

Tweed Shire

Water Cycle Management & Water Supply Augmentation

Workshop Presentation to Council

22.09.2009



Workshop Objectives

Inform Council

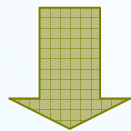
- IWCM (Integrated Water Cycle Management)
 - Evolution
 - Status

Intro to October Council Meeting

- Water Supply Augmentation
 - Drivers
 - Status
 - Process from here
 - Importance of process

Tweed Shire Integrated Water Cycle Management (IWCM)

- IWCM (2006)
 - 26 Actions
 - substantial progress



- IWCM (Feb 2009)
 - 18 Actions
 - in progress



Sector

Strategy Action and Activities

Water Supply

Strategy Action and

- 1. Demand Management
 - Demand Management Strategy
 - Water Loss Management Plan
 - Water Efficient Retrofits
 - User pays Pricing Restructure
 - Recycled Water Opportunities
 - Stormwater Management Education

- 2. Drought Management
 - Drought Management Strategy
 - Water Supply Modelling
 - Restrictions and Triggers
 - Emergency Supplies
 - Education

- 3. Risk Based Water Quality Management
 - Risk Based Water Quality Management Plan
 - Drinking Water Catchment Management Plan
 - Education

- 4. Water Loss Management
 - Leak Detection
 - Water System Modelling
 - Education

- 5. Quality Management
 - Risk Based Water Quality Management Plan
 - Drinking Water Catchment Management Plan
 - Water Utility Planning and Management

- 6. Environmental Management
 - Water Loss Management Plan
 - Stormwater Management Education

- 8. Typhoon Management Plan
 - Risk Based Water Quality Management Plan
 - Drinking Water Catchment Management Plan

- 9. Uki Water Treatment Plant
 - Risk Based Water Quality Management Plan
 - Drinking Water Catchment Management Plan

- 10. Water Asset Management
 - Modelling for Optimisation of Infrastructure

7. Water Supply

- Demand Management Strategy
- Water Loss Management Plan
- Recycled Water Opportunities
- Water Supply Augmentation Options
- Education

- 4. Water Loss Management
 - Leak Detection
 - Water System Modelling
 - Education

- 5. Quality Management
 - Risk Based Water Quality Management Plan
 - Drinking Water Catchment Management Plan
 - Water Utility Planning and Management

- 9. Uki Water Treatment Plant
 - Risk Based Water Quality Management Plan
 - Drinking Water Catchment Management Plan

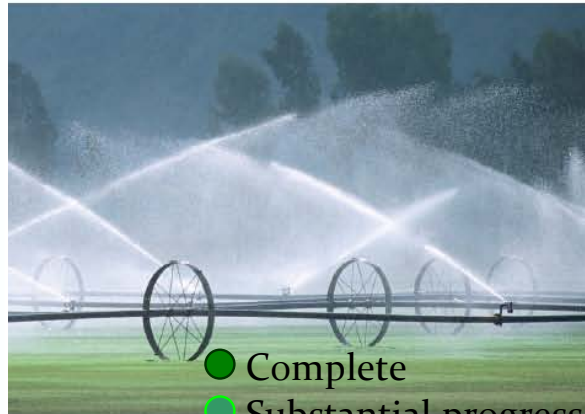
- 10. Water Asset Management
 - Modelling for Optimisation of Infrastructure

Urban Design

- 16. Implement WSUD and ESD
 - Stormwater Management
 - Augmentation and Optimisation of Infrastructure
 - Education
- 17. Promote WSUD and ESD
 - Stormwater Management
 - Augmentation and Optimisation of Infrastructure
 - Education

