply:	**Historical Data - Sewerage:**
1. Average life of system assets – 70 Years 2. Term of new loans – 30 years 3. Current (2009/10) Admin. Expenses - $474 K/a 4. Current Eng. & Supervision Expenses - $175 K/a 5. Current Operation Expenses - $266 K/a 6. Current Maintenance Expenses - $388 K/a 7. Current Energy Expenses - $158 K/a (Average increase @18% p.a. for first 3 yrs and thereafter @ 4% p.a. for future forecasts)	1. Average life of system assets – 70 Years 2. Term of new loans – 30 years 3. Current (2009/10) Admin. Expenses - $470 K/a 4. Current Eng. & Supervision Expenses - $182 K/a 5. Current Operation Expenses - $350 K/a 6. Current Maintenance Expenses - $789 K/a 7. Current Energy Expenses - $205 K/a (Average increase @18% p.a. for first 3 yrs and thereafter @ 4% p.a. for future forecasts)
All projected values are in 2009/10 $	

Scenario 4	**Developer Charge from (2009/10 $)**	**40 Year Capital Cost ($M)**	**Subsidy/ Govt. Grant for the forecast period ($M)**	**Typical Residential Bill (2009/10$)**	**Internal Funding for New Capex during next 5 Years ($M)**	**External Borrowing for New Capex during next 5 years ($M)**
Water Supply	9,510	79.4	16.1	495	7.79	20.00
Sewerage	11,818	100.1	4.7	687	8.55	0.45

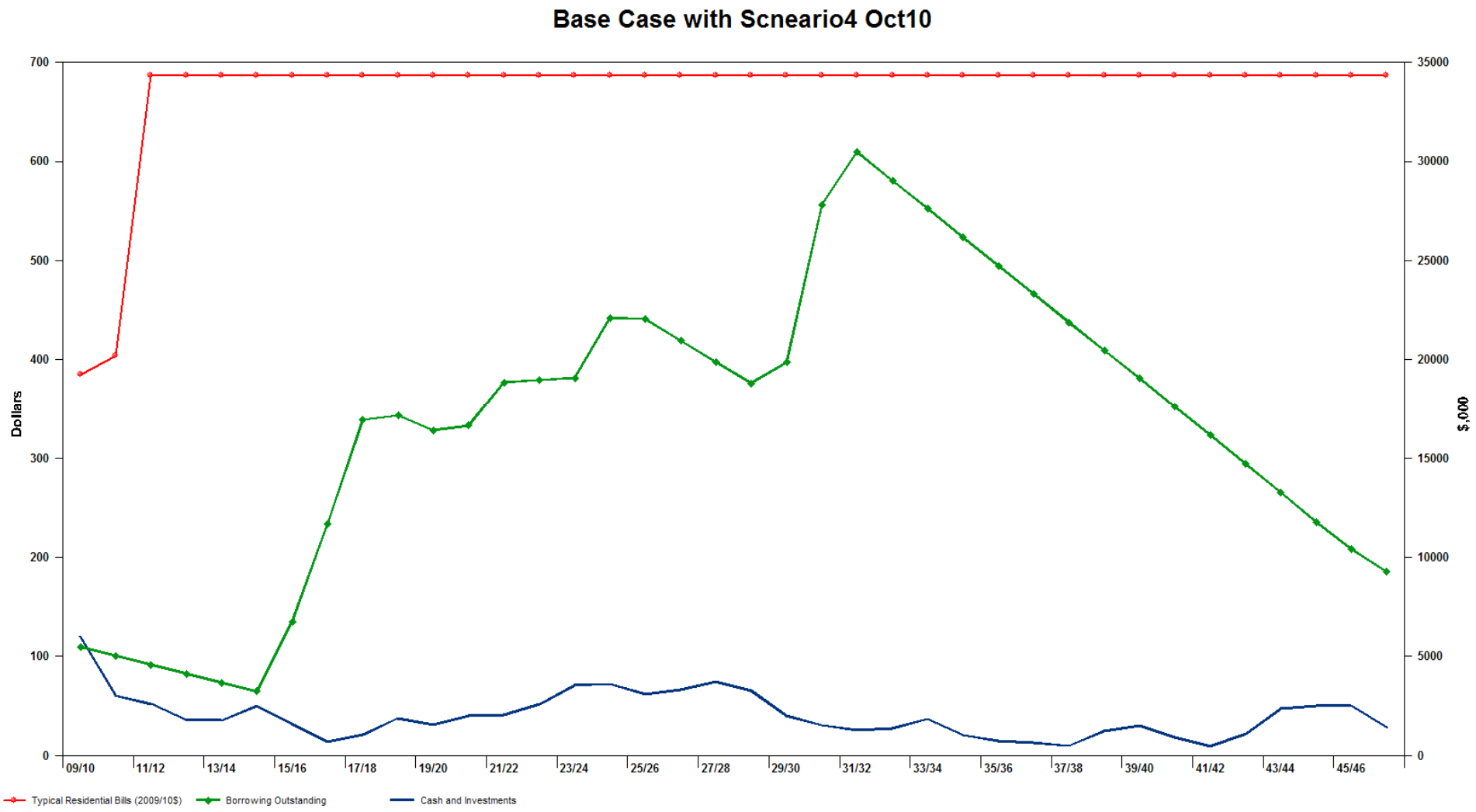
Typical Residential Bill, Outstanding Borrowing and Cash levels Vs Scenario 4 Capital Works Program – Water Supply:



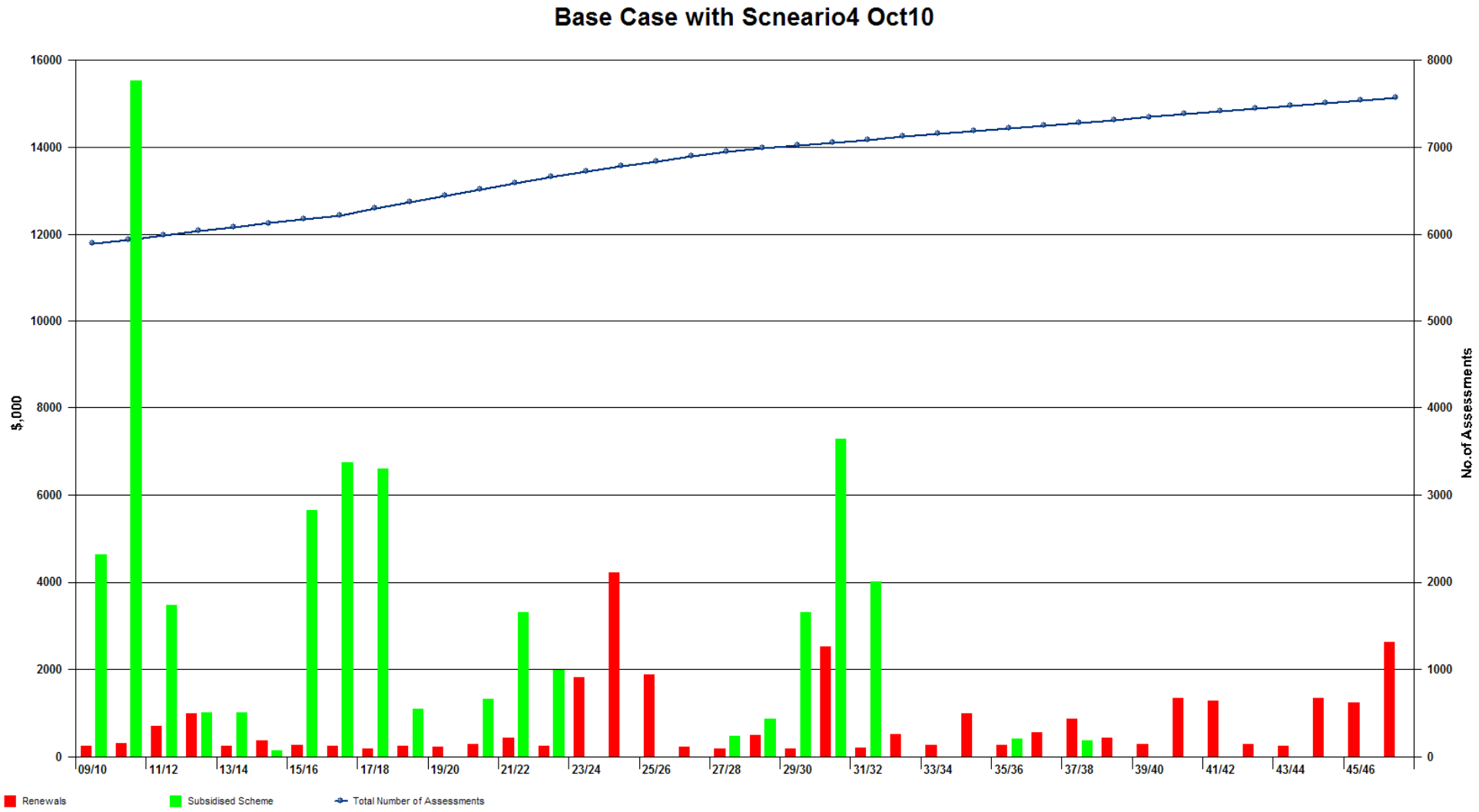
New (Scenario 4) Capital Works and Renewals Program – Water Supply:



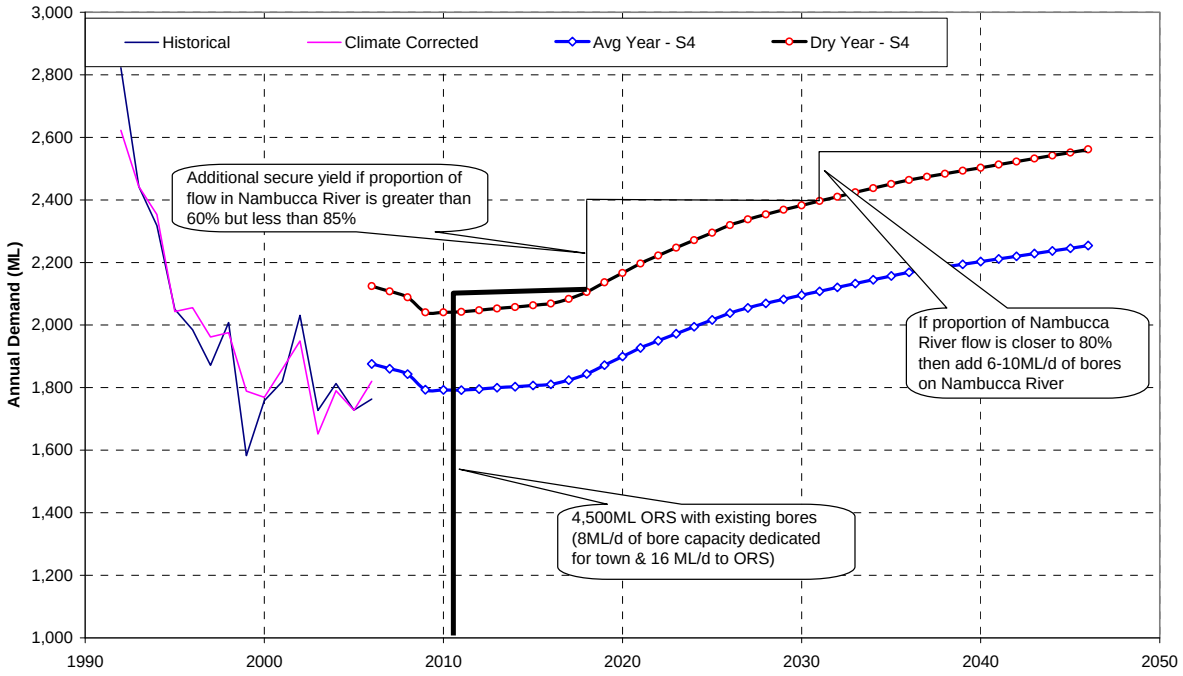
Typical Residential Bill, Outstanding Borrowing and Cash levels Vs Scenario 4 Capital Works Program – Sewerage:



New (Scenario 4) Capital Works and Renewals Program – Sewerage:



Appendix C Alternative Headwork Requirements



Appendix D Implementation Programs for Previous Growth Rates

Integrated Scenario 3 – 2% Timeframe for Implementation of Major Works

Scenario	System	Infrastructure	Year Required	Total Capital Cost ($M)
Integrated 3 – 2%	Water Supply	WTP1 – Implement a comprehensive and effective catchment management plan including fencing and river bank stabilisation (up to 4 km). Implement a well-head protection plan and storage aerators and storage management plan.	2009	$2.2
		HW1 - Build a storage and Borefield to meet projected future demands	2010	$51.0
		Construct new 0.9 ML reservoir south of Scotts Head to service Urban Release area Construct 200mm main to supply new reservoir from replacement Scotts Head Trunk main near the existing Scotts Head reservoir Construct a new 3.1 ML reservoir on the Western side of the Valla Urban Growth Area Construct 250mm main from the Nambucca trunk main at the Pacific Highway to the new Valla Urban Growth Area Reservoir Construct a booster pumping station in the new main (servicing the Valla Urban Growth Area Reservoir) with a capacity of approximately 40 L/s @ 16m head South Scotts Head Recycled Water Scheme (Pump station, rising main and storage) Valla Urban Growth Area Recycled Water Scheme (Pump station, rising main and storage)	2016	$13.4
		Reticulated Reuse Scheme from Macksville STP (parks and gardens)	2017	$1.3
		Build a new 16.8 ML/d Water Filtration Plant (WFP)	2023	$23.4
		Upgrade clear water pumping machinery to supply 285 L/s at 88m Replace 375mm AC main from Wirimbi Junction to Pacific Highway with 450mm main Replace 300mm AC from Wirrimbi Junction to PRV North of Nambucca river at Macksville with 375mm main Replace 200mm AC main to Scotts Head with 200mm m-PVC main	2025	$14.1
	Wastewater	Option B3 – Optimise Bowraville STP operation and dose with coagulant chemicals Upgrade Macksville SPS (2, 3, 4, 8, 9 and 13) New Macksville SPS (DCP17 and Nursing Home) Increased emergency storage at Macksville SPS2 and SPS3 Opportunity NH1 – Upgrade Nambucca Heads STP to 15,000 EP (10,000 EP Reactor) Upgrade Nambucca Heads SPS (1, 5, 6 and 8) Upgrade Valla Beach SPS (1, 5, 6 and 7)	2010	$30.9
		Opportunity M1 – Optimise current Macksville STP operation Upgrade Scotts Head SPS1	2011	$1.9
		Upgrade Macksville SPS 10 Opportunity SH1 – Upgrade Scotts Head with an 1,500 EP Reactor Upgrade Nambucca Heads SPS13	2012	$7.5
		Option B3 – New 1,500 EP Bowraville STP with a new wet-weather storage and appropriate buffer zones from residents Increased emergency storage at Bowraville SPS1	2015	$5.8
		Opportunity SH1 – New Sewer Mining Plant for South Scotts Head New South Scotts Head Urban Growth Area SPS Opportunity NH1 – New Sewer Mining Plant for Valla Urban Growth Area Opportunity NH1 – Upgrade inlet works at Nambucca Heads STP Upgrade Nambucca Heads SPS2 New Valla Beach SPS (7b and Valla Urban Growth Area)	2016	$26.0
		Opportunity M1 – New 3,000 EP Macksville Reactor with tertiary filters Upgrade Nambucca Heads SPS4	2017	$9.4
		Opportunity NH1 – Upgrade Nambucca Heads STP to 18,000 EP (Additional 3,000 EP Reactor) Upgrade Nambucca Heads SPS15	2028	$8.0

