



## CHAPTER 4

### OPTIONS GENERATION

Nullinga Dam and Other Options Preliminary Business Case



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## 4 OPTIONS GENERATION

### CHAPTER SUMMARY AND CONCLUSIONS

- This chapter outlines the long list of options identified to address the service need.
- The long list of options was generated through consideration of the SIP policy approach and categories for options assessment, analysis of previous assessments, work undertaken for the PBC, and stakeholder consultation. A do minimum (Base Case) option was also included in the analysis.
- The long list of options is:
  - Do minimum\*
  - Improve MDWSS rules and operation\*
  - Increase in on-farm water efficiency\*
  - Improve water trading\*
  - Modernise MDWSS distribution infrastructure and convert losses to new water allocations for sale
  - Raise Tinaroo Falls Dam
  - Utilise Quaid Dam/Mitchell Dam and build pipeline
  - Build Nullinga Dam
    - Agricultural use – initially delivery to Walsh River only (no distribution infrastructure)
    - Agricultural use – limited interaction western MDWSS distribution infrastructure
    - Mixed use – Cairns urban and agricultural supply (historical proposed use for Nullinga Dam)
  - Build Nullinga Weir
  - Harvest water from the Johnstone River and build pipeline
- The first four of the long list of options (marked\*) will not create any new water allocations.

### 4.1 Purpose

The purpose of this chapter is to outline the long list of options considered to address the identified service need and how it was generated.

### 4.2 State Infrastructure Plan

The SIP sets out a framework for options assessment and prioritising future infrastructure projects, as outlined in the figure below.



Figure 1 State Infrastructure Plan—Options Assessment

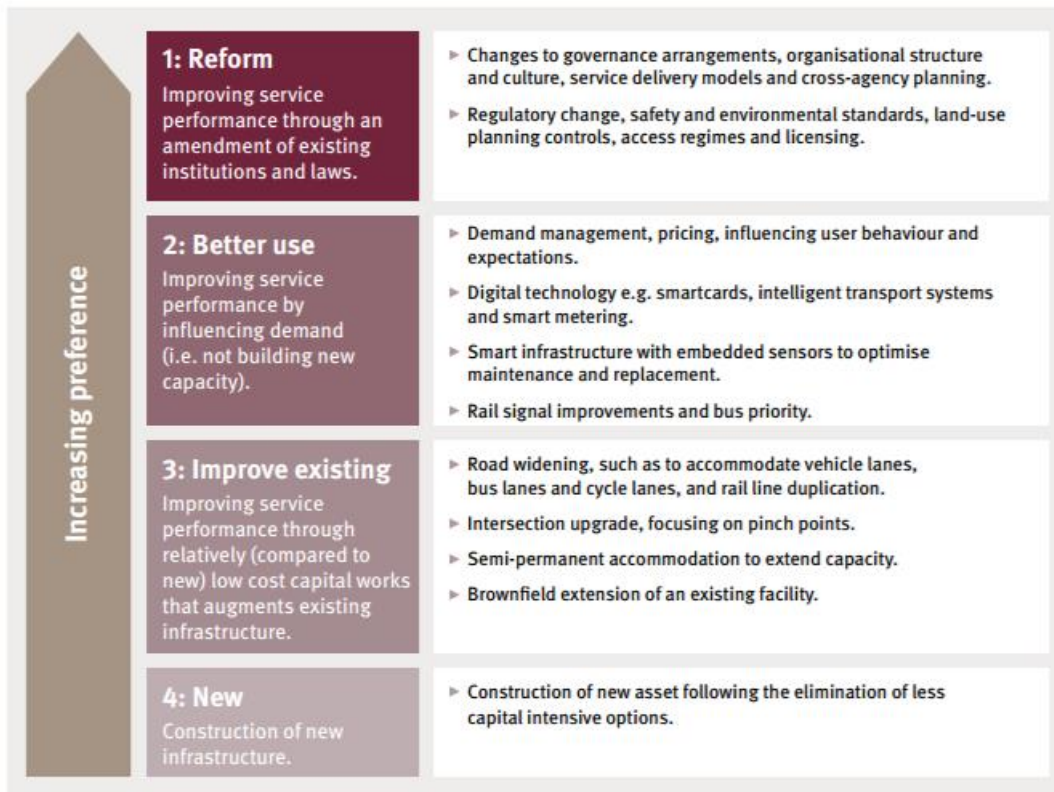


Figure 14: Queensland Government options assessment

The options assessment framework in the SIP recognises there is typically more than one way to solve a problem or address an opportunity, and that in many situations multiple options will be required to achieve the desired outcome. For example, the SIP indicates that a combination of ‘better use’ and ‘improve existing’ may effectively delay the need for new infrastructure, while ‘reform’ in combination with ‘new’ could reduce the cost of new infrastructure.

