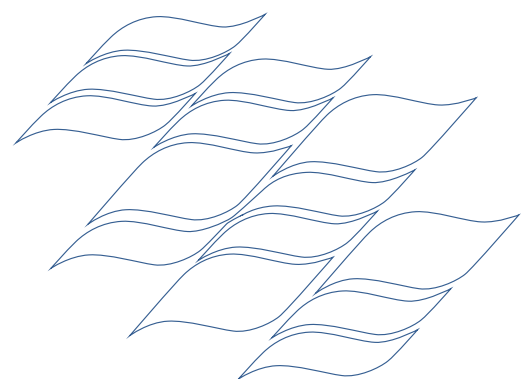


# Appendix 21

[RETURN TO APPENDICES LIST](#)

(1) Gladstone Desalination Project, Preparatory Phase Program AND (2) Gladstone Desalination Project, Approvals and Design Maintenance Schedule 2010–2030  
(Arup)



Gladstone Area Water  
Board

---

**Gladstone Desalination  
Project**

---

Preparatory Phase  
Program

Gladstone Area Water  
Board

---

**Gladstone Desalination  
Project**

---

Preparatory Phase  
Program

October 2009

Arup  
Arup Pty Ltd ABN 18 000 966 165



**Arup**  
Level 4 108 Wickham Street, Fortitude Valley QLD 4006, GPO Box 685 Brisbane QLD 4001  
Tel +61 7 3023 6000 Fax +61 7 3023 6023  
[www.arup.com](http://www.arup.com)

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Job number 206438-00

Job title	Gladstone Desalination Project	Job number	206438
-----------	--------------------------------	------------	--------

Document title	Preparatory Phase - Program	206438-00
----------------	-----------------------------	-----------

Document ref

Issue	01/10/09	Filename			
		Description	Final		
			Prepared by	Checked by	Approved by
		Name	Alan Baird & Martin England	Alan Baird	Martin England
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document

## Contents

	Page
1 Purpose of this Advice	1
2 Assumptions	1
3 Program Overview	2
4 Budget	2
5 Conclusion	2

## Appendices

Appendix A

Program

## 1 Purpose of this Advice

GAWB is developing the Project to a stage where it will reach a point of preparedness for delivery of the Project in a construction timeframe of 18 - 24 months following a period of Early Works.

GAWB is planning budgets for expenditures to achieve a point of preparedness for delivery of the Project and to maintain this state of preparedness over the period 2010 to 2030. GAWB has requested our third party advice in order to provide indicative tasks and associated budgets to achieve a point of preparedness for delivery of the Project

## 2 Assumptions

The program is based on project definition and preparatory works being completed prior to the project being maintained in a state of readiness. Scoping study, Siting Studies and Real Options Analysis has been completed and work is assumed to continue from October 2009.

The program (refer to Appendix A) shows the project immediately proceeding to Early Works with no maintenance period. A maintenance period can be incorporated into the program by including the required period in the included activity in Stage 3 (Maintenance Period and Early Works Mobilisation).

The budgets identified in the Program do not include GAWB internal costs, including project management, legal review and other management resources that will be required. The costs include:

- Allowances for consultants associated with site selection, developing delivery strategies for the elements of the project, developing concept design, progressing land tenure and completing preparatory investigations;
- Nominal allowances for external legal input to land, approvals and procurement activities; and
- Allowances for surveys and monitoring required for the preparatory works.

The program has been developed in stages that minimise the work and expenditure required to achieve a point of preparedness. To achieve this, a Design and Construct procurement approach has been assumed with most of the design, investigations, surveys, approvals and tender documentation scheduled to occur in the Early Works period.

It has been assumed that land will not be acquired during the project definition and preparatory works stages.

Costs incurred prior to October 2009 are not included. All costs noted are exclusive of GST.

### 3 Program Overview

The program has been developed in the following stages. Project Definition has been broken into several stages with the majority of the activities occurring in the 2010 / 11 financial year. Preparatory Works (Stage 2) are also completed in the 2010 / 11 financial year.