Integrated Scenario 3 – 1% Timeframe for Implementation of Major Works

Scenario	System	Infrastructure	Year Required	Total Capital Cost ($M)
Integrated 3 – 1%	Water Supply	WTP1 – Implement a comprehensive and effective catchment management plan including fencing and river bank stabilization (up to 4 km). Implement a well-head protection plan and storage aerators and storage management plan.	2009	$2.2
		HW1 - Build a storage (5,000 ML) and Borefield to meet projected future demands	2010	$48.0
		Construct new 0.4 ML reservoir south of Scotts Head to service Urban Release area Construct 150mm main to supply new reservoir from replacement Scotts Head Trunk main near the existing Scotts Head reservoir Construct a new 0.7 ML reservoir on the Western side of the Valla Urban Growth Area Construct 150mm main from the Nambucca trunk main at the Pacific Highway to the new Valla Urban Growth Area Reservoir Construct a booster pumping station in the new main (servicing the Valla Urban Growth Area Reservoir) with a capacity of approximately 8.5 L/s @ 15m head South Scotts Head Recycled Water Scheme (Pump station, rising main and storage) Valla Urban Growth Area Recycled Water Scheme (Pump station, rising main and storage)	2016	$6.8
		Reticulated Reuse Scheme from Macksville STP (parks and gardens)	2017	$1.3
		Build a new 13.5 ML/d Water Filtration Plant (WFP)	2023	$23.4
		Replace 375mm AC main from Wirimbi Junction to Pacific Highway with 450mm main	2030	$3.5
	Wastewater	Option B3 – Optimise Bowraville STP operation and dose with coagulant chemicals Upgrade Macksville SPS (2, 3, 4, 9 and 13) New Macksville SPS (DCP17 and Nursing Home) Increased emergency storage at Macksville SPS2 and SPS3 Opportunity NH1 – Upgrade Nambucca Heads STP to 15,000 EP (10,000 EP Reactor) Upgrade Nambucca Heads SPS (1, 5, 6 and 8) Upgrade Valla Beach SPS (1, 5, 6 and 7)	2010	$30.5
		Opportunity M1 – Optimise current Macksville STP operation	2011	$1.3
		Option B3 – New 1,500 EP Bowraville STP with a new wet-weather storage and appropriate buffer zones from residents Increased emergency storage at Bowraville SPS1	2015	$5.8
		Opportunity SH1 – New Sewer Mining Plant for South Scotts Head New South Scotts Head Urban Growth Area SPS Opportunity NH1 – New Sewer Mining Plant for Valla Urban Growth Area Opportunity NH1 – Upgrade inlet works at Nambucca Heads STP New Valla Beach SPS (7b and Valla Urban Growth Area)	2016	$16.2
		Opportunity SH1 – Upgrade Scotts Head with an 1,200 EP Reactor	2018	$6.3
		Opportunity M1 – New 2,500 EP Macksville Reactor with tertiary filters	2029	$8.8

Appendix E Triple Bottom Line Scoring Details

TBL	Objective	KPI	Target	Type	S4 Score	Notes	Weight	S4 Weighted Score
ENVIRONMENTAL	Ensure efficient use of drinking water	Percentage of new development and redevelopment proposals incorporating BASIX concepts	100% (ie, 40% reduction in average annual town water use for new residential dwellings)	C	5		0.000	0.00
		Percentage of existing houses fitted with water saving devices	Greater than 50% over the next 10 years	A	5		0.029	0.14
		Percentage reduction in peak water use per person	5% reduction in peak day consumption per person (averaged over system) within 5 years	A	5	Measured at 2012	0.029	0.14
		Percentage of existing houses fitted with RWT	Existing houses to fit water tanks (50% over 10 years)	A	2		0.029	0.06
	Ensure the sustainability of the water resources	Do not pump between dusk to dawn when flow at the gauging station after extraction by upstream irrigators is between 80ML/d to 120ML/d during January to September and 40ML/d to 120ML/d during October to December.	100%	C	5	Same for all scenarios	0.000	0.00
		Stop pumping to distribution system to meet existing demands when the flow at the gauging station reaches the 95%ile flow corresponding to that month.	100%	C	5	Same for all scenarios	0.000	0.00
		Stop pumping to distribution system to meet future growth demands and to fill the off-river storage (ORS) when the flow at the gauging station reaches the 90%ile flow corresponding to that month.	100%	C	5	Same for all scenarios	0.000	0.00
		The upstream irrigators and town water supply are allowed to extract up to 60% of the total daily flow provided other constraints are satisfied.	100%	C	5	Same for all scenarios	0.000	0.00
		When off-river storage (ORS) is drawn-down to say 60% and the water supply is subject to level 4 and above restrictions, the previous rules are relaxed with pumping to water supply ceasing at 95%ile flow corresponding to that month.	100%	C	5	Same for all scenarios	0.000	0.00
		Upstream irrigators are to cease pumping when the previous day's affected flow at the gauging station reaches the annual 95%ile flow, which is about 10ML/d.	100%	C	5	Same for all scenarios	0.000	0.00
	Reduce greenhouse gas emissions	Cutting of carbon dioxide emission from scheme operation to year 2000 levels by 2025	100% (NSW Greenhouse Plan)	BP	4	Average of 2002-2005 used as 2000 baseline	0.057	0.23
		Cutting of carbon dioxide emission from scheme operation (2000 base year)	60% by 2050 (NSW Greenouse Plan)	BP	1	Reported for 2046	0.057	0.06
	Help protect catchments, estuaries and aquatic ecosystems	Dollar value of catchment protection works funded by Council	By 2016, rehabilitate and protect 60% of stream length in the North Arm Nambucca River Sub-catchment (W1 CAP)	BP	5	Note this is 18/60 = 30%	0.057	0.29
			Active participation in water monitoring / environmental education networks by 2009 (W3 CAP)	BP	5	Existing Monitoring in place.	0.057	0.29
		Dollar value of estuarine protection works funded by Council	100% implementation of identified priority actions from the Estuary Management Plan by 2016 (C2 CAP)	BP	3.7	Based on activities in EMP	0.057	0.21
	Protect the health and diversity of the receiving waters	Percentage compliance to DECC licence for bacterial content	§ 100%	C	5.0	All scenarios compliant	0.000	0.00
		Percentage compliance to DECC licence for nutrient concentration and annual load	§ 100%	C	5.0	All scenarios compliant	0.000	0.00
		Percentage compliance to DECC licence for suspended sediment load	§ 100%	C	5.0	All scenarios compliant	0.000	0.00
		Percentage reduction in volume discharging	Greater than 80% for effluent	A	2.0	Measured against Traditional Scenario	0.029	0.06
			Greater than 5% for stormwater	A	5.0	Existing Urban Area in 2046 - 2006 base (Measured against traditional scenario)	0.029	0.14
		Percentage compliance to DECC licence for annual and daily volume of discharge	§ 100%	C	5.0	Option B1 won't achieve 100% compliance	0.000	0.00
	Ensure the sustainability of reuse areas	Annual percentage of groundwater and soil samples complying to relevant standards	§ 100% (DECC Licence – Bowraville STP)	C	5.0	This is % of compliant events from Bowraville STP from 2005-2007. It has been assumed that B1 will make no difference to this performance.	0.000	0.00
	Minimise the impact of stormwater run-off from existing land-use	Percentage compliance with DCP sediment control measures	Greater than 90%	A	4.0	Same for all scenarios	0.029	0.11
	Maximise beneficial reuse	Percentage of effluent reused, replacing town water supply	Greater than 50% within 5 years for Macksville and NH STP	A	1.0	Macksville in 5 years	0.029	0.03
				A	1.0	NH after development of Boggy / Cow Creek	0.029	0.03
				A	2.0	SH after St Scotts Head Development	0.029	0.06
		Percentage reuse of biosolids	Greater than 75% within 10 years	A	1.0	No biosolidsreuse opportunities	0.029	0.03
	Minimise the impact of the stormwater generation potential of future development through sustainable development and design.	Increase in net storm flow volumes between developed and undeveloped lot	Meet Blue Book Guidelines with 100% Target	BP	5.0	Same for all scenarios	0.057	0.29
		Increase in net nutrient loads between developed and undeveloped lot	Meet Blue Book Guidelines with 100% Target	BP	5.0	Same for all scenarios	0.057	0.29
		Increase in net suspended solids load between developed and undeveloped lot	Meet Blue Book Guidelines with 100% Target	BP	5.0	Same for all scenarios	0.057	0.29
		Reduction in stormwater run-off from roads	Meet Blue Book Guidelines with 100% Target	BP	5.0	Same for all scenarios	0.057	0.29
		Percentage of development proposals incorporating on-site stormwater management facilities	Meet Blue Book Guidelines with 100% Target	BP	5.0	Same for all scenarios	0.057	0.29
	Protect the recreational and economic value of the waterways and beaches	Percentage of wet days when unrestricted swimming is possible	Beachwatch Target 1: Median FC < 100 cfu/100 mL (5 samples with < 1 month frequency)	BP	0.0	Not able to quantify	0.057	
		Percentage of dry days unrestricted swimming is possible	Beachwatch Target 2: 2nd highest sample FC < 600 cfu/100 mL (5 samples with < 1 month frequency)	BP	0.0	Not able to quantify	0.057	
		Number of wet day samples with bacteria greater than 10cells but less than 100cells/100mL	Beachwatch Target 3: Median enterococci < 35 cfu/100 mL (5 samples with < 1 month frequency)	BP	0.0	Not able to quantify	0.057	
			Beachwatch Target 4: 2nd highest sample enterococci < 100 cfu/100 mL (5 samples with < 1 month frequency)	BP	0.0	Not able to quantify	0.057	
			ANZECC Target: Median enterococci < 35 cfu/100 mL (over bathing season)	BP	0.0	Not able to quantify	0.057	
		Number of dry day samples at outlets exceeding oyster farm bacterial guidelines	IEO Targets for Shellfish	BP	0.0	Not able to quantify	0.057	
		Number of samples at discharge points exceeding the oyster farm bacterial guidelines	IEO Targets for Shellfish	BP	0.0	Not able to quantify	0.057	
							1.43	**3.59**

TBL	Objective	KPI	Target	Type	S4 Score	Notes	Weight	S4 Weighted Score
SOCIAL	Maintain continuous water supply to towns	Average number of drought related Level 3 restrictions in a 10 year period (SBP)	1	BP	5	From Task 5	0.095	0.48
		Total percentage duration of drought related restrictions (SBP)	5%	A	5	From Task 5	0.048	0.24
	Protect the urban properties and premises	Average number of localised flooding due to inadequate system design	2 / year	A	4		0.048	0.19
		Percentage of urban population provided with stormwater management services	100%	A	5		0.048	0.24
	Enhance the 'nature coast' perception	Number of complaints about visual contaminants in waterways	2	A	0	Remove as similar to # 49.	0.048	0.00
	Protect public health	Compliance with Australian Drinking Water Quality Guidelines bacteriological standards	100%	BP	4		0.095	0.38
		Number of notices not to drink water	0	A	4	Due to WFP	0.048	0.19
		Number of reportable water borne diseases	0	A	5		0.048	0.24
		Number of complaints due to nuisance organisms (eg mosquitoes)	0	A	4	Assessed as part of RWT risk - BASIX	0.048	0.19
		Number of odour complaints per site	0	A	4	No septicity opportunities included	0.048	0.19
		Number of notifiable sewer surcharges in dry periods due to system failure	2 incidents / year (SBP)	BP	5	None at present	0.095	0.48
		Number of bypasses of sewerage treatment plants in dry periods	§ Nil (DECC Licences)	C	5	None at present	0.000	0.00
		Annual average of reportable surcharges in wet periods	Uncontrolled discharge onto private property < 1 / 200 connections (SBP)	BP	5	Increase with infiltration and inflow programs.	0.095	0.48
		Annual number of sewerage treatment plant bypasses in wet weather	0	A	5		0.048	0.24
		Percentage of on-site systems failing during wet weather resulting in run off onto public place	0	A	0	No data available	0.048	0.00
	Provide good quality drinking water	Compliance with Australian Drinking Water Quality Guidelines physical and chemical standards	100% (SBP)	BP	4		0.095	0.38
							1.76	**4.057**

Appendix F Value Management Workshop Report

Nambucca District Water Supply

Integrated Water Supply Management Strategy (IWCM)

VALUE MANAGEMENT WORKSHOP

MAY 2010

NAMBUCCA VALLEY

NAMBUCCA SHIRE COUNCIL

Contents

1 Executive Summary

A Value Management Workshop for the Integrated Water Supply Management (IWCM) Strategy was held on 12 May 2010.

