CITY OF GOLDCOAST.

736

Extract of

Adopted Report

of the

Economic Development and Major Projects Committee Meeting

held

Thursday 25 May 2017

at

2pm

City of Gold Coast Council Chambers
135 Bundall Road
Surfers Paradise

ITEM 2 MAJOR PROJECTS
OCEAN-SIDE CRUISE SHIP TERMINAL FEASIBILITY STUDY FINDINGS
PD330/214/18/01(P1)

Refer 259 page attachments

1 BASIS FOR CONFIDENTIALITY

1.1 I recommend that this report and attachments be considered in Closed Session pursuant to section 275 (1) of the *Local Government Regulation 2012* for the reason that the matter involves the local governments budget and contracts proposed to be made by it.

2 EXECUTIVE SUMMARY

Tourism Research Australia data shows that over the past decade, domestic visitor nights on the Gold Coast has dropped by nearly 20 per cent. During the same period Australian cruise ship passenger numbers increased by 480 per cent. This feasibility study evaluates the opportunity to improve the Gold Coast tourism sector performance by gaining access to this rapidly growing market.

A rigorous options development and assessment process has determined that an Ocean-side Cruise Ship Terminal (OCST), with an in-line wharf and jetty sheltered by a breakwater, is feasible. Based on outcomes of market sounding, workshops, financial and economic analysis, the construction of an OCST would result in a Benefit Cost Ratio (BCR) of between 3.0 and 3.9. That is, for every dollar invested in the project the Gold Coast would receive a benefit of at least three dollars which is a significant positive outcome. The project would support over 3,500 local jobs (construction and operation).

Financial analysis indicates that the OCST is cash flow positive from an operational perspective, although direct revenues are not sufficient to recover the full capital outlay required for construction (principal and interest) for all scenarios. However, given the significant economic benefit identified, and the value engineering and commercial investigations ahead, it is recommended the project progress to the project development phase.

3 PURPOSE OF REPORT

The purpose of the report is to update Council on the findings of the OCST feasibility study and to present the way forward to develop the project through the project development phase.

4 PREVIOUS RESOLUTIONS

At its meeting on 18 October 2016, Council resolved (**refer G16.1018.025**) as follows:

"That Committee Recommendation ED16.1013.005 be adopted as printed which reads as follows:

1. *That Council note the update for the Ocean-side Cruise Ship Terminal feasibility study.*

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2. *That Council, based on the reasons as outlined in Section 5.2 of this report, reduces the locations for investigation through the feasibility study from three to one, with the focus being a location ocean-side of Philip Park.*

3. *That to further inform the Spit Master Plan Process, the Mayor writes to the Premier noting Council's preference for further investigation of the ocean-side of Philip Park as the focus for the cruise ship terminal.*

At its meeting on 7 June 2016, Council resolved (**refer G16.0607.020**) as follows:

"That Committee Recommendation ED16.0602.006 be adopted, with a change to Part 2, such that it reads in its entirety as follows:

1. *That the report and attachments be deemed non-confidential except Attachment 3 which be deemed confidential in accordance with sections 171 (3) and 200 (5) of the Local Government Act 2009.*

2. *That the City undertakes the feasibility investigations to assess Ocean-side Cruise Ship Terminal options as outlined in this report."*

5 DISCUSSION

5.1 Feasibility Study Process Overview

Council resolved to undertake a feasibility study to investigate three locations for an Ocean-side Cruise Ship Terminal (OCST).

These locations were:

- Location 1: Offshore of Philip Park
- Location 2: Extension of the existing sand bypass jetty
- Location 3: Extension to the existing southern training wall of the Gold Coast Seaway

Council subsequently resolved to focus the feasibility study at Philip Park.

Figure 1 outlines where the feasibility study sits within a project development framework.

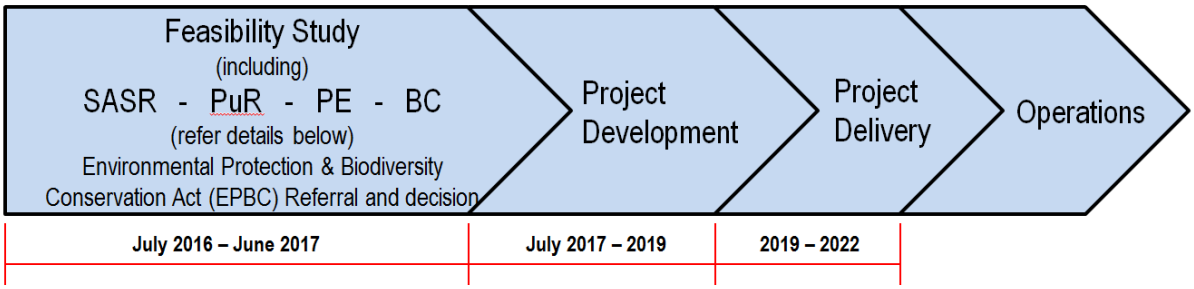

Figure 1: Typical Project Stages.

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The feasibility study developed for the OCST includes a number of documents as described in the Queensland Governments Project Assessment Framework (PAF). These documents are listed below and have been developed for this feasibility study.

- Strategic Assessment of Service Requirement (SASR):

This document is the need assessment. It describes an investment logic process, policy alignment and an overview of the cruise ship industry.

- Preliminary Update Report (PUR):

This milestone is unique to the OCST feasibility study. It focussed on an initial assessment of the project costs and benefits associated with a transit port only and highlighted economic benefits sufficient to return a BCR in the range of 0.6 (includes breakwater) to 1.1 (no breakwater option). The BCR's in the PUR highlighted the marginal economic viability for a transit port. The report also highlighted that the economic benefits may be substantially enhanced for a home port option.

- Preliminary Evaluation Report (PE):

The PE report documented the full options development and assessment process and included preliminary costs, revenues and benefits. It included a more detailed assessment of the project costs and benefits associated with both a transit port and home port and highlighted economic benefits sufficient to return a BCR of 0.6 for the transit port and between 3.4 and 4.3 for the home port scenarios. The BCR's in the PE highlighted the significant economic benefit associated with home port operations and derived a preferred technical solution configured as a home port in response to the significant economic benefit and the cruise industry requirements for additional home port requirements.

- Business Case (BC):

The business case process adopted for the project follows the "problem-solving" approach preferred by Infrastructure Australia and adopted by the Queensland State Government and Building Queensland (BQ) and is included to this report as Attachment 1.

The three distinct components of the business case include:

- Need Assessment
- Project Definition
- Implementation

The following sections address these components of the business case.

5.2 Need Assessment

5.2.1 Strategic Rationale for a Gold Coast OCST

Tourism is a significant portion of the Gold Coast economy. In 2014 – 15, the tourism sector:

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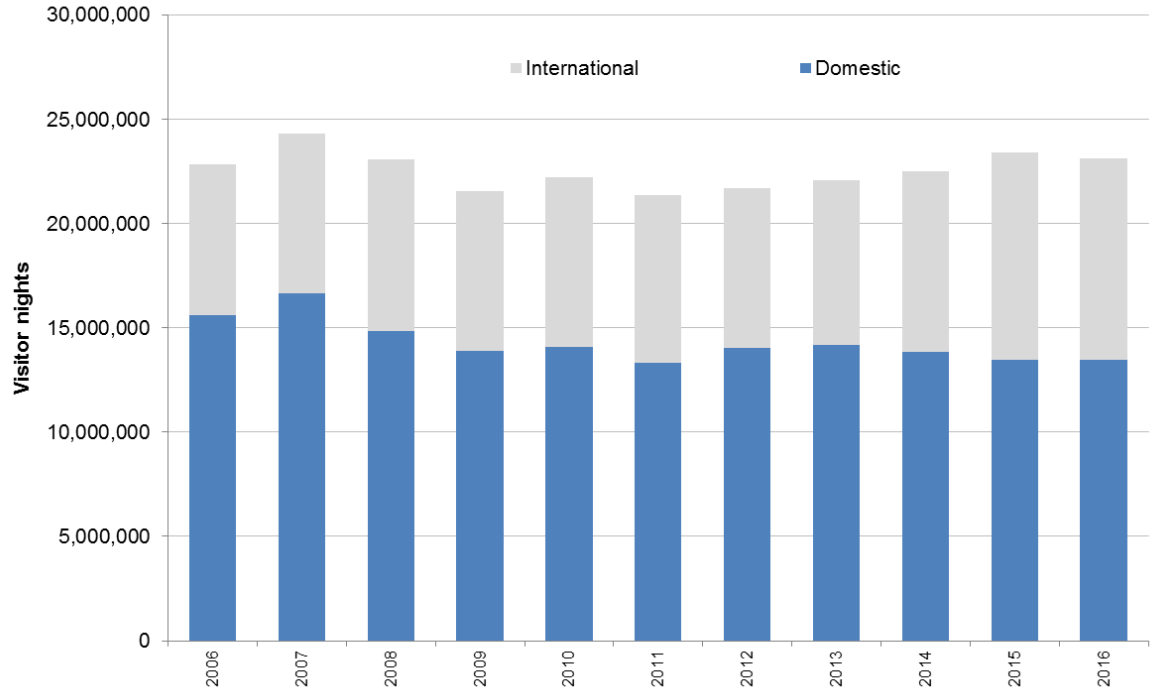
- generated $3.6 billion (13.5%) of the Gold Coast's $27 billion economy, over $1 billion came directly from the international tourism market,
- represented 17.3% of all employment (26,052 people directly and 15,272 people indirectly employed),
- represented 17.7% of output / sales in the Gold Coast

As Figure 2 below illustrates, annual domestic visitor nights on the Gold Coast have dropped over the past ten years following the global financial crisis. There has been some level of growth and recovery over the past 12 months and this is almost entirely due to an increase in Chinese visitors, representing a single market segment.



(source: Tourism Research Australia, Year ending December 2016)
Figure 2: Visitor nights on the Gold Coast 2006-2016

There have been examples of increased spending on tourism advertising to improve domestic tourism performance. In 2013/14 an additional $15M was spent by Gold Coast Tourism (GCT) on a television campaign but as can be seen from Figure 2, produced little discernible impact on domestic markets. To rejuvenate the Gold Coast's tourism industry, the Gold Coast needs to continually focus on enhancing visitor attraction by providing new reasons to visit. Investment in tourism infrastructure improves the sustainability and resilience of the tourism sector, as well as the broader overall economy.

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The cruise ship sector is one of the fastest growing tourism sectors internationally and is making a noticeable contribution to visitation and expenditure throughout key markets. As an example of the opportunity offered to the Gold Coast by the cruise shipping sector, over the past ten years (2007 - 2016) domestic visitor nights on the Gold Coast declined by almost 20 per cent. During this same period, Australian cruise ship passenger numbers increased by 480 per cent (to 1,058,781 passengers).

The growth in the cruise shipping segment has put pressure on the existing infrastructure to accommodate the industry. Releasing the *"Contribution of Cruise Tourism to the Australian Economy in 2015-16"*, Cruise Lines International Association (CLIA) Chairman Mr Steve Odell said, *"Our challenge is to make sure that this growth is not taken for granted by government and other stakeholders. Australia is very appealing for both home-ported and international cruise ships, but to make the most of our potential and maintain our edge in an increasingly competitive environment, we must recognise the importance of long term infrastructure planning and a positive regulatory environment, and do all that is possible to encourage more cruise ships to our shores,"*.

Consistent with the PAF and BQ guidelines, the business case established four key service requirements:

1. provide additional tourism drawcards on the Gold Coast
2. provide significant marine infrastructure to capitalise on the growing cruise shipping market
3. provide additional tourism infrastructure to encourage greater tourist visitation and economic growth
4. a clear, concise and widely supported plan regarding the future development of the Spit.

Given the shifts in the tourism market and the emergence and growth of the cruise industry in Australia and internationally, the development of maritime infrastructure to facilitate cruise shipping visitation to the Gold Coast is considered a strong and necessary strategic response. An OCST would provide necessary marine infrastructure for the Gold Coast to capitalise on the growing cruise ship market and increase tourist visitation and strengthen the local economy.

Additional detailed information relating to the Strategic Rational for the project can be found in Chapter 2 of the business case in Attachment 1.

5.2.2 Alignment with Policy

The development of an OCST on the Gold Coast aligns with Local, State and Federal government policies, linking to specific tourism, infrastructure and planning priorities and initiatives. Table 1 below highlights the relevant government policy that the proposed OCST aligns with:

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Level of Government	Policy Document
Local Government	Gold Coast 2020
	Economic Development Strategy 2013-2013
	Destination Tourism Management Plan (2014-2020)
Queensland State Government	State Infrastructure Plan
	Queensland Tourism and Transport Strategy
	Advancing Tourism 2016-2020
Australian Federal Government	Tourism 2020
	National Long-term Tourism Strategy

Table 1: Overview of Policy Alignment

Additional detailed information relating to the Alignment with Policy for an OCST on the Gold Coast can be found in Chapter 3 of the business case in Attachment 1.

5.2.3 Market Sounding

The feasibility study has included a significant market sounding exercise, shaped specifically for the level of detail required for each milestone. A summary of the market sounding undertaken for this study is included in Appendix F (Market Sounding Report) of the business case in Attachment 1.

Market sounding with the cruise ship industry has highlighted a need for additional infrastructure to continue the strong growth in the segment. Brisbane has the second most ship visits of any place in Australia with 149 visits (40 of which are transit calls) and plans are in place for a new facility at the mouth of the Brisbane River (Luggage Point). Current ships calling to Brisbane can stop at Portside (Hamilton), Fisherman's Island (Port of Brisbane) or they anchor at Tangalooma (Moreton Island). Portside is limited to smaller ships due to navigational constraints. Fisherman's Island is at the Port of Brisbane and Tangalooma is an anchorage.

South East Queensland has strategic locational benefits for a cruise ship. It has access to a 7 day Pacific Island itinerary, and also a 7 day Queensland Coast itinerary.

Figure 3 below shows the difference between Sydney and South East Queensland to access the Pacific Islands.

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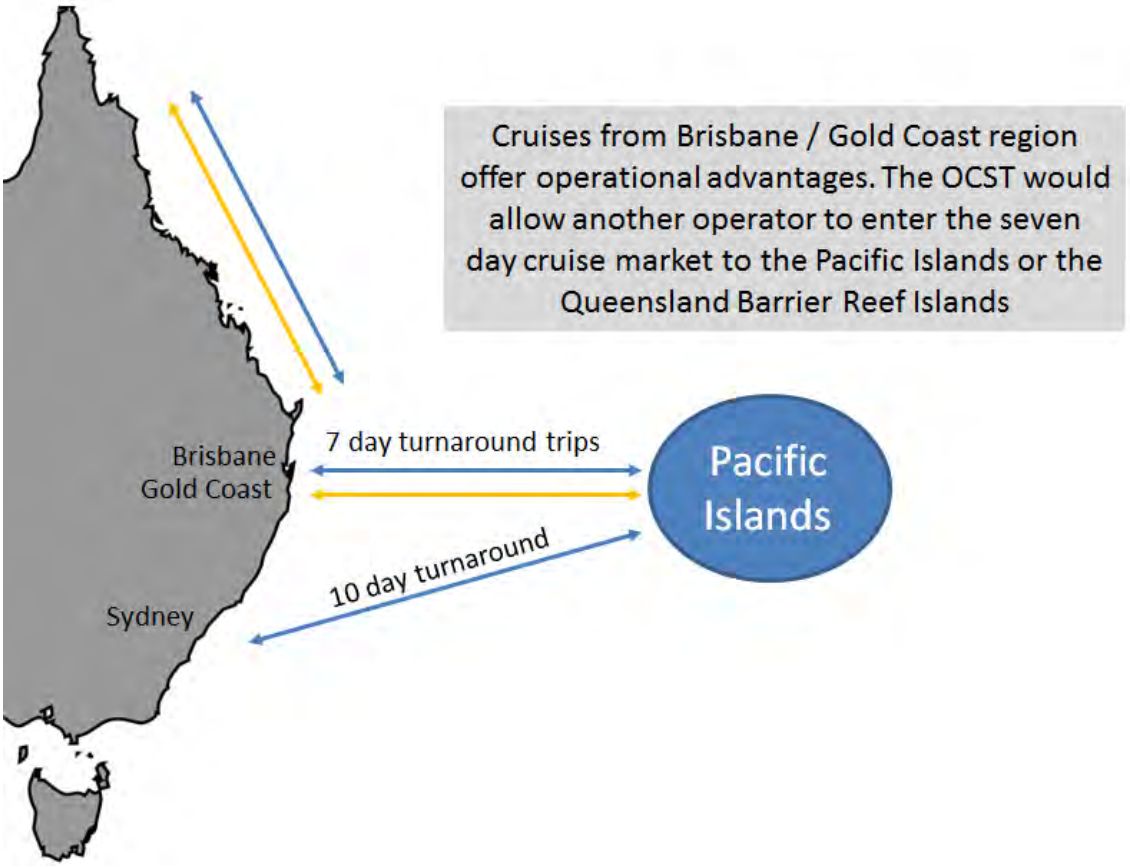

Figure 3: Access to Pacific Islands

The two most common of the current home port operations out of Brisbane utilise these seven day itineraries to the Pacific Islands and the Queensland Coast and are all conducted by a single supplier (Carnival Cruise Lines). All of the turnaround calls in Brisbane are conducted by this single operator. A review of all the cruise ship visits for the next 12 months to Brisbane (both transit and home port calls) highlights Carnival Cruise Lines 146 visits, Royal Caribbean Cruises two visits and Norwegian Cruise Line one visit.