An additional and important methodological consideration is the inclusion of a do minimum option. This is highly beneficial in the initial option identification process as it can act as a baseline for option assessment and help in needs and option benefit assessment. As such, a do minimum option is described and incorporated in the subsequent options analysis.

### 4.3 State Infrastructure Plan Analysis

The SIP options categories were used as an initial tool to assist with the development of the long list of options. Using the SIP hierarchy, a range of theoretical water options were considered under each category. The options generated through this process are listed in the table below.



Table 1 State Infrastructure Plan Analysis

OPTIONS	ADDRESS PROBLEM OR REALISE OPPORTUNITY BY	EXAMPLES FOR WATER INFRASTRUCTURE AND PBC
Reform	Amending institutions or laws to improve water service delivery	<ul style="list-style-type: none"> <li>▪ Change organisational culture (e.g. operational efficiency in SunWater scheme management)</li> <li>▪ Change governance or organisational structure (e.g. LMA for the MDWSS distribution infrastructure)</li> <li>▪ Improve water trading institutions (e.g. increase trading transparency and liquidity - Tableland Canegrowers administers a free water trading register for the MDWSS)</li> <li>▪ Introduce carry-over in MDWSS or raise awareness of carry-over entitlements</li> <li>▪ Amend programs relating to on-farm efficiency measures</li> </ul>
Better use	Change or influence demand and water use practices (without building new capacity)	<ul style="list-style-type: none"> <li>▪ Improve on-farm water use efficiency (e.g. trickle irrigation, overhead low pressure systems)</li> <li>▪ Improve water trading (e.g. improve water trading platform and access to trading information)</li> <li>▪ Introduce demand management programs to change user behaviour (e.g. irrigators placing water orders rather than taking water from the channels without ordering)</li> <li>▪ Water pricing reform (e.g. reform irrigation prices)</li> <li>▪ Amend billing frequency</li> </ul>
Improve existing	Low cost capex to augment existing capacity (relatively low cost vs new build)	<ul style="list-style-type: none"> <li>▪ Convert system operational losses from MDWSS</li> <li>▪ Install variable speed drives at pump stations</li> <li>▪ Install in-channel control systems and robust cost-effective Supervisory Control and Data Acquisition (SCADA) system or equivalent</li> <li>▪ Upgrade and automate regulation gates on channels (integrate with SCADA)</li> <li>▪ New water balancing storages</li> <li>▪ Channel bank raising</li> </ul>
Build new	Build new infrastructure	<ul style="list-style-type: none"> <li>▪ Build new dam e.g. Nullinga Dam</li> <li>▪ Build new weirs, if such opportunities exist</li> <li>▪ Raise other weirs</li> <li>▪ Raise existing dams (e.g. Tinaroo Falls Dam)</li> </ul>



## 4.4 Long List of Options

Following the SIP analysis, the long list of options was then developed on the basis of the service need, available data, documents and reports and the outcomes of the Stakeholder Reference Group process. This process included listing previously considered options for water supply in the region and variations of previous options (e.g. variations of the Nullinga Dam option), where supported by analysis.

Urban specific or urban only water supply options were not considered for the long list (e.g. urban demand management) as Cairns urban supply was not part of the identified service need. However, for completeness, a mixed use urban/agricultural supply Nullinga Dam option was included in the long list as the mixed-use dam has been the traditional historical proposed use for Nullinga Dam.

The Stakeholder Reference Group also requested the following options be included in the long list of options: raising Tinaroo Falls Dam, utilisation of Quaid/Mitchell Dam, and flood harvesting the Johnstone River and building a pipeline to the Atherton Tablelands.

New options were also included in the long list from work undertaken for the PBC. These options included variations on the Nullinga Dam proposal that excluded urban water supply for CRC and included a focus on agricultural expansion in the Atherton Tablelands.

In developing the long list of options for the Nullinga Dam option, consideration was given to previous assessments of the proposed dam by SunWater which provided for small, medium and large sizes. A decision was made to not take forward three different sizes of dam in the long list on the basis that if Nullinga Dam was a preferred option at the end of the PBC, the size of the dam should be sized to match the volume of credible demand for water from the dam, rather than an arbitrary 'pre-determined' yield.

The long list of options to address the service need is outlined in the table below, grouped under the SIP categories.