The major conclusions, recommendations and actions from the Workshop are:

1. There was general recognition that:
- Do nothing is not an option
- Rates and Developer Charges have to increase as soon as possible and the increase should preferably be as close as possible to neighbouring Councils
- A communication strategy is required to convey to ratepayers the reasons for and quantum of the increase

2. A supplementary IWCM report is to be prepared and submitted to Council with revised capital works, etc., based on the adopted 1% population growth rate. The report is to define Scenario 4 being the outcomes from the review of Scenario 3 at the Value Management Workshop. In the report Scenario 4 needs to have a Triple Bottom Line (TBL) scoring using the assessment criteria developed in the IWCM study process and recommendations.

3. The NSW Office of Water (OoW) is to be advised of the reasons for the IWCM review, Councils revision of Scenario 3 and adoption of Scenario 4.

2 Introduction

2.1 Workshop Aim

The aim of the Workshop was to:
- broadly determine a IWCM works program which is affordable
- create a climate of shared knowledge for Nambucca Shire Councillors and staff

A schematic of the Workshop Aim is at Figure 1 below

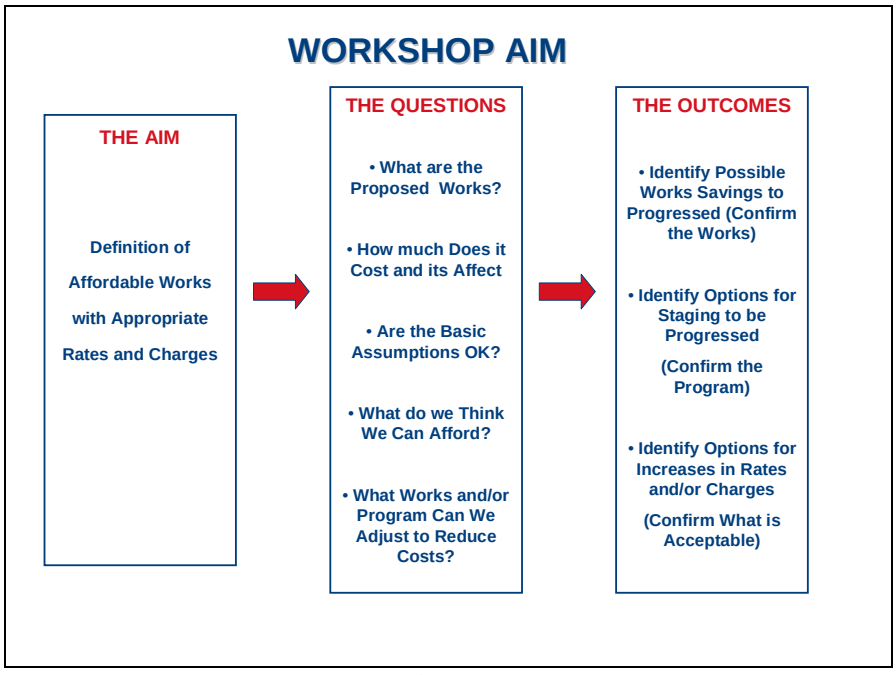


Figure 1

2.2 The Participants

The Workshop was attended by the majority of Shire Councillors, key Council staff, a NSW Office of Water representative and Consultants. A list of participants is at Appendix A.

3 The IWCM

The background of the IWCM is as follows:

3.1 Adoption of IWCM Scenario 3

- The IWCM Strategy study commenced end 2007
- Eight Technical Task Papers were prepared
- 5 Project Reference Groups (PRG) workshops were held
- One traditional and 3 integrated scenario strategies were assessed
- The community selected a preferred Strategy Scenario 3 based on a triple bottom line (TBL) assessment
- Broader community consultation was held and about 80 written submissions were received and assessed
- Council adopted in-principle the Scenario 3 strategy in late 2009

3.2 Proposed Works

The Proposed Scenario 3 Works are:

Item	Description
A. Management System Measures	
1	Review and update existing tariff structure based on the adopted IWCM strategy for both water supply and sewerage
2	Review and update the existing water supply and sewerage developer charges based on the adopted IWCM strategy
3	Prepare/update the following plans for water supply and sewerage and to carry out on-going reviews • Strategic Business Plans • Capital works program (the IWCM strategy) • Asset renewals program (new established as part of IWCM strategy needs regular review) • Asset valuation • Asset register • Operation of maintenance manual plans • Emergency response plans including water quality • Drinking water quality management plan Operational environmental plan
4	Upgrade the existing data and asset management systems for both the water supply and sewerage services and to carry out on-going monitoring and updates
5	Implement and monitor the Trade Waste policy
6	Develop and maintain a data management system on an on-going basis
7	Undertake regular audits of the fluoridation plant

Item	Description
8	Undertake regular audits of operational environmental management plan (o-EMP)
B. Works and Studies	
1	Update the existing reticulation model and to undertake analysis on an on-going basis
2	Upgrade the existing telemetry system and to renew it on an on-going basis
3	Odour/septicity study and for on-going management such as odour bed, deodorant dosing
4	Develop a sewer reticulation model and to undertake analysis on an on-going basis
5	Monitor water quality at Deep Creek
6	Additional storage tanks at each SPS to reduce risk of sewage overflow
7	Study to quantify risk of common power supply source to headworks bore and lift pumps
C. Major Water Supply and Sewage Works	
1	Enhanced residential tune-up retrofit program consisting of the Basic residential tune-up retrofit program measures plus additional measures such as micro-irrigation, water efficient washing machine and cistern replacement units targeting 50% of existing residences with 75% rebate from NSC
2	Non-residential water efficiency program
3	Enhanced system leakage reduction program consisting of mains replacement, improved response time, telemetry, metering and pressure management
4	Rain water tanks (RWT) refit program targeting 50% of existing homes with 90% rebate from NSC
5	Grey water rebate program
6	Upgrade the distribution mains from Wirimbi Junction to Pacific Highway near Nambucca Heads and the PRV north of Nambucca River at Macksville
7	Upgrade the distribution main from South Macksville to Scotts Head
8	Construct a new reservoir and main from each of the urban growth areas
9	5,000 ML off-river storage on the upper reaches of Bowra Creek with provision in the storage foundation and embankment for future raising to the ultimate capacity of 14,000ML and an additional 40ML/d borefield capacity along Nambucca River and South Creek
10	Opportunity WTP1 with comprehensive and effective catchment management plan including fencing and river bank stabilisation (up to 4km), well-head protection and storage management plans and storage aerators
11	BASIX compliance with harvesting of roof water into rainwater tanks for all new developments in existing urban areas only
12	Inflow and infiltration reduction measure of high, medium and low priority SPS
13	Optimise current Bowraville sewage plant performance and build a new plant by 2015
14	Optimise current Macksville STP operation by operating at high MLSS during peak load periods and then add a new reactor by 2017
15	Upgrade existing Scotts Head STP capacity to 3,500EP through chemical dosing and adding a reactor in 2011 plus provide a sewer mining plant and reclaimed water reuse system for the south Scotts Head release area for BASIX compliance
16	Upgrade existing Nambucca Heads STP capacity to 18,000EP in stages plus provide a sewer mining plant and reclaimed water reuse system for the Valla Urban Growth area for BASIX compliance
17	Centralised reuse with treated wastewater from the Macksville STP for Macksville park, high school playing fields and Golf course

The proposed works and associated strategies to manage population growth and demand are shown schematically in figures 2, 3 and 4 following:

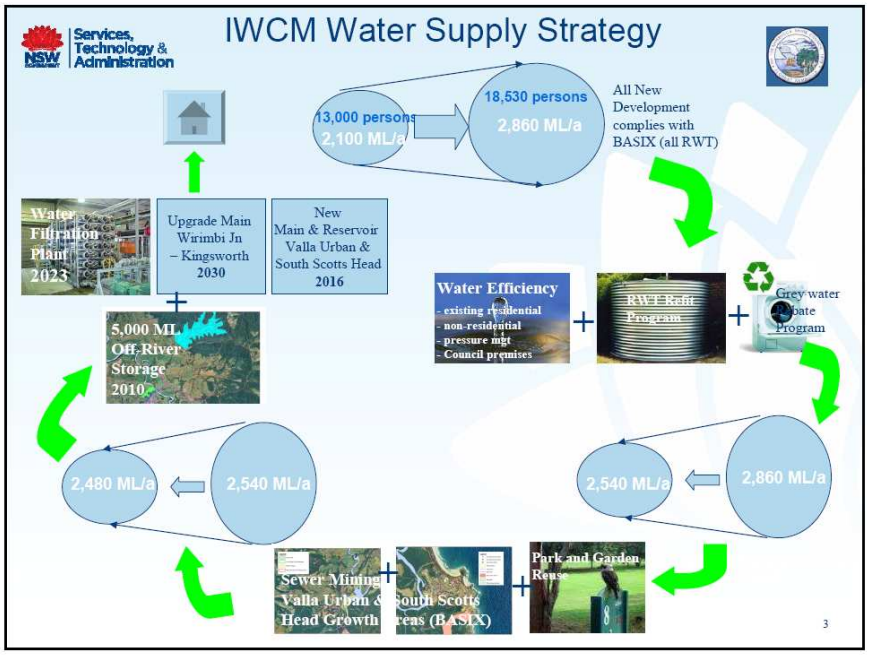


Figure 2

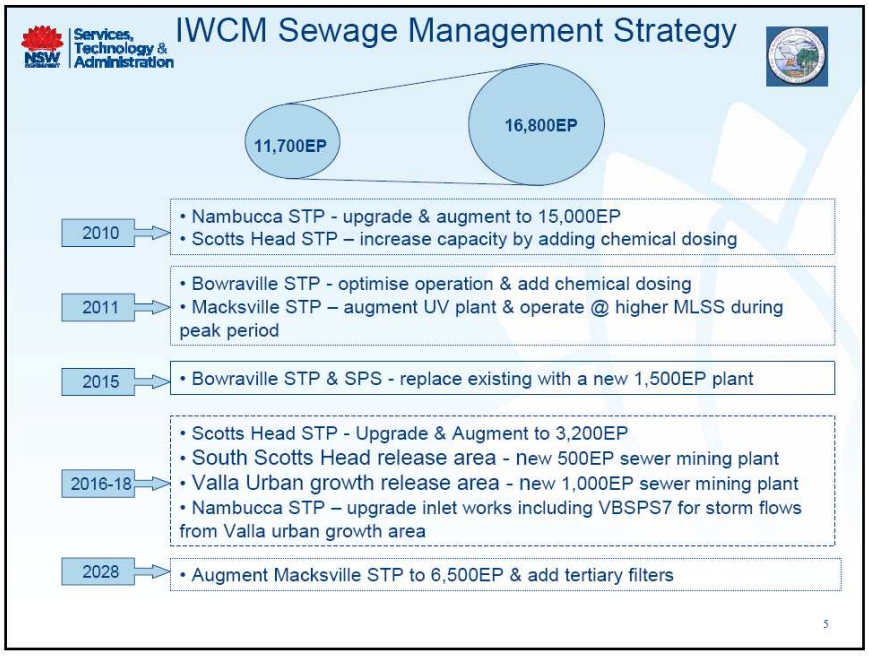


Figure 3

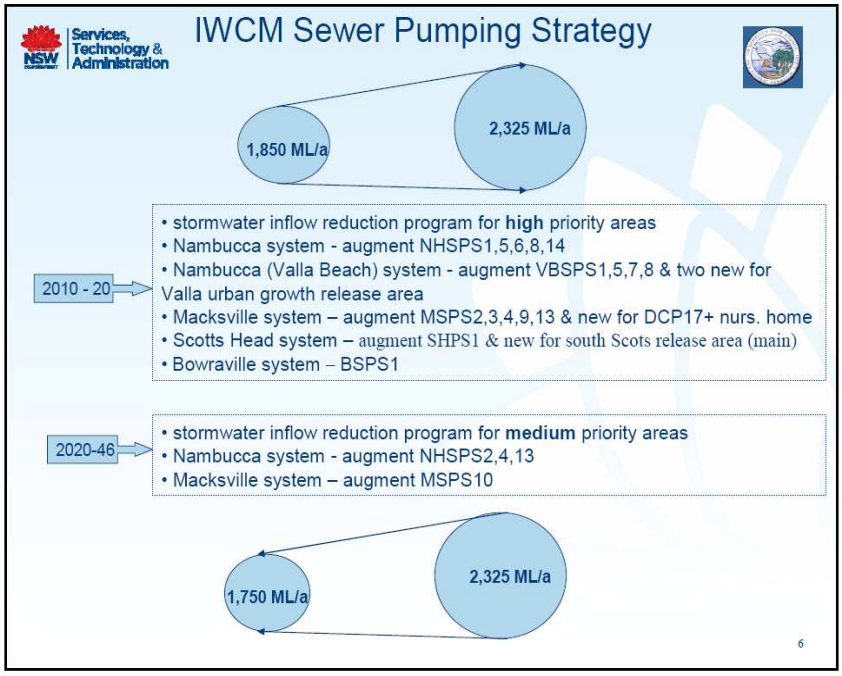


Figure 4

3.3 Do Nothing Option

The following extract is provided from the Environmental Impact Statement for the Off River Storage:

"Investigations to date have concluded that the NDWSS (Nambucca District Water Supply System) is highly vulnerable to drought and that additional water supply security would be provided as soon as possible to provide local residents and businesses with an acceptable level of drought security and to secure the current and future sustainability of the Nambucca River's aquatic ecology and its river dependent industry.

If additional water security is not pursued, the Nambucca LGA:

- *Runs the risk of poor water security particularly during drought periods;*
- *Would face increased probability of water restrictions being enforced during drought periods;*
- *Could not accommodate the predicted population growth over the next 40 years. This would have flow-on effects on industry, commerce and ultimate employment.*
- *Faces on-going environmental impacts associated with the potential over-use of water resources within the Nambucca River due to the lack of controls over environmental flows and*
- *Community may be forced to invest in alternative emergency sources of water which would require substantial financial commitment both in terms of capital investment and recurrent operating costs.*

Even with the demand measures proposed by the Integrated Water Catchment Management (IWCM) Strategy, there exists a need to resolve water security and

expected shortages during drought periods to ensure the community is not detrimentally affected.