The Asian cruise ship market has experienced recent rapid growth. Data from CLIA shows that there has been an average 43 per cent annual growth from 2012 to 2015 for Asian passengers undertaking cruises outside Asia. Australia has a negligible share of this market and is uniquely located to take advantage of the seasonal differences in the cruise market.

China has the fastest growing cruise shipping market in the world with new larger ships being built specifically to target this growth market. With cruise shipping having distinct seasons and Australia being counter seasonal to China, this represents an opportunity for the Gold Coast, and Australia, to boost cruise ship visitor numbers.

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5.3 Project Definition

5.3.1 Feasibility Study – Preferred Option

The identification of a preferred option included a detailed options development and options assessment process that was systematic and narrowed the options from 12 initial options to a preferred option.

The process included:
- consideration of infrastructure and non-infrastructure solutions
- consideration of optimal location, including potential for utilising existing infrastructure
- development of functional and technical criteria
- development of a long list (12) of infrastructure outcomes to meet the service need, functional criteria and technical criteria
- selection of a preferred infrastructure arrangement option using a Multi-Criteria Analysis (MCA)
- consideration of design variations of the different infrastructure elements within the preferred arrangement

The preferred option includes an in-line wharf and jetty sheltered by a breakwater. This layout was selected based on outcomes of market sounding, workshops, technical studies, MCA, financial and economic analysis. Feedback from the cruise industry and experienced Captains were integral to the options assessment process and informed the preferred orientation. Technical investigations in relation wave modelling and dynamic mooring assessments were also considered in the selection process and informed the size of the breakwater. The preferred option can operate as either as a transit port or home port. A transit port is one which operates only as a day visit port on a ship itinerary with ships calling (generally for the day) and passengers enjoy the City for a day trip, and then depart again in the afternoon. A home port is the start / end point of a voyage and includes the transfer of passengers and provisioning of the ship. Figure 4 shows the preferred option layout.

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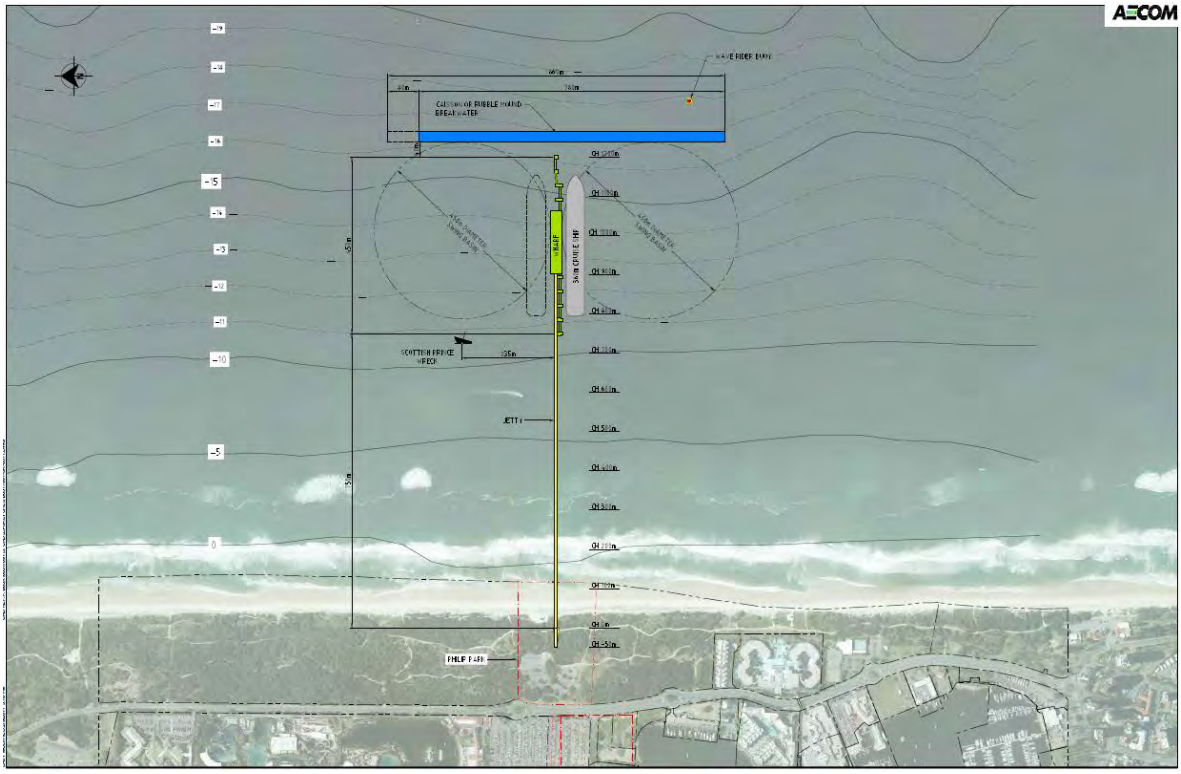

Figure 4: Preferred Option Layout Plan

The preferred option includes the following primary components:

- Breakwater – the breakwater is required to provide cruise ships with protection from waves while berthing and at dock. This is necessary to allow passengers to board and disembark the ship safely and provide certainty to the market of availability during adverse conditions. The breakwater is approximately 780m long and of concrete caisson construction.

- Jetty – a 900m long jetty extending perpendicular from shore. The jetty is a skeletal framed structure comprising raking piles and headstocks (bents) and a vehicle running surface. The jetty elevation rises above the significant wave height for approximately 800m of its length before sloping down to the wharf deck level. This option includes a 7m wide roadway along the length of the jetty that allows for traffic and pedestrian access.

- Wharf and Dolphins – a concrete wharf structure (in line with the jetty) is included for cruise ship access. An independent system of berthing and mooring dolphins is also included at wharf deck level on the southern side.

- Berth – the preferred option includes a single berth only with a 450m swing basin. There is a space allowance for future expansion for a second berth on the north side of the wharf. A second berth would require relatively little additional infrastructure including dolphins to the northern side of the wharf and a minor extension to the breakwater.

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- Onshore infrastructure and services – including the terminal building, roads and access, stormwater, sewer, water, electrical, gas and communications infrastructure.

Additional details of the Reference Project design elements are included in Chapter 4 of the business case in Attachment 1.

5.3.2 Examples of Existing Projects

The OCST project is uniquely located ocean-side of the Gold Coast. The high energy wave environment which is conducive for the recreational activities many Gold Coasters undertake each day needs to be controlled for large cruise ships to berth. There are recent examples around the world where engineered solutions have been implemented in high energy wave environments to protect areas for large vessel movement, mooring and operations.

Attachment 2 includes details of two recent projects in the Pacific Ocean with a similar wave environment to the Gold Coast with engineered solutions for vessel operations behind a constructed breakwater. These are at Costa Azul, Mexico and Pampa Melchorita, Peru.

5.3.3 Staging Options

Throughout the development of the feasibility study, the project team sought to develop a technically feasible staging option for the OCST to improve the financial performance. Based on the ocean-side design, two primary staging options were considered for the primary infrastructure components, the jetty and the breakwater.

The staging options were:

- Constructing the jetty and wharf first, adding the breakwater later
- Constructing the breakwater and wharf first, adding the jetty later.

Both of these options would offer cost savings however neither is considered feasible for technical and commercial reasons.

5.3.4 Long Term Recycled Water Release Project (LTRWRP)

There is potential for cost synergies through integration of the OCST and LTRWRP projects. Additional refinement of cost values, project inclusions and potential for value engineering would be required in the next phase of the OCST project to provide a more detailed cost comparison.

It is recommended that the synergies between the projects continue to be explored during the project development phase of the project.

5.3.5 Market / Demand Assessment

By 2020 annual cruise ship passenger numbers boarding in Australia are forecast to reach 2 million. The actual year on year growth rate of cruise ship visits to Australian ports between 2011 and 2016 is 14.28 per cent. This significant increase in domestic cruises around

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Australia is a major contributor to the overall growth in global passenger numbers increasing from 17.8 million in 2009 to 24.2 million in 2016, an increase of 36 per cent (4.5 per cent year

on year growth). The Gold Coast does not have direct access to this market and cruise operators are unlikely to set up tendering arrangements due to the open ocean conditions.

Demand has been estimated by forecasting the future size of the South East Queensland cruise market based on current growth trends and market penetration rates to determine the number of vessels required to service this demand. Market penetration is the percentage of the catchment population taking a cruise ship trip. The vessels are then allocated to the Gold Coast OCST based on sharing the SEQ market with Brisbane, ranging from a 20 per cent share in year 1 ramping up to a 50 per cent share post year 3 for the Gold Coast.

Four demand scenarios have been developed which are the basis for the financial and economic assessment:

- Transit Scenario: Growth at 8 per cent
- Scenario 1: Growth at 8 per cent, market penetration rate of 8 per cent
- Scenario 2: Growth at 10 per cent, market penetration rate of 9 per cent
- Observed: Growth at 14.28 per cent, market penetration rate of 10 per cent

The observed scenario above also includes a 50 per cent market share assumption with Brisbane from year one.

The demand profiles developed for the business case are tabulated below. Capping of the cruise visits at 212 is based on Sydney's seasonal distribution of visits with only a single ship visit per day. Summer contributes 40 per cent of the ship visits, autumn 15 per cent, winter 10 per cent and spring 35 per cent. The home port options also include transit calls. Transit call numbers are significantly lower than home port calls due to the current trends in Brisbane as described in section 5.2.3. And based on the current market sounding a transit port growth rate of 8% is considered optimistic. Nonetheless an aggressive growth rate of 10% has been tested and provides a BCR of 0.8. It is proposed to continue to investigate transit port visits as part of the next project phase and a decision between transit port and home port is not required at this time.

The reference project is easily adjusted to accommodate an additional mooring should it be required.

Year	Transit	Scenario 1	Scenario 2	Observed
2022	20	59	65	158
2027	29	144	160	176
2032	42	160	178	195
2037	62	178	197	212
2042	93	199	212	212
2047	138	212	212	212
2052	201	212	212	212

Table 2: Derived demand estimates for the OCST

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Further details associated with the derivation of the demand estimates are included in Chapter 7 in the business case as Attachment 1.

Revenues associated with the OCST are directly proportional to the number of ship visits. The business case has used two cost profiles, a lower and upper bound estimate of port charges.

Redacted

Sydney is higher at $220,078 per ship. Reference data is presented in Table 91 in Appendix G of Attachment 1.

5.3.6 Economic and Financial Analysis

Economic Analysis

For the purposes of assessing the economic impacts of the OCST project, an Input-Output (I-O) assessment has been applied to determine the economic impacts of the project. The input-output assessment is a form of economic analysis based on the interdependencies between economic sectors. It is used for estimating the impacts of positive or negative economic effects throughout the economy.

The economic impact of the OCST project has been assessed through the business case in three aspects:

- Output: represents the gross revenue generated by businesses/organisations in each of the industry sectors in the region. Gross revenue is also referred to as total sales or total income.
- Value-added: represents the marginal economic value that is added by each industry sector in the region, otherwise interpreted as a contribution to regional economic growth.
- Employment: measures the number of people that are employed by businesses/organisations in each of the industry sectors in the region, measured on a full time equivalent basis.

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Table 3 below represents an overview of the scale and diversity of the economic benefits created by the OCST project for the Gold Coast, including the overall impact (output), employment and value added effects, throughout the 30 year analysis period.

Scenario 2 Economic Impact	Gold Coast	State of Queensland	Proportion of Impact on Gold Coast
Output $M (Direct and indirect)	$2,763M	$3,749M	74 per cent
Employment (Direct and Indirect)	3,587	4036	89 per cent
Value Add $M (Direct and indirect)	$1,205M	$1,705M	72 per cent

Table 3: Summary of Gold Coast based Economic Impacts for Scenario 2

Table 3 above highlights that the OCST on the Gold Coast would make a significant contribution to the Gold Coast economy and contribute toward the goals as set-out in the Economic Development Strategy for the City. The OCST would support between 3,400 and 3,600 Gold Coast jobs.

The business case has highlighted that the OCST will increase total visitor nights to the City by between 109,137 to 431,374 annually (scenario 2). This demonstrates a positive contribution to the Cities domestic tourism market through increased:

- Visitor nights
- Employment
- Output
- Value Add

Cost estimates and lifecycle costs have been prepared based on benchmark data from similar projects and include allowances for adverse weather and contingencies. Costs have been reviewed and agreed by construction companies capable of delivering similar infrastructure projects and have advised they are fit for purpose. Caisson construction is a complex process given the size of each unit and the proximity to deep water to transport these elements into place. Construction locations for caissons are limited and will be subject to further detailed investigations.

The costs presented at the feasibility stage are preliminary in nature and are subject to design development, value engineering and a competitive market tender process.

Benefit Cost Analysis

The methodology used for the BCR assessment has been informed by the guidelines presented in the PAF and uses total estimated direct project costs and direct project benefits. The BCR is a ratio of the overall benefit of a project and the costs of that project. A BCR greater than one indicates the project has benefits exceeding its costs.

The benefits associated with the project include port charges, passenger and crew expenditure, induced visitor expenditure and commercial rent. Expenditure associated with re-supply of food and beverages for the cruise ships have not been included in the BCR.

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Table 4 below shows the BCR for the different scenarios and is three or greater for all home port scenarios. For the transit port scenario, it is less than one and therefore is not recommended to progress to a further stage.

	Transit Port[1]	Home Port, Scenario 1	Home Port, Scenario 2	Home Port, Demand
Total PV Benefits	$0.24B	$1.37B	$1.51B	$1.74B
Total PV Costs	$0.43B	$0.45B	$0.45B	$0.45B
BCR	0.6	3.0	3.3	3.9

Table 4: Estimated Project BCR's
Note:
1. [1]denotes transit port figures sourced from Preliminary Evaluation Report.
2. The above BCR's do not include direct benefits associated with resupply expenditure. Resupply expenditure includes the expenditure associated with food and beverage resupplies for cruise ships associated with home port activities and are included in the economic analysis. At this preliminary stage, the supply chain has not been assessed to understand if resupply would be a direct benefit and as such a conservative approach has been included to exclude it from the BCR calculations. The BCR's are increased to the range of 4.6 to 5.9 if resupply expenditure is included. As a comparison the Western Sydney Airport being delivered by the Federal Government has a BCR of 1.9.

The OCST will have a significant positive economic impact on the Gold Coast and Queensland through increased visitation, employment, value add and output and is valued in the study at between $3.46 billion and $4.25 billion.

Financial Assessment

The business case includes a whole of life financial appraisal of the project which analyses the total costs (capital and operational) and revenues in Present Value (PV) terms over the full 30 year analysis period for both the upper bound and lower bound port charge revenue scenario's. It relates specifically to the owner of the project. The financial assessment of the project considers both capital and operational costs. From an operational perspective the business case results indicate that the OCST has a positive operational cash flow for home porting. The whole of life cycle financial appraisal is tabulated below:

Item	Transit Port ($M)		Home Port, Scenario 1 ($M)		Home Port, Scenario 2 ($M)		Home Port, Observed ($M)	
Redacted								
Net Project Cost	**(364.9)**	**(324.6)**	**(186.2)**	**(85.4)**	**(154.4)**	**(45.8)**	**(114.1)**	**4.3**

Table 5: Whole-of- Life Net Present Value Project Costs ($M)
Note: () represents a negative number / cost

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The results suggest that direct OCST revenues are not sufficient to fully recover the capital outlay (principal and interest) required for construction of the OCST over the 30 year analysis period, with the exception of the observed growth with upper bound revenues. Note that this scenario uses the current market growth and utilising current average Brisbane port charges.

Analysis has been undertaken to assess the financial outcomes if the OCST operated as a transit port only. Table 5 above shows that despite the slightly lower present value of capital cost required to construct the transit port, the financial viability of a transit port is less than that of a home port for all growth and revenue scenarios due to the reduced estimated visits and therefore low revenue associated with a transit port.

Cash flows and sensitivity analyses are contained in section 9.5, 9.6 and 9.7 of the business case Attachment 1. The BCR range of 3.0 to 3.9 represents a compelling economic case for the OCST. Beyond the costs and benefits the OCST has a positive impact on the Gold Coast economy through economic output in the range of $2.6B to $3.1B and is expected to support between 3400 and 3,600 local jobs and create between $1.1B and $1.4B in value add. The present value of forecast expected cash flow ranges from -$186.2M to a profit of $4.3M, highlighting potential for a low or zero cost to Council.

Further, significant upside exits should market demand require a second berth. Apportioning the cost of the breakwater and jetty over two berths would significantly improve the financial case.

5.4 Environmental Impacts

Chapter 10 of Attachment 1 includes the Environmental Analysis of the project undertaken for the feasibility study. In addition to the information presented a referral was made to the Federal Minister for the Environment and Energy to seek clarification on whether the project has any potential to impact on Matters of National Environmental Significance (MNES).

