

TITLE: [CNR-CM] Tweed District Water Supply Augmentation Options - Selecting a Preferred Option

ORIGIN:

Water

SUMMARY OF REPORT:

Council's Integrated Water Cycle Management (IWCM) Strategy, adopted in its meeting of 19 December 2006, incorporates 18 water management actions. Action 7 focuses on improving the security and increasing the amount of water supplied for the Tweed District.

At its meeting of 20 October 2009, Council adopted a process to ensure augmentation of the water supply to meet projected demand to 2036. This approach provides both security and flexibility by:

1. Selecting a preferred option (based on Water Supply Augmentation Options study). THIS PHASE
2. Gaining development approval for that option by 2023 (so that the Tweed has an augmentation option that can be brought online quickly when required). NEXT PHASE.
3. Committing further resources to construct and operate the approved scheme when it is actually needed. CONSTRUCTION AND OPERATION PHASE.

A Water Supply Augmentation Options study has been undertaken in two stages. The first stage of the study was adopted by Council in its meeting of 20 October 2009. The second stage of the Options study (Fine Screen Report) assessed short-listed options based on more detailed information and studies, together with a comprehensive Community Consultation process.

This report outlines the results of the Fine Screen Options study and recommends a preferred option to augment the Tweed District Water Supply to meet the Shire's needs until the end of the planning period in 2036.

RECOMMENDATION:

That Council:

1. **Monitors and resources demand management actions with the aim of achieving at least BASIX/WELS reductions and reports to Council annually on progress.**
2. **Adopts the raising of Clarrie Hall Dam as the preferred option for augmenting the Tweed District Water Supply.**
3. **Proceeds with the Planning Approvals process and Detailed Design in relation to the raising of Clarrie Hall Dam.**

4. **Liases with landholders at Doon Doon Creek to facilitate acquisition of properties or parts thereof as required.**
5. **Determines the most cost-effective approach to upgrading the existing Clarrie Hall Dam spillway by 2016.**
6. **Pursues dialog with the relevant South East Queensland water authorities in parallel as an alternative augmentation option and as an emergency drought option.**
7. **Retains ownership of land at Byrill Creek to enable consideration of future water supply augmentations beyond the current planning horizon.**

REPORT:

Background

Integrated Water Cycle Management Strategy (IWCM)

Council's IWCM approach to water management has included a combination of focussed demand management and securing water supplies. Council's IWCM Strategy, adopted 19 December 2006, incorporates 18 specific Strategy Actions.

Demand Management Strategy (DMS)

Action 1 of the IWCM aims at investigating ways to reduce potable water use, decrease water extractions from the environment, and increase the amount of water supplied from alternative sources such as water recycling and rainwater tanks. Council has been successful in reducing per capita water use by approximately 40% since the 1990's. The Demand Management Strategy (DMS) proposes ways to further reduce residential and non-residential demand and increase the amount of rainwater and recycled water utilised.

The DMS found the existing water supply capacity will be exceeded - due to ongoing population growth - despite significant reductions in per capita water use. Therefore Action 7 of the IWCM focuses on increasing the secure yield of the existing water supply.

Chronology of Water Actions

Since the adoption of Council's LEP2000 and gazettal of the Water Management Act (2000) a number of actions have been carried out in relation to strategic water management within the Shire. An overview of significant actions, particularly the relative Council Business Papers is provided in Table 1 below.

Table 1: Chronology of relevant significant water actions, particularly the relative Council Business Papers

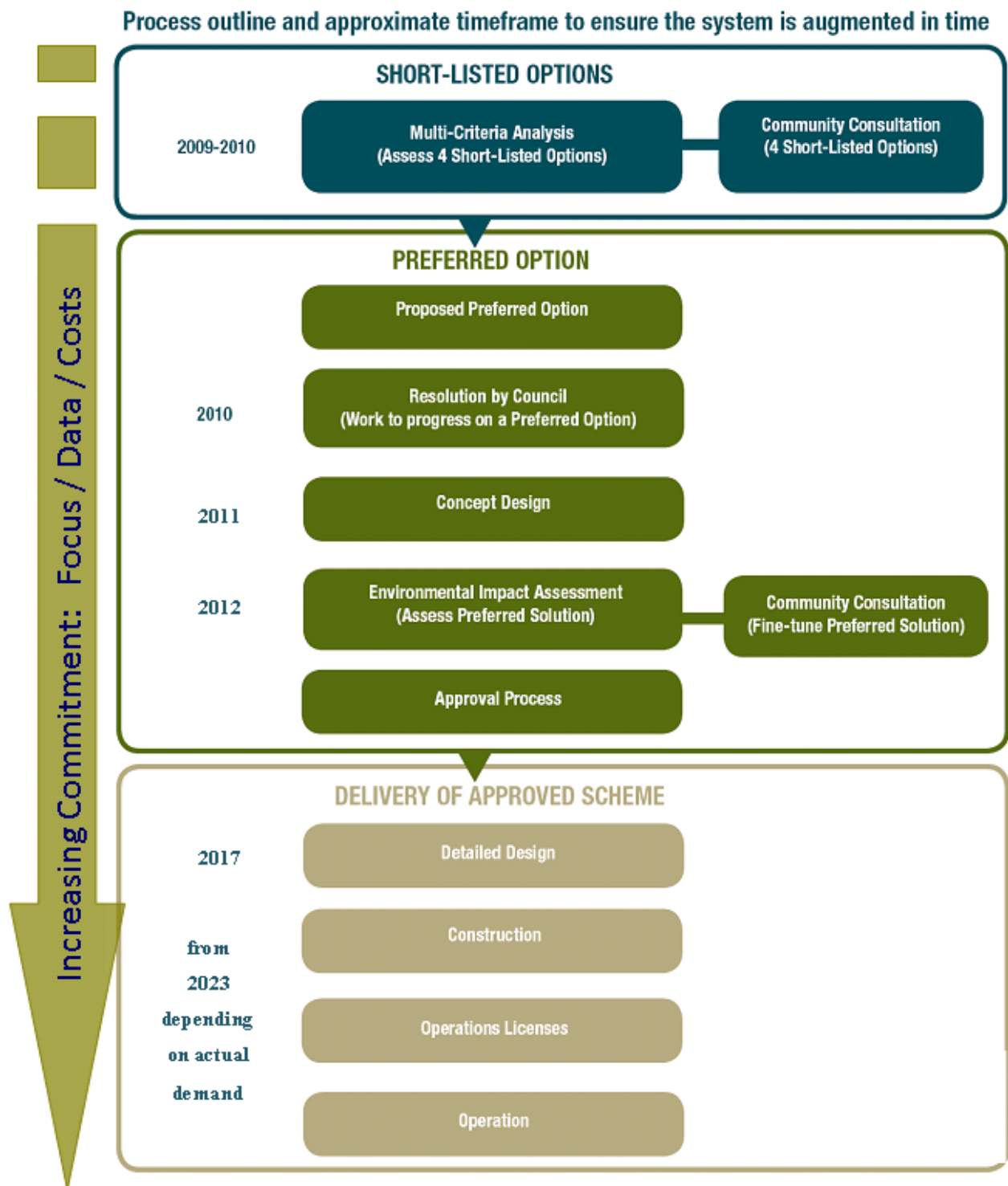
Actions carried out under:	
Water Management Act, 2000 (including requirements from Water Sharing Plans, Environmental flows, Licensing and Extraction entitlements)	
2007	First draft Water Sharing Plan produced by Office of Water (from Water Management Act 2000)
2008	Council Bus.Paper: 1787251 Regional Water Plan - Department of Water & Energy 25-Mar-2008
2009	Second draft Water Sharing Plan produced by Office of Water
Integrated Water Cycle Management (IWCM)	
IWCM Strategy	
2002	Council Bus.Paper: 689263 Tweed Valley Integrated Water Cycle Plan 09-Aug-2002
2006	Council Bus.Paper: 1510652 Tweed Integrated Water Cycle Management (IWCM) Context Study & Strategy Report 09-Dec-2006
2006	Council Bus.Paper: 1510204 Water and Wastewater Activity Management Plans 04-Dec-2006
2007	Council Bus.Paper: 1660674 Integrated Water Cycle Management (IWCM) Community Consultation Strategy 11-Sep-2007
2009	Council Bus.Paper: 1969192 Integrated Water Cycle Management (IWCM) Strategy - Status Report 27-Jan-2009
Demand Management	
2001	Council Bus.Paper: 640534 Water Pricing 21-Nov-2001
2004	Council Bus.Paper: 1074163 Grey Water Reuse 30-Jul-2004
2005	Council Bus.Paper: 1286564 Rainwater Tank Policy Adoption 21-Oct-2005