The "do nothing" option was therefore not considered to be a viable option and the concept design process was commenced."

3.4 Estimated Pre Workshop Cost

The current estimated cost of the IWCM Strategy prior to the workshop is shown in detail at Appendix C and summarized as follows:

Water Supply Strategy	=	$115.0M
Sewerage Strategy	=	$106.3M
Estimated Pre Workshop Cost		**$221.3M**

4 Key Issues and Concerns from Off River Storage VM Workshop

The major issues and concerns raised at the Off River Storage Value Management Workshop are at Appendix F. Some of those concerns were of a IWCM wide nature, and are provided for information and reference.

5 Project Assumptions

5.1 Typical Residential Rates and Developer Charges

Assumptions and Issues

- A comparison of Nambucca Shires Typical Residential Bills (TRB) and Developer Charges with other Councils and Utilities is at Appendix B.
- Estimated TRB's and Developer Charges for Scenario 3 at 1% population growth are also at Appendix B.

Discussions and Conclusions

- Increases in TRB's and Developer Charges have to occur as soon as possible if works are to be properly funded.
- TRB's and Developer Charges are significantly lower than all neighbouring Councils and Water Utilities. They will have to increase considerably (110% for TRB's and 155% for Charges) to fund Scenario 3 at 1% population growth.
- The reason for and quantum of the increases need to be well communicated to the ratepayers.

5.2 Population Projection

Assumptions and Issues

- Projections for population were based on both residential and industrial development.
- Urban growth areas and infill of existing residential areas were allowed for.
- Projections were undertaken in consultation with Council planners and then checked against NSW Planning assessments.

- The growth for this VM Workshop has been assumed to be 1%. Slides 14 to 19 of Appendix D shows the population projection and their basis.

Discussions and Conclusions
- General discussions queried the following:
    - Accuracy of Scotts Head's projections.
    - Number of lots in South Nambucca.

5.3 Demand Projections

Assumptions and Issues
- Demand projections have taken into account affects of Scenario 3 of the IWCM work in reducing demand and a reduction in growth to 1%.
- Slides 20 to 23 at Appendix D show the predicted annual and peak day demands.

Discussions and Conclusions
- Relying on demand management will not in itself provide a secure yield.
- The proposed washing machine rebate and cistern replacement program should be dropped or delayed as their replacement is likely to occur naturally anyway.
- The Water Efficiency Program appeared expensive compared to the benefits gained and not good value for money.

5.4 Security of Supply and Water Restrictions

Assumptions and Issues
- Slides 24 to 25 of Appendix D show the affect of the recent severe drought on supply and the predicted storage levels.
- Sizing of the Works (Storage dam etc) is currently based on a 5/10/20 guideline as follows:
    - Reliability: Water restrictions no more than 5% of the time (at say Level 3).
    - Robustness: Frequency of restrictions to be less than a 1 in 10 year chance of occurring.
    - Security: The Works only supply 80% of unrestricted demand during water restriction periods.
- Slide 26 of Appendix D provides further explanation of the 5/10/20 guideline.
- The NSW Office of Water now recommends a 5/10/10 guideline.

Discussions and Conclusions
- Council can choose to use the 5/10/10 guideline.

5.5 Environmental Flow and Extraction Rates

Assumptions and Issues
- Currently Council pump with no environmental flow requirements.
- Any augmentation will trigger environmental flow requirements.
- Flows were established considering aquatic environment requirements primarily focused on selected fish species. These flows are shown schematically at slide 29 of Appendix D.

Discussions and Conclusions

- Environmental flows are a given and any proposed changes would require extensive negotiation with Regulatory Authorities as well as extensive modelling.

5.6 Climate Change

Assumptions and Issues

- The affect of Climate Change is shown at slide 30 and slide 31 of Appendix D.

Discussions and Conclusions

- Climate Change affects have been included in modelling.

5.7 Sewer Treatment and Management

Assumptions and Issues

- Slides 32 and 33 of Appendix D outline the issues and problems of the sewerage infrastructure.

Discussions and Conclusions

- The IWCM strategy addresses these issues and concerns.

6 Conclusions and Recommendations

Conclusions and Recommendations

Considering all the discussion points and conclusions in Sections 5.1 to 5.7, the Workshop generated the following conclusions and recommendations:

1. There was general recognition that:

   - Do nothing is not an option.
   - Rates and Developer Charges have to increase as soon as possible and the increase should preferably be as close as possible to the neighbouring Councils.
   - A communication strategy is required to convey to ratepayers the reasons for and quantum of the increases.

2. A supplementary IWCM report is to be prepared and submitted to Council with revised capital works, etc., based on the adopted 1% population growth rate. The report is to define Scenario 4 being the outcomes from the review of Scenario 3 at the Value Management Workshop. In the paper the Scenario 4 needs to have a TBL scoring using the assessment criteria developed in the IWCM study process and recommendations.

3. The NSW Office of Water (OoW) is to be advised of the reasons for the IWCM review, Council's revision of Scenario 3 and adoption of Scenario 4.

4. The following amendments to IWCM Scenario 3 are to adopted:

a. Water treatment plant is not to be included for TRB and developer charge calculations.
b. The size of the Off River Storage is to be 4,500ML (inclusive of 500ML deep storage) with adoption of the new NSW Office of Water storage design 5/10/10 rule instead of the previous 5/10/20 rule and later programming of borefield extensions subject to the outcome of the borefield pumping test results.
c. The requirement to construct a Storage foundation for a future 14,000ML capacity should be reviewed before detailed design proceeds.
d. The following items of the Residential Retrofit Program are not to proceed:
    i. Micro-irrigation unit installation
    ii. Water efficiency washing rebate
    iii. Cistern replacement rebate
e. The allowance for the system leakage reticulation program is to be adjusted to $1M over 10 years. That allowance is to be reviewed based on the findings of the Water Directorate Water Reduction Program that is currently underway with Federal funding.
f. The rainwater tank (RWT) refit program is to be reviewed to cap the cost at $2M whilst achieving appropriate take up by ratepayers. To establish the typical cost of a RWT rebate program a sample of up to 5 different residential house settings be assessed including cost of plumbing to provide water to garden and toilet.
g. The allowance for parks and gardens reuse at Macksville be adjusted to $0.5M for investigation only.
h. Additional typical residential bill analysis be undertaken for scenario 4 including staged increase to TRB, financing arrangements, subsidy level, affordability etc.

5. The following components of Scenario 3 are to be reviewed with outcomes included in Scenario 4.
    a. The newly approved addition of about 400 lots (20 lots/annum over 40 years) in the Nambucca Heads area and the associated implications.
    b. Scotts Head population growth within the existing urban area and in the South Scotts Head release area needs to be re-assessed in consultation with the council planners (currently looks high!) along with the associated implications.
    c. The allowance, timing and scope for the BASIX compliance with reclaimed water (dual reticulation) at the South Scotts Head Release area.
    d. The program, scope and costs of all sewerage schemes. This needs to be undertaken by Richard Spain and Roshan Iyadurai.

Indicative Post Workshop Estimate

Following the workshop the costs of the IWCM Strategy were reviewed considering the recommendations and conclusions above. The indicative future estimates are shown in detail at Appendix C and summarized as follows:

Water Supply Strategy	=	$ 74.6M
Sewerage Strategy	=	$106.3M*
Indicative Post Workshop Cost		**$180.9M**

* The Sewerage Strategy Costs are to be reviewed post workshop by NSW Water Solutions (Roshan Iyadurai) and Nambucca Shire Council (Richard Spain).

APPENDIX A

Workshop Participants

Workshop Participants

Name	Organisation	Role
Cr Rhonda Hoban	Nambucca Shire Council	Mayor
Cr Janet Court	NSC	Deputy Mayor
Cr Anne Smyth	NSC	Councillor
Cr John Ainsworth	NSC	Councillor
Cr Brian Finlayson	NSC	Councillor
Cr Michael Moran	NSC	Councillor
Cr Martin Ballangarry	NSC	Councillor
Vipuli Narangoda	NSC	
Peter Byrnes	NSC	
Michael Coulter	NSC	General Manager
Bruce Redman	NSC	Director Operations & Tech Services
Richard Spain	NSC	Manager Water & Sewerage
Glenn George	NSW Office of Water	Urban Water Manger
Kevin Plummer	NSW Public Works	Regional Procurement Advisor
Vincent Joseph	NSW Public Works	Regional Projects Coordinator
Roahan Iyadurai	NSW Water Solutions	Senior Engineer
Chris Jefferd	NSW Water Solutions	
Jim Fear	NSW Public Works	Engineering Advisor

APPENDIX B

Rates and Developer Charges

NAMBUCCA DISTRICT WATER SUPPLY: INTEGRATED WATER SUPPLY MANAGEMENT (IWCM)
MID NORTH COAST COMPARISON OF TYPICAL RESIDENTIAL BILLS AND DEVELOPER CHARGES

COUNCIL / UTILITY 2009/10 year	Typical Residential Bill			Developer Charges		
	Water	Sewer	Total	Water	Sewer	Total
Mid Coast Water	445	794	1,239	5,220	8,210	13,430
Coffs Harbour	477	676	1,153	7,010	4,930	11,940
Port Macquarie	438	601	1,039	8,780	3,800	12,580
Kempsey	447	595	1,042	8,150	6,870	15,020
Bellingen	392	531	923	6,300	4,250	10,550
Nambucca – Current	257	385	642	4,400	4,080	8,480
Nambucca Scenario 3 at 1% growth	673	683	1,356	10,665	10,820	21,485

***Post Workshop Information for 2010/11 year**

Coffs Harbour*	**477**	**740**	**1,217**	**8,690**	**8,300**	**16,990**

APPENDIX C

Cost Estimates

DESCRIPTION	PRE WORKSHOP ESTIMATE $M	POST WORKSHOP INDICATIVE ESTIMATE $M
WATER SUPPLY DEMAND MANAGEMENT		
Residential Tuneup Retrofit Program Consisting of: • 3A Showerhead • Cistern Displacement Unit • 3A Tap Aerators • Quick Leakage check; and • Visual audit and rectification of all minor fixture leakage • Micro-irrigation unit • Water efficient washing machine rebate • Cistern replacement rebate	4.2	**Say 0.5**
Non Residential Water Efficiency Program	.14	**Nil**
System Leakage Reduction Program Consisting of: • Mains replacement • Improved response times; and • Improved telemetry and metering • Pressure reduction	5.1	**1.0**
RWT Refit Program With A Target To Install 50% Of Existing Homes With A Tank	5.6	**2.0**
SUB TOTAL	**15.0**	**3.5**
WATER SUPPLY WORKS		
• Off River Storage- Preconstruction	Included	**11.2**
• Off River Storage - 5,000ML storage	48.1	**28.0**
• Additional 8ML/d borefield capacity	4.0	**8.0**
• Catchment management, wellhead protection and storage protection works	1.7	**1.7**
• Water filtration plant	23.4	**Nil**
• Upgraded distribution works	4.1	**4.1**
• Parks and garden reuse at Macksville	1.3	**1.3**
• BASIX compliance with reclaimed water at Valla urban growth area (dual reticulation costs only)	1.0	**0.5**
	1.7	**1.7**
SUB TOTAL	**85.3**	**56.5**
WATER SUPPLY WORKS RENEWAL		
• Renewal of Existing and New Assets over 40 years	**14.6**	**14.6**
SUB TOTAL		
TOTAL IWCM WATER SUPPLY STRATEGY	**114.9**	**74.6**

DESCRIPTION	PREWORKSHOP ESTIMATE $M	POST WORKSHOP INDICATIVE ESTIMATE $M
SEWER WORKS *		
Bowraville Sewerage Scheme		
• STP	0.3	0.3
• SPS and Rising Main	0.1	0.1
Sub Total	**0.4**	**0.4**
Macksville Sewerage Scheme		
• STP	10.1	10.1
• SPS and Rising Mains	2.7	2.7
Sub Total	**12.9**	**12.9**
Scotts Head Sewerage Scheme		
• STP	6.7	6.7
• South Scotts Head Sewer Mining	3.7	3.7
• SPS and Rising Mains	1.1	1.1
Sub Total	**11.5**	**11.5**
Nambucca Heads Sewerage Scheme		
• STP	18.6	18.6
• Valla Urban Growth Area Sewer Mining	7.0	7.0
• Nambucca Heads SPS and Rising Main	2.9	2.9
• Valla Beach SPS and Rising Main	6.3	6.3
Sub Total	**34.8**	**34.8**
Inflow/Infiltration Reduction Program	**14.9**	**14.9**
Asset Renewal Existing & New (40 years)	**31.8**	**31.8**
TOTAL IWCM SEWERAGE STRATEGY	**106.3**	***106.3**

*** It must be noted that the Sewerage Strategy Costs are to be reviewed post workshop by NSW Water Solutions (Roshan Iyadurai) and Nambucca Shire Council (Richard Spain).**