A determination has indicated that the project does not significantly impact MNES if conducted in accordance with conditions imposed by the Minister. This decision streamlines the Environmental Impact Statement (EIS) process and reduces the number of assessment agencies required to review the EIS.

5.5 Social Impacts

Chapter 12 of Attachment 1 includes an assessment of social impact considerations. This work will be enhanced through the EIS process.

5.6 Transport Impacts

Chapter 13 of Attachment 1 includes an assessment of traffic impacts. This work will be enhanced through the EIS process.

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5.7 Next Step – Project Development Phase

The next phase of work would be the 'project development phase'. This phase of the project includes confirming the project specification and design to enable the City to undertake further market sounding which improves confidence in both the cost and benefits estimate. Risk reduction activities include the approvals process (including the EIS), community consultation, regulatory options assessment, design brief development, reference design development, commercial negotiations / arrangements and term sheet development with commercial partners. It is expected that these early risk reduction activities will enable a more competitive construction price and tender process.

To progress the OCST project, the key activities in the project development phase will include:

- developing a detailed project plan
- establishing project governance including steering committee and the project team
- engage external advisors including:
  - engineering and impact assessment advisors (reference design and EIS)
  - commercial and transaction advisors
  - legal advisory services
- continue market engagement with cruise operators to develop term sheets
- commence engagement with the State Government
- commence EIS and supporting technical studies in conjunction with the Coordinator General (State)
- commence regulatory approvals and land tenure processes
- develop the project reference design to support the EIS and procurement process
- develop a procurement strategy
- continue market engagement with contractors to refine the approach to project delivery
- commence engagement with the Port of Brisbane Corporation as a potential port operator

To minimise Councils' commitment but still maintain project momentum in the approval process, reference design and transaction management process, commencement of the following activities are recommended:

- Initial Advice Statement (IAS) for lodgement to State Government – Office of the Coordinator General
- commence seasonal (winter spring) flora and fauna studies
- design and geotechnical information to support IAS and approvals process
- GCW&W LTRWRP release modelling
- continuation of market sounding – firmer commitment from cruise ship industry

These are activities that form part of the project development phase which are further outlined in detail in following sections 5.7.1 to 5.7.8.

Redacted

The outcomes of this initial work will be reported to Council prior to commitment of the full expenditure described in section 8.

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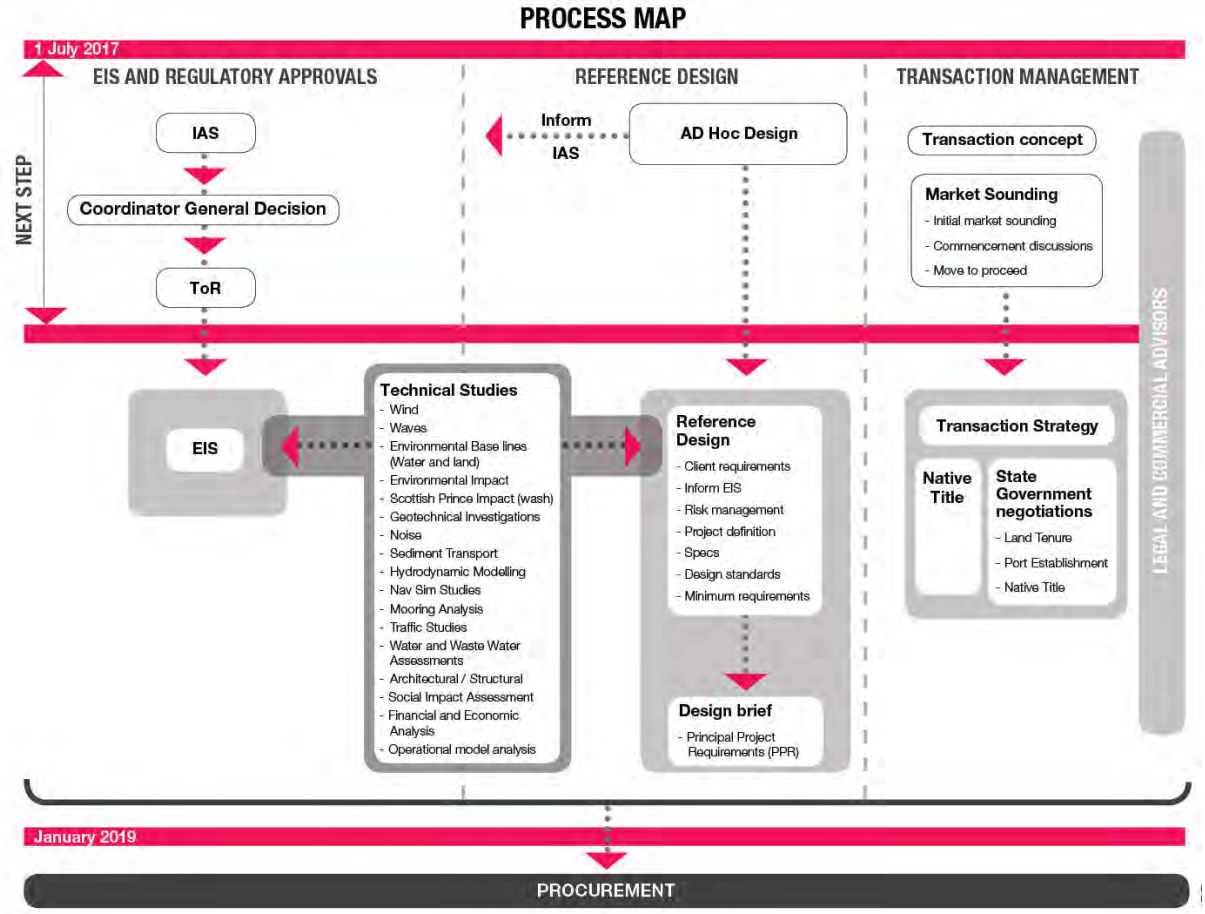

Figure 5: Process Map for Project Development Phase

5.7.1 Project Planning

This project activity includes project planning and engagement activities required for project set-up.

Project planning activities for the OCST project include:

- develop project plans including a project implementation plan that defines
  - project team
  - project governance
  - responsibilities
  - resources
  - timeframes
  - costs
- engage external advisors including engineering, EIS, commercial and financial, and legal
- iterative review of the project cost estimate

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5.7.2 Initial Market Sounding

Discussions with cruise ship operators initiated during the business case would be continued during the project development phase.

Redacted

5.7.3 Commercial Agreements with Beneficiaries

Discussions will be held with local businesses that will be beneficiaries

Redacted

to discuss potential contributions to the project.

5.7.4 Transaction Management / Procurement Activities

A detailed procurement plan and strategy will be prepared for the project which will include activities such as detailed market sounding with contractors to further refine the preferred packaging and procurement strategy. Determining an appropriate delivery model is a critical step in the project development process. The key objective is to identify, assess and select the model that provides the best value for money outcome, whilst meeting the service requirements and project objectives.

Contract documentation for the procurement of design and construct contracts will be developed during the project development phase. This includes expressions of interest, request for tender and design/construct contract documents. Commercial assistance for structuring the transaction would also be required.

Contract documentation and the design brief would form the basis for the procurement processes. As part of the project development phase, a more detailed reference design will be developed to support the EIS and potential procurement documents (refer section 5.7.8).

5.7.5 EIS Process

The proposed OCST will be developed in accordance with Australian, State and Local Government requirements. It is expected that the City will prepare an Environmental Impact Statement (EIS) for the Project under the provisions of the SDPWOA. This would require the Coordinator-General (CG) declaring the Project a Coordinated Project for which an EIS is required in accordance with Section 26.1.(a) of the SDPWOA.

The EIS process includes:

- IAS
- terms of Reference (ToR) development
- declaration of Controlled Project by the State
- preparation of EIS to address ToR

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An IAS is the first step in the EIS process. It's a scoping document that provides information on the:

- size and nature of the proposed project
- environment in and around the project location
- scale and extent of the project's potential environmental impacts
- any proposed measures to mitigate potential adverse impacts

The IAS helps the Coordinator-General determine whether the project in question should be declared a Coordinated Project and the level of assessment required. Council will receive a copy of this document.

Technical studies required for the EIS process include:

- noise
- wind
- waves
- environmental base line
- environmental impacts
- sediment transport
- navigational simulations
- mooring analysis
- traffic studies
- water and waste water assessments
- structural analysis
- social impact assessment
- financial assessment
- economic analysis
- operational model assessments
- geotechnical investigations

Given the open ocean environment which the majority of the project is located, detailed geotechnical information is limited. This information is required for the jetty design, wharf design, dolphin design, caisson design and dredging process design. A significant allocation of the project development budget is related to sourcing geotechnical information to reduce risk associated with insufficient geotechnical information to update cost estimates. It is proposed to commence geotechnical investigations immediately to inform the IAS and reference design.

5.7.6 Legal, Regulatory and Approval Requirements

Legal and regulatory issues to be addressed during the project development phase are:

- completion of development applications under SARA or relevant PDA (post EIS)
- investigations of regulatory arrangement for port operations
- address native title associated with the proposed location and develop a plan for compliance (post EIS)

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- clarification of land tenure e.g. future leases

5.7.7 Community and Stakeholder Consultation

This activity is required to provide accurate information to the community regarding the project impact and to seek project feedback. Community and stakeholder consultation will be undertaken in addition to the mandatory community consultation to be undertaken through the EIS process.

5.7.8 Development of Reference Design and Project Brief

A project brief serves to define the functional and technical project requirements and forms a part of the contract documentation for engagement of the Design and Construct contractor. The project brief would include, but not necessarily be limited to the following documentation:

- reference project design
- existing design reports
- technical design criteria including applicable design codes and any site specific technical criteria
- functional design criteria including but not limited to service life, vessel parameters and berth utilisation
- material specifications
- site condition reports including bathymetric study, geotechnical investigation and met-ocean data.

Additional development of the reference project design by an engineering consultant will be required as a part of defining the project brief and for support of the EIS activities. The reference project design will build on the design work completed as a part of the business case to provide greater definition of technical and functional scope, to allow for refinement of project cost estimates and to reduce project design risks.

6 ALIGNMENT TO THE CORPORATE PLAN, CORPORATE STRATEGIES AND OPERATIONAL PLAN

Gold Coast 2020, Bringing the City vision to life:

Prosperity built on a strong diverse economy

2.3 We have infrastructure that supports productivity and growth
2.4 We are a City with a strong and globally competitive business environment
2.5 We are a globally recognised tourism destination

The development of an OCST is aligned with Section 6.3 Infrastructure: Infrastructure that supports productivity and growth and key actions in the Economic Development Strategy 2013-23.

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Signature Project:

Tourism Infrastructure Development – identify and deliver projects to maximise economic outcomes and the city's reputation as a world class tourist destination.

Key Activities:

Maintain and expand strategic marine industry infrastructure, including the Broadwater Marine Project

Create a purpose built world class dive attraction

7 GOLD COAST 2018 COMMONWEALTH GAMES™ IMPACT

Not Applicable.

8 FUNDING AND RESOURCING REQUIREMENTS

Special Budget Committee Meeting 3 May 2016 approved to amend the purpose of the existing budget from the now concluded Broadwater Marine Project (ED5550, Cost Centre 1005106) to the feasibility and technical studies for an OCST. The feasibility study expenditure is summarised below in Table 6.

2016/17 Expenditure Summary as at 1 May 2017	
Multidisciplinary Feasibility Study Team	575,943
Wave Modelling and Mooring Assessment	87,852
Recycled Water Network Options Assessment	60,940
Contingency, procurement and workshops	12,275
Total Expenditure	**737,009**
Feasibility Study Budget	865,586
Residual	128,577

Table 6: Summary of Feasibility Study Expenditure
Note: Special Budget Committee saw a reprovision budget that did not include a variation for additional works associated with the RFI for the EPBC referral

Included in the 2017-18 budget process is a request for the works (as outlined in Section 5.7) to commence between June and September 2017. The matter of funding for the procedural steps beyond September 2017 would be the subject of a future report.

It is recommended the contract LG314/621/16/200 with Price Waterhouse Coopers be varied to commence the following works between June and September 2017:

- IAS for lodgement to State Government – Office of the Coordinator General

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OCEAN-SIDE CRUISE SHIP TERMINAL FEASIBILITY STUDY FINDINGS
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- seasonal (winter spring) flora and fauna studies
- design and geotechnical information to support IAS and approvals process
- market sounding – firmer commitment from cruise ship industry

The continuation of the current engagement is required to maintain the continuity of expert advice, making it disadvantageous or impractical to undertake a competitive process.

9 RISK MANAGEMENT

Project risks for the OCST have been considered through the development of the business case. Chapter 6 of Attachment 1 details the risk analysis process undertaken for the feasibility study. Appendix E of Attachment 1 includes the specific project risk register.

10 STATUTORY MATTERS

Not Applicable.

11 COUNCIL POLICIES

Not Applicable.

12 DELEGATIONS

Not Applicable.

13 COORDINATION & CONSULTATION

Table 7 below identifies internal stakeholders that have been involved / participated in the report to date.

Name and/or Title of the Stakeholder Consulted	Directorate or Organisation	Is the Stakeholder Satisfied With Content of Report and Recommendations (Yes/No)
Coordinator Project Specification and Delivery	GCW	Yes

Table 7: Stakeholder Consultation

During the development of the feasibility study external consultation has occurred with Australian Government, State Government, various Cruise Ship companies, a cruise industry body and commercial organisations on the Spit. Attachment 1 highlights a rigorous industry related consultation process.

14 STAKEHOLDER IMPACTS

Potential synergies may exist with the OCST Project and the LTRWRP. Consultants experienced with the LTRWRP have assessed options to integrate both the LTRWRP and the OCST project.

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This high level cost comparison indicates that there is potential for cost synergies through integration of the OCST and LTRWRP projects. Additional refinement of cost values, project inclusions and potential for value engineering would be required in the Project Development phase of the OCST project to provide a more detailed cost comparison.

15 TIMING

The project development phase of the OCST involves a full EIS process, procurement process, reference design and consultation process. It is envisaged to run from July 2017 to December 2018.

16 CONCLUSION

The feasibility study has established the case for taking the Gold Coast Ocean-side Cruise Ship Terminal forward to the project development phase, demonstrating economic benefit cost ratios of three or greater. A home port terminal (Scenario 2) would provide a significant contribution to the Gold Coast economy, supporting over 3500 local jobs and over 4000 State wide jobs.

Despite the challenging marine environment and the functional requirements of an OCST, the feasibility study has identified a design which will give the cruise industry the required confidence to use the facility.

The project was referred to the Federal Minister for Environment for determination in relation to matters of national environmental significance. The project has been determined to not significantly impact matters of national environmental significance, if conducted in a particular manner (i.e. it is not a controlled action). This determination streamlines the approvals process.

The financial analysis of the project suggests that from an operational perspective it is cash flow positive and in some scenarios also recovers the full capital outlay required for construction (principal and interest). A home port, over the long term, will be more financially viable and provide a significantly greater economic return to the City when compared to a transit port due to additional revenues, resupply expenditure and induced visitor expenditure.

The project development phase of the OCST involves an environmental impact statement process, continuing market sounding, reference design and procurement process strategy. It is recommended to commence some early activities as outlined in section 5.7 and consider other procedural steps beyond September 2017 in a future report. It is envisaged the project development phase would run from July 2017 to December 2018.

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17 RECOMMENDATION

It is recommended that Council resolves as follows:

1 That the report and presentation be deemed non-confidential except for those parts deemed by the Chief Executive Officer to remain confidential in accordance with sections 171 (3) and 200 (5) of the Local Government Act 2009.

2 That Council notes the business case for the Ocean-side Cruise Ship Terminal feasibility study and acknowledges the positive benefit cost ratio range of 3.0 to 3.9 associated with a home port.

3 That based on the positive benefit cost ratio it is in the public interest to continue the investigation into the Ocean-side Cruise Ship Terminal.

4 That Council endorses the procedural steps as outlined in section 5.7 of the report for works to commence June 2017. These steps include:

a. an Initial Advice Statement for submission to the State government (Office of the Coordinator General)

b. seasonal (winter / spring) flora and fauna studies

c. design and geotechnical information to support an Initial Advice Statement submission

d. continuing market sounding

Further, that funding for this work is considered as part of the 2017/18 budget process.

5 That contract LG314/621/16/200 with Price Waterhouse Coopers be varied to include the additional scope identified within this report, as extension of the current engagement is required to maintain the continuity of expert advice, making it disadvantageous or impractical to undertake a competitive process.

6 That the procedural steps beyond those outlined in recommendation 4 above be the subject of an update report to be provided to Council in October 2017.

Author:
Luke Adair
Coordinator Major Projects

Authorised by:
Darren Scott
Director Economic Development and Major Projects

18 May 2017

TRACKS REF: Document2

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OCEAN-SIDE CRUISE SHIP TERMINAL FEASIBILITY STUDY FINDINGS
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RESOLUTION G17.0530.024 moved Cr Tate seconded Cr Vorster

That Committee Recommendation ED17.0525.002 be adopted as printed which reads as follows:-

1 That the report and presentation be deemed non-confidential except for those parts deemed by the Chief Executive Officer to remain confidential in accordance with sections 171 (3) and 200 (5) of the *Local Government Act 2009*.