Catchment Management

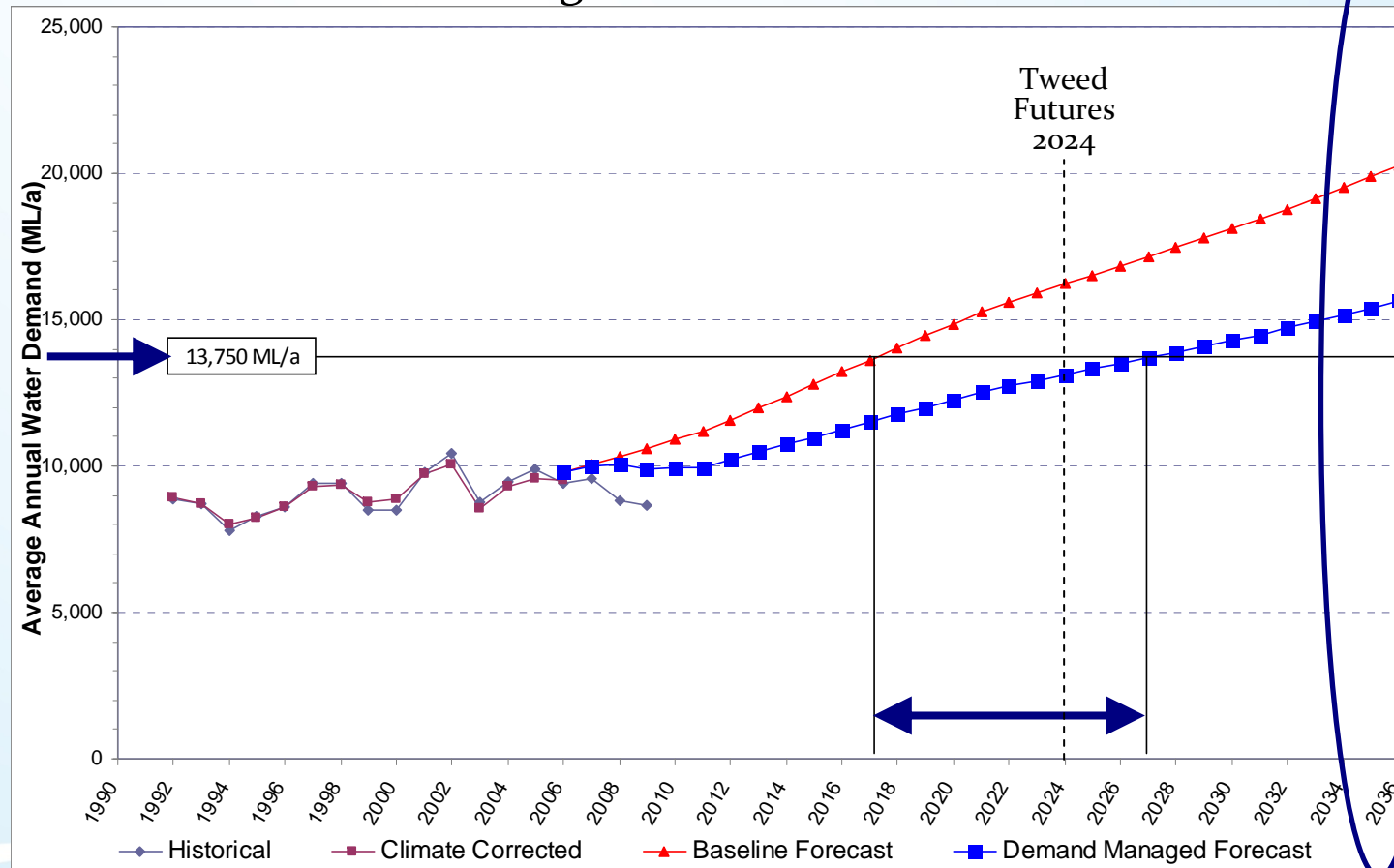
- 18. Drinking Water Catchment Management Plan
 - Drinking Water Catchment Management Plan
 - Stormwater Management
 - Education



- Complete
- Substantial progress
- Started
- Not started

Water Supply Augmentation

Tweed Shire Long-term Water Demand Forecast



(Based on the predicted Shire population of 157,000 by 2036)



Water Supply Augmentation

Objectives

*Integrated Water Cycle
Management (IWCM)
framework*

- Sufficient water quantity (30yr plan)
- Minimise impacts (Social, Enviro, Economic)

Water Supply Augmentation Options

Initial Options Study → broken into 3 Stages:

 Stage 1: Determine options (long list)

 Stage 2: Determine Shortlisted Options



Stage 3: Determine Preferred Option

Water Supply Augmentation Options

Stage 1: Identified nine options:

- options involving dams:
 - raising the existing Clarrie Hall Dam
 - new dam on Byrrell Creek
 - new dam on Oxley River, near Tyalgum (Rocky Cutting)
- options involving pipelines to other Water Utilities:
 - pipeline link to Rous Water, at Ocean Shores
 - pipeline link to South East Queensland Water, at Tugun
- other options:
 - groundwater supply
 - desalination (3 sites identified)
 - indirect potable reuse
 - direct potable reuse

Water Supply Augmentation Options

Stage 2: Analyse nine options

- Data & preliminary studies
- Multi-Criteria Analysis (MCA)
- Short-list 3 or 4 Options
(for more detailed investigation)

Data & Preliminary Studies

Collection of data:

- Previous reports and studies
- Council staff
- Government Agencies
- Aboriginal representatives

Preliminary estimates and studies:

- Quantity of water yielded
- Flora and fauna
- Construction & operation costs
- Construction & technology constraints
- Greenhouse gas contributions

Multi-Criteria Analysis (MCA)

Goals:

- Holistic
- Triple-bottom line (social, environmental, economic)
- Transparent
- Objective
- Repeatable

Multi-Criteria Analysis (MCA)

Criteria used:

1. Secure Yield (*mandatory*)
2. Planning Objectives
3. Established Technologies & Feasibility (*mandatory*)
4. Environmental Constraints
5. Social & Political Impacts
6. Legislative Constraints
7. Cultural Heritage Impacts
8. Lead Time & Potential for Escalation
9. NPV(30yr) and Cost per kL
10. Greenhouse Gas Emissions



Multi-Criteria Analysis (MCA)

Criteria were weighted according to significance:

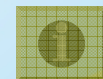
Assessment Criteria	Adopted Weighting Factor
Secure Yield	5
Planning Obligations	4
Established Technologies and Feasibility	4
Environmental Constraints	4
Legislative Acceptability	4
Cultural Heritage Impacts	4
NPV and Cost per kL	4
Social and Political Impacts	3
Greenhouse Gas and Energy Consumption	3
Lead Time and Potential for Escalation	2

(Weightings: 1. very low 2. low 3. medium 4. high 5. very high)

Analyse Criteria

Options ranked:

Rank	Option	NPV (30yr)	MCA Score
1	Option 1 - Raising Clarrie Hall Dam	\$42 million	151
2	Option 2 - Byrill Creek Dam Construction	\$51 million	117
3	Option 5 - Pipeline to the SEQ Water Grid	\$116 million	111
4	Option 4 - Pipeline to Rous Water	\$51 million	109
5	Option 3 - Oxley River Dam Construction	\$64 million	102
6	Option 7 - Groundwater Supply	\$44 million	93
7	Option 6 - Desalination	\$194 million	81
8	Option 8 - Indirect Potable Reuse	\$221 million	72
9	Option 9 - Direct Potable Reuse	\$307 million	65



Shortlisted Options

To be investigated in detail in Stage 3:

- A. raising the existing Clarrie Hall Dam
- B. new dam on Byrrill Creek
- C. pipeline link to South East Queensland Water, at Tugun

Due to potentially long-lead times:

- D. Contingency combination option
 - pipeline link to Rous Water, at Ocean Shores
 - groundwater supply
 - smaller pipeline link to SEQ Water, at Tugun