Refer to the program in Appendix A for more details.

	Start	Finish
Stage 1 – Project Definition		
<ul style="list-style-type: none"> <li>• Stage 1a – Scoping, Siting Studies and Real Options</li> <li>• Stage 1b - Project Definition               <ul style="list-style-type: none"> <li>○ Part A - Site Selection</li> <li>○ Part B – Project Definition 1</li> <li>○ Part C – Project Definition 2</li> </ul> </li> <li>• Stage 1c - Consultant / Investigation Procurement</li> </ul>		Completed
	Oct 2009	Jan 2010
	Jan 2010	May 2010
	May 2010	Nov 2010
	Oct 2010	Nov 2010
Stage 2 – Preparatory Works	Dec 2010	Apr 2011
Stage 3 - Maintenance Period and Early Works Mobilisation	Apr 2011*	Apr 2011*
Stage 4 - Early Works (incl Contractor Procurement)	Apr 2011	Feb 2012
Stage 5 - Design, Delivery and Construction	Feb 2012	Dec 2013

\* Maintenance Period shown as nil duration

### 4 Budget

The total indicative budget for Stage 1 and Stage 2 is \$1,095,000 and is summarised as follows:

- Stage 1 - \$745,000; and
- Stage 2 - \$350,000

These costs are expended across financial years as follows:

- Financial year 2009 / 10 - \$305,000
- Financial year 2010 / 11 - \$790,000

Activity level budgets are included in the program in Appendix A.

### 5 Conclusion

Having regard to GAWB's contingent supply strategy, the following preparatory works (to be concluded by 30 April 2011) will provide GAWB with the generally equivalent ability to access water from a local desalination plant to that of the Gladstone-Fitzroy Pipeline Project. Both projects can be delivered in nominal two year construction programs whilst noting the difference in scale of both projects and the greater volume of preparatory work in place for the Pipeline Project. The Pipeline Project's preparatory works are forecast to be concluded by 31 August 2010.

Appendix A

---

**Program**



Gladstone Area Water  
Board

---

**Gladstone Desalination  
Project**

---

Approvals & Design  
Maintenance Schedule  
2010-2030

Gladstone Area Water  
Board

---

**Gladstone Desalination  
Project**

---

Approvals & Design

Maintenance Schedule  
2010-2030

September 2009

Arup  
Arup Pty Ltd ABN 18 000 966 165



**Arup**  
Level 4 108 Wickham Street, Fortitude Valley QLD 4006, GPO Box 685 Brisbane QLD 4001  
Tel +61 7 3023 6000 Fax +61 7 3023 6023  
[www.arup.com](http://www.arup.com)

This report takes into account the particular instructions and requirements of our client.

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Job number 206438-00

Job title Gladstone Desalination Project Job number 206438-00

Document title Approvals & Design 206438-00

Document ref

Issue	30/09/09	Filename	Desal Maintenance Schedule & Advice 090930 [Final].doc		
		Description	Final		
			Prepared by	Checked by	Approved by
		Name	Alan Baird, Andrew Batts, Martin England & Sally Wilson	Alan Baird & Martin England	Martin England
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document

## Contents

	Page
1 Executive Summary	1
2 Purpose of this Advice	2
3 Assumptions	2
4 Approvals	2
5 Design	3
6 Maintenance Schedule	3
7 Budget	3
7.1 Approvals	3
7.2 Design	4
7.3 Summary	4
8 Conclusions	4

## Appendices

Appendix A

Maintenance Schedule

# 1 Executive Summary

GAWB will develop the Project to a stage where it has reached a point of preparedness for delivery of the Project in a construction timeframe of 18-24 months following a period of Early Works.

To maintain its capability to deliver the Project in the long-term a managed program of maintenance is required to monitor emerging developments and assess their impact on the Project's Approvals and Design, and hence preparedness for delivery within the required timeframe. To adequately and efficiently manage the maintenance phase from July 2010 to June 2030 a number of tasks are required to maintain / refresh the current (and planned) deliverables.