2006	Council Bus.Paper: 1405827 Australian Government Water Smart Australia Program	02-May-2006
2006	Council Bus.Paper: 1394122 Tyalgum Public School Rainwater Project	10-May-2006
2006	Council Bus.Paper: 1427633 Integrated Water Cycle Management Strategy Action 3 and 11 Effluent Reuse	25-Jul-2006
2007	Council Bus.Paper: 1592769 Residential Water & Energy Retrofit Program	04-May-2007
2007	Council Bus.Paper: 1650642 Irrigation of Les Burger Rugby Sports Fields with Recycled Water	14-Aug-2007
2008	Council Bus.Paper: 1829185 Tweed District Long Term Water Supply - Demand Management Strategy	26-May-2008
2009	Council Bus.Paper: 1969230 Tweed District Water Supply - Demand Management Strategy	19-Jan-2009
2010	Council Bus.Paper: 11125008 Demand Management Strategy	06-Jan-2010
Drought Management		
2002	Report on required Drought Actions	
2007	Council Bus.Paper: 1550624 Tweed District Water Supply Restriction Policy	27-Feb-2007
2009	Council Bus.Paper: 3397353 Water Supply Drought Management Strategy	10-Jul-2009
Long term Water Supply		
2002	Detailed Water Supply Yield Analysis report	
2003	Council Bus.Paper: 904663 Clarrie Hall and Byrill Creek Dams	07-May-2003
2004	Council Bus.Paper: 1067117 Clarrie Hall Dam Spillway Upgrade & Storage Capacity Increase	14-Jul-2004
2005	Council Bus.Paper: 1208313 Tyalgum Water Supply Upgrade	23-May-2005
2006	Updated detailed Water Supply Yield Analysis report - take into account 2002-2003 drought and environmental flow requirements	
2006	Council Bus.Paper: 1511526 Tweed District Long Term Water Supply	04-Dec-2006
2009	Council Bus.Paper: 7218831 Tweed District Water Supply Augmentation - Process to Augment and Methodology to Determine a Preferred Option	09-Oct-2009
2010	Council Bus.Paper: 11125008 Tweed District Water Supply	06-Jan-2010

Water Augmentation Process

At its meeting of 20 October 2009, Council adopted a process to ensure augmentation of the water supply to meet projected demand to 2036. The phased approach reduces risks by ensuring the requirements of the previous phases have been met and will not impede subsequent phases. This approach provides both security and flexibility by:

1. Selecting a preferred option (based on Water Supply Augmentation Options study). **THIS PHASE**
2. Gaining development approval for that option by 2023 (so that the Tweed has an augmentation option that can be brought online quickly when required). **NEXT PHASE.**
3. Committing further resources to construct and operate the approved scheme when it is actually needed. **CONSTRUCTION AND OPERATION PHASE.**



Augmenting the Secure Yield

The secure yield of the existing Tweed Shire water supply is approximately 13,750ML/a. Demand will exceed supply at some time in the future regardless of which demand management approach is used. The actual date this occurs will depend on the success of demand management actions and actual population growth rates.