Table 2 Long List of Options

OPTION	DESCRIPTION	KEY STAKEHOLDERS	TIMEFRAME	SCALABILITY
<b>DO MINIMUM (BASE CASE)</b>				
Do minimum	Continue with status quo/business as usual	<ul style="list-style-type: none"> <li>▪ DNRM</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> </ul>	N/A	N/A
<b>REFORM</b>				
Improve MDWSS rules and operation	Review the ROP and ROL with the aim to create new rules and operation procedures to assist in change of irrigators water use patterns (e.g. reform carry over provisions, educate peak flow entitlement and introduce peak flow trading)	<ul style="list-style-type: none"> <li>▪ DNRM</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> </ul>	Short	High
Increase on-farm water efficiency	Increase irrigators' use of on-farm water use efficiency methods (e.g. promote uptake of irrigation methods on-farm that achieve same or greater crop yield with less water use/losses)	<ul style="list-style-type: none"> <li>▪ DNRM</li> <li>▪ DAF</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> </ul>	Medium	High
<b>BETTER USE / IMPROVE EXISTING</b>				
Improve water trading	Remove impediments in current systems to facilitate increased water trading (e.g. introduce real time trading information)	<ul style="list-style-type: none"> <li>▪ DNRM</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> </ul>	Short	Low
Modernise MDWSS distribution infrastructure and convert losses to new water allocations for sale	Modernise the MDWSS infrastructure and convert distribution losses to new tradeable medium priority water allocations for sale to the market (e.g. improve bulk water meters, build additional balancing storages, pressurise open pipe, install channel monitoring/SCADA, construct channel flow regulating structures and install variable speed drives, where appropriate)	<ul style="list-style-type: none"> <li>▪ DEWS</li> <li>▪ DNRM</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ Affected landholders</li> </ul>	Medium	Medium



OPTION	DESCRIPTION	KEY STAKEHOLDERS	TIMEFRAME	SCALABILITY
Raise Tinaroo Falls Dam	Raise Tinaroo Falls Dam and create new water allocations within the MDWSS for sale from the increased storage area and yield	<ul style="list-style-type: none"> <li>▪ DEWS</li> <li>▪ DNRM</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ Affected landholders</li> <li>▪ Tablelands Regional Council</li> <li>▪ Recreational users</li> </ul>	Long	Medium
Utilise Quaid Dam/Mitchell Dam and build pipeline	Utilise Quaid Dam/Mitchell Dam (an existing private, shallow dam) and build a pipeline to the Atherton Tableland for agricultural water supply	<ul style="list-style-type: none"> <li>▪ Mitchell Dam owner (private)</li> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ Mareeba Shire Council</li> </ul>	Long	Low
<b>BUILD NEW</b>				
Build Nullinga Dam for agricultural use – initially for delivery to Walsh River only (no distribution infrastructure)	Build Nullinga Dam for delivery to Walsh River customers – initially no distribution infrastructure, but flexibility to connect in the future. Water deliveries would be made to river bank and other customers of the MDWSS, and further downstream	<ul style="list-style-type: none"> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ Entrants in new irrigation scheme</li> <li>▪ Mareeba Shire Council</li> <li>▪ Tablelands community</li> </ul>	Long	High
Build Nullinga Dam for agricultural use—limited interaction with western MDWSS distribution infrastructure	Build Nullinga Dam for Walsh River deliveries and distribution to western MDWSS customers (limited interaction with MDWSS including capex for distribution infrastructure)	<ul style="list-style-type: none"> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ Entrants in new irrigation scheme</li> <li>▪ Mareeba Shire Council</li> <li>▪ Tablelands community</li> </ul>	Long	Medium





OPTION	DESCRIPTION	KEY STAKEHOLDERS	TIMEFRAME	SCALABILITY
Build Nullinga Dam for mixed use—Cairns urban and agricultural supply	Build mixed use Nullinga Dam for Cairns supply urban/agriculture to the MDWSS (allocation swap/substitution of Tinaroo Falls Dam and MDWSS allocations to Cairns Regional Council and provision of new water supply and allocations from Nullinga Dam to the western zones of the MDWSS)	<ul style="list-style-type: none"> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ MDWSS water entitlement holders</li> <li>▪ Mareeba Shire Council</li> <li>▪ Tablelands community</li> <li>▪ Cairns Regional Council</li> <li>▪ Cairns Regional Council residents</li> </ul>	Long	Medium
Build Nullinga Weir for agricultural use	Build a Nullinga Weir (if possible) for agricultural water supply	<ul style="list-style-type: none"> <li>▪ SunWater</li> <li>▪ MDWSS irrigators</li> <li>▪ MDWSS water entitlement holders</li> <li>▪ Mareeba Shire Council</li> <li>▪ Tablelands community</li> </ul>	Long	Low
Harvest water from the Johnstone River and build pipeline	Extract water from Johnstone River and build pipeline to the Atherton Tableland region for agricultural water supply	<ul style="list-style-type: none"> <li>▪ Tablelands Regional Council</li> <li>▪ Mareeba Shire Council</li> <li>▪ MDWSS irrigators</li> <li>▪ Existing MDWSS water entitlement holders</li> <li>▪ Tablelands community</li> </ul>	Very long	Low