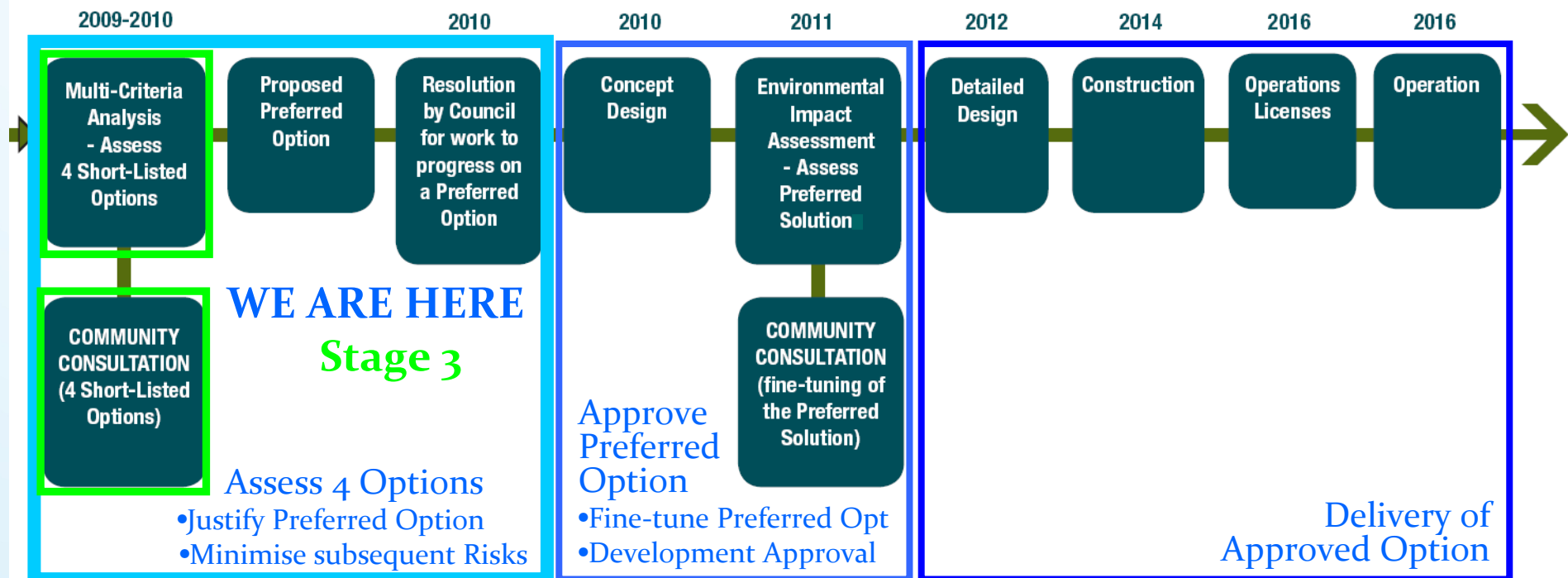
Where to from here?



Route to Augmentation

Flowchart of the Process

Process outline and approximate timeframe to ensure the system is augmented in time



Increasing Commitment: Focus / Data / Costs

Water Supply Augmentation Options

Stage 3: Determine Preferred Option

- Further Information & Studies
- Community Consultation
- Multi-Criteria Analysis (MCA)
- Council determines Preferred Option

Further Information & Studies

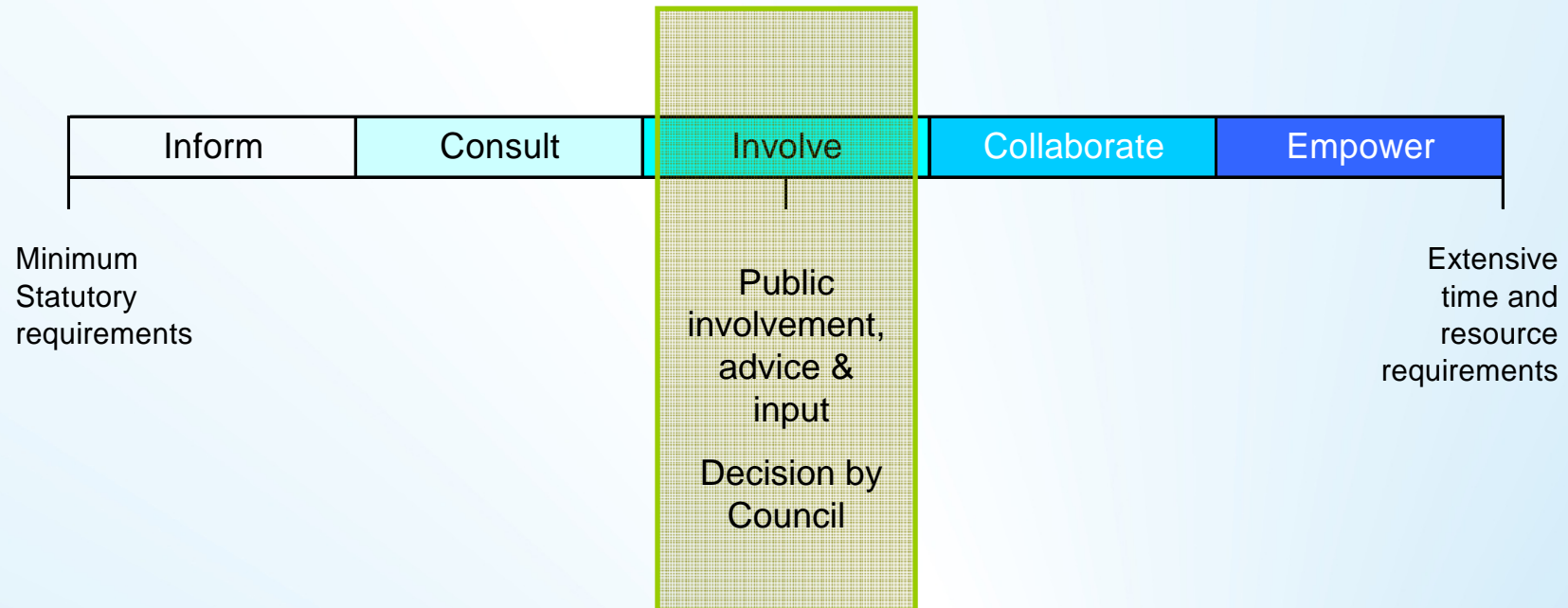
Collection of data:

- Tweed Community
 - Affected Landholders
 - Tweed Interest Groups
 - Aboriginal representatives
 - Government Agencies
 - Council staff
-
- Estimates and studies:
 - Cultural Heritage
 - Construction & operation costs
 - Greenhouse gas contributions



Community Consultation

Types of Community Consultation



Source: IAP2 Public Participation Spectrum, International Association of Public Participation Australasia

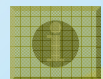
Proposed Community Consultation

Engagement Objectives

- Inform
 - Options
 - MCA process
 - Engagement process
- Consult
 - Stakeholders
 - Wider community
- Involve
 - Stakeholder representatives

Inform

- Letters to stakeholders
- Media coverage
- Information & reports available
- 1800 number
- Public stalls



Consult

- Individual Meetings
 - Affected Landholders
 - Aboriginal Advisory Committee presentations
 - Government Agencies
- Contact
 - 1800 number (Q&A)
 - Email (TSCwater@tweed.nsw.gov.au)
- Public submissions
 - Public exhibition period
 - Written submissions
 - Verbal submissions (1800 number)

Involve

- Community Reference Group
 - Learn & deliberate
 - Provide considered advice
 - Communicate with constituents
 - Identify issues
 - Identify information deficiencies
 - Identify consultation gaps

Community Reference Group

• Who?	(No.)
• Councillors	2
• Affected Landholders	2
• Aboriginal representatives	1
• Environmental groups	2
• Commercial & business groups	2
• Residents & ratepayer groups	3
• Fisher/catchment user groups	1
	<hr/>
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Community Reference Group

- Two Selection Processes
 - A. Direct nominations
 - B. EOI → Selection Panels → Check against Criteria
(Expressions Of Interest)
- Selection Criteria
 - Representativeness
 - Two-way Information sharing
 - Issues investigation
 - Constructive contribution
 - Availability

Community Reference Group

- Direct Nomination
 - TSC Council
 - Affected Landholders
 - Aboriginal Advisory Committee
- EOI Selection Panels (Southern Cross University)
 - Environmental representatives
 - Fisheries/Catchment user representatives
 - Commercial & Business representatives
 - Residents & Ratepayer representatives