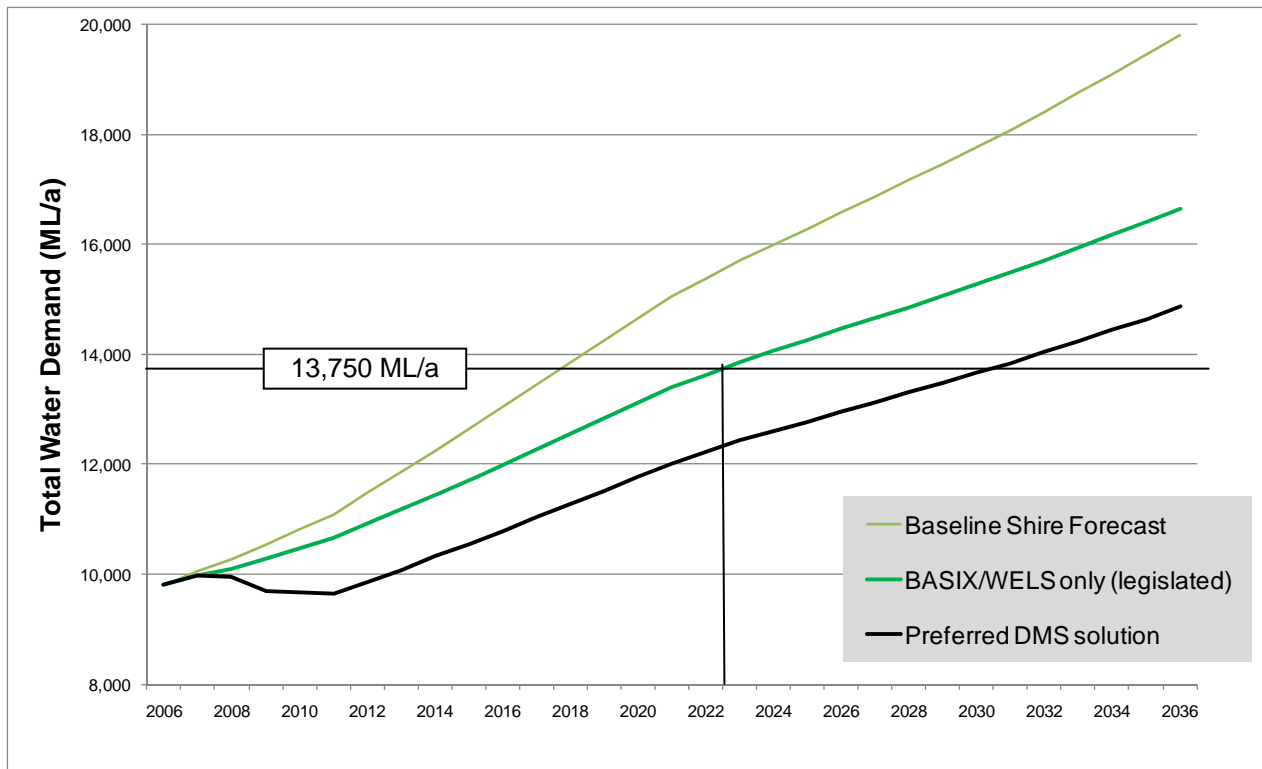


Fig 1: Projected growth in Tweed Shire Annual Water Demand depending on Demand Management actions

The BASIX/WELS demand curve is considered the most appropriate for water supply augmentation planning. The Baseline curve is considered overly-conservative. Council can not mandate the preferred DMS solution. The BASIX/WELS demand management actions are legislated and offer greater certainty they will be met as a minimum.

Actual population growth rates will also have considerable influence on the date augmentation will be required. To ensure the Tweed is ready and does not run out of water, Council has assumed higher growth rates for water supply planning purposes.

Alternatively, other known but uncertain factors that could change this forecast are impacts from Climate Change and possible changes to Water Sharing Conditions on the Tweed. Both of these issues could reduce the secure yield to a value less than 13,750 ML/a and bring forward the date when demand exceeds supply.

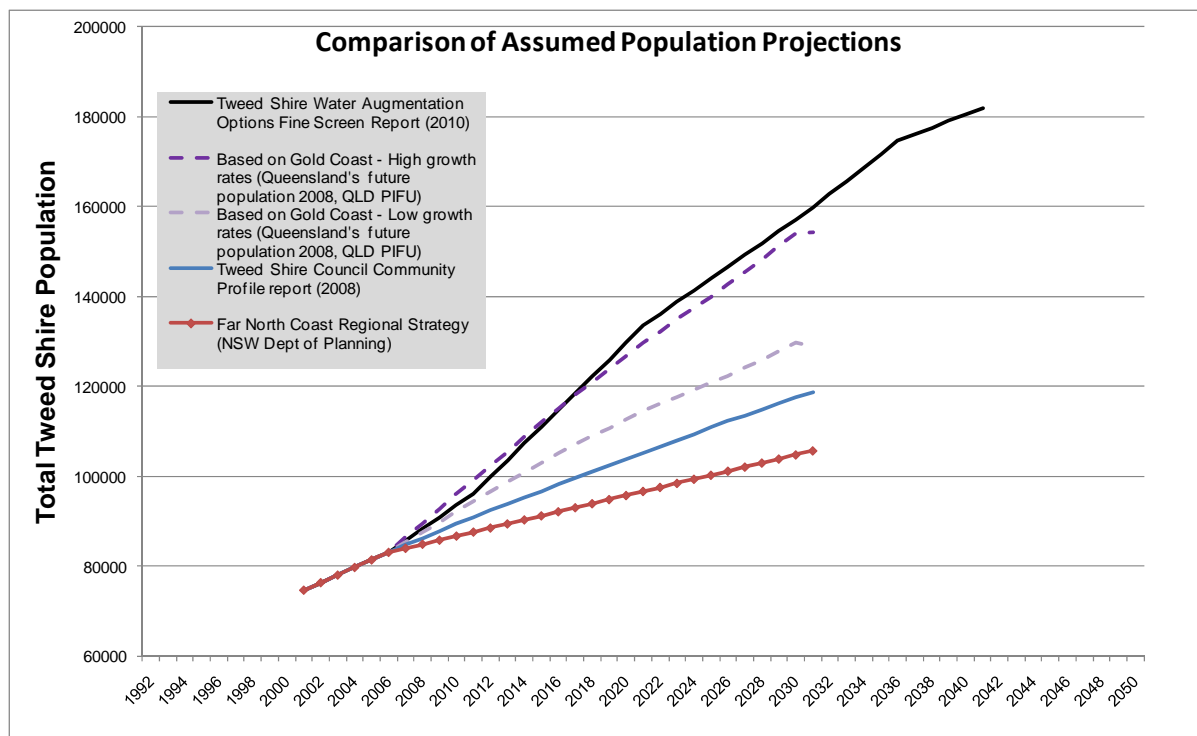


Fig 2: Council has utilised higher growth rates for water planning purposes

Aim of the next phase – Planning Approval

The aim of the next phase is to secure planning approval for the preferred augmentation option by the earliest date that additional water is likely to be needed. The aim is not to construct the preferred option. This approach provides both security and flexibility by:

1. ensuring the Tweed has an augmentation option that can be brought online at the earliest projected date if required
2. enables construction to be delayed until it is actually needed; for example if population growth rates are lower than projected, or demand management is more successful than the BASIX/WELS curve.