2 That Council notes the business case for the Ocean-Side Cruise Ship Terminal feasibility study and acknowledges the positive benefit cost ratio range of 3.0 to 3.9 associated with a home port.

3 That based on the positive benefit cost ratio it is in the public interest to continue the investigation into the Ocean-Side Cruise Ship Terminal.

4 That Council endorses the procedural steps as outlined in section 5.7 of the report for works to commence June 2017. These steps include:

a an Initial Advice Statement for submission to the State Government (Office of the Coordinator General)

b seasonal (winter / spring) flora and fauna studies

c design and geotechnical information to support an Initial Advice Statement submission

d continuing market sounding

Further, that funding for this work is considered as part of the 2017-18 budget process.

5 That contract LG314/621/16/200 with Price Waterhouse Coopers be varied to include the additional scope identified within this report, as extension of the current engagement is required to maintain the continuity of expert advice, making it disadvantageous or impractical to undertake a competitive process.

6 That the procedural steps beyond those outlined in recommendation 4 above be the subject of an update report to be provided to Council in October 2017.

A division was called

For	10	Cr Caldwell, Cr Vorster, Cr Crichlow, Cr Baildon, Cr O'Neill, Cr Boulton, Cr Gates, Cr PC Young, Cr Taylor, Cr Tate
Against	4	Cr Tozer, Cr Owen-Jones, Cr PJ Young, Cr McDonald
Abstained	0	
Absent	1	Cr La Castra

CARRIED

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Ocean-side Cruise Ship Terminal Business Case

City of Gold Coast

Ocean-side Cruise Ship Terminal, Business Case

Final Draft

May 2017

pwc

Disclaimer

This document has been prepared by PricewaterhouseCoopers Australia (PwC) at the request of the Council of the City of Gold Coast (the City) in our capacity as advisors in accordance with the Terms and Conditions contained in the Consultant Agreement between the City and PwC.

The information, statements, statistics and commentary (together the Information) contained in this document has been prepared by PwC from publicly available material and from information provided by the City. PwC does not warrant or guarantee any of the demand or revenue forecasts presented in this Report nor does it warrant or guarantee the economic and financial analysis which relies upon the demand and revenue forecasts. PwC may in our absolute discretion, but without being under any obligation to do so, update, amend or supplement this document.

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Executive summary

An ocean side Cruise Ship Terminal (CST or the Project) on the Gold Coast is currently being investigated by the City of Gold Coast (City). This Business Case presents a strong economic case for the Gold Coast CST driven by the burgeoning cruise market and Gold Coast's already established reputation as a tourism destination.

A dedicated CST on the Gold Coast has long been advocated as having considerable potential to stimulate tourism growth on the Gold Coast and Queensland, however on the back of the 2018 Commonwealth Games and the current market growth now represents the best opportunity to progress this Project to delivery.

The purpose of this Business Case is to progress and refine the work undertaken previously in the Strategic Assessment of Service Requirements (SASR), Preliminary Update Report and Preliminary Business Case.

The Case for a Cruise Ship Terminal

The current assessment of the Gold Coast CST is timely given that the global cruise ship market is in a period of sustained growth with the Australian market representing a significant portion of that growth. Cruise shipping is one of the fastest-growing tourism sectors in the world and Australia is the second fastest-growing market (behind China) within the industry[1].

There has been a 600 per cent increase in the total passenger numbers for Australian cruises from 2004 to 2015[2] (from 158,000 to 1,000,000 annually or 30.1 per cent year on year growth). Annual passenger numbers are forecast to reach 2 million by 2020. According to Australian Cruise Association's 2015-16 Economic Impact Assessment of the Cruise Industry in Australia (ACA EIA), 1,015 vessels visited Australia across 39 different Australian ports (including coastal islands).

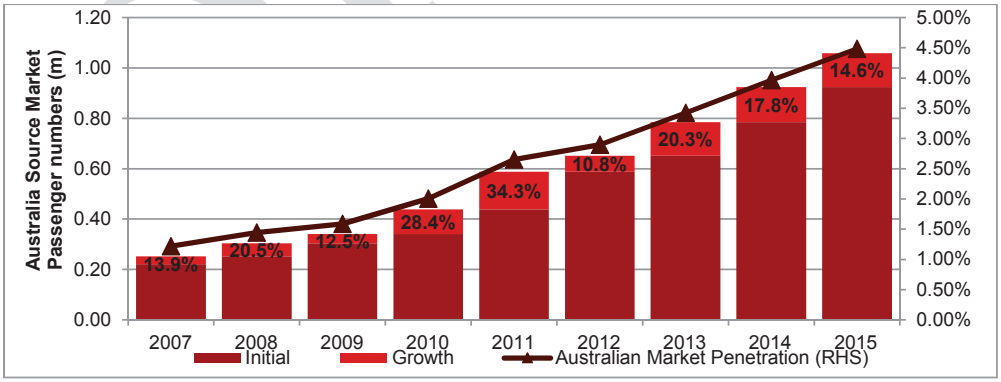

Figure 1: Cruise ship visits to Australian Ports 2013 - 2016

[1] Source: Cruise Line International Association Australasia, Cruise Industry Source Market Report, Ocean Cruise Passengers Australia 2015.

[2] Cruise Lines International Association. Retrieved from: http://www.cruising.org/docs/default-source/research/2016_clia_sotci.pdf?sfvrsn=4)

Global demand for cruising has increased 62% in the ten years from 2005 to 2015.

By 2020, Australia is forecast to reach 2 million passengers per year.

Australia is well positioned to access this anticipated growth, with its counter-seasonal climate advantage of a southern hemisphere location, however a lack of port infrastructure represents the biggest impediment to achieving ongoing growth. The East Coast of Australia market is dominated by Sydney and Brisbane as destinations, however both have difficulty satisfying the appetite of cruise operators. The Gold Coast's tourism assets, both natural and manmade, represent a significant drawcard for cruise line operators to visit the Gold Coast and there is an opportunity for the Gold Coast to capitalise on the opportunity to provide an alternate destination to Sydney and Brisbane for cruise operators on the eastern seaboard.

As a cruising destination the Gold Coast offers a broad range of day trip opportunities for passengers and when combined with the proximity of two international airports and local holiday options, it is also ideally positioned to function as an origin/destination port.

Tourism and the Gold Coast Economy

Tourism Research Australia (TRA) shows that visitors to Queensland spend more than in any other state in Australia with economic contribution from tourism worth almost $20 billion per annum. While Queensland as a state is currently experiencing a tourism boom, the growth rates vary across the state, with Far North Queensland recording almost 25 per cent growth in tourism expenditure from 2011 to 2015, whilst the Gold Coast observed only 8 per cent growth during the same period[3] .

The Gold Coast will continue to be a major tourist destination, hosting more than 12 million visitors and holding more than 60 major events each year[4] . The City will also play h0st to the Commonwealth Games in April 2018 and is seeking to leverage the international exposure of the Games by increasing visitation to the City.

The tourism sector comprises a significant proportion of the Gold Coast's economy representing 13.5 per cent or $3.6 billion of the City's total $27 billion economy in 2014-15, including over $1 billion which comes directly from the international market[5] . In the same year, the tourism sector employed 26,052 people directly and an additional 15,279 people indirectly and was responsible for 17.3 per cent of employment and 17.7 per cent of total economic output/sales within the City.

Strategic Rationale

The Investment Logic Map (ILM) developed during the earlier stages of this Project established the strategic need for a CST by identifying the problems or challenges facing the Gold Coast, identifying the benefits that will accrue to the City if the problems can be solved, identifying the strategic responses available to the City to address the challenges, and the range of solutions that could be developed to implement the responses.

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[3] http://tra.gov.au/Tourism_Region_Profiles/Region_profiles/index.html#

[4] Gold Coast Destination Tourism Management Plan 2014-2020. http://www.goldcoast.qld.gov.au/documents/bf/destination-tourism-management-plan.pdf

[5] Gold Coast Tourism Industry Report (2014). http://invest.moregoldcoast.com.au/wp-content/uploads/sites/2/2015/09/Gold-Coast-Tourism-Report-Year-ending-Dec-2015.pdf

The expected continued growth in the cruise ship industry coupled with strong market interest in Gold Coast as a cruise ship destination provides a strong case for a Gold Coast CST as a solution to address the region's tourism and economic growth needs. As part of a robust feasibility process, non-infrastructure solutions and strategic interventions have been considered as potential options.

To further grow and stimulate the Gold Coast economy, preliminary consultation with the Gold Coast community revealed that the region needs additional tourism drawcards. The Gold Coast needs to facilitate the upkeep of its international brand as a world-class tourist destination, provide marine and tourism infrastructure and implement a plan regarding the future of The Spit, all of which is strategically aligned with local, state and national infrastructure and tourism policies and initiatives.

Reference Project

The development of the Reference Project has involved a multi-phased assessment of the infrastructure and non-infrastructure solutions for the project to develop the Reference Project. This assessment included:

- Identifying the preferred location for the terminal – Philip Park was identified as the preferred location in the SASR and the Preliminary Update Report. This was maintained in the Business Case
- Establishing the technical criteria and functional requirements for a cruise terminal including the requirements for a base port and a transit port
- Assessing a range of technical solutions against the functional requirements including a multi criteria assessment of the project options in consultation with the project team, key stakeholders and industry
- Consideration of staging options to improve the affordability and to increase the likelihood of the project proceeding
- Potential for incorporation of the LTRWP in the Reference Project to derive synergies from a whole of the City perspective.

Led by the service needs of cruise operators and based on market and industry evidence, this Business Case has identified a Reference Project consisting of an inline wharf and jetty with a caisson breakwater, located at Philip Park as it is considered to best meet the risk-based technical, functional and cost requirements (see Figure 2 and Figure 3). The proposed solution is not considered likely to have significant impact on the surrounding environment.

Executive summary

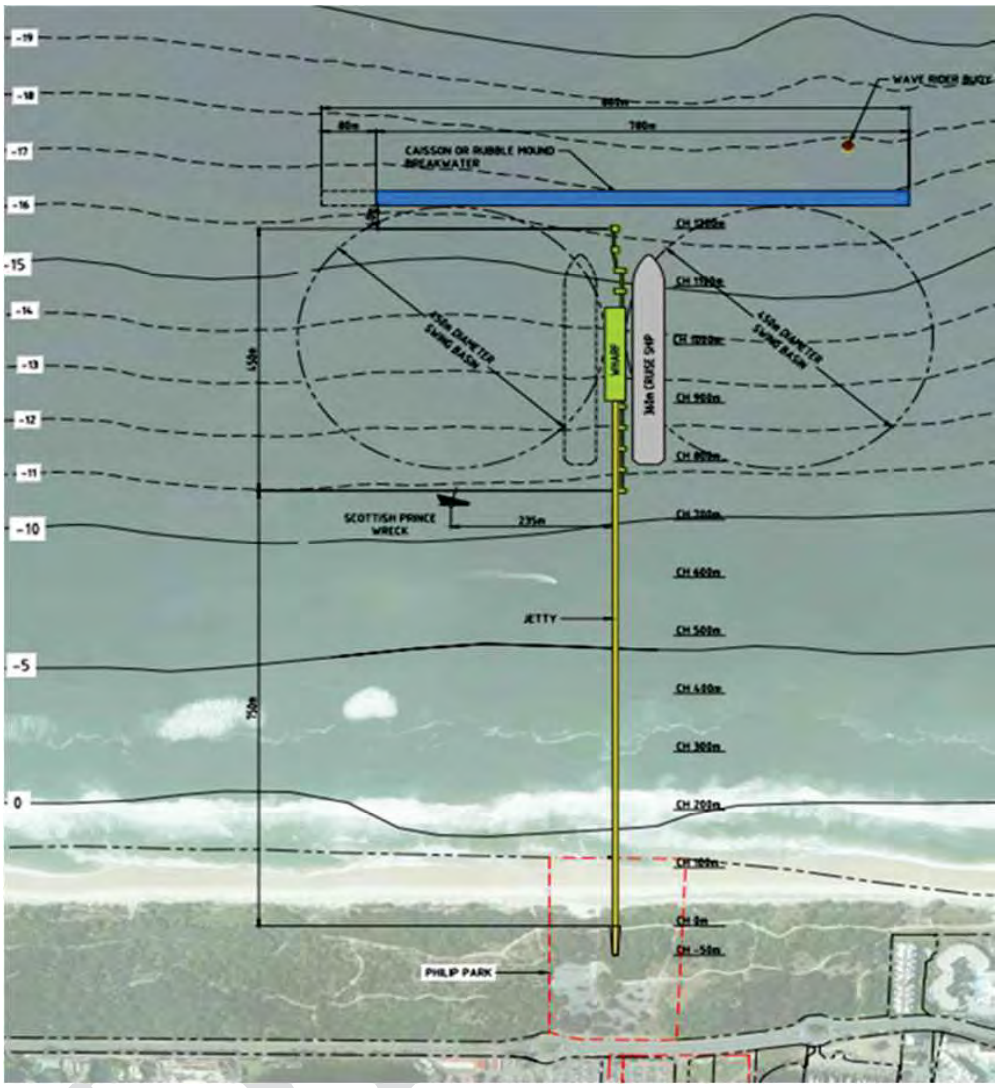

Figure 2: Preferred Layout - Ocean Side Cruise Terminal

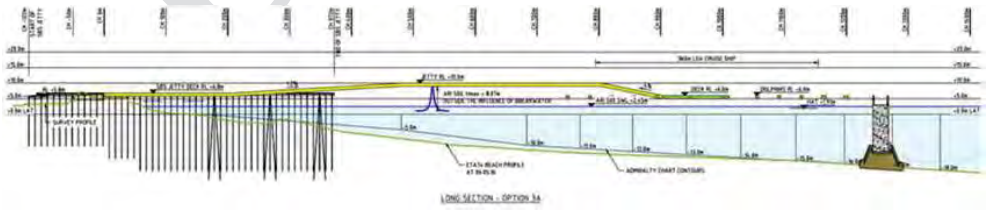

Figure 3: Long section of preferred option with exaggerated vertical scale

The Reference Project has a capital cost of approximately $463 million in 2017 terms, as per Table 1 and is expected to be constructed over a period of 3 years. There is potential for value engineering to be completed in future phases of this Project.

Table 1: Capital costs - ocean side CST ($ million)

Capital Cost Estimate – Reference Project	Real terms ($2017)
Client costs including procurement, EIS & transaction costs	[redacted]
Planning, approval and design	[redacted]
Contract administration and construction preliminaries	[redacted]
Landside civil and building works	[redacted]
Jetty and wharf construction (including mooring dolphins)	[redacted]
Breakwater construction	[redacted]
Total	**463.4**

Project Viability

The economic and financial viability of the project relies almost entirely on cruise operators choosing to base vessels out of the Gold Coast, which will only occur if there is sufficient demand from the cruising public.

Demand

The future demand for cruising is inherently uncertain, particularly considering the proposed CST would not begin operating until 2022. Based on industry engagement it is expected that the recent strong growth and increased market penetration rates (measured as number of passengers divided by a population of people) are expected to continue in the near term. The market expects that growth will be effectively capped at a 'steady state' market penetration rate. Australia already has the largest market penetration rate of any country in the world with regard to cruising, however the market engagement suggests that the current market penetration levels are expected to grow further.

Queensland represents 26 per cent of the total cruise ship market and in 2015-16 Queensland welcomed 326 ship visits. The Brisbane Cruise Ship Terminal is currently the only major cruise facility that is servicing the people of South East Queensland.

The anticipated expansion of the Brisbane Terminal, which is currently being contemplated by Port of Brisbane and the Queensland State Government would assist in supporting the forecast demand, however is not expected to inhibit Gold Coast's ability to attract vessels to use the CST. Likewise it is not expected that the Gold Coast CST would be inducing demand from Brisbane. Industry engagement has expressed a view that future market growth can accommodate both facilities.

Demand has been estimated by forecasting the future size of the South East Queensland cruise market based on current growth trends and market penetration rates to determine the number of vessels required to call to service this demand. The vessel calls are then allocated to the Gold Coast CST based on a per cent market share assumption with Brisbane.

Table 2 outlines the estimated number of vessel calls for the Gold Coast CST used to inform the financial and economic assessment. Each of the four scenarios relies on a different growth and market penetration assumption:

- Transit Scenario – growth rate 8%
- Scenario 1 – growth rate 8%, market penetration rate of 8%

- Scenario 2 – growth rate 10%, market penetration rate of 9%
- Observed – growth rate 14.2%, market penetration rate of 10%

Facility capacity is capped at 212 vessels per annum based on observed trends in existing facilities within Australia.

Table 2: Estimated number of vessel calls

Year	Transit Scenario	Scenario 1	Scenario 2	Observed
2022	20	59	65	158
2027	29	144	160	176
2032	42	160	178	195
2037	62	178	197	212
2042	93	199	212	212
2047	138	212	212	212
2052	201	212	212	212

Economic

Based on the demand forecasts above the economic analysis was undertaken by defining the project case based on the Reference Project against the base case where there is no CST developed on the Gold Coast. The CST is expected to deliver significant benefits to the Gold Coast region including port charges revenue, resupply expenditure, passenger and crew expenditure and induced visitor expenditure.

Four demand scenarios have been considered:

The Present Value (PV) of the above benefits (discounted at 7%) more than offset the PV of the costs associated with the facility over the assessment period (30 years) as set out in Table 3.