APPENDIX D

Presentation – Roshan Iyadurai

Nambucca Shire Council Integrated Water Cycle Management (IWCM) Strategy

Value Management Workshop
May 2010
Roshan Iyadurai

1

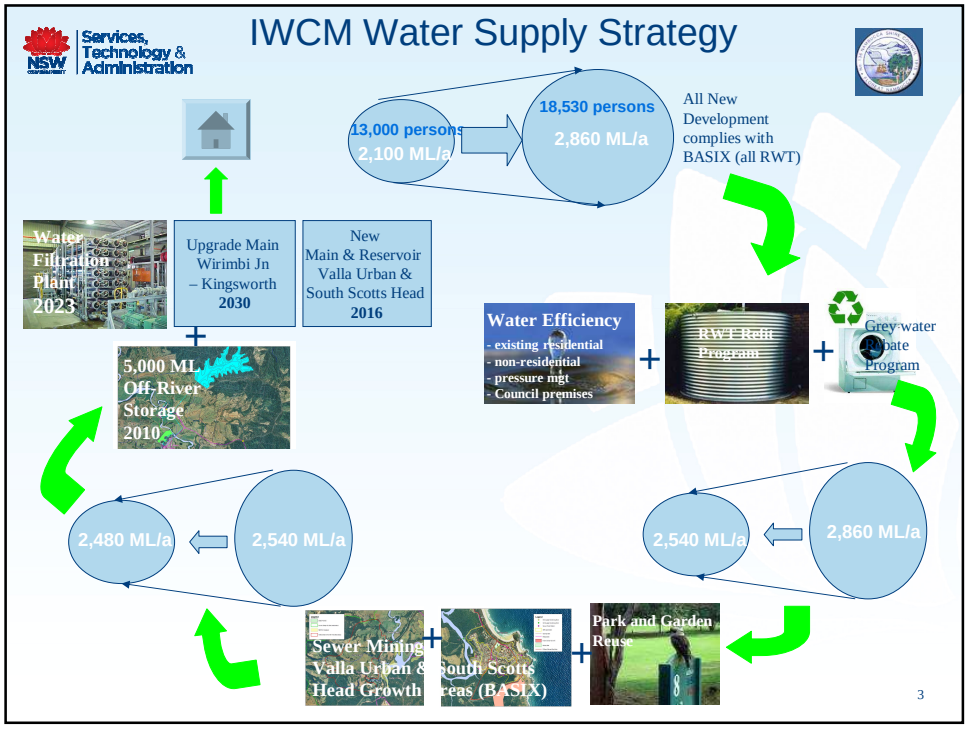
Slide 1

Background

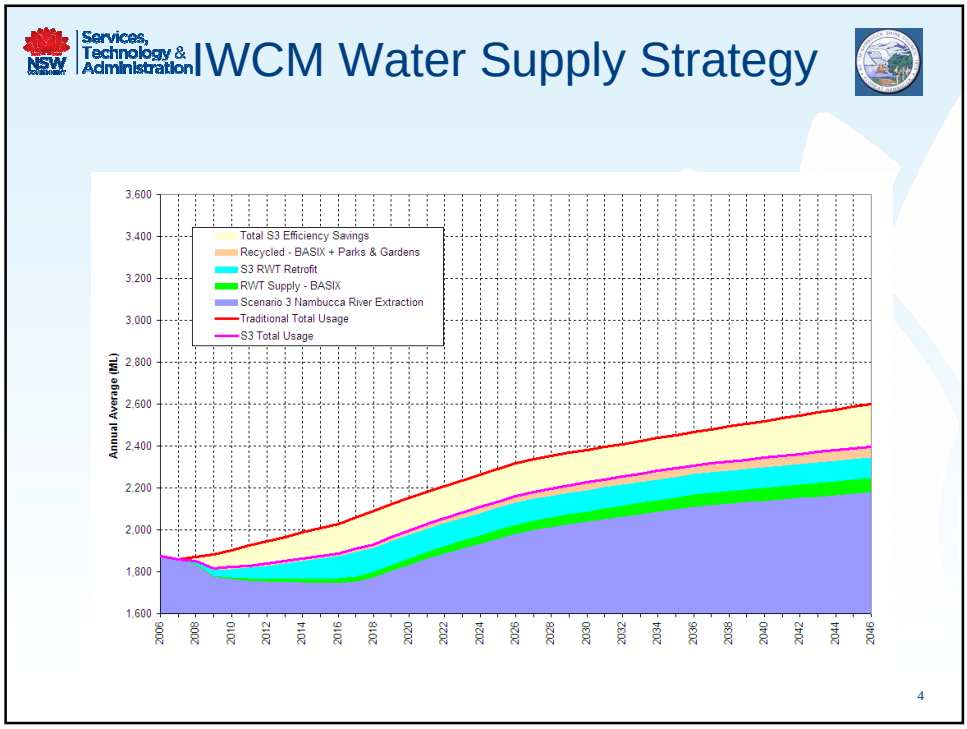
- The IWCM Strategy study commenced in end 2007
- Eight Technical Task Papers were prepared
- 5 Project Reference Group (PRG) workshops were held
- One traditional & 3 integrated scenario strategies were assessed
- The community selected a preferred Strategy Scenario based on triple bottom line (TBL) assessment
- Broader community consultation was held and about 80 written submissions were received and assessed
- Council adopted in-principle the preferred strategy in end 2009

2

Slide 2

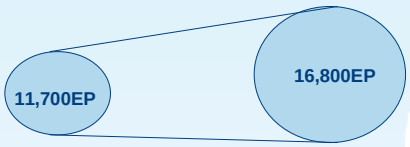

Services, Technology & Administration
IWCM Water Supply Strategy
13,000 persons
2,100 ML/a
18,530 persons
2,860 ML/a
All New Development complies with BASIX (all RWT)
Water Filtration Plant 2023
Upgrade Main Wirimbi Jn – Kingsworth 2030
New Main & Reservoir Valla Urban & South Scotts Head 2016
Water Efficiency
- existing residential
- non-residential
- pressure mgt
- Council premises
RWT Retrofit Program
Grey water Rebate Program
5,000 ML Off-River Storage 2010
2,480 ML/a
2,540 ML/a
2,540 ML/a
2,860 ML/a
Sewer Mining Valla Urban & South Scotts Head Growth
reas (BASIX)
Park and Garden Reuse
3

3


Services, Technology & Administration
IWCM Water Supply Strategy
Total S3 Efficiency Savings
Recycled - BASIX + Parks & Gardens
S3 RWT Retrofit
RWT Supply - BASIX
Scenario 3 Nambucca River Extraction
Traditional Total Usage
S3 Total Usage
Annual Average (ML)
3,600
3,400
3,200
3,000
2,800
2,600
2,400
2,200
2,000
1,800
1,600
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
2032
2034
2036
2038
2040
2042
2044
2046
4

4

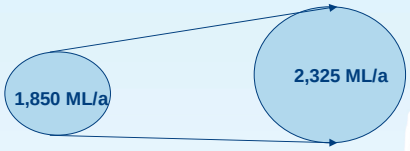
IWCM Sewage Management Strategy



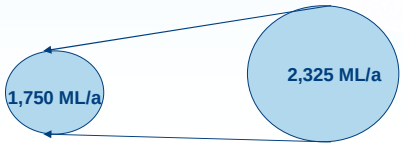
2010	• Nambucca STP - upgrade & augment to 15,000EP • Scotts Head STP – increase capacity by adding chemical dosing
2011	• Bowraville STP - optimise operation & add chemical dosing • Macksville STP – augment UV plant & operate @ higher MLSS during peak period
2015	• Bowraville STP & SPS - replace existing with a new 1,500EP plant
2016-18	• Scotts Head STP - Upgrade & Augment to 3,200EP • South Scotts Head release area - new 500EP sewer mining plant • Valla Urban growth release area - new 1,000EP sewer mining plant • Nambucca STP – upgrade inlet works including VBSPS7 for storm flows from Valla urban growth area
2028	• Augment Macksville STP to 6,500EP & add tertiary filters

5

IWCM Sewer Pumping Strategy



2010 - 20	• stormwater inflow reduction program for **high** priority areas • Nambucca system - augment NHSPS1,5,6,8,14 • Nambucca (Valla Beach) system - augment VBSPS1,5,7,8 & two new for Valla urban growth release area • Macksville system – augment MSPS2,3,4,9,13 & new for DCP17+ nurs. home • Scotts Head system – augment SHPS1 & new for south Scots release area (main) • Bowraville system – BSPS1
2020-46	• stormwater inflow reduction program for **medium** priority areas • Nambucca system - augment NHSPS2,4,13 • Macksville system – augment MSPS10



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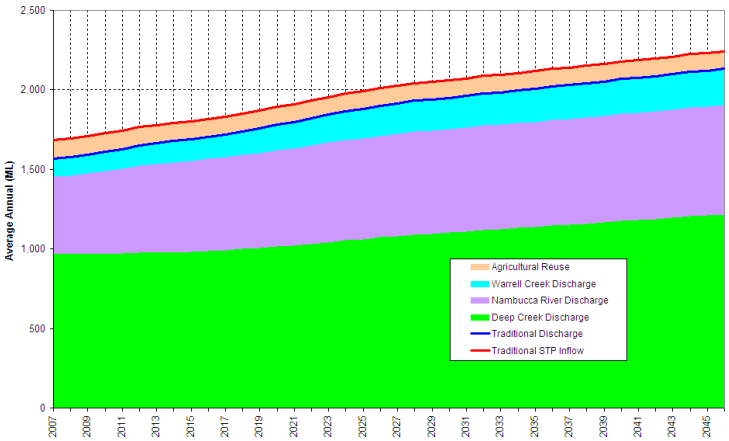
Council Sewerage Schemes



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IWCM Do Nothing Scenario

Current Drought Emergency Measures

Measure	Observation
Water Conservation	oNeeds to be ongoing oHarder in future?
Leakage Reduction	oNeeds to be ongoing oHarder in future?
Residual flow harvesting	oDredge & sand-bag river oSalt water contamination oHow long?
South Creek bore	oPoor water quality oHow long?
Kingsworth storage	o50ML? oPoor water quality
Sea water desalination	oLong lead time oExpensive
Water carting	oLong lead time? oExpensive
Bottled water	oEvacuations? oVery expensive

- Managing restrictions is costly
- Restriction has both social & economic cost

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IWCM Do Nothing Scenario

- **Can the population continue to grow?**
- **Governance responsibility**
- **Status of economic activity (business, tourist, etc)?**
- **Water services does not meet industry best practice**
- **Will state & federal government subsidy be available?**
- **Water services financially not sustainable?**
- **It is not an option!**

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IWCM Strategy

- Item 3 in agenda

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IWCM Water Supply Strategy
Summary of Costs

+


+


= $15M

+


+


= $4.0M

Total Cost = $115M

= $50.2M

TRB = $673/annum

DC = $10,665/ET

= $23.4M

Upgrade Main Wirimbi Jn – Kingsworth **2030**
+
New Main & Reservoir Valla Urban & South Scotts Head **2016**
= $7.6M

Renewal of existing & new assets = $14.6M over 40 yrs

IWCM Sewerage Strategy
Summary of Costs

Inflow/Infiltration Reduction Program = $14.9M

Bowraville system = $0.4M

Macksville system = $12.9M

Nambucca & Valla Beach system = $34.8M

Scotts Head system = $11.5M

Asset renewal existing & new (40 yrs) = $31.8M

Total Cost = $106.3M

TRB = $683/annum

DC = $10,820/ET

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IWCM Strategy

- Item 6 in agenda

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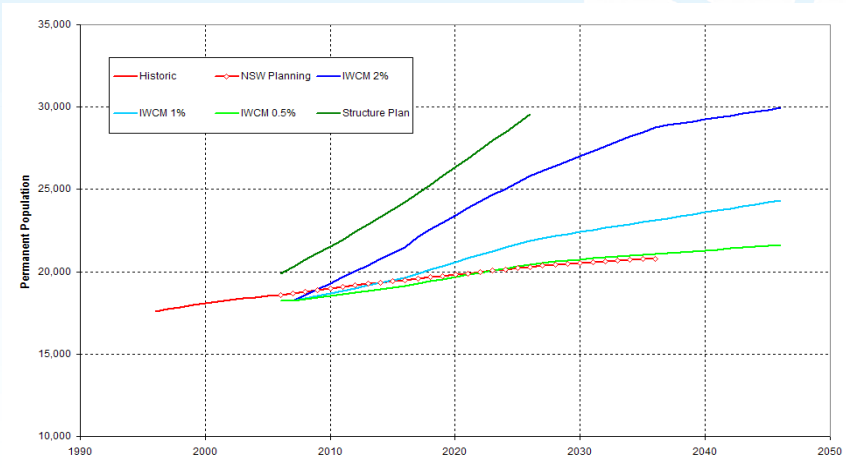
Population Projection



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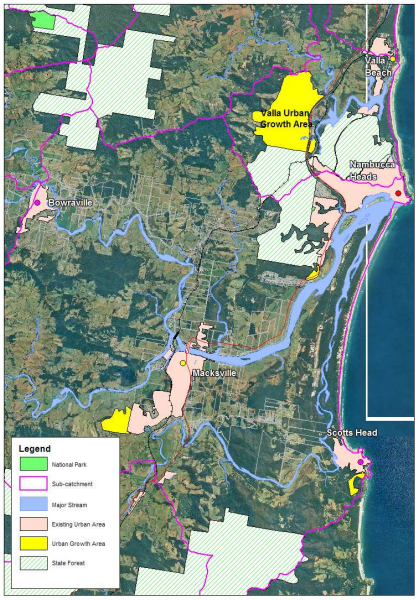
Growth Areas



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Population - Assumptions

Future / Existing	Urban Area	1%
Future Release	All	Area specific HHS Fixed at 2006 Levels
	Valla Urban Growth Area (was Boggy / Cow Creek)	15% of land in future urban release areas will be occupied over a 30-year time frame (start 2017)
	South Valla Beach	Removed
	South West Macksville	Removed - Growth in the DCP 17 area is considered sufficient to meet Macksville's needs. 50% of 570 lots occupied over 40 years
	South Scotts Head	30% of land in future urban release areas will be occupied over a 15-year time frame (start 2017). 50% occupied by 2046.
Existing Urban Areas	All	Area specific HHS Fixed at 2006 Levels
	DA Approved Lots	80% occupancy up over 20 years (start 2008)
	Vacant Lots	80% occupancy up over 40 years (start 2008)
	Potential Development (un-subdivided land)	30% of land occupied over planning horizon (13 lots / Ha)
	Infill - Redevelopment (Nambucca Heads Only)	200 Units redevelopment over 20 years (start 2009)

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Population Assumptions

- For Visitor Population
  - Starting visitor populations established through examination of tourist facilities and estimates of holiday houses (unoccupied dwellings in census)
  - Known tourist developments allowed for (e.g. Valla Urban Tourist Park)
  - Remainder of visitor population grown in proportion to permanent population