Next steps

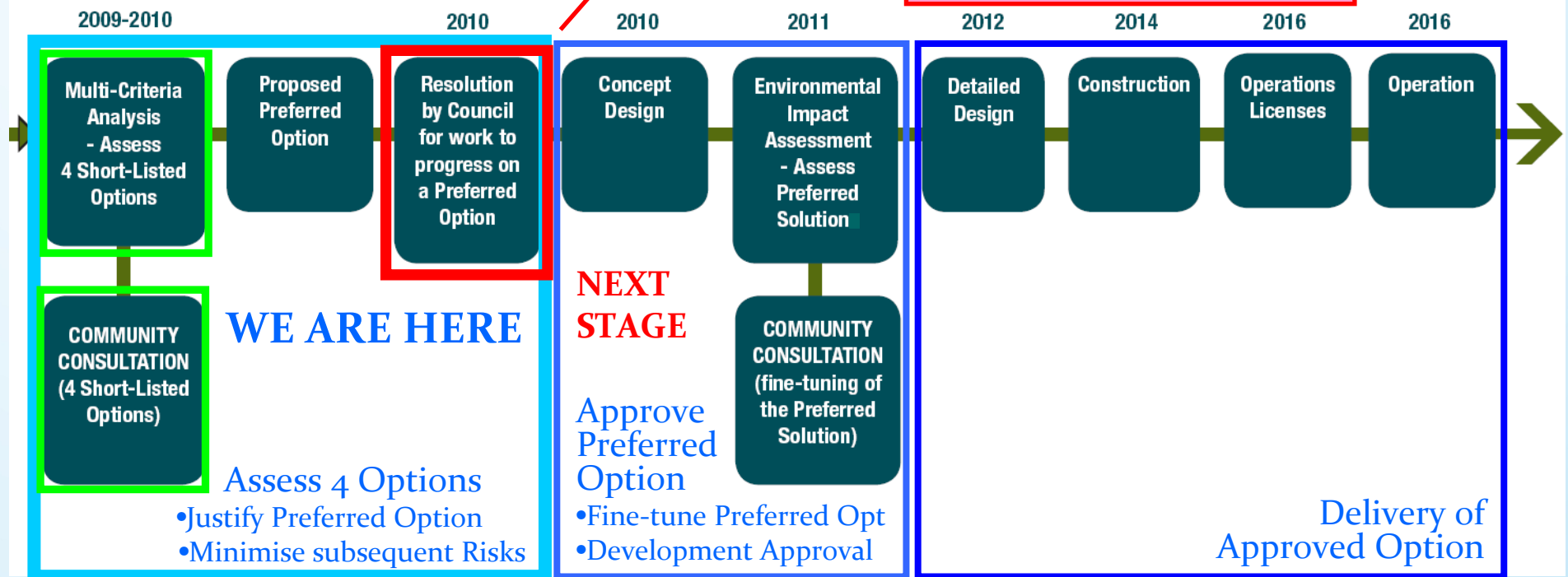
- October Council Meeting will seek:
 - Adoption of:
 - Water Supply Augmentation process
 - Process to date
 - Proposed process
 - Community Consultation process
 - Selection of:
 - Councillors on Community Reference Group

Route to Augmentation

Flowchart of the Process

Process outline and approximate timeframe to ensure the system is a

Has Council any further requirements to be able to make this decision?



Increasing Commitment: Focus / Data / Costs



THANK YOU



Additional Information Slides



Tweed Shire IWCM (2006)

Progress on Original 26 Actions

• Urban Town Water Actions:

- Demand Management Studies
- Target 12% unaccounted water
- Explore Demand Substitution options
- Review of Secure Yields
- Determine Impacts of Water Sharing Plans on Water Supply
- WTP Tyalgum
- Undertake Long-term Demand Forecasts
- Review impact of Australian Drinking Water Guidelines

• Urban Wastewater Actions:

- Sewerage System gauging and monitoring
- Sewerage Optimisation
- Effluent Reuse Opportunities report
- Wet-weather performance of Tweed WWTPs
- Options for increasing Effluent Quality and Reuse
- Investigate Dual Reticulation & Decentralised Sewerage for New Development Areas
- Long-term Detailed Sewerage Loading Forecasts

- Complete
- Substantial progress
- Started
- Not started



Tweed Shire IWCM (2006)

Progress on Original 26 Actions (cont.)

• Urban Stormwater Actions:

- Stormwater Retro-fit Program (Retention & Treatment)
- Review Stormwater Management Plan

- Complete
- Substantial progress
- Started
- Not started

• General Urban Actions:

- Implement WSUD and ESD Principles
- Update Local Planning Instruments
- Planning / discussions with Developers for Alternatives to Rain Water Tanks
- Asset Management Plans
- Implement DWE Best Practice Guidelines

• Rural Catchment Management Actions:

- On-site Sewage Treatment and Disposal
- Identify Hot-spots that adversely Impact on Water Quality
- Ongoing Support to Catchment Management Initiatives
- Groundwater Study