Table 3: Present value benefits, costs and benefit cost ratio

	Scenario 1	Scenario 2	Observed
Total PV benefits	$1.37B	$1.51B	$1.74B
Total PV costs	$0.45B	$0.45B	$0.45B
Benefit cost ratio	**3.0**	**3.3**	**3.9**

The Benefit Cost Ratios (BCRs) calculated range from **3.0** (under the low demand case) to **3.9** (in the high demand case). This presents a compelling economic case for the development of a CST on the Gold Coast with all BCRs significantly higher than 1.

Beyond the costs and benefits included for the purposes of calculating the BCR, a Gold Coast CST is expected to have a positive economic impact for Gold Coast City and Queensland through increased visitation and output. The positive impact of a Gold Coast CST on economic output is expected to range from $2.6B and $3.1B. A Gold Coast CST is also expected to add between 3,400 and 3,600 FTE jobs and create between $1.1B and $1.4B in value add.

Financial

The financial assessment undertaken has shown that the upfront construction cost of the CST is recoverable in nominal terms over the 30 year assessment period through direct revenue generated by the CST. From a purely operational perspective the results indicate that the CST has positive operational cash flows year on year.

The results presented in Table 4 outline the PV of the project's expected cash flows.

Table 4: Present value of cash flows

Present Value	Scenario 1	Scenario 2	Observed
Lower Bound Port Charges	**(186.2)**	**(154.4)**	**(114.1)**
Upper Bound Port Charges	**(85.4)**	**(45.8)**	**4.3**

The PV of the forecast expected net cash flows to the City over the 30 year assessment period, discounted at 5% reflecting Council's approximate borrowing rate ranges from -$186.2m to +$4.3m depending on which demand and revenue scenario is assessed These results indicate it is likely that the facility would represent a net cost to the City over the next 30 years.

Project Impacts

All major infrastructure projects can have a profound impact on the community and surrounding areas. The CST is no exception in this regard. The Business Case has assessed the likely impacts of the CST Project on the community, environment and transport network.

Social Impacts

Evaluation of social impacts is based on processes identified in Building Queensland guidance material and includes stakeholder consultation, identification of potential social impacts, risk assessment to determine materiality of impacts and identification of measures for mitigation. The primary social impacts identified include:

- Potential for new business service offerings, upskilled employment and additional employment opportunities
- Attraction of additional tourists and associated tourist infrastructure
- New public amenity, improved area usage and improved security.

Ongoing community consultation will be required in subsequent project phases to continue to engage and communicate with the community about the project. Project plans including project implementation, construction, operations and risk management developed in future project phases will also need to consider social impacts and mitigation measures.

Environmental Impacts

The CST includes land at Philip Park in Main Beach and extends into Queensland State waters approximately 1,200m offshore. A desktop investigation (and subsequent site based investigations) of the environmental characteristics of the area was completed including the site context, physical features and ecological values of the area. This study included a review of the ocean environment, cultural heritage including the Scottish Prince Shipwreck, and local area flora and fauna. This study found that the proposed project is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

Environmental management and risk mitigation will be a key consideration in construction and operations of the CST project. Project implementation, construction, operations and risk management plans will require consideration of environmental impacts and management measures.

The project will also need to conform to Commonwealth and Queensland State requirements for environmental impact identification and management. The City has commenced the next phase of environmental assessment by referring the project to the DoEE to determine if the project will be a Controlled Action in accordance with the EPBC Act. An Environmental Impact Statement (EIS) will also be required in subsequent project phases.

Traffic Impacts

The CST project will have an impact on traffic volumes in the local area road network. The Business Case considers impacts of additional traffic volumes estimated to be caused by the Reference Project. An analysis has been completed of traffic flows on Seaworld Drive, MacArthur Parade, Main Beach Parade, Waterways Drive and the Gold Coast Highway. The study established that the CST will increase the traffic loading on the Spit and will increase the level of congestion at the key intersections particularly during peak times. It is understood that many of the intersections and roundabouts in this local area are already over capacity at peak times thus traffic mitigation strategies will be required as a part of the CST project.

Potential traffic mitigation strategies identified in the Business Case include scheduled movement of passengers around existing traffic peaks, provision of car parking to reduce the amount of trips to and from the area, provision of coach transport integrated with the existing transport network to reduce number of trips and to upgrade key intersections in the area for increased volumes.

Development and implementation of a detailed traffic management plan will be required for both construction and operation phases. This plan would include transport routes and modes and address safety concerns for cyclists and pedestrians.

Delivering the Project

Affordability

Overall affordability of the CST needs to be considered in the context of the available financing and funding sources. There is currently no committed finance to build the Project.

The City has a significant cash balance of $780 million which suggests that at least some of the capital expenditure required for the CST could be financed through existing resources. This would be the most readily available financing available, however budgetary impacts would need to be considered carefully. State and Commonwealth finance (including concessional loans) are other options to be considered by the City. The City's level of debt coverage and gearing ratio as reported in the 2015-16 Annual Report suggests that the City would be able to raise additional debt finance via Queensland Treasury Corporation without negatively impacting its creditworthiness. It must be recognised that current fiscal pressures and intense competition between domestic projects for federal funding mean that Commonwealth support may not be available for this project.

Since the high profile failure of multiple toll roads domestically due to lower than expected patronage there is very little appetite for private investors to take patronage risk on large scale infrastructure. Unless cruise companies are prepared to sign up to long term agreements to guarantee usage of the facility over an extended period of time (15+ years) it is unlikely that private finance will be available.

User charges are the most obvious source which Council can use to fund the facility and will likely provide a majority of the ongoing funding. Whilst the terminal is expected to operate at a profit, it is considered unlikely that the facility will generate a commercial return (i.e. the

facility will be unlikely to generate enough revenue to offset the upfront construction and provide a commercial return). User charges could further be supplemented through the use of the facilities by private vessels including charter vessels and super yachts, however this is not expected to be material.

Other available funding relates to the synergies of incorporating the LTRWP into the Reference Project, deriving rent or charges through additional commercial opportunities or capturing value from the indirect beneficiaries of the CST. None of these potential funding streams are considered material with respect to the overall affordability of the CST, however should be explored further as part of the pre-procurement activities.

Project Procurement

A packaging and procurement assessment was undertaken for the CST on the basis of:

- The Project's technical requirements
- The risk and interface profile
- Scope for innovation
- Desire for budgetary and timing certainty
- Market considerations.

[redacted]

Implementation

Post Business Case, the project will move into the 'Project Development' phase. The key activities in this phase include project establishment, completion of legal, regulatory and approval requirements, establishing commercial agreements with potential facility users, community and stakeholder consultation, development of the project brief and reference design, and procurement activities [redacted]

Based on the assumption that the Business Case is considered by Council in June 2017, it is expected that the Project Development phase would be initiated in Q3 of 2017 and be completed by the end of 2018 (18 months duration). [redacted] This construction schedule is based on the assumption that caissons for the breakwater are constructed at Cairncross dry dock in Brisbane.

[redacted]

Conclusions

The Business Case has established the case for Gold Coast CST on the back of the burgeoning cruise ship industry and Gold Coast's position as a popular and internationally recognised tourist destination. Despite its long history of assessments, a CST would now complement the timing of the Commonwealth Games in 2018 [redacted]

Despite the challenging marine environment and the functional requirements of an Oceanside CST, the Business Case has identified a design which will give the cruise industry the required confidence to the use the facility.

The Business Case has determined that while it is possible for a Gold Coast CST to generate a financial return in a limited number of scenarios, it is likely that the facility would represent a net cost to the City over the term of the analysis (30 years). A Gold Coast CST however would generate a significant economic return for the region and would generate new industries and job opportunities for local residents. The scale of the economic benefits make this a worthwhile investment for the City to pursue its growth and liveability agenda.

It is recommended that the Council notes the findings of the Business Case and approves that the project proceed to the Project Development Phase.

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Glossary of Terms

Term / Abbreviation	Definition or description
BCR	Benefit Cost Ratio – Indicator used to attempt to quantify the overall value for money of a project or proposal in economic terms.
Berth	The dock or pier where a cruise ship ties up to the shore.
Breakwater	A structure constructed for the purpose of forming an artificial harbour for the protection from the effect of waves to provide safe berthing for ocean vessels.
Buoy	An anchored floating object used for mooring (tying) up a ship, marking a channel or marking a hazard.
BQ	Building Queensland
BQ BCDF	Building Queensland Business Case Development Framework.
City	City of Gold Coast
Council	The Council of the City of Gold Coast (elected officials)
CST	Cruise Ship Terminal
Current	The flow or movement of water due to changes in elevation or tides.
DoEE	Department of Environment and Energy
Dolphin	A group of piles driven close together and bound with a steel or concrete pile cap. Berthing dolphins include fendering and fender panels and act to absorb berthing energy. Mooring dolphins include mooring gear and provide resistance for moored vessels.
EIS	Environment Impact Statement – A Queensland Process used to ensure environmental management is considered as part of the approvals process for all development proposals that require assessment by local government or have the potential to harm the environment.
EPBC Act	Environmental Protection and Biodiversity Conservation (EPBC) Act. The Federal Government's central piece of environmental legislation that provides a legal framework to protect and manage matters of national environmental significance such as nationally and internationally important flora, fauna, ecological communities and heritage places.
Embark	To go on board a cruise ship, especially for the first time at the beginning of the cruise.
Gangway	The ramp used to enter or exit the cruise ship.
Gross Registered Tonne (GRT)	Measured used on a cruise ship where each GRT equals 100 cubic feet of enclosed revenue-earning space within the ship.
Home Port	The port from which a cruise ship originates. Also known as a base port.
Jetty	A structure projecting out from the shore to provide vessel access.

Glossary of Terms

Term / Abbreviation	Definition or description
Mooring	The means of tying a vessel to a pier, dock buoy or another vessel.
MCA	Multi Criteria Analysis – A decision-making tool and structured approach to determine overall preferences among alternative options against set multiple criteria
PAF	Project Assessment Framework
PBC	Preliminary Business Case
Pile or Piling	Pile is the metal or concrete pole driven into the seabed. Piling is the support or protection for wharves and piers.
PPP	Public Private Partnership – A long-term contract between the public and private sectors where government pays the private sector to deliver infrastructure and related services on behalf , or in support, of Government's broad service responsibilities.
PV	Present Value. The discounted present value of a stream of costs or benefits over time.
SASR	Strategic Assessment of Service Requirements, the first stage of project assessment under the PAF.
SIB	Social Impact Baseline
SIE	Social Impact Evaluation
IRA	Impact Risk Assessment
Transit	A ship visit where a significant number of passengers disembark to go ashore and then get back on the ship.
GOC	Government Owned Corporation

1 Background

1.1 Introduction

The City of Gold Coast (City) has commissioned PwC, AECOM, and MacroPlan Dimasi to prepare a Feasibility Study and Business Case exploring options for the provision of an ocean-side Cruise Ship Terminal (CST) on the Gold Coast.

A CST on the Gold Coast has long been an aspiration of successive Gold Coast Councils, although it has frequently met resistance. This includes difficulty in demonstrating the commercial case for a CST coupled with significant political and community concerns regarding the environmental impact in or around the Gold Coast Seaway.

The establishment of a Gold Coast CST has the potential to grow Queensland and regional tourism and offer significant economic value to the area.

This assessment of the Gold Coast CST is timely given that the global cruise ship market is in a period of sustained growth with the Australian market representing a significant portion of that growth.

Global demand for Cruising has increased 62% in the ten years from 2005 to 2015.

Australian demand for Cruising has increased by 467% in the same ten year period, from 186,666 in 2005 to 1,058,781 passengers in 2015.

By 2020, Australia is forecast to reach 2 million passengers per year.

Australia is well positioned to access this anticipated growth, with our counter-seasonal climate advantage of a southern hemisphere location, however a lack of port infrastructure represents the biggest impediment to achieving ongoing growth. The East Coast of Australia market is dominated by Sydney and Brisbane as destinations, and both have difficulty satisfying the appetite of cruise operators. The Gold Coast, as Australia's premier tourist destination is well placed to capitalise on the opportunity to provide an alternate destination to Sydney and Brisbane for cruise operators on the eastern seaboard.

As a cruising destination the Gold Coast offers a broad range of day trip opportunities for passengers and when combined with the proximity of two international airports and local holiday options, it is also ideally positioned as an origin/destination port.

CLIA Australasia Chairman and Norwegian Cruise Lines Managing Director, Steve Odell, warned that the cruise ship industry's rapid growth and success is to not be taken for granted by the public sector. Capacity constraints in Sydney are increasing placing more pressure on ports in Brisbane and Melbourne. The absence of marine infrastructure to accommodate any sort of cruise ship restricts the Gold Coast from accessing the growing cruise ship market. Mr Odell highlighted that to make the most of Australia's potential, and to maintain a competitive edge, the public sector must recognise the importance of long-term infrastructure development and planning, partnered with a positive regulatory government, in order to do all that is possible to encourage more cruise ships to Australian shores.

Tourism remains a key of the Gold coast economy with the International Visitor Survey (IVS) figures show over 1 million people visited the Gold Coast in the 12 months to September 2016, representing a 16.2 per cent increase on the previous 12 month period. Gold Coast Tourism CEO Martin Winter has stated that the industry was also celebrating a record increase in international visitor expenditure, which grew 15 per cent to $1.3 billion.

Domestic visitor data shows visitors to the Gold Coast have spent $3 billion in the year ending September 2016. The National Visitor Survey (NVS) conducted by Tourism Research Australia (TRA) reported a 6.5 per cent increase in domestic visitor expenditure recorded for the year ending September 2016. The total number of domestic visitors also increased by 3.8 per cent to 3.7 million, while the number of visitor nights fell 1.5 per cent to 13.3 million. A Gold Coast CST would draw additional visitors to the City and provide a significant boost to the regional economy.

1.2 Project Background

A dedicated CST on the Gold Coast has long been advocated as having considerable potential to stimulate tourism growth on the Gold Coast and Queensland. The plans for a Gold Coast CST date back to 2001 with the Queensland Cruise Shipping Plan identifying the Gold Coast as one of the key locations for improved infrastructure to support and promote the growth of cruising in Queensland. The history of investigations into the feasibility of a Gold Coast CST and associated market processes is summarised in Figure 4 with further details included in Table 5.