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Population - Assumptions

WATER SUPPLY				
Population Centre	**2006**	**2026**	**2046**	**Growth %p.a.**
Bowraville	992	1,025	1,027	0.1%
Macksville	2,705	3,341	3,734	1.0%
Scotts Head Existing	804	1,351	1,506	2.2%
South Scotts Head	0	222	476	-
Scotts Head	804	1,573	1,983	3.7%
Nambucca Heads	5,984	6,752	7,425	0.6%
Valla Beach (including Hyland Park)	1,486	1,792	2,012	0.9%
Valla Urban Growth Area	0	464	838	-
Rural	1,069	1,486	1,512	1.0%
Total Serviced	**13,040**	**16,434**	**18,530**	**1.1%**
Not Connected	5,179	5,436	5,792	0.3%
Shire	**18,219**	**21,870**	**24,322**	**0.8%**
Visitor Population	6,354	7,145	7,510	-

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Population - Assumptions

SEWER				
Population Centre	**2006**	**2026**	**2046**	**Growth %p.a.**
Bowraville	992	1,025	1,027	0.1%
Macksville	2,580	3,216	3,608	1.0%
Scotts Head Existing	801	1,348	1,504	2.2%
South Scotts Head	0	222	476	-
Scotts Head	801	1,570	1,980	3.7%
Nambucca Heads	5,874	6,642	7,315	0.6%
Valla Beach (including Hyland Park)	1,497	1,804	2,024	0.9%
Valla Urban Growth Area	0	464	838	-
Rural	0	0	0	-
Total Serviced	**11,744**	**14,721**	**16,792**	**1.1%**
Not Connected	6,475	7,149	7,530	0.4%
Shire	**18,219**	**21,870**	**24,322**	**-**
Visitor Population	6,272	7,063	7,428	-

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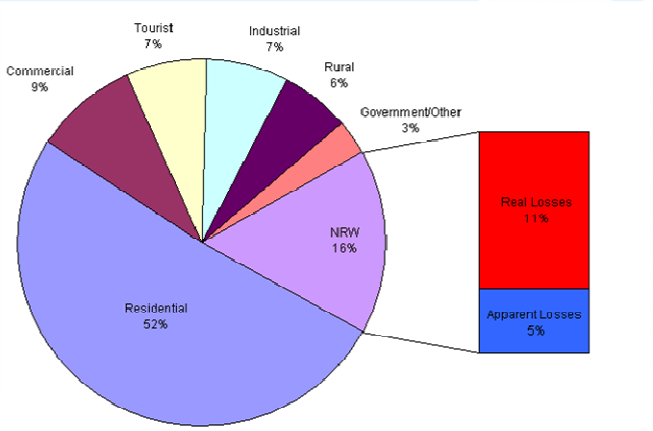
Water User Categories



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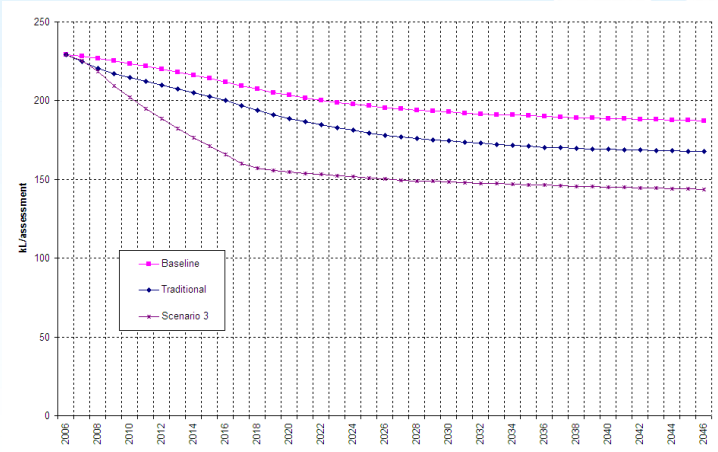
Unit Water Use



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Demand Projection - Annual

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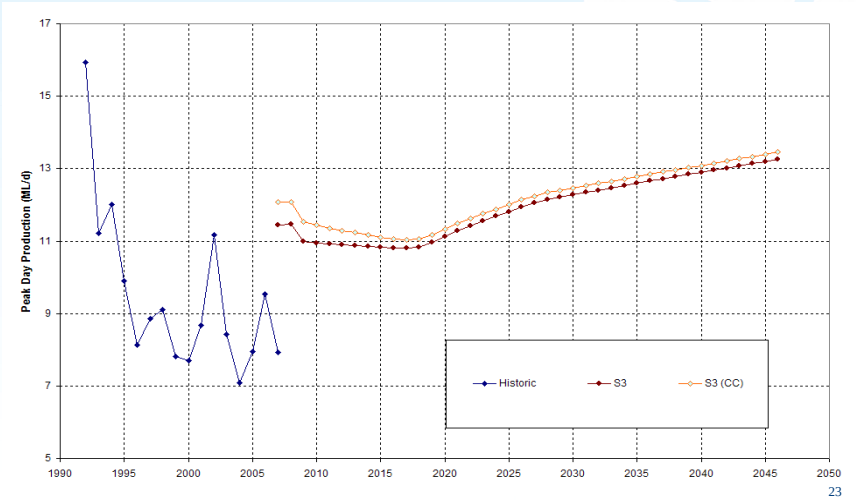
Peak Day Demand



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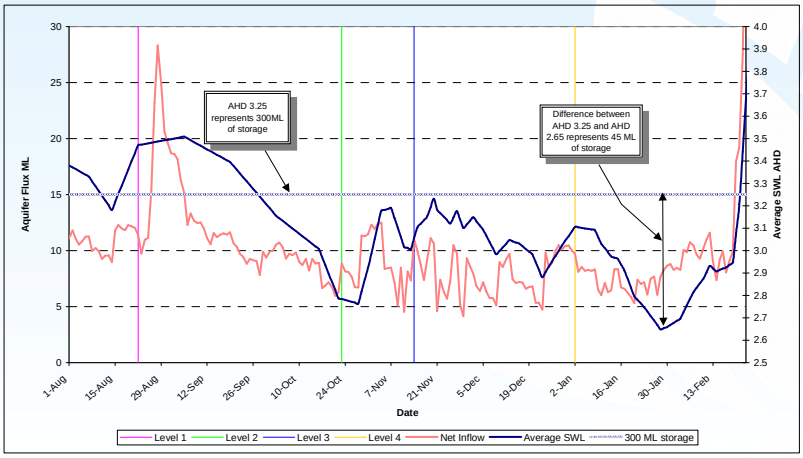
Security of Water Supply - Existing



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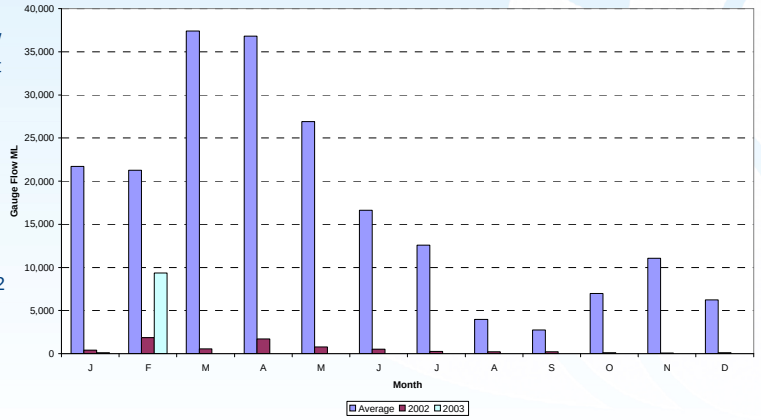
Variability of Nambucca River flows

- Annual average flow is 211GL but highly variable
- Below "average" flows for more than 12 months
- 2002/03 drought broke in late February



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Services, Technology & Administration

Security of Water Supply - New

Reliability – The proportion of time when supply is unrestricted. Over any extended period, restrictions should not be in place for more than 5% of the time. In Nambucca for example this would mean that based on 100 years of stream flow the total duration of water restrictions would be less than 60 months

Robustness – The average frequency of restriction should be less than once every 10 years. There would be less than a 1 in 10 chance of having to impose restrictions in any one year

Security - The storage will not be drawn down to below a critical level which would prevent Council providing even a basic supply or require alternative supply measures. The IWCM strategy guards against this scenario by ensuring that the system can supply 80% of unrestricted demand from the time restrictions are imposed. This is based on the conservative assumption that the full drought of record could recommence at this time.

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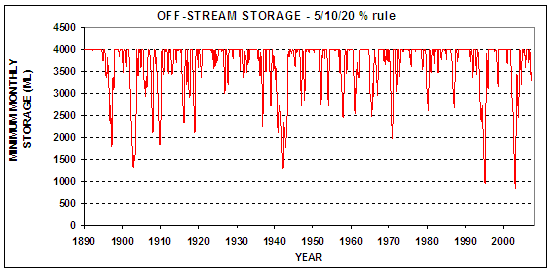
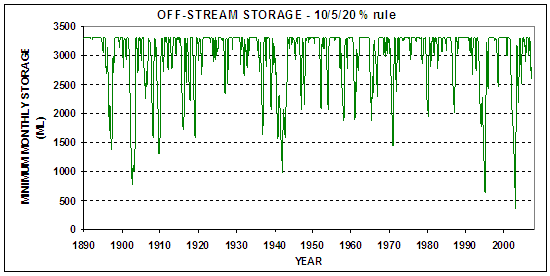
Security of Water Supply - New

Secure Yield
2,490ML/a



Storage size =
4,000ML
Bores = 33ML/d

Secure Yield
2,490ML/a

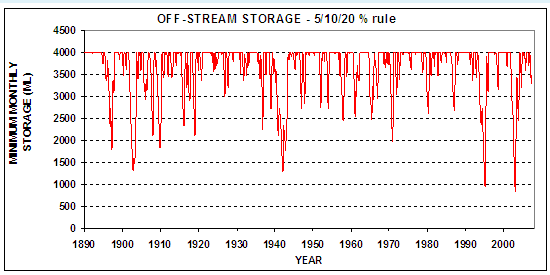


Storage size =
3,300ML
Bores = 33ML/d

27

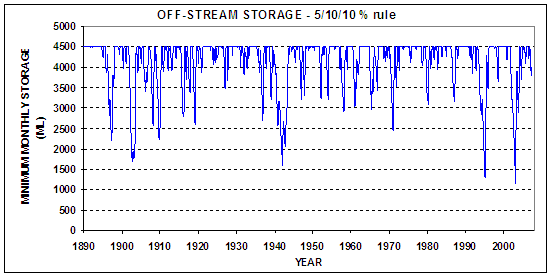
Security of Water Supply - New

Secure Yield
2,490ML/a



Storage size =
4,000ML
Bores = 33ML/d

Secure Yield
2,490ML/a



Storage size =
4,500ML
Bores = 33ML/d

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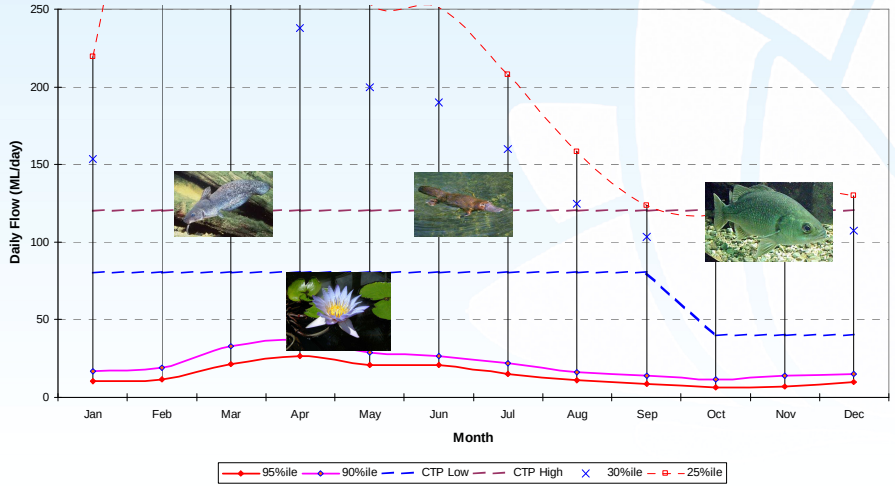
Services, Technology & Administration

Water Supply – Environmental Flows

For example … environmental objectives that will be achieved in Nambucca River



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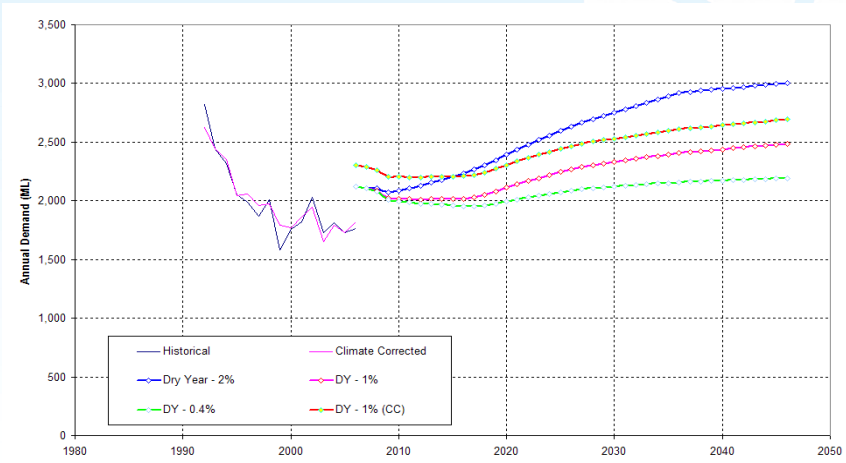
Services, Technology & Administration