The underlying assumption for the purpose of this advice is that there will be no augmentation before 2030. Any process of augmentation before 2030 will trigger a different process of price reset. Early Works and project (construction) costs are therefore outside the scope of this advice.

The advice only considers impacts from 2010 to 2030. If additional work is required it has been programmed in the Early Works phase and it is not accounted for here (e.g. it is deemed to be a project cost).

There is a high probability that there will be changes to existing policy and legislation and the introduction of new policy and legislation that may impact upon the approvals requirements for the Project. It is therefore essential that resources are committed to monitoring the statutory regime over the Maintenance Schedule to ensure that the implications of any such changes or additions on the approvals requirements for the Project are determined efficiently and any associated changes to future works or the design are also addressed efficiently.

To support the attainment of preparedness a concept design will be procured. It will retain a nominal useful life of approximately 5 years. Beyond this, a range of issues are likely to progressively create scope drift, which will require to be addressed by progressively more extensive concept design re-work. Improvements in desalination technology, tenure of the corridors (particularly to open water) and raw water quality may impact in the short-term. However, if no particular issue dominates, the incremental effect of a range of issues over time will further diminish the viability of concept design deliverables and their ability to be adopted as a base for scoping the project (and development of preliminary design) without check and / or change.

To review major environmental / EIS approvals and emerging issues, budgets of \$15,000 every 4 years are recommended.

To review design and emerging issues a budget of \$117,500 every 4 years is recommended. To consolidate the review work at year 4, 8 and 12, additional budgets of \$75,000 in year 8 and 16 are recommended. [Actual year 8 and 16 budgets are \$192,500.]

The tasks described in the Maintenance Schedule are considered the minimum necessary to maintain the currency and validity of the Approvals and Design developed in the Preparatory Works phase. It allows GAWB to:

- track major developments across a range of key areas of interest to the Project
- manage emerging developments which impact on the Approvals and Design associated with the Project
- hold the Project ready for efficient delivery within a 18-24 month construction period (following a period of Early Works).

## 2 Purpose of this Advice

GAWB will develop the Project to a stage where it has reached a point of preparedness for delivery of the Project in a construction timeframe of 18-24 months following a period of Early Works. It will attain a capability to augment supply to its Service Area by completing sufficient Preparatory Works (which are described in the attached high-level program). To maintain its capability to deliver the Project in the long-term a managed program of maintenance is required to monitor emerging developments and assess their impact on the Project's Approvals and Design, and hence preparedness for delivery within the required timeframe.

GAWB is planning budgets for expenditures over the projected maintenance years (that is, 2010 to 2030). GAWB has requested our third party advice in order to provide indicative tasks and associated budgets to adequately and efficiently manage the maintenance phase from July 2010 to June 2030.

## 3 Assumptions

The underlying assumption for the purpose of this advice is that there will be no augmentation before 2030. Any process of augmentation before 2030 will trigger a different process of price reset. Early Works and project (detailed design, documentation and construction) costs are therefore outside the scope of this advice.

*[It is noted that the Project will not reach a point of preparedness until 2010/11 however the presentation of this advice has assumed timely attainment of preparedness, followed by maintenance on the same schedule as GFP, allowing potential economies in mobilisation of GAWB and advisory teams.]*

The advice only considers impacts from 2010 to 2030. If additional work is required it has been programmed in the Early Works phase and it is not accounted for here (e.g. it is deemed to be a project cost).

It is assumed that an EIS will not be required for the project and the environmental approvals have been left to the Early Works period. This allows approval activities to be significantly reduced. However this approach is different to previous advice and will require confirmation in the Project Definition stage.

The Early Works period is defined as a 10 month period to include all approvals, preliminary design, survey, geotechnical investigation, tender documentation, tendering, business case and contract award. The requirements for this significant number of concurrent and interrelated activities will need monitoring by the PM during the maintenance period to ensure that project risk is effectively managed.

*DN - Land and Project Management has not been incorporated into this advice.*

## 4 Approvals

As noted above, we have based our comments on the assumption that development of the desalination project will not require an EIS or EPBC approval. However, some form of Environmental Assessment will be required as supporting information for the applications for various approvals. This work has been identified in the Early Works period.