Background

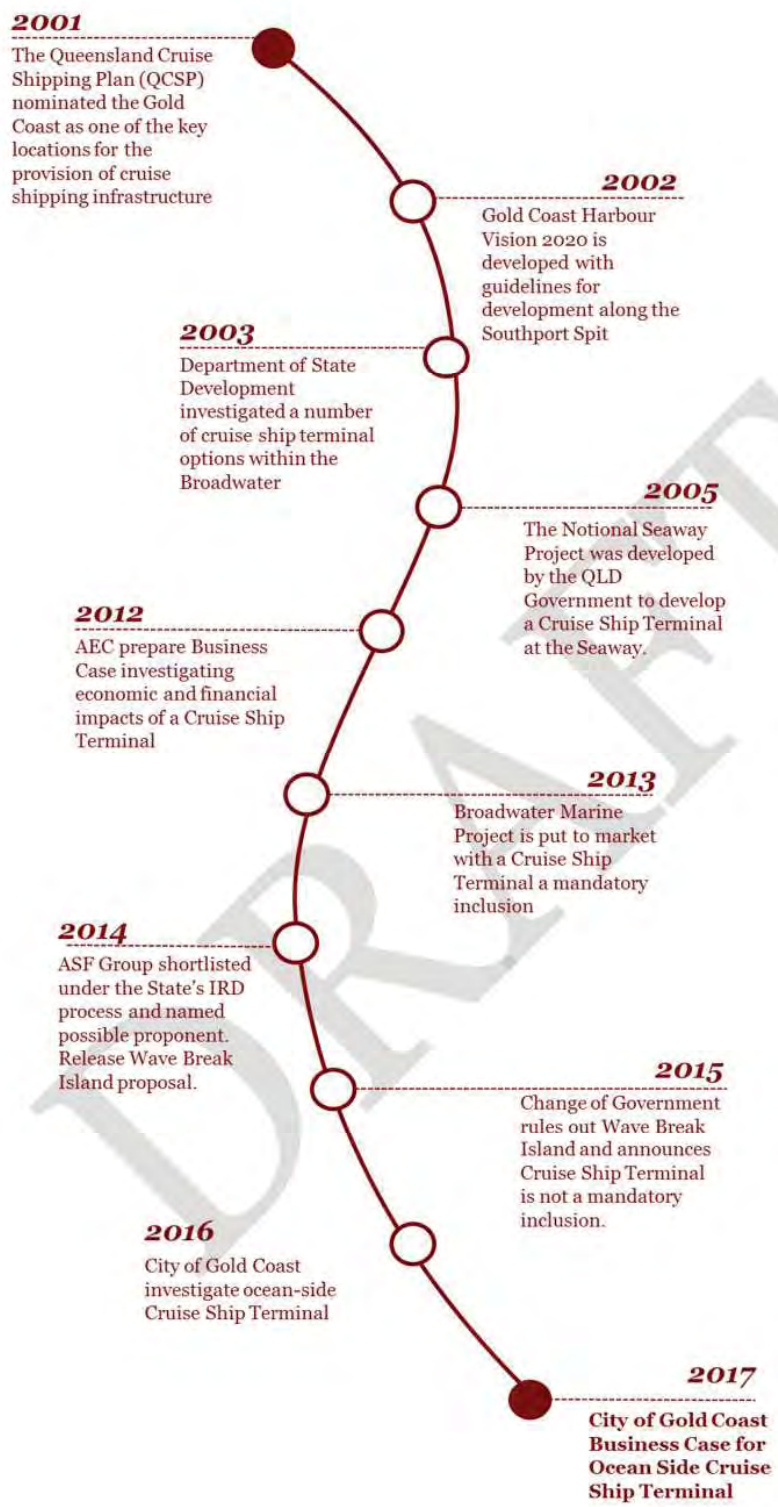

Figure 4: Previous strategic and planning projects

Table 5: Project and policy history of a cruise ship terminal on the Gold Coast

Year	Milestone
2001	The 2001 QCSP provided a whole-of-government framework for developing the Queensland cruise shipping industry to provide more jobs for Queenslanders and to help Queensland's regions capitalise on their unique assets and resources. The QCSP identified the benefits of cruising, the impediments to growth in the cruising market, and initiatives to facilitate growth.
2002	A plan entitled Vision 2020 contained guidelines for development along the Southport Spit; either side of Seaworld Drive.
2003	The Department of State Development final Options Definitions Report investigated a number of cruise ship terminal options within the Broadwater. The report was produced in line with the State Government's Value for Money Framework.
2005	The Notional Seaway Project was a Queensland Government proposal to establish a Cruise Ship Terminal at the Seaway supported by marine and tourism development. The Coordinator General conducted an Environmental Impact Statement for this significant project in accordance with State Development and Public Works Organisation Act 1971.
2006	QLD Government Election announcement to abandon the Notional Seaway Project due to community concerns about dredging the Seaway and the possibility of development on Doug Jennings Park.
2012	City of Gold Coast Standalone Cruise Ship Terminal Options Investigations (including a Cruise Ship Terminal Business Case for a transit port only option prepared by AEC Group) Unsolicited Market Proposals: Sembawang and Leda Group.
2013	Broadwater Marine Project: Cruise Ship Terminal is a **mandatory** inclusion The Broadwater Marine Project was a joint initiative of the Queensland Government and the City seeking private sector investment to deliver an integrated resort development. Plans at this time were for a cruise ship terminal on State Government-owned land on The Spit or on Wave Break Island in the Broadwater.
2014	Broadwater Marine Project concludes, ASF Consortium identified as a 'possible proponent' ASF Group shortlisted under Queensland State's Integrated Resorts Developments (IRD) Process and named possible proponent. Queensland Government rules out Spit north of Seaworld for ASF's development proposal. ASF releases Wave Break Island focused proposal.
2015	New Queensland government rules out Wave Break Island proposal and announces CST is not a mandatory IRD inclusion.
2016	City of Gold Coast announces intention to investigate ocean-side CST. Ocean-side CST - SASR completed
2017	Ocean-side CST – PBC completed (March 2017) Ocean-side CST – Business Case completed (April 2017).

1.3 Purpose and Approach of the Business Case

The purpose of this Business Case is to progress and refine the work previously undertaken in the Strategic Service Assessment Requirements (SASR), Preliminary Update Report and the Preliminary Business Case. Based on the work completed to date, the Business Case develops an optimised technical solution for an economically viable ocean-side CST, including cost estimates, financial assessment and economic evaluation.

1.4 Document Structure

This document represents the third of three steps towards developing the Business Case in accordance with the Building Queensland (BQ) Business Case Development Framework and Queensland Government Project Assessment Framework (PAF). It follows the "problem-solving" approach preferred by Infrastructure Australia and adopted by the Queensland State Government and Building Queensland by first defining the problems that need addressing before assessing a favoured solution. The document is structured into four distinct parts:

- Needs Assessment
- Project Definition
- Implementation
- Conclusion.

1.4.1 Needs Assessment

The needs assessment draws directly from the work undertaken in the SASR. The immediate purpose of the needs assessment is to make a strong case that a substantive problem exists and that it is in the Council's best interests to develop a solution.

Strategic Rationale (Chapter 2) / Alignment with Policy (Chapter 3)

These chapters are founded on the 'bottom-up' principles of an SASR and uses Investment Logic Mapping, which aims to identify and build on the service needs, outcomes sought and benefits derived from responding to the service requirements. Chapter 4 addresses the linkages between the proposed CST development and its alignment with Local, State and Federal Government policies.

1.4.2 Project Definition

Reference Project (Chapter 4) / Cost (Chapter 5)

These chapters present the Reference Project and provides detailed design descriptions. Chapter 5 provides the forecast costs of the proposed CST development.

Risk Analysis (Chapter 6)

Chapter 6 provides an overview of the detailed risk assessment process conducted in consultation with relevant stakeholders. Risk ratings and mitigation strategies are also assigned in this Chapter which need to be addressed during the CST development and implementation stages, as per best risk management practice.

Market Considerations /Demand Assessment (Chapter 7), Economic Analysis (Chapter 8) / Financial and Commercial Analysis (Chapter 9)

Chapters 7, 8, and 9 provide a summary of the demand assessment, financial assessment and economic appraisal of the proposed CST development. These chapters present different

transit and home port scenarios which demonstrate that given sufficient cruise ship arrivals, the CST proposition is able to provide a marginal return on investment and a significant net benefit to the economy.

Environmental Assessment (Chapter 10)

Chapter 10 presents a study of the immediate environment of the proposed development area. Potential project impacts on the environment are also addressed.

1.4.3 Implementation

Public Interest (Chapter 11) / Social Considerations (Chapter 12)

Chapters 11 and 12 identify and evaluate the potential impacts to the general public as a result of the CST development. The social impact evaluation focuses on the changes in physical environment and the Spit public amenities, which may impact society's personal and cultural values and level of satisfaction.

Traffic Analysis (Chapter 13)

Chapter 13 assesses the potential traffic impacts and the additional traffic generated as a result of the CST.

Legal and Regulatory (Chapter 14)

Chapter 14 assesses the legal, regulatory and approvals processes associated with delivery of the CST project including establishment of a port authority, native title and environmental approval processes.

Sustainability (Chapter 15)

Sustainability of the project in terms of project governance, environment, social impacts and economic impacts is considered in Chapter 15.

Packaging and Procurement (Chapter 16) / Project Implementation (Chapter 17)

Chapter 17 addresses the delivery model options available to Council for the CST's delivery and operating phases. It provides an assessment of the appropriateness of a Public-Private Partnership model, measured against various value drivers. This Chapter also provides affordability, funding and commercial opportunity considerations for Council review. Chapter 17 provides a roadmap for implementing the CST project.

1.4.4 Conclusions

Conclusions and Recommendations (Chapter 18)

Chapter 18 presents the findings of the Business Case and the next steps

2 Strategic Rationale

2.1 Overview

The current feasibility study of a CST on the Gold Coast recognises the significant legacy of previous studies outlined in Chapter 2, and continues a detailed and rigorous assessment process that will culminate in a Business Case.

The SASR was finalised in December 2016 which addressed the service needs and service requirements, in accordance with the PAF. The remainder of this chapter outlines the process adopted in assessing the need for the CST on the Gold Coast.

2.2 The Case for a Cruise Ship Terminal

The Gold Coast is Australia's sixth largest city and largest non-capital city with a population of more than 555,000[6]. The City forms part of the South East Queensland (SEQ) region which has a population of more than 3.2 million people[7]. The population is forecast to reach almost 800,000 by 2031, making it one of the fastest growing cities in Australia[8]. The Gold Coast is a major tourist destination, hosting more than 12 million visitors and holding more than 60 major events each year[9]. The City will also play h0st to the Commonwealth Games in April 2018.

Tourism Research Australia (TRA) shows that visitors to Queensland spend more than in any other Australian state with the economic contribution from tourism worth close to $20 billion. While Queensland as a state is currently experiencing a tourism boom, the growth rates vary across the state, with Far North Queensland recording almost 25 per cent growth in tourism expenditure from 2011 to 2015, whilst the Gold Coast observed only 8 per cent growth during the same period[10].

The tourism sector comprises a significant proportion of the Gold Coast's economy representing 13.5 per cent or $3.6 billion of the City's total $27 billion economy in 2014-15, including over $1 billion which comes directly from the international market[11]. In the same year, the tourism sector employed 26,052 people directly and an additional 15,279 people indirectly and was responsible for 17.3 per cent of employment and 17.7 per cent of total economic output/sales within the City.

Gold Coast's tourism expenditure is predominantly driven by the collective number of domestic and international visitor nights each year. Data from TRA shows that visitor numbers have been broadly static since 2013, with a compound annual growth rate of under 2 per cent. International visitor growth has been strong, averaging 8 per cent per year.

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[6] Estimated resident population by local government area (LGA), Queensland, 2004 to 2015p, ABS 3218.0, Regional Population Growth, Australia, 2014–15 and Queensland Treasury estimates. http://www.qgso.qld.gov.au/products/tables/erp-lga-qld/index.php

[7] Queensland Government's Statistician's Office, Population growth highlights and trends, Queensland regions, 2015 edition. http://www.qgso.qld.gov.au/products/reports/pop-growth-highlights-trends-reg-qld/pop-growth-highlights-trends-reg-qld-2015.pdf

[8] Queensland Government population projections to 2031 – Local Government Areas (2011 edition) Appendix B. Projected resident population (medium series), local government areas. http://www.qgso.qld.gov.au/products/reports/qld-govt-pop-proj-lga/qld-govt-pop-proj-lga-2011-edn.pdf

[9] Gold Coast Destination Tourism Management Plan 2014-2020. http://www.goldcoast.qld.gov.au/documents/bf/destination-tourism-management-plan.pdf

[10] http://tra.gov.au/Tourism_Region_Profiles/Region_profiles/index.html#

[11] Gold Coast Tourism Industry Report (2014). http://invest.moregoldcoast.com.au/wp-content/uploads/sites/2/2015/09/Gold-Coast-Tourism-Report-Year-ending-Dec-2015.pdf

Domestic visitors, on the other hand, have grown by only 0.5 per cent per year. As Figure 5 illustrates, annual visitor nights on the Gold Coast have fluctuated over the past ten years with relatively poor and stagnated performance following the Global Financial Crisis. There has been some level of growth and recovery over the past 12 months and this is almost entirely due to an increase in Chinese visitors, representing a single market segment.

Figure 5: Tourist visitor nights on the Gold Coast (Source: Tourism Research Australia)

To achieve sustainable economic activity and growth, and to rejuvenate the Gold Coast's stagnating tourism industry, there needs to be ongoing investment in tourism infrastructure and services as well as a broadening of relevant demand sources/target markets. Attracting additional sources of demand creates resilience within the sector and supports overall growth. The Gold Coast needs to continually focus on enhancing visitor attraction and demand to maintain and improve the sustainability and resilience of the tourism sector, as well as the broader overall economy.

2.2.1 Strategic targets for Gold Coast's tourism sector

Recent tourist expenditure growth has been limited and the City has set optimistic targets for future visitor expenditure, from approximately $4 billion in 2010 to $7 billion by 2020[12]. The latest data from the TRA (2016Q2) shows that total visitor expenditure is still around $4 billion, indicating the scale of the challenge to reach $7 billion by 2020. There needs to be a significant increase in visitation to the City for this target to be achieved. This requires additional visitor attraction and/or exposure to additional tourism markets.

The expenditure targets set by the City are a goal that needs to be supported through investment that is focused on visitor attraction. The state-level tourism forecasts produced by TRA indicate that there is expected to be strong capacity for growth over the next several years. Figure 6 adjusts these forecasts to be relevant to the Gold Coast and illustrates the potential growth from domestic and international visitors for the City.

[12] Gold Coast Destination Tourism Management Plan 2010-2020

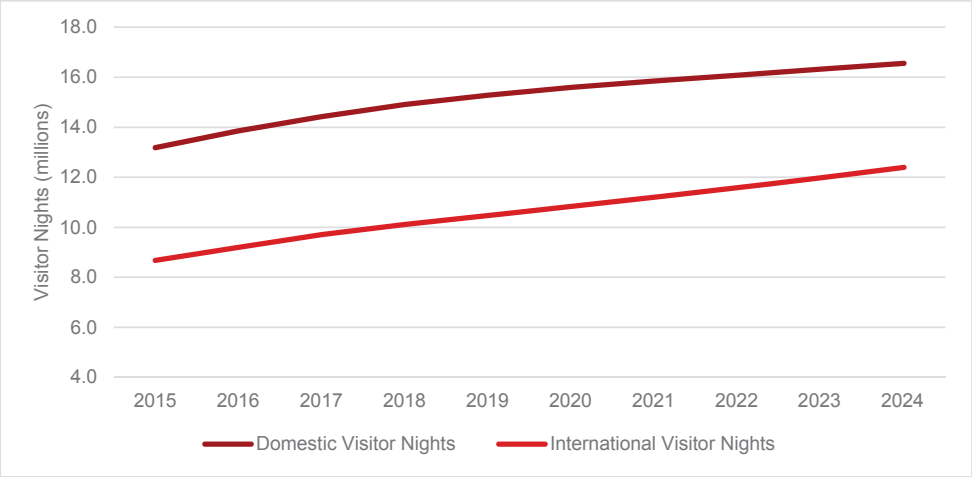

Figure 6: Gold Coast Tourism Forecasts (Source, TRA 2015, MacroPlan Dimasi)

These forecasts indicate the potential capacity for growth based on market conditions (such as the opportunity to take advantage of the burgeoning growth of the Asian middle class and its outbound tourism market). Forecasts in themselves do not ensure that there is sufficient capacity or attraction to secure these additional visitors to Queensland or the Gold Coast. Given the role of tourism in the Gold Coast economy, it is imperative that the City and the State of Queensland work together to promote the Gold Coast as a tourist destination.

2.2.2 *Igniting the Gold Coast's tourism sector with the cruise ship market*

The Gold Coast continues to be a world class destination providing a premium experience for tourists. It is therefore critical that the Gold Coast maintains an appropriate array of tourism products which can cater to tourist destination and experience expectations. The expectations of tourists are evolving and the Gold Coast must also evolve with new attractions and service offerings for visitors.

The cruise ship sector is one of the fastest growing tourism sectors internationally and is making a noticeable contribution to visitation and expenditure throughout key markets. As an example of the opportunity offered to the Gold Coast by the cruise shipping sector, over the past ten years domestic visitor nights on the Gold Coast declined by almost 20 per cent. During this same period, Australian cruise ship passengers increased from 221,033 to 1,058,781 passengers[13]. Cruise shipping is one of the fastest-growing tourism sectors in the world and Australia, is one of the fastest-growing markets within the industry.[14] Total international passenger numbers also increased at an average annual rate of 4.5 per cent from 19.1 million people in 2010 to 22.1 million in 2014. Figure 7 illustrates the significant growth in Australian cruise ship passengers in recent years.

[13] Tourism Research Australia

[14] Cruise Lines International Association

Strategic Rationale

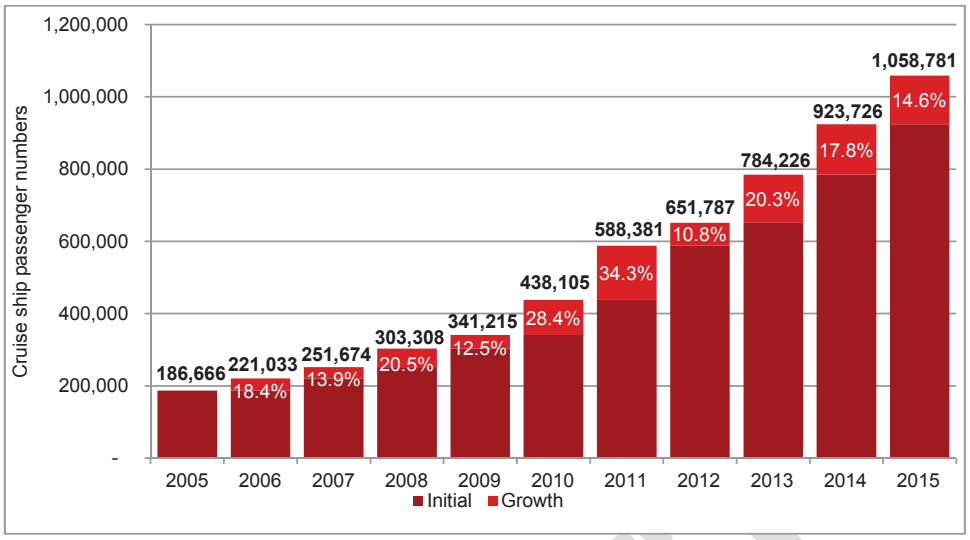

Figure 7: Australian Cruise Ship Passenger Numbers (Source: Australian Market Report 2015, Cruise Lines International Association (CLIA))

On an international scale, China experienced growth of 40.3 per cent in passenger numbers from 2014 to 2015. These results have specific relevance to the Gold Coast tourism market with Chinese international visitors representing a significant portion of all visitor nights on the Gold Coast.