Water Supply Augmentation Options Report

A Water Supply Augmentation Options study has been undertaken to determine the best way to augment the water supply to meet the Shire's needs until the end of the planning period in 2036. The first stage of the study was adopted by Council at meeting of 20 October 2009. It identified nine options for analysis and ranked these options using multi criteria analysis (MCA) which include economic, social, environmental and governance considerations. It proposed a short-list of 3 options and a contingency option for further investigation:

- Raising Clarrie Hall Dam
- Construct a new Byrrill Creek Dam
- Construct a Pipeline to SEQ Water Grid
- Combination of Pipelines to SEQ and Rous Water plus accessing Groundwater (Contingency Option)

Information for the Fine Screen Report

In the second stage of the Options study (Fine Screen Report), these short-listed options were assessed in more detail to determine a preferred option. This stage was based on more detailed information and studies of the short-listed options, together with a comprehensive Community Consultation process to further inform the MCA. Additional detailed information has been sourced through:

- Additional consultants reports focusing on environmental, cultural heritage, planning, and costing issues
- Consultation with stakeholder groups including potentially affected landholders, the Aboriginal community, government agencies, and community groups
- Consultation with residents and the Tweed community through a comprehensive sixth month process; including facilitation of an independent Community Working Group
- Improving ways for the community to provide feedback and submissions through a designated email address and Freecall 1800 number

Additional Studies

The Phase 1 report utilised 18 individual reports. The Phase 2, Fine-screen assessment has made use of 27 additional reports containing more detailed information on the short-listed options. Of these, 15 documents were produced specifically for this phase of the project. A full list of additional reports is outlined below:

No.	Author	Date	Title	Report No.
19	Peter Parker Environmental Consultants Pty Ltd	December 1998	Byrrill Creek Reafforestation Programme – A Flora and Fauna Assessment	
20	Peter Parker Environmental Consultants Pty Ltd	August 2000	Byrrill Creek Forestry Venture – An Environmental Assessment of Selected Harvesting	
21	ECO-SURE Environmental Consultants	2003	The Restoration Prioritisation of High Conservation Value Riparian Lands of the Upper and Mid Tweed River	
22	EnvITE NSW and BRS Pty Ltd	March 2006	Byrrill Creek Riparian Rehabilitation Plan	
23	Southern Cross University	March 2008	Preliminary Archaeological Overview for Proposed Raising of Clarrie Hall Dam	
24	Greenloaning Biostudies Pty Ltd	April 2008	Identification of Issues and Constraints of Proposed Raising of Clarrie Hall Dam	0705001RP3
25	Dr. K A Bishop	July 2008	Environmental Flow Scoping Study for Doon Doon Creek and the Lower Tweed River, NSW (Draft Report)	
26	Biolink Ecological Consultants	July 2009	Koala Plan of Management for proposed World Championship Rally activities in Parts of the Tweed LGA	
27	Biolink Ecological Consultants	July 2009	Ecological Assessment – Proposed World Championship Rally event in Parts of Tweed LGA	
28	Converge Heritage + Community Pty Ltd	August 2009	Preliminary Archaeological Overview of Proposed Byrrill Creek Dam	09066C/2009
29	Department of Environment Climate Change & Water NSW	August 2009	Draft Water Sharing Plan – Tweed River Area Unregulated and Alluvial Water Sources	ISBN 978 1 921546 50 1

No.	Author	Date	Title	Report No.
30	NSW Department of Commerce	August 2009	Byrrill Creek Storage Size and Estimate of Secure Yield	
31	Biolink Ecological Consultants	October 2009	Assessment of Amelioration Measures and Ecological Impacts associated with a World Championship Rally event in parts of the Tweed and Kyogle LGA, August to September 2009	
32	MWH	6 October 2009	Tweed District Water Supply Augmentation Options Study Stages 1 & 2 Coarse Screen Assessment of Options	A1100300
33	Queensland Water Commission	June 2010	South East Queensland Water Strategy	ISSN 1836-5051 #29229
34A	MWH	December 2009	Demand Management Strategy - Stage 2 Non-Residential Program Evaluation	A1187200
34B	MWH	December 2009	Demand Management Strategy (Summary Report)	A1187200
35	NSW Public Works	December 2009	Construction of Dam on Byrrill Creek – Update of Cost Estimates	DC09140
36	Tweed Shire Council	January 2010	Minutes of the Planning Focus Meeting	
37	NSW Public Works Memorandum	February 2010	Additional Yield Estimates for Byrrill Creek Storage	
38	Tweed Shire Council and the Community Working Group	March 2010	Tweed District Water Supply Augmentation Project A Report by the Community Working Group	
39	Tweed Shire Council	March 2010	Minutes of the Aboriginal Community Meeting	
40	Tweed Shire Council	March 2010	Environmental Impact Quantifier	
41	Tweed Shire Council	March 2010	Social Impact Quantifier	
42	NSW Services Technology & Administration	June 2010	Preliminary Planning Overview of Tweed Water Supply Augmentation Options	
43	Tweed Shire Council	July 2010	Water Supply Augmentation Project Submissions Report on Demand Management Strategy and Water Supply Augmentation.	
44	Climate Change in Australia, CSIRO	2010	Projections of Australia's future climate for the years 2030, 2050 and 2070	www.climatechangeaustralia.gov.au
45	Institute for Sustainable Futures, UTS		The Use of Levelised Cost in Comparing Supply and Demand Side Options	Water Supply Vol 13 No. 3 pp 185-192, IWA Publishing

Table 2: Additional Studies used during the Fine Screen Study

Community consultation

Council has informed the community about the recommendations of the Coarse Screen Report and feedback has been sought through the following avenues:

- Daily News advertisement on 28 January 2010, Tweed Link advertisements and articles on 26 January, 9 February and 16 February 2010, and media releases 12 January, 2 February 2010 inviting comments from and inviting the community to attend information days at Tweed Heads, Murwillumbah and Pottsville.
- A Community Working Group comprising of key representatives from the community met five times over a four month period to debate and discuss issues. The CWG produced a report of recommendations which informed the process.
- Council has attended regular meetings with the Aboriginal Advisory Committee and the Aboriginal Community.
- Three Community Information Sessions were held from 2pm to 7pm at:
 - Tweed Heads, Wednesday 10 February 2010
 - Murwillumbah, Thursday 18 February 2010
 - Pottsville, Tuesday 23 February 2010
- Free call 1800 telephone line enabling the public to have their questions answered and to take the effort out of writing a submission by making a 30 second verbal submission. Over 60 calls were received.
- Designated email address WaterTSC@tweed.nsw.gov.au to enable the community to contact Council's Water Unit directly.
- An Interested Parties Register to keep people and organisations informed of developments either by email or regular post. Over 100 people are registered and 13 circulars have been distributed.
- Council has made presentations to community groups including the Murwillumbah Rotary, the River Catchment Catch-up, the Aboriginal Advisory Committee, an open meeting of the Aboriginal Community, the Tweed River Committee, and Government Agencies.
- Multiple factsheets and reports to inform the community
- All factsheets and reports available online or at Council offices and libraries
- The date for submissions was extended following a request by the CWG to allow additional time for the community to make submissions

Council received 147 submissions. Details of issues raised from the community are listed and responded to in the Community Submissions Report.

Government Agencies consultation

Information and advice from Government Agencies has been used to inform the Fine-screen process. Agencies have attended combined and individual meetings, and had the opportunity to provide submissions and comment regarding the shortlisted options. The following agencies have been contacted for involvement in the process:

- NSW Dept of Environment, Climate Change and Water - Environmental Protection Regulation Group
- NSW Dept of Lands
- NSW Dept of Planning
- NSW Department of Primary Industries - Fisheries
- NSW Forestry
- NSW Health
- NSW National Parks and Wildlife Service
- NSW Office of Water

- NSW Public Works
- NSW Water Solutions
- Northern Rivers Catchment Management Authority
- Rous Water
- Gold Coast City Council
- QLD Dept of Main Roads
- QLD Water Commission
- South East QLD Water Grid Manager
- Tweed Shire Council Planning Department

Fine Screen Report Assessment

The additional detailed information was used to enhance both the input data and methodology of the multi criteria analysis (MCA) fine-screen assessment. Ten assessment criteria, grouped under four Quadruple Bottom Line categories, were used to differentiate the benefits and risks associated with each of the options.

Assessment Criteria	Explanation
Governance (of Natural Resources)	
Secure Yield	Whether the augmentation option has sufficient capacity and certainty of provision to meet the 2036 forecast demand of 16,750 ML/annum for 157,000 population, and to what extent it has excess capacity to meet the uncertainty of the predicted demand and meet future demand beyond that date.
Planning Obligations	The number of stakeholders involved in the regulatory framework to meet the statutory compliance requirements and the associated timeframe and risks for completion by 2023, when augmentation is required.
Legislative Acceptability	The extent to which required legislation is influenced by discretionary powers, which impact upon the augmentation option to increase its uncertainty of delivery.
Maintenance of Stable Economic Growth	
Established Technologies and Feasibility	Whether existing technologies and accepted practice are involved, or whether there are risks associated with water quality, innovation and emerging technologies.
Lead Time for Construction & Potential for Escalation of Costs	Where the uncertainties associated with the preliminary phases of project delivery increase the risks of blow-out of time and of the end costs of the completed project.
Net Present Value based on Capital and Operating Costs and Levelised Cost (\$ per ML)	Evaluation of estimated Net Present Value, taking account of the capital and operations costs over 80 or 30 years discounted to present day dollars at 7%. This is also expressed as levelised cost per unit of production (\$ per ML).
Effective Protection of Social Values	
Social Impacts	Impact on established developed areas (urban, rural, agricultural, commercial, industrial, etc.) and their associated political interactions.
Cultural Heritage Impacts	Impacts upon areas of historical importance and sites of cultural significance.
Effective Protection of the Environment	
Environmental Constraints	Extent and severity of environmental impacts that are likely to be encountered including aquatic, terrestrial and areas of conservation significance.
Greenhouse Gas Emissions and Energy Consumption	An assessment of the greenhouse gas emissions due to embodied energy, construction activities and ongoing operational activities.

Table 3: Summary of Fine Screen Assessment Criteria

Significance of the Assessment Criteria (Weightings)

The additional detailed information was used to enhance the multi criteria analysis (MCA) fine-screen assessment. Three sets of weighting factors were also used to incorporate the information gathered during the fine screen assessment and to determine the sensitivity of the MCA:

- The first set was based on those used in the Coarse Screen report but revised based on the additional Fine Screen information.
- The second set applied evenly weighted factors over the quadruple bottom line between the governance, economic, social and environmental issues.
- The third set reflected the greater social and environmental concerns expressed by members of the Community Working Group and some members of the public.