It is assumed that the major development approvals will therefore be obtained during the Early Works period.

Due to the duration of the Maintenance Schedule, there is a high probability that there will be changes to existing policy and legislation and the introduction of new policy and legislation that may impact upon the approvals requirements for the Project. It is therefore essential that resources are committed to monitoring the statutory regime over the Maintenance Schedule to ensure that the implications of any such changes or additions on the approvals requirements for the Project are determined efficiently and any associated changes to future works or the design are also addressed efficiently.

## 5 Design

The concept design will retain a nominal useful life of approximately 5 years. Beyond this, a range of issues are likely to progressively create scope drift, which will require to be addressed by progressively more extensive concept design re-work.

Improvements in desalination technology, tenure of the corridors (particularly to open water) and raw water quality may impact in the short-term. However, if no particular issue dominates, the incremental effect of a range of issues over time will further diminish the viability of concept design deliverables and their ability to be adopted as a base for scoping the project (and development of preliminary design) without check and / or change. In particular, as time passes, whilst the concept design of the current scheme remains functional, its credentials as the most optimal scheme will be difficult to substantiate without further design effort. By addressing significant issues as they develop, it will be possible to maintain a feasible concept design and maintain its viability as far as reasonably practicable. However, elements may require complete re-work, in particular the works within the corridors.

The longer the maintenance period, the more likely concept design re-work will be undertaken (for technical and non-technical reasons).

The Schedule concentrates on high-level issues and assumes all significant design issues can be addressed during Early Works and / or the start-up of the construction period.

Critical issues include:

- Change and / or amendment of corridors
- Confirmation of environmental approvals process
- Change and / or amendment of statutory regulations etc
- Change in water industry regulations and / or best practice (e.g. disposal of brine)
- Changes / improvements in technology (e.g. desalination process, ICA and pumps)
- Developments around water quality (e.g. raw water and product water)
- Change GAWB requirements (e.g. network integration and operational philosophy).

## 6 Maintenance Schedule

A draft high-level maintenance schedule has been developed (and is attached) to allow GAWB to identify key stages and budget accordingly.

It is assumed that GAWB will lead the activity associated with the Maintenance Schedule, with a dedicated Project Manager mobilised at appropriate stages, and where possible GAWB teams performing each task. Particular tasks may require the ad-hoc appointment of external advisors, e.g. desalination technology review, water quality etc.

## 7 Budget

Key items included in the budget and discussed further in the attached schedule (Appendix A) are:

### 7.1 Approvals

---

For approvals, the following nominal budgets are recommended:

- To review policy / legislation changes as they arise and provide advice to GAWB on potential implications (and consider changes as part of relevant applications), a budget of \$10,000 every 4 years
- To review land use changes, \$5,000 every 4 years.

## 7.2 Design

To review design and emerging issues and provide a running log for GAWB to manage developments a budget of \$117,500 every 4 years is recommended. This is composed of two tasks at \$32,500 every 2 years, one task at \$52,500 every 4 years.

To consolidate intermediate reviews additional budgets of \$75,000 at year 2018 and \$75,000 at 2026 are recommended. This may be disbursed in whole (\$150,000) or in part, e.g. five work packages of \$30,000 each.

## 7.3 Summary

The budget estimate is presented at 2009 prices and is exclusive of GST.

There is no allowance for GAWB project management and / or procurement costs in the make-up.

A provision of 5% is recommended for expenses. This has not been allowed for in the budget.

The proposed budget is presented in tabular format below.