The growing cruise ship market represents an opportunity to enhance attraction and increase tourist visitation for the Gold Coast. This market holds strong potential to ignite the tourism sector on the Gold Coast. In addition, the Gold Coast's tourism assets, both natural and manmade, are a significant incentive for cruise line companies to visit the Gold Coast. The absence of a suitable CST is potentially prohibiting the City from realising the full extent of this opportunity.

The benefits that could be created by building a CST on the Gold Coast include:

- Developing new tourism experiences for cruise passengers and other tourists. This may include significant increases in retail opportunities both on a terminal itself and throughout the Gold Coast. It may also include the provision of a dive site from the pier, a significant tourist attraction being one of the first dive sites accessible from land on the Gold Coast
- Delivering enhanced facilities which attract new and repeat visitations from both cruise passengers and other tourists
- Increased tourist spending enhancing economic and social benefits to local communities. A CST and increased cruise ship visits would contribute to the achievement of planned tourism growth
- Raising the profile of Queensland destinations worldwide.

2.3 Service Needs and Service Requirements

Consistent with the PAF and BQ guidelines, the assessment of the service needs and service requirements underwent a first principles investment logic mapping process to establish the need for the project against economic and strategic drivers. The Investment Logic Map (ILM) establishes the strategic need for a CST by identifying the problems or challenges facing the Gold Coast, and in this context, identified the benefits that would be accrued to Council if the

problems were solved. In this robust process, a series of strategic responses available to the City were identified, along with the potential solutions that could be developed to implement the responses. The problems identified as an outcome of the ILM process are outlined in Figure 8 which shows the finalised ILM. . The remainder of this Section provides a more in depth justification of the problems identified.

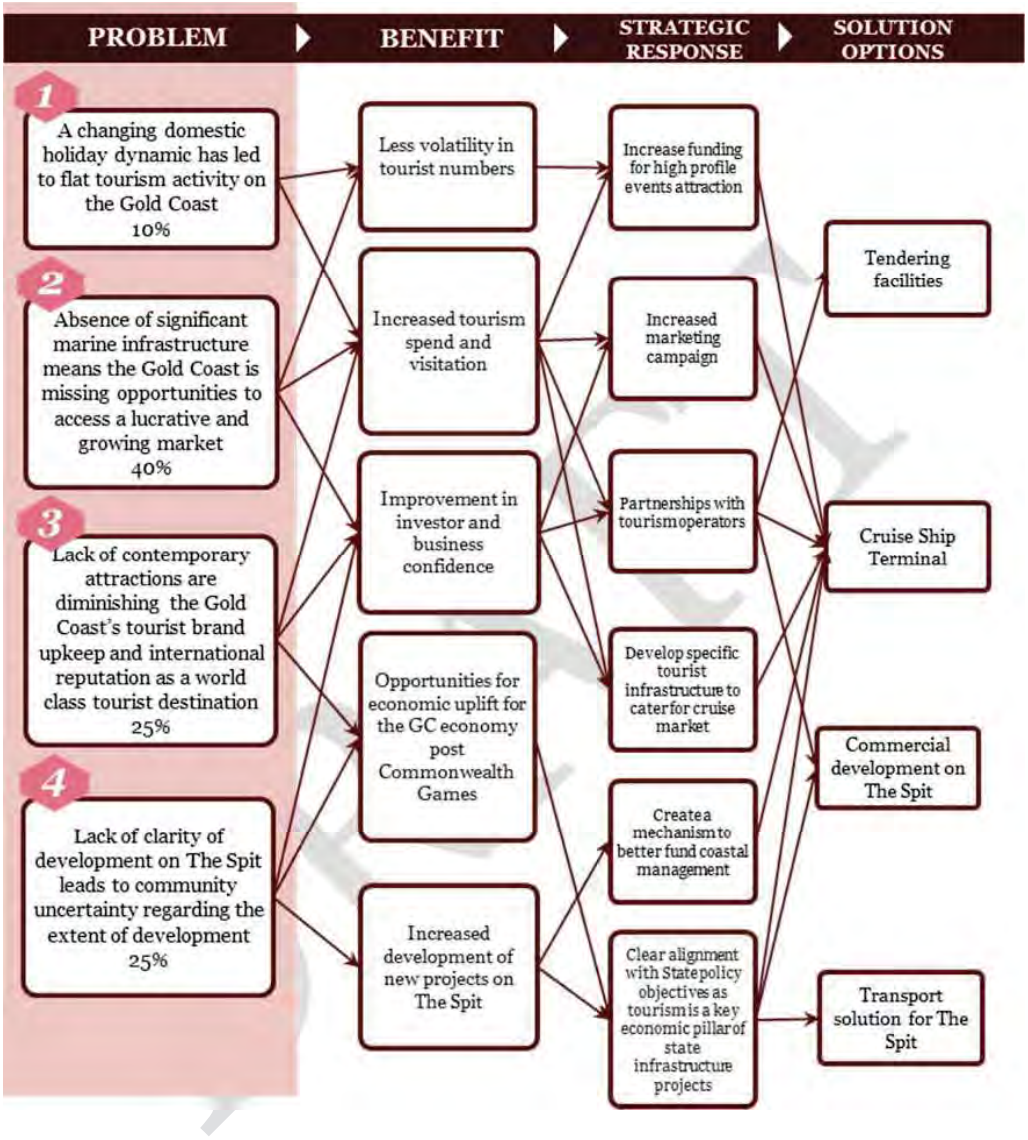

Figure 8: Investment Logic Map

2.3.1 Problem statement 1: A changing holiday dynamic has led to flat tourism activity on the Gold Coast

The nature and pattern of domestic tourism—the 'tourism dynamic'—is changing. To attract tourists, regions need more than just natural attractions. It is no longer sufficient to assume that tourists will flow to regions with natural attractions without significant investment in facilitating infrastructure that creates a destination that is able to compete in a robust international market.

Tourist destinations are increasingly needing more than one significant drawcard. Where previously, the Gold Coast would have been able to rely on its world class beaches to ensure

tourism growth, this may not be the case in the future. The Gold Coast is already addressing this issue with the development of a broad range of cultural and entertainment-based initiatives (see Table 6).

Table 6: Current and future cultural and entertainment facility near the Spit

Project	Facility	Description
Integrated Resort Development (IRD)	Gold Coast Integrated Resort (ASF Consortium)	Integrates entertainment, gaming, retail, hotel, leisure, residential and outdoor components.
Luxury resorts	Jewel Development	The Wanda Ridong joint venture between two successful Chinese developers to construct a triple tower consisting of a 5 star hotel and residential apartments.
	Ruby Project	A $1.4 billion construction of four-tower resort and residential project.
	Jupiters Hotel & Casino re-development	A $345 million transformation, creating a world-class integrated resort with new restaurants and bars, pool, gaming facilities and six-star all-suite tower.
Retail	Pacific Fair redevelopment	Redevelopment of Pacific Fair shopping centre to accommodate an additional 120 retail outlets.
Precinct development	Gold Coast Cultural Precinct	Currently under construction, this precinct is a 16.9 hectare site that will accommodate visual and performing arts facilities.
Southport Priority Development Area	Southport China Town project	The Gold Coast CBD is undergoing a $5 billion transformation including high-tech knowledge hubs, vibrant multi-cultural precincts.
	Broadwater Parklands	

Outcome sought

The potential customers of the projects and facilities outlined in Table 6 should be drawn to the region for multiple reasons. The CST on the Gold Coast would offer significant synergies with existing attractions as well as the planned IRD and other new developments within the Southport area, ensuring that the Gold Coast can present a high quality visitor gateway to the broader region.

Additionally, the CST could provide significant commercial retail opportunities and, potentially, a dive site and viewing platform from the pier. These opportunities are both an attraction for customers as well as a potential additional funding source.

Service requirement: *Provide additional tourism drawcards on the Gold Coast.*

2.3.2 *Problem statement 2: Absence of significant marine infrastructure means the Gold Coast is missing opportunities to access a lucrative and growing market*

There has been a 600 per cent increase in the total passenger numbers for Australian cruises from 2004 to 2015[15] (from 158,000 to 1,000,000 annually or 30.1 per cent year on year growth). By 2020 annual passenger numbers are forecast to reach 2 million. This boom in domestic cruises around Australia is a major contributor to the overall growth in global passenger numbers increasing from 17.8 million in 2009 to 24.2 million in 2016, an increase of 36 per cent (4.5 per cent year on year growth)[16]. The Gold Coast does not have direct access to this market as there is currently no CST on the Gold Coast and cruise operators have traditionally not set up tendering arrangements due to the open ocean conditions and a lack of facilities.

The growth of the cruise ship industry is indeed on a global scale with an expected $6.8 billion investment from the private sector in new ocean and river vessel orders for 2017 to 2026 onwards[17]. Table 7 outlines the new ocean vessels on order in 2017 and the outlook for future orders. As determined during market sounding activities, by 2020, Royal Caribbean will have introduced a new, larger fleet of 'Quantum Class' cruise ships with increased passenger capacity. New and even larger P&O Australia ship orders are also forecasted from 2020 at 4,200 passenger capacity[18]. Other cruise ships accommodating approximately 2,000 passengers are expected to be de-commissioned in about five years' time.

Table 7: New ocean vessel orders 2017 - 2026

Year	Ocean vessels	River vessels	Ships ordered	New capacity
2017	13	13	26	30,006
2018	15	2	17	29,448
2019	20	2	22	51,824
2020 – 2026	32	0	32	119,510
Total	**80**	**17**	**97**	**230,788**

In 2014-15, the Brisbane Cruise Ship Terminal benefitted from 134 cruise ship visits that generated 451,237 passenger days and 83,065 crew days within the city. In terms of expenditure, the benefit is estimated at $170.9 million from passengers and $20.6 million from crew[19]. If the Gold Coast CST attracted only one third of the cruise ships compared to Brisbane and supported 150,000 passenger days within the city, there would be an

[15] Cruise Lines International Association. Retrieved from: http://www.cruising.org/docs/default-source/research/2016_clia_sotci.pdf?sfvrsn=4)

[17] CLIA State of the Industry 2017, retrieved from https://www.cruising.org/docs/default-source/research/clia-2017-state-of-the-industry.pdf?sfvrsn=0

[18] Ibid.

[19] Cruise Down Under EIA Report 2014-15, AEC Group

expenditure benefit of approximately $56.8 million attributed to passengers with an additional $7.5 million attributed to crew.

The potential benefits indicated above are based on market performance in 2014-15. Performance has continued to improve since this period with the number of cruise ships, passengers and supporting infrastructure all forecast to increase into the foreseeable future. There is the potential that with appropriate local infrastructure and capacity, the benefit captured locally could increase in line with the market growth for the cruise ship sector.

Additionally, we understand that the existing Sydney Overseas Passenger Terminal is approaching capacity with up to 440 ships expected to berth each year by 2017. According to current forecasts the operators will need to turn away boats within the next two years. There is very limited scope for expansion of the Sydney facilities at The Rocks, and likely limited appetite from the industry and potential overseas passengers to dock at another location in Sydney, for example the White Bay terminal or Botany Bay.

Therefore, to accommodate forecast growth, there is a need for new terminal facilities on the East Coast of Australia. The Gold Coast is ideal for this as there is existing tourism infrastructure to support higher tourist numbers which the majority of other locations on the East Coast may not have.

The Gold Coast also offers a very temperate climate during the winter months, in contrast to colder weather at other cruise ship terminal locations throughout Southern Australia and as such an added advantage to the cruise industry is that it could operate all year round, contributing to the Gold Coast economy in the typically quieter winter months. This location would enable the one week Pacific Island turn around cruises that currently monopolise the Brisbane Cruise Ship Terminal and would create competition to Carnival Cruise Lines.

Asian market

The Asian cruise ship market has experienced rapid growth since 2012. Data from the Cruise Lines International Association (CLIA) shows that there has been an average 43 per cent annual growth from 2012 to 2015 for Asian passengers undertaking cruises outside Asia, equating to over 300,000 passengers in 2015[20].

Australia has a negligible share of this market, with Australia, New Zealand and the South Pacific combined capturing only 2.5 per cent of these passengers. This represents a substantial opportunity for the Gold Coast, and Australia, to boost tourist visitation. The provision of a CST, combined with the allure of the IRD and a concerted marketing campaign, has the potential to capture more of this growing market.

As discussed further in Section 3.3, the Queensland Government's State Infrastructure Plan specifically focusses on increasing the economic opportunities presented by the growing middle class in Asia and India. A CST on the Gold Coast provides the State significant potential to capitalise on this opportunity.

Outcome sought

The outcome sought is to provide the Gold Coast with the opportunity to benefit from the growing cruise market, both from domestic visitors and international visitors particularly from the Asian region. This will facilitate economic growth both in the Gold Coast and the rest of the Queensland.

[20] CLIA, Asian Cruise Trends 2016

Service requirement: *Provide significant marine infrastructure to capitalise on the growing cruise shipping market.*

2.3.3 *Problem statement 3: Lack of contemporary attractions are diminishing the Gold Coast's tourist brand upkeep and international reputation as a world class tourist destination*

Tourism Australia's most recent visitor profile and satisfaction report revealed that only 5 per cent of domestic and international visitors indicated that the reason for visiting the Gold Coast was because of the "variety of things to see and do"[21]. The primary reason for visiting was the option to enjoy any or all of the beaches, shopping and dining. The report indicated that 86 per cent of visitors had visited Gold Coast before and when questioned about what they expected to experience and whether their expectations were met, there were no responses which rated the experience as being well above their expectations. Interestingly, the report suggests that this is due to the visitors 'high level of familiarity with the region' and with the 'experiences on offer'.

This would suggest that while the Gold Coast performs well in achieving return visitors, there is a lack of facilities which encourage the perception of there being a 'variety of things to do' to the extent that satisfaction can exceed expectations. A strong sense of familiarity can be attributed to the fact that there have not been significant changes in Gold Coast's landscape of attractions accompanied by insufficient availability of contemporary attractions.

A lack of investment in tourism infrastructure will entrench the stagnation of the Gold Coast as a tourist destination as was shown in Figure 5. There is a need for the Gold Coast to significantly invest in its brand, and the Queensland Government's commitment to host the 2018 Commonwealth Games is a significant commitment in that regard.

The Gold Coast gained broad exposure on the international stage when a television audience of 300 million watched the handover of the Commonwealth Games Federation Flag at the Glasgow 2014 Commonwealth Games.

GC2018 will host more than 6,000 athletes, representing 70 nations and territories around the world. With an estimated 1.5 billion television audience, the GC2018 will undoubtedly help ignite the tourism industry, providing the region a unique opportunity to capitalise on global exposure. This is recognised in the Gold Coast's Economic Development Strategy 2013-2023 which has a stated aim to:

"Optimise the return on investment from hosting the 2018 Commonwealth Games."

If the region is to maximise the positive effect of hosting the GC2018 it is imperative that it presents a consistent strategic direction for the Gold Coast. Current initiatives organised by the Council are assisting in this regard, including the City of Gold Coast Investment Attraction Program and the City of Gold Coast International Plan.

[21] Tourism Research Australia (2013) Gold Coast Visitor Profile and Satisfaction Report. https://www.tra.gov.au/documents/vps/Gold_Coast_Visitor_Profile_and_Satisfaction_Report_Nov2013_FINAL2.pdf

It will also be critical to ensure that there are sufficient infrastructure investments in the tourism sector to provide confidence to tourists and operators that the Gold Coast is a fresh and thriving destination, building on the momentum created by GC2018 exposure.

Outcome sought

With more than 2.3 million international visitors in Australia spending $4.7 billion in the year ending September 2016[22], the Gold Coast has the opportunity to capitalise on this strong tourism expenditure and likelihood of repeat visitation.

The City of Gold Coast can signal its renewed and continuing support for the tourism market by providing additional tourism infrastructure. This will lead to greater confidence from the private sector that the Gold Coast is a secure investment and that investments in the region will be supported resulting in greater tourist activity and economic growth.

If the Gold Coast can invest in or facilitate a number of marquee infrastructure projects, it will encourage further investment in the region from the private sector which will in turn lead to an enhancement of the Gold Coast's brand, increased tourism activity and industry confidence.

Service requirement: *Provide additional tourism infrastructure to encourage greater tourist visitation and economic growth.*

2.3.4 Problem statement 4: Lack of clarity of development on the Spit leads to community uncertainty regarding the extent of development

Table 5 assessed the engineering, environmental, operational, planning and costing aspects of the proposed development. Several locations for a CST have historically been considered, including the Seaway, Wavebreak Island and the Broadwater. Strong community concerns were raised about to the significant cost and hazard constraints of a CST in the southern Broadwater. At the time of the studies, the location options in closer proximity to the Seaway were thought to be more feasible and acceptable by community and Government stakeholders.

A number of City and State investigations, and private sector development proposals have sought to promote a Gold Coast CST however each has failed to achieve the required combination of economic justification, and political and community support.

The public areas of the Spit are a treasured Gold Coast asset and previous redevelopment opportunities in the area have been met with significant public backlash due to the perceived restriction of access to public land, and reduced amenity for local residents and tourists. As a result of the opposition from parts of the community hindering development, the Spit remains underutilised with significant opportunity to improve public amenity.