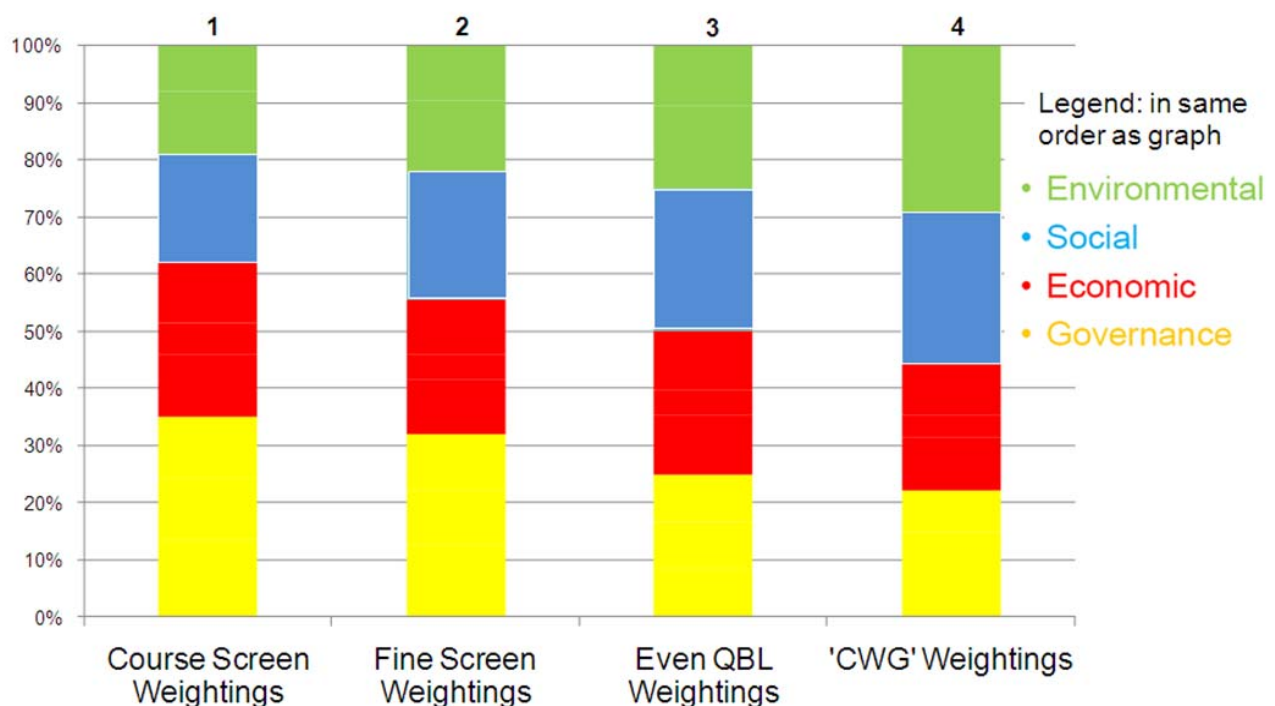


Figure 3: Comparison of the significance of Quadruple Bottom Line weighting factors in the Course Screen (1) and Fine Screen sensitivity assessment (2, 3 and 4)

Ratings of the Impact upon each Assessment Criterion

The ratings were assigned as summarised in Table 4; based on the detailed tables and commentary under Appendix B and Section 4 of the Fine Screen report (MWH, Sep 2010) where 1 indicates a high risk and 5 a low level of risk.

MCA Criteria:	Option: Clarrie Hall Dam	SEQ pipeline	Byrrill Ck Dam	Combined* Emergency
Environmental Constraints	3	4	2	4
GHG & Energy	4	3	3	3
Social Impacts	2	4	2	4
Cultural Heritage Impacts	3	3	2	4
Established Technologies	5	5	5	4
Lead Time & Escalation	3	2	1	3
Costs	4	2	4	1
Secure Yield	5	3	5	2
Planning Obligations	3	2	2	3
Legislative Acceptability	4	1	2	3

Table 4: Comparison of Option ratings

Fine Screen Multi-Criteria Analysis (MCA) Results

The MCA score for each option was derived as follows:

$$\text{Rating} \times \text{Weighting} = \text{Score}$$

The resultant scores provided a comparison of the shortlisted options, which were then ranked to identify the preferred option. The contingency option was assessed as a short-term supply option and so cannot be directly compared or ranked with the other short-listed options (4.4.1.4 of Fine Screen report, MWH Sep 2010).

By using three MCA weighting approaches the MCA provides a sensitivity analysis of the subjectivity intrinsic in the MCA weightings. The results in Figure 4 show that the process is robust and while option scores changed, the option rankings did not, regardless of the weighting approach used.

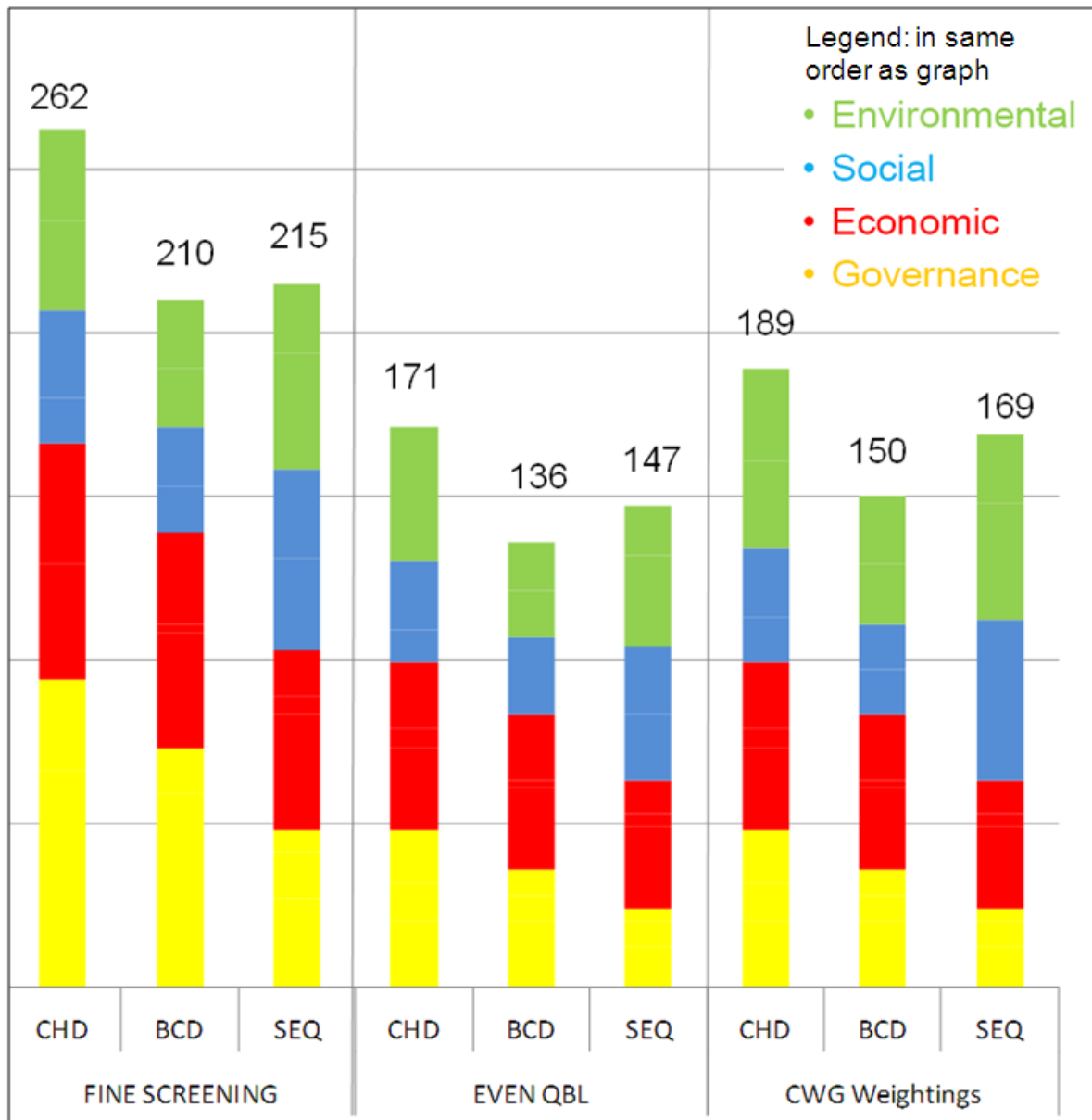


Figure 4: MCA Scores showing results from the sensitivity analysis

Discussion of Results – Comparison of Options

Results Summary:

- Clarrie Hall Dam is the preferred Water Supply Augmentation option. It remained the first ranked option against each of the three MCA weighting approaches used.
- The second ranked option is the Pipeline to SEQ Water Grid. It has significant legislative issues for which the risk is too high for it to be considered the preferred option.
- The third ranked option is Byrrell Creek Dam. It scored equal or lower than CHD for every criteria, and has significant high risk issues particularly in relation to legislative, environmental and cultural heritage issues.
- Given probable timings of demand, and the expected lead-time for the preferred option, the emergency contingency option is unlikely to be required.

Clarrie Hall Dam

The MCA Analyses showed that the highest ranked option is Option 1 - Raising of Clarrie Hall Dam. This option remained the first ranked option against each of the three MCA weighting approaches used. It achieved the highest overall score and highest individual scores for the following criteria compared with the other two shortlisted options:

- | | |
|--|-----------|
| • Secure Yield | Rated 5/5 |
| • Planning Obligations | Rated 3/5 |
| • Legislative Acceptability | Rated 4/5 |
| • Established Technologies and Feasibility | Rated 5/5 |
| • Lead Time for Construction & Escalation Risk | Rated 3/5 |
| • Net Present Value & Levelised Cost per ML | Rated 4/5 |
| • Greenhouse Gas & Energy Consumption | Rated 4/5 |

The above reflects the strongest Quadruple Bottom Line (economic, social, environmental and governance) foundation for proceeding with this Option. It would therefore appear that this Option provides the most secure way forward for augmenting the Tweed district water supply.

The planning approvals and pre-construction permit process associated with the raising of Clarrie Hall Dam, coupled with the relatively long phase of project implementation is expected to take seven years – from mid 2010 - mid 2017.

The Clarrie Hall Dam option includes areas of National Park, which will require agreement with National Parks and Wildlife Service, involving appropriate offset measures. This issue presents possibly the greatest risk associated with the dam option.

While the Aboriginal community acknowledged that each of the shortlisted options would have cultural and heritage impacts and it does not support the destruction of cultural heritage sites, given the available information at this stage it is prepared for Council to further pursue the raising of Clarrie Hall Dam whilst following best practice processes and continuing consultation with the community.

Pipeline to SEQ Water Grid

The second ranked option, Option 5 - Pipeline to SEQ Water Grid, has inherently high risks associated with:

- Expected protracted negotiations over dealings with a number of political and procedural issues between States, which have not previously been confronted;
- Uncertainties over the high bulk purchase price of water from the SEQ Water Grid Manager;
- Lack of certainty regarding these issues which may prove insurmountable within the timeframe available for augmentation of the Tweed system

The risk that these issues would not be resolved in time is too high for the Pipeline to SEQ Water Grid to be considered the preferred option. However, should the legislative issues be resolved, the risk of planning delays and cost escalation are significantly reduced and this option could become more favourable, particularly as a long term emergency option. In terms of social and environmental constraints, this option performed well against the other short-listed options.

Byrrill Creek Dam

The third ranked option, Option 2 - Construction of a New Dam on Byrrill Creek, does not rate higher than the raising of Clarrie Hall Dam for any of the assessment criteria, except possibly for the Social Acceptability criterion, where it is marginally favourable.

It is the option with the longest lead time for completion and is likely to take nine years for the combined processes of planning and pre-construction approvals and the construction phase.

It is the option with the most significant environmental concerns in terms of a changing habitat, from a flowing watercourse to a lake environment, together with a new major fish barrier and it is likely that these issues would take longer to resolve than for raising Clarrie Hall Dam because the Byrrill Creek Dam is a new on-stream storage.

The cultural heritage of the site is less well known than Clarrie Hall Dam, and being a new storage the Byrrill Creek Dam has higher potential to impact on known sites and places directly associated with the cultural significance of nearby Wollumbin/Mt Warning.

Combined Emergency Supply Option

The need for the Combined Emergency Supply is diminished from the Coarse Screen demand projections assuming that the revised demand projections resulting from the implementation of BASIX/WELS are achieved. The Combined Emergency Supply will therefore only be required in the event that the preferred option for augmentation of supply is not completed by the year 2023. The Combined Emergency Supply Option is a short term solution (say within four years) on the basis that the preferred option takes longer than this timeframe to implement.

The requirement of the Combined Emergency Supply is approximately 2,000 ML/annum (5.5 ML/day). Council may focus on a single component of the Combined Emergency Supply, which has the least potential for delays, should it be necessary to implement this option before the year 2023. The Combined Emergency Supply could most likely be provided through a component of either the pipeline to Rous Water or the groundwater supply.