Year	Approvals (4 yrs)	Design (2 yr)	Design (4 yrs)	Design (8 yrs)
2010	\$0	\$0	\$0	\$0
2011	\$0	\$0	\$0	\$0
2012	\$0	\$32,500	\$0	\$0
2013	\$0	\$0	\$0	\$0
2014	\$15,000	\$32,500	\$52,500	\$0
2015	\$0	\$0	\$0	\$0
2016	\$0	\$32,500	\$0	\$0
2017	\$0	\$0	\$0	\$0
2018	\$15,000	\$32,500	\$52,500	\$75,000
2019	\$0	\$0	\$0	\$0
2020	\$0	\$32,500	\$0	\$0
2021	\$0	\$0	\$0	\$0
2022	\$15,000	\$32,500	\$52,500	\$0
2023	\$0	\$0	\$0	\$0
2024	\$0	\$32,500	\$0	\$0
2025	\$0	\$0	\$0	\$0
2026	\$15,000	\$32,500	\$52,500	\$75,000
2027	\$0	\$0	\$0	\$0
2028	\$0	\$32,500	\$0	\$0
2029	\$0	\$0	\$0	\$0
2030	\$0	\$0	\$0	\$0
Total	\$60,000	\$292,500	\$210,000	\$150,000

## 8 Conclusions

The attached Maintenance Schedule is necessary to maintain the currency and validity of the Approvals and Design developed in the Project Definition and Preparatory Works stages and also to maintain a feasible concept design. It allows GAWB to track major developments across a range of key areas of interest to the Project. Its adoption will allow GAWB to manage emerging developments which impact on the Approvals and Design associated with the Project and hold the Project ready for efficient delivery within a 24 month construction period (following a period of Early Works).

Appendix A

---

**Maintenance Schedule**

**GAWB  
DESALINATION PROJECT  
MAINTENANCE SCHEDULE TO 2030  
APPROVALS & DESIGN**

**Principles / Key Drivers**

1. Only impacts from 2010 to 2030 are considered. This is based on minimizing all Preparatory Works and moving activities to the Early Works stage.
2. It is assumed that not all land tenure will be secured and maintained for the 2010 to 2030 period. (It is assumed the Yarwun WTP site will be secure). It is considered government will not provide full secure tenure in the GSDA, without assurance of the Project proceeding in the foreseeable future.
3. It is assumed that GAWB will maintain a feasible option developed to concept design standard. This will need to recognize land tenure issues / changes / footprint changes.
4. It is assumed that Yarwun WTP will be the site with outfall / inlet via Fisherman's Landing.

**Guidance**

It assumed the first annual review will occur in 2011, the first 2 year review will occur in 2012, and the first 4 year review will occur in 2014. A similar cycle to GFP has been adopted to coordinate PM / review effort. This could be refined at a later date. However, for the purposes of this schedule the cost is independent of GFP and some savings may be attained.

It is assumed that a GAWB project manager will manage the maintenance process, and continually refresh and populate the maintenance schedule (and risk register). It is assumed a GAWB project manager will be mobilized on a full-time basis as follows for each key review to scope, guide, direct and report:

- 2 weeks for 2 year cycle tasks
- 12 weeks for 4 year cycle tasks
- 12 weeks for major concept design tasks (less if rolled-up with other work).

In addition to a central coordination role, the project manager will be responsible for linkage of each task and assessing wider project impacts.

It is suggested that an additional 5% is allowed for expenses associated with each sub-task. [*This has not been embedded into the budget estimate below.*]

The budget estimate excludes allowances for GAWB PM, expenses and GST. It is based on 2009 prices. The budget has been prepared such that it is likely that the regular recurrent costs will not be fully expended at each interval (annual, 2yrs, 4yrs etc) and will allow for some unknowns and concept redesign to be accommodated.

Impact	Commentary	Action		
		Task	Budget	Timeframe
<b>Approvals</b>				
Project Footprint “not reserved”	Project Footprint will need to be secured (assuming that appropriate tenure for pipeline corridor has been secured/obtained and any ongoing license / tenure costs are covered elsewhere). Not costed	Monitor & maintain necessary tenure where available		Every 4 yrs
Change in land use	There will likely be increased development over time that is currently not foreseen, eg changes within the GSDA and surrounding areas. These may or may not impact on the Project and is difficult to quantify.  <i>This triggers assumption that corridors are lost and concept re-design is required – see below.</i>	Review land use impacts periodically and consider as part of future relevant applications	\$5,000	Every 4yrs
Change in Government policy / legislation for Approvals	Over time, policy will likely become more onerous for project proponents. This could include associated offset requirements. Progressing State / Local approvals could manage some of this risk.	Review policy / legislation changes as they arise and provide advice to GAWB on potential implications. Consider changes as part of relevant applications	\$10,000	Every 4yrs