Demand Projection – Climate Change



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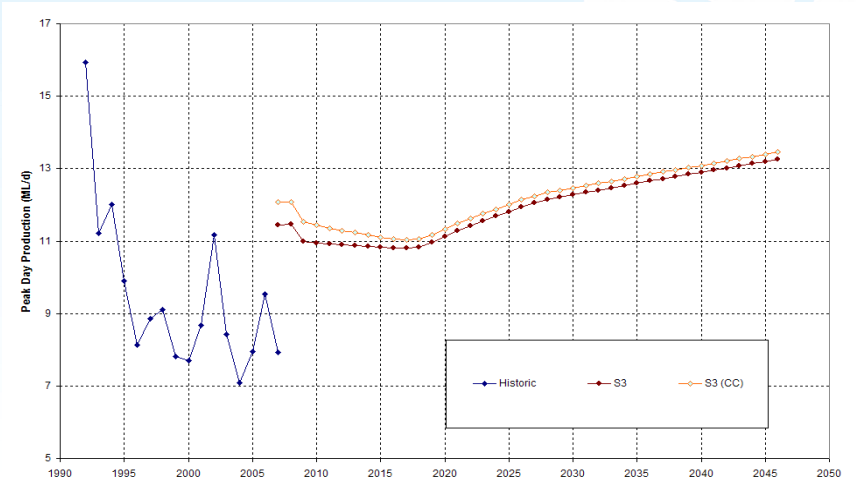
Peak Day Demand – Climate Change



31

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Services, Technology & Administration

Council Sewerage Schemes

Nambucca Head

- Existing sewage plant effluent *regularly* fails to comply with licence condition
- Current population load exceed the capacity of existing sewage plant and some sewer pump stations/mains
- Part of existing sewage plant is not modern technology
- Population (and hence load) served by the scheme is increasing
- The major Valla Urban growth area sub-division may need to be served by this scheme

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Services, Technology & Administration

Council Sewerage Schemes

Macksville, Scotts Head & Bowraville

- Existing sewage plant effluent *occasionally* fails to comply with licence condition
- Some sewer pump station catchments have high groundwater & stormwater flows into the sewers
- Population (and hence load) served by the Macksville & Scotts Head schemes are increasing
- The capacity of existing sewage plant and some pump stations would be exceeded with population growth – Scotts Head STP (2016) and Macksville STP (2029)
- Bowraville sewage plant is at capacity and is ageing - needs replacement

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Services, Technology & Administration

Others

- Current management plans and systems need updating
- Planning and development control instruments relating to water services need strengthening
- Existing performance and environmental monitoring and data management need review to ensure best practice
- Current pricing of water services needs review including:
  - Access charge
  - Usage charge
  - Developer charges

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Services, Technology & Administration

IWCM Strategy

- Item 7 in agenda

Services, Technology & Administration

IWCM Water Supply Strategy
Detailed Cost Breakdown

	Duration (Years)	Participating Accounts	Commencement Year	Program Cost
Residential Tuneup Retrofit Program consisting of: • 3A Showerhead; • Cistern Displacement Unit; • 3A Tap Aerators • Quick leakage check; and • Visual audit and rectification of all minor fixture leakage • Micro-irrigation Unit; • Water efficient washing machine rebate; and • Cistern Replacement rebate.	10	2,201	2,011	4,254
Non-Residential Water Efficiency Program	4	62	2011	14
System Leakage Reduction Program consisting of: • Mains Replacement; • Improved Response Times; and • Improved telemetry and metering. • Pressure Reduction	10	N/A	2011	5,126
RWT Refit program with a target to install 50% of existing homes with a tank	10	2,201	2011	5,580
		Total Cost		14,974

IWCM Water Supply Strategy
Detailed Cost Breakdown

WATER SUPPLY		
Description	**Capex ($M)**	**Year for Implementation**
5,000 ML off-river storage (No extra bores)	$48.1	2010
An additional 8 ML/d borefield capacity along South Arm Creek	$4.0	2023
Catchment management, wellhead protection and storage protection works	$1.7	2010
Water Filtration Plant	$23.4	2023
Upgraded Distribution Works	$4.1	2016
Parks and Garden Reuse @ Macksville	$1.3	2017
BASIX compliance with reclaimed water at South Scotts Head Release Area (Dual retic cost only)	$1.0	2017
BASIX compliance with reclaimed water at Valla Urban Growth Area (Dual retic cost only)	$1.7	2017
TOTAL	**$85.3**	

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IWCM Sewerage Strategy
Detailed Cost Breakdown

High Priority inflow measures (10 years) = $7.3M

Medium priority inflow measures (10 years) = $7.6M

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IWCM Sewerage Strategy
Detailed Cost Breakdown

SEWER	
Description	**Capex ($M)**
Bowraville Sewerage Scheme	
STP	$0.3
SPS and Rising Mains	$0.1
Total	$0.4
Macksville Sewerage Scheme	
STP	$10.1
SPS and Rising Mains	$2.7
Total	$12.8
Scotts Head Sewerage Scheme	
STP	$6.7
South Scotts Head Sewer Mining	$3.7
SPS and Rising Mains	$1.1
Total	$11.5
Nambucca Heads Sewerage Scheme	
STP	$18.6
Valla Urban Growth Area Sewer Mining	$7.0
Nambucca Heads SPS and Rising Main	$2.9
Valla Beach SPS and Rising Main	$6.3
Total	$34.8
TOTAL	**$59.5**

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IWCM Strategy

- Item 8 in agenda

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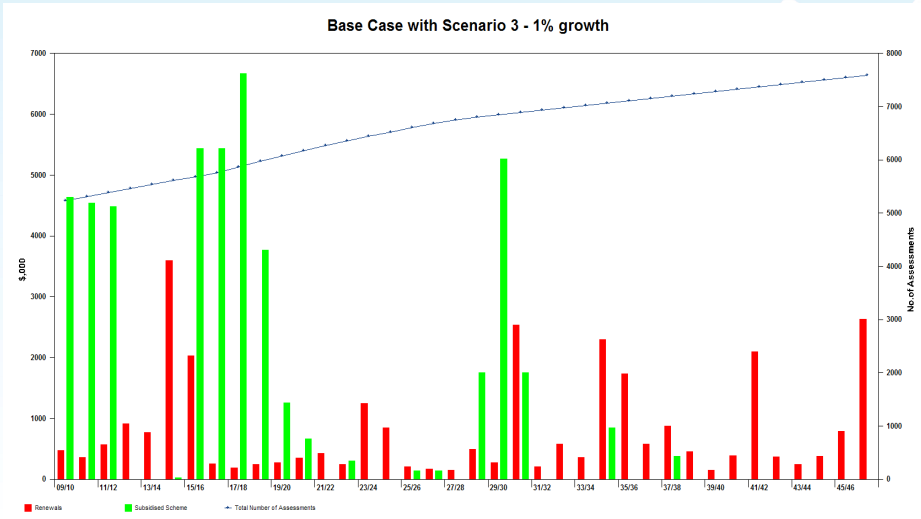
IWCM-Sewerage - New & Renewal Works Plan

Services, Technology & Administration



41

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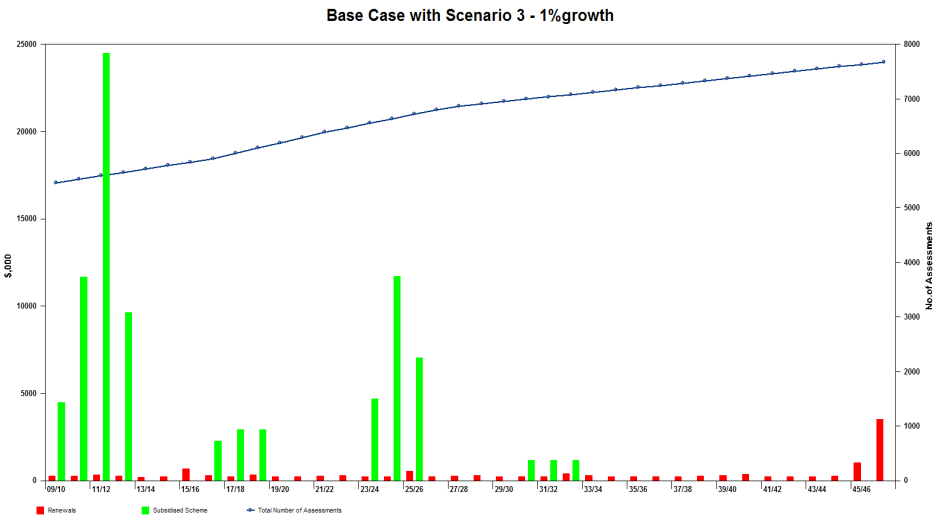
IWCM-Water - New & Renewal Works Plan

Services, Technology & Administration



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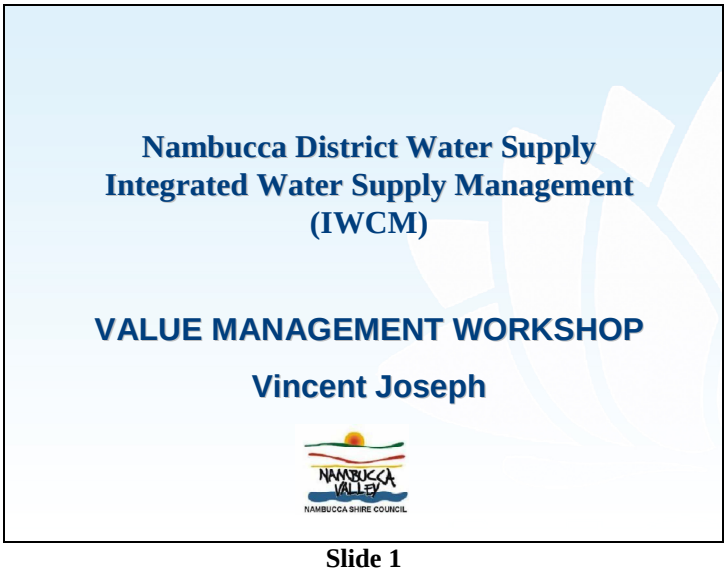
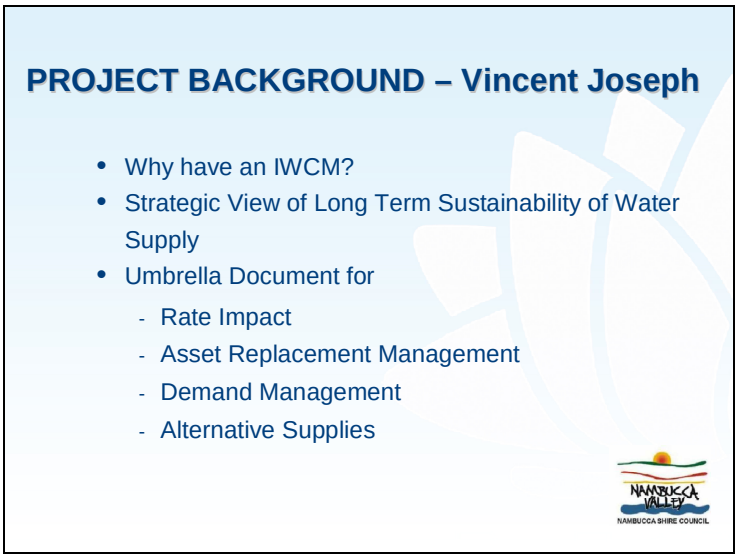
APPENDIX E

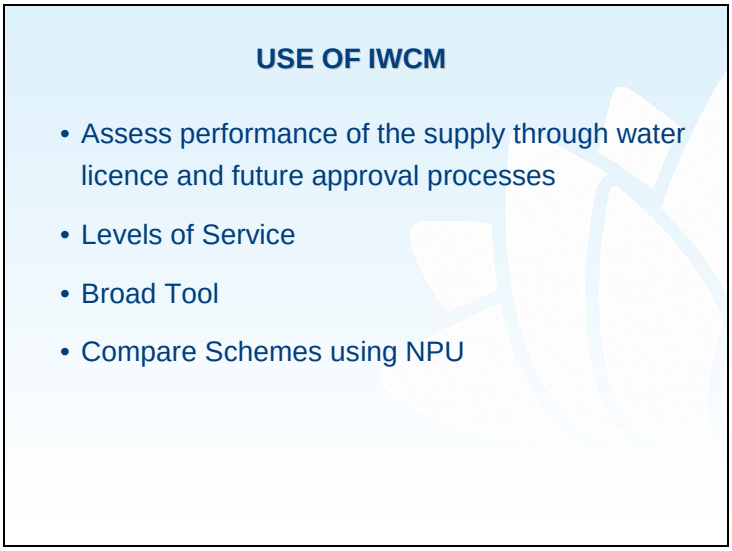
Presentation – Vincent Joseph


Nambucca District Water Supply
Integrated Water Supply Management
(IWCM)
VALUE MANAGEMENT WORKSHOP
Vincent Joseph
NAMBUCCA SHIRE COUNCIL

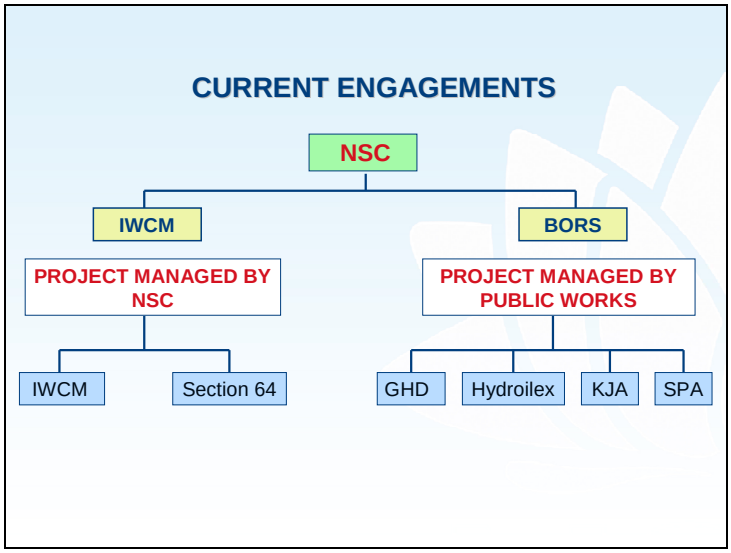
Slide 1


PROJECT BACKGROUND – Vincent Joseph
Why have an IWCM?
Strategic View of Long Term Sustainability of Water Supply
Umbrella Document for
Rate Impact
Asset Replacement Management
Demand Management
Alternative Supplies
NAMBUCCA SHIRE COUNCIL

2


USE OF IWCM
Assess performance of the supply through water licence and future approval processes
Levels of Service
Broad Tool
Compare Schemes using NPU

3



4

PROGRAM STATUS

Completed

- Engaged Public Works — August 2007
- Borefield Investigation — March 08 - Sep 09
- EIS Exhibition — Nov 09 - Dec 09
- Concept Design Complete — January 2010

NAMBUCCA SHIRE COUNCIL

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PROGRAM STATUS

Proposed Program

- Council Determine EIS — April 2010
- Detailed Design — Jan - Dec 2010
- Tendering — Feb – Aug 2011
- Construction - All Works — Oct 2011 – Oct 2012
- Construction - Staged — Oct 2011 – 2015??