Tweed (2009)



Demand Management Strategy

Residential

- 5000L Rain Water Tanks
- BASIX
- Leakage Control
- Permanent Low Level Restrictions
- Rain Water Education Program
- Communication & Education Program
- Incremental Pricing Structure

Commercial

- nearing completion

Water Loss Management

- Water Loss Management Plan
- Pilot Leak Detection schemes
- Ongoing System Modelling

Water Supply

- Demand Management Strategy
- Water Loss Management Plan
- Recycled Water Opportunities
- Water Supply Augmentation Options
- Education

Recycled Water

In operation

- Condong Co-generation Facility
- Coolangatta Tweed Heads Golf Club
- Chinderah Golf Course
- Uki Eucalypt Plantation
- Tyalgum Pasture Irrigation

Planned

- Les Burger Field, Bogangar
- Arkinstant Park Municipal Oval
- Tweed Heads Cemetery
- Burringbar / Mooball Reuse Scheme

Strategies/Options

- Recycled Water Opportunities Report
- Kingscliff Recycled Water Scheme

Education

- Ongoing School Education
- Resource Centre
- Sustainable Living Centre
- Water Efficient Appliances Retrofits
- Waterweek / River Festival

- Complete
- Substantial progress
- Started
- Not started

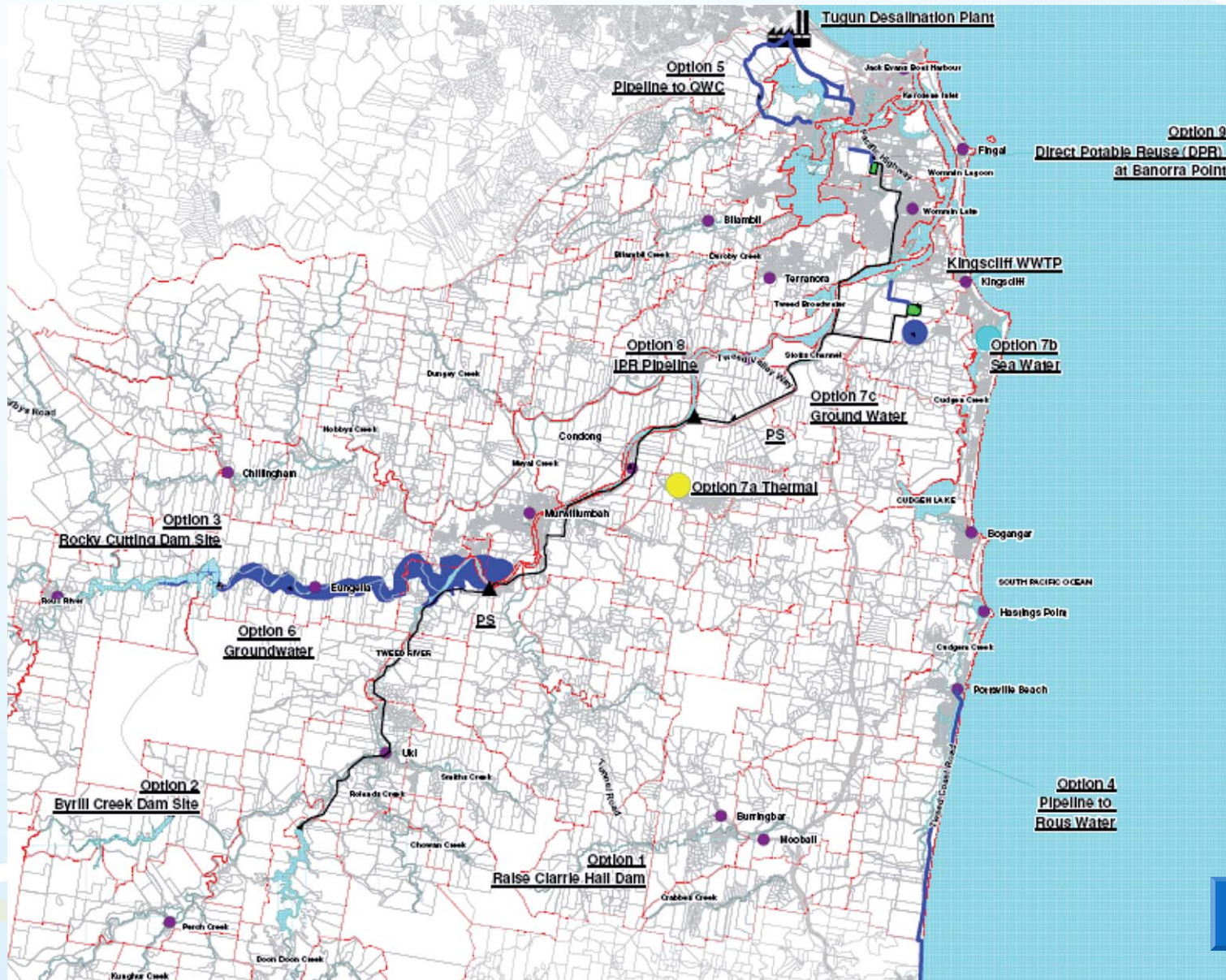


Water Supply Augmentation

Initial Options Study → broken into 3 Stages:

- Stage 1: Determine long list of options
- Stage 2: Determine Shortlisted Options:
 - Gather data
 - Undertake preliminary studies
 - Compare and rank options
 - Produce shortlist of options for further investigation
- Stage 3: Determine Preferred Options:
 - Gather further detailed information
 - Undertake further preliminary studies
 - Conduct intensive Community Consultation
 - Propose Preferred Option (for detailed investigations)

Water Supply Augmentation Options



Multi-Criteria Analysis (MCA)

MCA compared Options against 10 criteria:

Assessment Criteria	Explanation
Secure Yield	Whether the augmentation option has sufficient capacity to meet the 2036 forecast demand of 19,000 ML/annum for 157,000 population, and to what extent it has excess capacity to meet future demand beyond that date.
Planning Obligations	The number of stakeholders involved in the regulatory framework and the associated timeframe and risks for completion by 2016, when augmentation is required.
Established Technologies and Feasibility	Whether existing technologies and accepted practices are involved, or whether there are risks associated with innovation and emerging technologies.