<b>Design</b>				
Change in final alignment to open water, power supply and network integration	Amendment of horizontal and vertical alignments will impact on design where change is driven by approvals / land / other corridor users / future development, e.g. industrial development / expansion, road, rail, services, easements etc. Redesign maybe required to renew approvals etc.	Review and assess impact of known amendments	\$10,000	Every 2yrs
Change in raw water quality	Water quality deterioration may impact on process, e.g. consumption of consumables, operational philosophy, product water quality etc.	Monitor and review water quality from various sources	\$15,000	Every 4yrs
Change in water quality standards	New or amended regulations may impact on compliance of scheme with desired standards.	Review quality standards on a desktop basis	\$2,500	Every 4yrs
Change / improvement / innovation in available desalination technology	Current technology may become obsolete, sub-optimal etc when merging desalination technology evolves.	Review emerging technologies and engage with market	\$10,000	Every 2yrs
Change / improvement in available pump technology	Current pump station GA and pump configurations may become sub-optimal or redundant if technology evolves.	Review emerging technologies	\$5,000	Every 4yrs
Change / improvement in control and instrumentation technology	Current ICA (instrumentation, control and automation) selection may become sub-optimal or redundant if technology evolves. [This is an area of continual and technology led improvement.]	Review emerging technologies		
Change in disposal arrangements for brine	Regulations may tighten and current proposed arrangements may be restricted and / or eliminated as an option.	Review emerging regulations and monitor impacts	\$10,000	Every 4yrs
Change in availability for power supply	Current availability may change as other developments pick up spare or reserved capacity.	Maintain contact with utility and negotiate as necessary	\$5,000	Every 2yrs
Change in network	Current assumptions on network integration	Review network	\$10,000	Every 4yrs

integration requirements	inform storage capacity / location, network connection point, pumping head etc. Any change will impact design, e.g. condition of existing main at connection point, hydraulic capacity constraints etc.	developments / condition assessments (and model as necessary to establish impacts on GFP)		
Change in conditions in overwater environment	The marine environment may change over time and impact on design, for example commencement of inshore dredging works.	Monitor developments and assess impacts on project's marine works	\$7,500	Every 2yrs
Change in GAWB operational requirements	GAWB Operations to 2030 may evolve enhanced protocols / approaches and elements of the scheme may no longer be appropriate. OH&S and other regulations may oblige change.	GAWB Operations to review functional requirements (set 2009-10) and confirm current alignment with emerging GAWB practice	\$10,000	Every 4yrs

### Major Concept Design Review

It is assumed that major reviews of significant issues impacting on the concept design will be commissioned by GAWB over the Maintenance Period. This is assumed to include rolling-up intermediate issues and reviews from earlier stages of the period into an issues log. It is further assumed that GAWB will project manage this each major review over a 3 month period. One full-time project manager will be required with the support of GAWB technical staff as appropriate (say on the basis of one FTE over 3 months). The review will establish critical issues which require immediate work to maintain the currency and viability of the concept design. It is not intended to create detailed design merely to test, and develop emerging issues to the point that wider impacts are understood, and a strategy (or modest body of work) exists to maintain the readiness of the project for delivery within an achievable timeline. A key deliverable will be a new or significantly refreshed concept design, probably focusing on major process improvements, or loss of one or all corridors, in whole or part. A budget of \$150,000 (at 2009 prices) is suggested over the Maintenance Period. This is represented on the schedule as two activities of \$75,000. This is presented for the purpose of budgeting, but the budget may be drawn down in say, five equal installments to service more frequent reviews, and concept design refresh. This excludes allowances for GAWB PM, expenses and GST.