Recommendations based on the Fine Screen Report

Based on the underlying demand forecast assumptions and the Fine Screen assessment of shortlisted options it is recommended that Tweed Shire Council:

1. Monitors and resources demand management actions with the aim of achieving at least BASIX/WELS reductions and reports to Council annually on progress.
2. Adopts the raising of Clarrie Hall Dam as the preferred option for augmenting the Tweed District Water Supply.
3. Proceeds with the Planning Approvals process and Detailed Design in relation to the raising of Clarrie Hall Dam.
4. Pursues dialog with SEQ in parallel as an alternative augmentation option and as an emergency drought option

Implications

Selection of Clarrie Hall Dam as the preferred option:

- Offers least risk option of the short-listed options based on existing information; it does not represent a zero risk option. Further studies will be required as part of subsequent works and these investigations may uncover issues which are currently unknown.
- Subsequent phases involve significant planning, investigations and approvals steps which have a long timeframe (+5 years) and require significant resource commitments depending on the studies and requirements from government agencies (initial estimates are between \$4-6M).
- Several properties or parts of properties at Doon Doon Creek need to be acquired. This process should be streamlined as much as possible to reduce landholder stress and inconvenience. Landholders in the area affected by any future Byrrill Creek Dam will face some uncertainty as to the long term land use for the area.
- The existing Clarrie Hall Dam spillway requires upgrading by 2016 and it is unclear whether the Dam Safety Committee will grant further extension to this date. There are benefits in delaying the larger infrastructure costs associated with the dam raising and proceed with upgrading of the spillway which would be built over at some time in the future. Alternatively, the dam raising could be brought forward to meet the spillway upgrade deadline. It is recommended that an economic analysis be conducted to determine the most cost effective timings and approach.
- Council's Drought Management Strategy highlighted the need to investigate emergency supplies for instances of prolonged drought or contamination events, and this requirement is still required.
- The size of the raised Clarrie Hall Dam will provide secure yield beyond that required for the immediate planning period (sizing due to construction issues and efficiencies of scale). Depending on actual population growth rates and the success of demand management actions, raising the dam could provide secure yield to 2050 and beyond as illustrated in Figure 5 below.

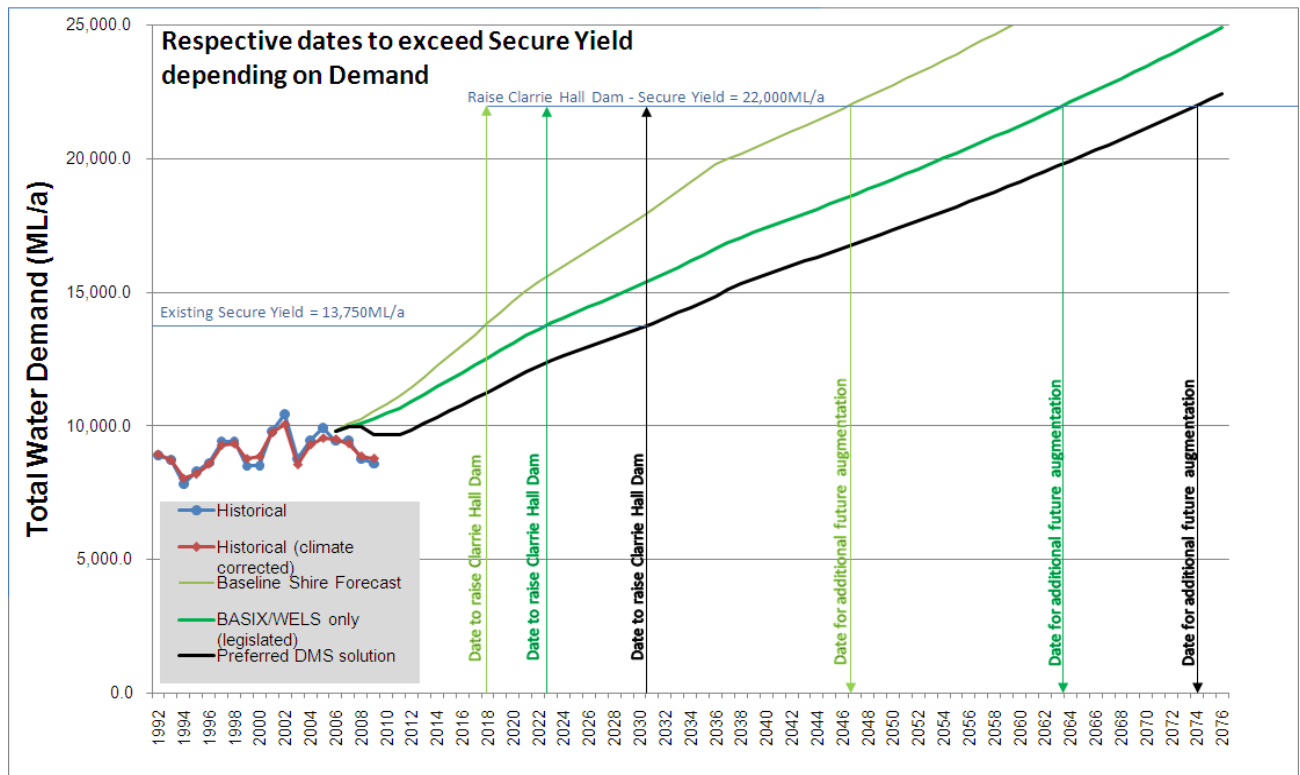


Figure 5: Respective dates to exceed Secure Yield depending on demand

LEGAL/RESOURCE/FINANCIAL IMPLICATIONS:

Significant resources are required to monitor and maximise demand management actions so that water savings equivalent or better to BASIX/WELS can be achieved.

The preferred option has:

- significant planning, investigations and approvals steps which have a long timeframe (+5 years) and require significant resource commitments (estimates are between \$4-6M).
- acquisition of several properties or parts of properties at Doon Doon Creek.
- significant costs to construct and have the scheme operational which is likely to require loan funding.
- economic analysis of upgrading the existing Clarrie Hall Dam spillway to determine if there are benefits in upgrading now and building over at some time in the future.

POLICY IMPLICATIONS:

Nil.

UNDER SEPARATE COVER/FURTHER INFORMATION:

To view any "**non confidential**" attachments listed below, access the meetings link on Council's website www.tweed.nsw.gov.au (from 8.00pm Wednesday the week before the meeting) or visit Council's offices at Tweed Heads or Murwillumbah (from 8.00am Thursday the week before the meeting) or Council's libraries (from 10.00am Thursday the week of the meeting).

1. Tweed District Water Supply Augmentation Options Study, Stage 3 – Fine Screen Assessment of Shortlisted Options - September 2010 - Appendix B (ECM 22447641)
 2. Tweed District Water Supply Augmentation Options Study, Stage 3 – Fine Screen Assessment of Shortlisted Options - September 2010 (ECM 22445566)
 3. Submissions Report - Water Supply Augmentation Project - August 2010 (ECM 22447639)
 4. Council Workshop Presentation - Water Supply Augmentation - Selecting a preferred option - 28 Sep 2010 (ECM 22056503)
-