Environmental Constraints	Extent and severity of environmental impacts that are likely to be encountered including aquatic, terrestrial and areas of conservation significance.
Social Acceptability	Impact on established developed areas (urban, rural, agricultural, commercial, industrial etc.) and their associated political interactions.
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.
Cultural Heritage Impacts	Impacts upon areas of historical importance and sites of cultural significance.
Lead time for Construction and Potential for Escalation Costs	Where the uncertainties associated with the preliminary phases of project delivery increase the risks of blow-out of the end costs of the project.
Cost - Net Present Value and \$/kL	Evaluation of estimated Net Present Value, taking account of the capital and operations costs over 30 years discounted at 7%. This is also expressed as a cost per unit of production (\$/kL).
Greenhouse Gas Emissions and Energy Consumption	An assessment of the energy inputs, which are proportional to the direct greenhouse emissions.

Mandatory Criteria

1. Adequate water quantity (min. additional quantity: 5,250 ML/annum)
3. Established Technologies & Feasibility

Options not meeting mandatory criteria:

Option 4 Pipeline to Rous Water	- Provides only 1,825ML/annum
Option 6 Groundwater Supply	- Provides only 1,470ML/annum
Option 9 Direct Potable Reuse	- multi-barrier technologies for direct potable reuse untested in Australia. - Unlikely acceptance of 2 nd direct potable reuse system worldwide

Analyse Criteria

Poorly ranked Options:

Option 3 New Oxley River Dam	<ul style="list-style-type: none">- Significant habitat constraints- Likely to flood parts of Tyalgum
Option 7 Desalination	<ul style="list-style-type: none">- Second most expensive option- Impacts of saline discharge
Option 8 Indirect Potable Reuse	<ul style="list-style-type: none">- Most expensive option- Impacts of saline discharge- Unlikely to have community support

Inform

- Letters to specific stakeholders
 - Landholders
 - Interest & Community Groups
 - Government Agencies
- Media
 - Tweedlink
 - Media releases
- Information available
 - Factsheet summaries / Full reports
 - Website / TSC Offices / Libraries / Mailout (upon request)
 - 1800 number
- Public stalls
 - River Festival
 - National Water Week
 - Shopping Centre stalls