NAMBUCCA SHIRE COUNCIL

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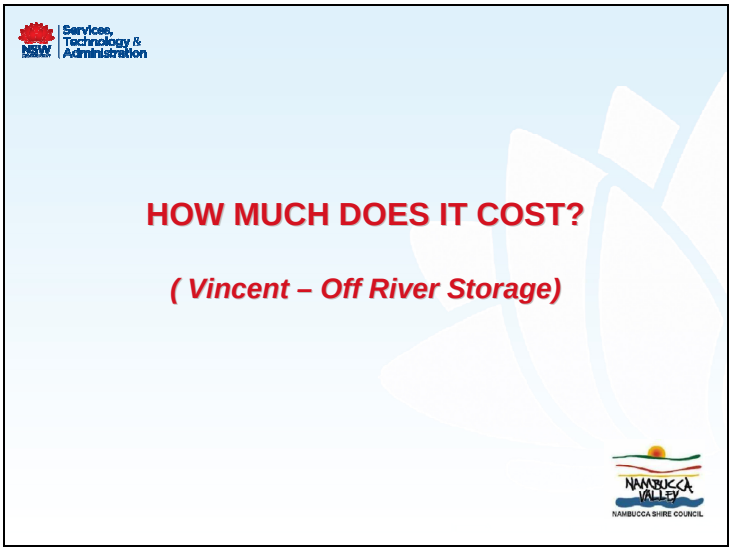


7

Current Estimate - BORS

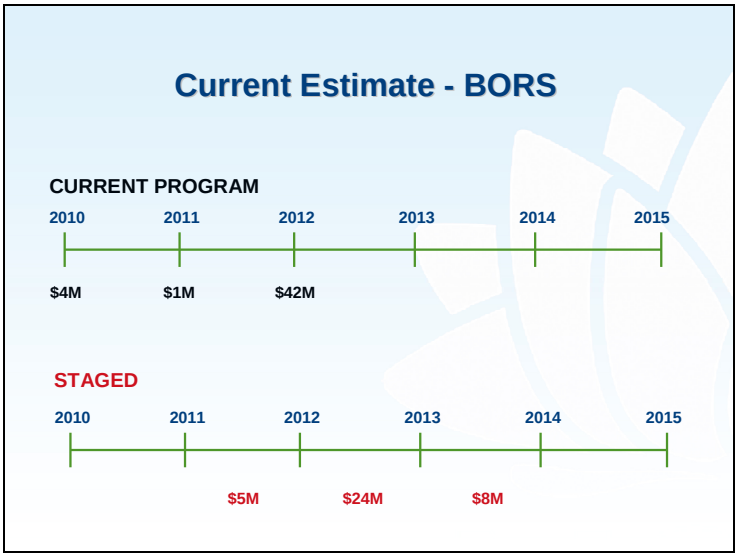
Preconstruction	$ 7M
Off River Storage	$24M
Bores, power, pipeline, road	$18M
Other	$ 5M
Total	$54M

8

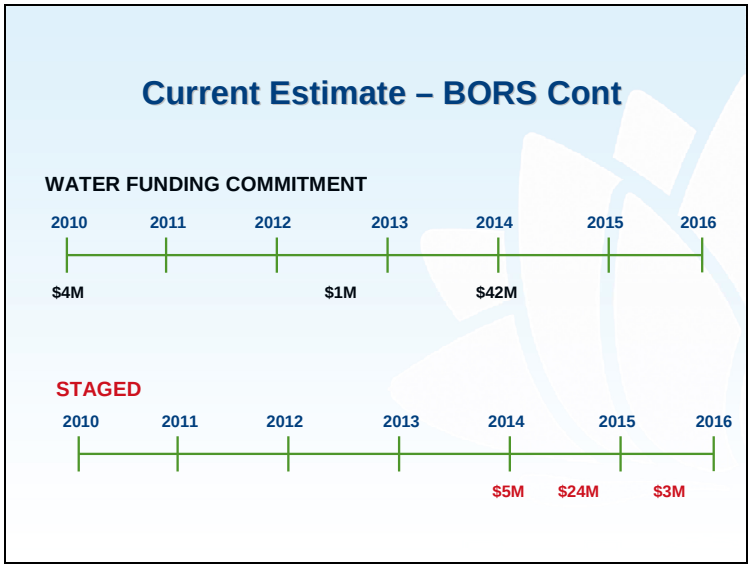
Borefield Staging

Stage 1	2012	$8M
Stage 2	2015	$3M
Stage 3	2020	$5M
Stage 4	2025	$2M

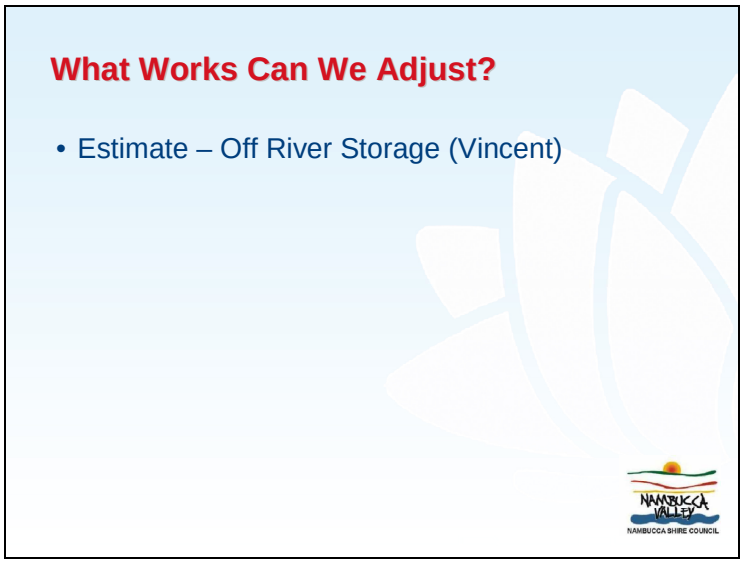
9


Current Estimate - BORS
CURRENT PROGRAM
2010
2011
2012
2013
2014
2015
$4M
$1M
$42M
STAGED
2010
2011
2012
2013
2014
2015
$5M
$24M
$8M

10


Current Estimate – BORS Cont
WATER FUNDING COMMITMENT
2010
2011
2012
2013
2014
2015
2016
$4M
$1M
$42M
STAGED
2010
2011
2012
2013
2014
2015
2016
$5M
$24M
$3M

11


What Works Can We Adjust?
• Estimate – Off River Storage (Vincent)
NAMBUCCA VALLEY
NAMBUCCA SHIRE COUNCIL

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BORS Estimate Breakdown

- Pre Construction
  - Spent to date $4.08M
  - Balance to Complete $3.0M
  - Contingencies $4.12M

  $11.2M

- Construction
  - Off River Storage + Other Works $34.7M*****
  - Contingency – general $6.4M (23%)
    - grouting $0.2M
    - increased costs $1.5M

  $42.8M

***** Contingency 15% $5M

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Estimate Breakdown

- Pre Construction $8.4M
  - Storage Land $0.7M
  - Concept Design + EIS $2.5M
  - Salinity Monitoring $.18M
  - Project Management $0.7M

  $4.08M

- Balance to Complete
  - Detailed Design + Land Matters $1.3M
  - Adaptive Management Strategy $0.1M
  - Land Acquisition $0.7M
  - Project Management $0.9M

  $3.0M

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- Contingencies
  - Adaptive Management Risk $.29M
  - Environmental Management Plans $.80M
  - Substation Land Site $0.5M
  - Design
    - additional $0.1M
    - increased costs $0.3M
  - Environmental
    - monitoring $0.4M
    - challenges $0.4M
    - INU stabilisation $0.5M
  - Land
    - compensatory habitat $0.2M
    - additional $0.3M
  - General $.33M

  $4.12M

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APPENDIX F

Register of Key Issues and Concerns from Off Creek Storage Value Management Workshop

APPENDIX F

Sub Group	Issue and Concern	Addressed At Workshop	Post Workshop Comment
Blue	Will rate increases and developer charges be affordable	No	The IWCM workshop is to review this issue
	What is an acceptable rate and developer charge	No	The IWCM workshop is to review this issue
	When should Council provide a secure supply if nothing is done	No	Some opinion is that Council does not have a secure water supply. In the EIS the "Do Nothing" option outlines the risks if a secure supply is not provided.
	Why can't there be an on-stream dam	Maybe	
	How big is enough for the dam	Yes	
	Will this supply be enough for industrial growth	Yes	
	What are the ongoing operational and maintenance costs	No	This will be best defined in the detailed design phase. In the meantime Clarence Valley Council's recurrent costs could be investigated for Shannon Creek
	Can Council operate under the Drought Management Plan	No	Previous advice to Council is no
	Do we know how much water we have now	No	Yes but further testing is required as per recommendation 2 of this report
	Is there a viable alternative to this project	No	In the 1990's various alternatives were investigated. Around 2004 these were revisited and a triple bottom line analysis identified the current proposal as the preferred option
Green	How much will Adaptive Management cost	Info available	The process and methodology involved in Adaptive Management needs to be defined by Council and submitted to Regulatory Authorities. Upon this definition costs can be assessed

Sub Group	Issue and Concern	Addressed At Workshop	Post Workshop Comment
	Can Adaptive Management change reliability	Yes	
	How much will environmental compliance costs impact on rates	No	The IWCM workshop is to review this issue
	Will quality of stored water be suitable	Yes	
	Changing legislative requirements	No	This is a risk with probability hard to assess.
	Groundwater quality and collapse	Yes	
	Effect of climate change (water quality, extraction and tidal wedge)	Yes	
	Have Land Management costs been taken into account	No	This will be best defined in the detailed design phase. The current estimated capital costs include for land purchase, compensatory habitat etc. Clarence Valley Council's recurrent costs for Shannon Creek could be investigated to establish estimates.
	If we build the works can we make savings in other areas of the IWCM	No	No, the size of the storage is premised on implementing Scenario 3 of the IWCM
	"Do nothing" – what are the environmental risks	Yes	
	Water Licence – rules for initial infilling	No	Compliance with extraction rules and environmental flows will be required
	What is the life span of the Works	Yes	
	Will IWCM extend the life of the project	Yes	
	Will environmental release from the storage be "real" (pattern)	Yes	
	Is water filtration required	Yes, not required	
	Did the environmental studies take into account	Yes	

Sub Group	Issue and Concern	Addressed At Workshop	Post Workshop Comment
	seasonality		
	Impact on hollow log species plus hollow bearing trees	Yes	
	Contamination of borefields	Yes	
	Evaporation rates (losses in the system)	Yes	
	Siltation (river and dam)	Yes	
	Is population projection reasonable	Yes	
	How are the Works related to the IWCM	Yes	
	Capacity of power supply for current works and any future works e.g. filtration plant	No	The concept design included investigations on power supply needs. Country Energy has been consulted
	Can we stage the Works	Yes	
	Benefits of smaller storage	Yes	
Red	Is population growth 'correct'	Yes	
	Will no water mean no development	Yes	
	Running out of water	Yes	
	Environmental flows – are they reasonable	Yes	
	Can demand management be better	Yes	
	No alternative solution being provided or discussed	No but info available	In the 1990's various alternatives were investigated. Around 2004 these were revisited and a triple bottom line analysis identifies the current proposal as the preferred option.
	Supply has not failed in the past	Yes	
	Life span of Works	Yes	
	Losing momentum in getting a supply (PARALYSIS BY	Yes	

Sub Group	Issue and Concern	Addressed At Workshop	Post Workshop Comment
	ANALYSIS)		
	Need to have proactive environmental management	Yes	
	Salt intrusion and future water quality from both bores and storage	Yes	
Black	Water quality in times of drought	Yes	
	Transfer of Forestry Land	Yes	
	Examination of other dam sites	No but info available	In the 1990's various alternatives were investigated. Around 2004 these were revisited and a triple bottom line analysis identifies the current proposal as the preferred option
	Stagnant water and algae	Yes	
	Belief in EIS Statements	No	Statements in the EIS are made with the information available and are generally based on professional opinion & expertise.
	Can we / why not use tanks (recognising water quality issues)	No	The use of tanks is addressed and taken into account in adopting Scenario 3 of the IWCM
	State government consent conditions imposing $ e.g. Environmental monitoring	Yes	
	Claims against Council for failure to supply	No but info available	Legal advice to Council suggests that a "do nothing" option exposes Council to potential claims
	How much water is available	Yes	
	Overreaction to 2000 drought	Yes	
	Wind driven assistance to pumping	No	Previous investigations have concluded that windmills do not supply sufficient capacity
	Affect on general water table	Yes	
	Insecure water tank supply	No	The use of tanks is addressed and taken into

Sub Group	Issue and Concern	Addressed At Workshop	Post Workshop Comment
			account in adopting Scenario 3 of the IWCM
	Cost of env'l flow provision compared with the cost of just getting a secure yield	No but info available	The extra costs due to environmental flows is estimated at approximately 15% of the total project cost
	Affect on downstream users considering impact of tides	No	Design of the borefield should prevent salt water intrusion
	Change of government and change to water authorities	Yes	
	Recycled water – has it been considered	Yes	
Extra	The affect of conflict of interest on decision making and not being aware of it	Yes	
	Compensatory habitat (need for and cost)	Yes	
	Assistance to industry to capture stormwater and rainwater	No	This issue was taken into account in the IWCM
	Affect on demand management	No	Demand management is addressed in the IWCM strategy and adoption of its Scenario 3

NSW GOVERNMENT

Public Works
NSW Water Solutions

L13, McKell Building
2-24 Rawson Place
Sydney NSW 2000

T 02 9372 7871
F 02 9372 7877
TTY 1300 301 181