Outcome sought

Given the previous opposition to redevelopments in the Southport Spit region, it will be critical to ensure that the proposed CST includes considerable public access regions and green open spaces. It will be important that the local residents can see the proposed CST as an asset to the region that will increase the region's amenity.

[22] Queensland Tourism Investment Guide 2016

Service requirement: *A clear, concise and widely supported plan regarding the future development of the Spit.*

The four key service requirements identified as part of the ILM process are presented in Figure 9.

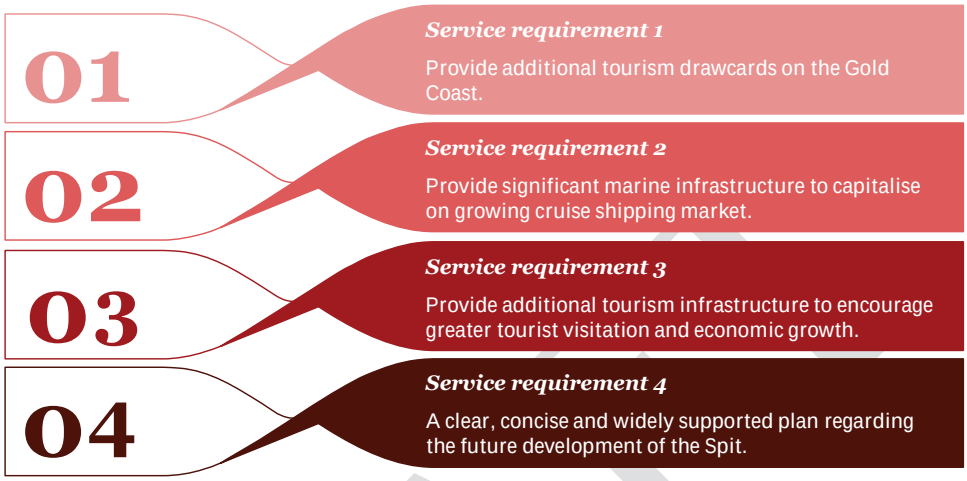

Figure 9: Service requirements

2.4 Benefits

The second step of the process is to establish a set of possible benefits that may accrue to stakeholders if steps are taken to remedy the problems identified. These benefits will form the basis of documentation that will form part of the Business Case.

For the purposes of the ILM process, benefits should:

- Have the means of being measured
- Relate directly to the problem statements
- Consider the potential benefits to a broad range of stakeholders.

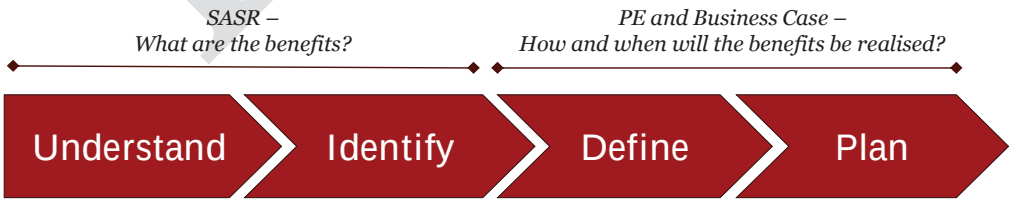

Figure 10: Benefits Stages

The benefits identified at the SASR stage formed the basis of the economic and financial assessment in the Business Case.

Based on the problems identified, the headline benefits identified through the ILM workshop were:

- The possibility to reduce the seasonality impacts the tourism market has on the Gold Coast economy
- Increased development opportunities on the currently underutilised Spit to improve public amenity
- Increased visitation and expenditure on the Gold Coast with the flow on impacts of this increased expenditure through the wider GC economy
- Leveraging the exposure from the 2018 Commonwealth Games and ensuring there continues to be economic opportunities on the Gold Coast after this event
- Providing additional drawcards to the region by integrating with the proposed IRD and others developments
- Enhancing the Gold Coast reputation as a premier tourist destination.

2.4.1 Strategic response

Strategic responses are possible interventions that will assist to combat the identified problem(s) and help to deliver some or all of the identified benefits. The strategic responses identified as part of the ILM process are detailed in Table 8.

Table 8: Benefits of the Strategic Responses

Strategic Response	Possible Benefits
Increased funding for high profile events and attractions *can potentially lead to...*	• Less volatility in tourism numbers • Increased tourism visitation and spend
An international marketing campaign *can potentially lead to...*	• Less volatility in tourism numbers • Increased tourism visitation and spend
Further partnerships with tourism operators *can potentially lead to...*	• Increased tourism visitation and spend
Development of maritime infrastructure to cater for burgeoning cruise market *can potentially lead to...*	• Improvement in investor and business confidence • Increased development on the Spit • Increased tourism visitation and spend • Less volatility in tourism numbers • Economic uplift post Commonwealth Games
Clearly align policy (State and local) for the Spit *can potentially lead to...*	• Increased development on the Spit • Improvement in investor and business confidence • Economic uplift post Commonwealth Games

2.4.2 Potential Solutions

Given the shifts in the tourism market and emergence of the cruise industry in Australia, the development of maritime infrastructure to facilitate cruise shipping visitation to the Gold Coast was considered the best strategic response to the problems identified. The other options considered may contribute to the successful delivery implementation of a CST on the Gold Coast. The other options were considered less likely to be able to alleviate the problems identified without a cruise terminal and did not provide the scale of benefits required.

Strategic Rationale

The other four strategic responses will assist with the reinvigoration of tourism on the Gold Coast and should be considered by the City independently to the assessment of the CST. Adopting these initiatives may also increase the potential for success for the proposed CST.

3 Alignment with Policy

3.1 Overview

It is important that critical infrastructure, particularly infrastructure that requires significant funding requirements gets support from all levels of Government. The potential development of Gold Coast's CST aligns with Local, State and Federal Government policies, linking to specific tourism, infrastructure and planning priorities and initiatives. This Section demonstrates the key government policies that should offer support for the development of a CST on the Gold Coast.

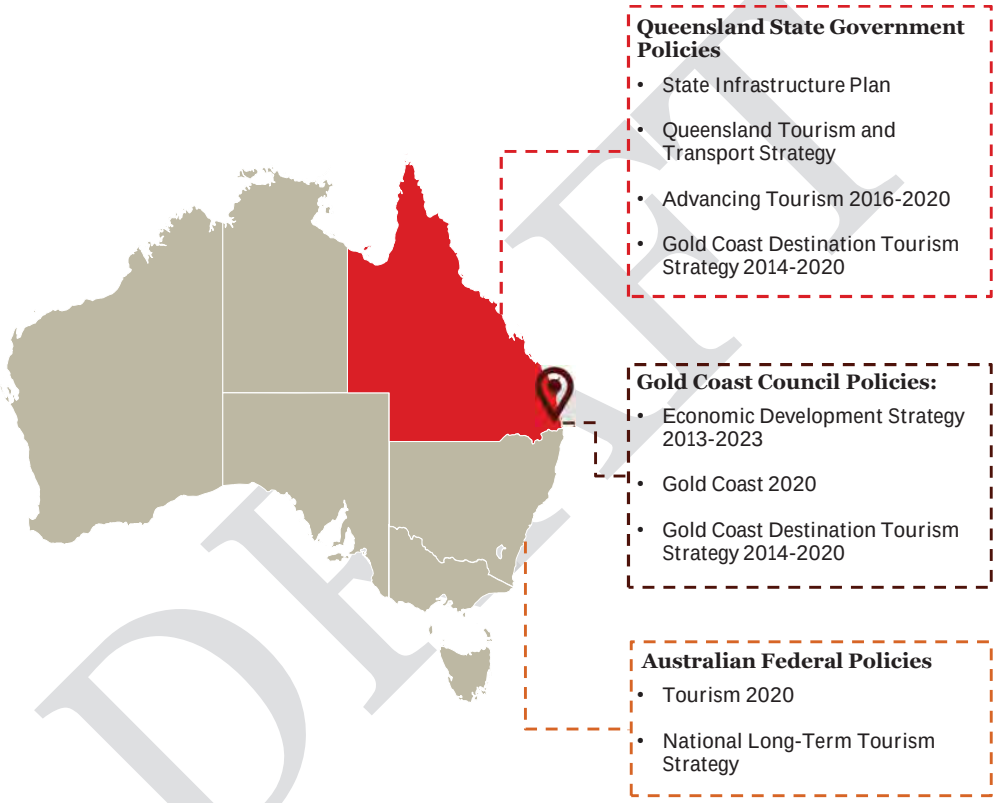

Figure 11: Local, State and Federal Government priorities and policies

3.2 Local Government Priorities

3.2.1 Economic development strategy

The development of an ocean-side CST aligns with City's Economic Development Strategy 2013-23 which outlines the City's strategic themes and key actions. As per Section 6 of the Strategy, one of the City's key activities is to:

"Maintain and expand strategic marine industry infrastructure."

As part of the Strategy, the City has identified the following objective for tourism infrastructure development:

> *"...identify and deliver projects to maximise economic outcomes and the city's reputation as a world class tourist destination."*

A CST would make a significant contribution to the Gold Coast's infrastructure and reputation and thus clearly aligns with the above objectives and strategies.

3.2.2 Gold Coast 2020

Gold Coast 2020 is the City's Corporate Plan which identifies key themes and actions to work towards its Vision to be *"Inspired by lifestyle. Driven by opportunity."* The Corporate Plan is based on three City Vision themes

Gold Coast's 2020 Vision to be driven by opportunity provides a strong foundation for the City's objectives Table 9 demonstrates how the development of a Gold Coast CST contributes to Council achieving its objectives and realising its Vision.

Table 9: Alignment with Gold Coast 2020

Theme	Objective	How the CST contributes
Place	Our modern centres create vibrant communities	Integrate CST into vibrant waterfront facilities, growing the sense of community around The Spit region.
	Everyone can enjoy a beach experience	Addresses the proven cause and effect of Gold Coast's changing tourism dynamic by providing infrastructure which facilitates extra tourism products for an enjoyable beach experience for all kinds of tourists.
	Our city benefits from a great Gold Coast 2018 Commonwealth Games	A CST would be able to leverage the broad exposure from the Commonwealth Games into a successful new tourism offering Contributes to economic stability post Commonwealth Games.
Prosperity	Our city is innovative and grows successful businesses	A conservative estimate from MacroPlan Dimasi suggests that a CST could create over $60 million in additional expenditure on the Gold Coast.
	We have infrastructure that supports productivity and growth	A new CST will support the growing cruise ship market demand and facilitate tourism growth on the Gold Coast.
	We are a city with a strong and globally competitive business environment	A new CST keeps Gold Coast competitive, providing world-class amenities, facilitating competitive business activity across the region.
	We are a globally recognised tourism destination	Gold Coast is already a globally recognised tourism destination and a new CST ensures the maintenance of this reputation.

Theme	Objective	How the CST contributes
People	We are a highly skilled community.	A new CST is expected to create significant new jobs in the region[23], providing the community with the opportunity to upskill in new industries (e.g. cruise ship lines, maritime customs and bio-security).
	We are proud of our city.	A new CST goes hand-in-hand with the Gold Coast IRD. A new CST provides improved amenities, potentially serving as an iconic structural landmark for the community to be proud of.

3.2.3 Gold Coast Destination Tourism Management Plan (DTMP) 2014 -2020

The DTMP extends the successful partnership between the City and the tourism industry through Gold Coast Tourism. It is a collaborative approach to ensure the sustainable success of the Gold Coast tourism industry and aggressively capitalise on key opportunities for the city as a world-class tourism destination.

The DTMP addresses the changing needs of the broader visitor economy in the Gold Coast region. It aims to build on a strong foundation with acknowledges the vital demand-side destination marketing undertaken by Gold Coast Tourism by aligning the strategies, resources, and efforts of industry and all levels of government towards a set of unified long-term objectives and outcomes.

The DTMP has been developed by the City and Gold Coast Tourism based on an extensive base of tourism intelligence, industry engagement and experience. The strategic platforms and resulting actions outlined in the DTMP have been defined by the following guiding principles that provide the context for growth:

- **Reinforce the Foundations**: ensure the areas which have generated success to date are supported and developed
- **Strength in Collaboration**: align and define the strategies, resources and efforts of all stakeholders towards a unified vision
- **Develop the Experience**: continually advance the destination offering
- **Sustainable Success**: progress with understanding and balance.

The State Government were co-developers and sponsors of the DTMP.

Overall, the development of a CST on the Gold Coast clearly aligns with local government priorities because it addresses the key themes and objectives outlined in its Economic Development Strategy, its Corporate Plan, and the DTMP.

These documents both highlight the importance of maintaining the Gold Coast's reputation as a tourism destination and also address the need to invest in infrastructure which contributes to the future economic growth of the region.

[23] The magnitude of the economic benefits, including jobs created, will be addressed in later stages of the evaluation process.

3.3 Queensland Government Priorities

3.3.1 Advance Queensland

The Queensland Government's Department of Tourism, Major Events, Small Business and the Commonwealth Games (DTESB) has a long-term commitment to grow the state's tourism industry.

Advancing Tourism 2016-20 is the Queensland Government's plan to grow tourism and jobs and as part of the wider initiative, the government also announced Advance Queensland: Connecting with Asia Strategy.

One of the key strategic themes of Advancing Tourism 2016-20 is to invest in infrastructure and improve access to tourism transport[24]. This includes:

- Capitalising on cruise market opportunities
- Highlighting the potential economic contribution of Home Porting in Queensland
- Supporting sustainable development of key Queensland cruise shipping ports
- Encouraging private sector investment in the cruise ship industry growth.

Such State Government initiatives are a strong indication of the importance of the tourism industry to the State and the need to connect with the tourism market in Asia. The DTESB also works closely with DestinationQ, a partnership between the Queensland Government and the tourism industry, to increase investment in tourism infrastructure, events and experiences, showcasing Queensland as an attractive destination for tourists.

DestinationQ provides a 20-year plan to grow the visitor economy in Queensland. The Plan identifies several key strategic themes designed to increase visitor expenditure to $30 billion by 2020. One of the plan's key strategic themes is to grow investment for well-planned, timely public and private infrastructure to enable tourism growth and visitor access. A strategic directive of this theme is to deliver a sustainable multimodal transport systems that provides safe and equitable access. As tourist access is critical to Queensland's future tourism performance, the Plan specifically highlights the importance of new cruise infrastructure availability to provide tourists with a seamless transport experience, integrated with the overall tourist destination products[25].

3.3.2 State Infrastructure Plan

The Queensland Government identifies cruise tourism as a priority market segment for development. Published in March 2016, the Queensland Government's State Infrastructure Plan (SIP) highlights the rise of economic opportunities in Asia and its growing middle class. According to the China Cruise and Yacht Industry Association (CCYIA), the number of 'middle class' Chinese residents is forecast to grow to over 600 million by 2020[26]. CCYIA also suggests that China is expected to become the second largest cruise market by 2017, with 1.7

[24] Department of Tourism, Major Events, Small Business and the Commonwealth Games, Advance Queensland, *Advancing Tourism 2016-20*. https://publications.qld.gov.au/dataset/5024fa5c-8704-42df-b8f8-4367980ae875/resource/0ac3dd2c-ddf8-486e-a02c-1cda37747a32/download/advancing-tourism-2016-20.pdf

[25] DestinationQ (2016). *Vision and Strategy*. https://www.destq.com.au/

[26] AECGroup (2012). *Gold Coast Cruise Ship Terminal Business Case: Market Sounding & Demand Assessment,* pg 2

million people from the Chinese mainland booking cruises in 2014, at an annual growth rate for 43 per cent over the period 2013 to 2014[27].

SIP states that Queensland is well positioned to capitalise on these opportunities through the provision of efficient infrastructure and through selecting the right projects which are expected to deliver productivity benefits to the State. SIP identifies the Gold Coast region as an attractive tourism industry zone. It recommends that:

"...regions with tourism advantages require marine and aviation infrastructure."

SIP advises that Queensland regions play to their advantages to grow local economies and therefore leverage opportunities of the growing global economy, particularly Asia[28]. Tourism is clearly an advantage for the Gold Coast and should therefore be a focus for the region.

The proposed Gold Coast CST aligns with State Government infrastructure priorities by presenting a solution to the requirement of marine infrastructure which allows the Gold Coast to use its advantage of being one of Australia's key tourism regions and also allows Queensland access to the growing Asian market.

3.3.3 Queensland Tourism and Transport Strategy

The Queensland Tourism and Transport Strategy (QTTS) was developed by the Queensland Department of Transport and Main Roads in partnership with the Queensland Department of Tourism, Major Events, Small Business and the Commonwealth Games. The QTTS was released at the end of 2016 and considers tourist needs across the cruise modes of transport, with a focus on key tourism destinations and major population centres.

The QTTS articulates the vision and priority actions to ensure that transport networks and soft infrastructure support tourism growth into the future. It aims to identify tourists' requirements for future plans and investments across the transport network[29].

3.4 Australian Government Priorities

3.4.1 National Long-Term Tourism Strategy and Tourism 2020

The National Long-Term Tourism Strategy and Tourism 2020, both developed by Tourism Australia, provide a policy framework for industry and governments to address the barriers to industry growth. They focus on improving the tourism industry's productive capacity and competitive advantage in the global economy, with particular emphasis on capitalising on the opportunities presented by the Asian market.

Tourism is a significant industry for Australia generating $95 billion in spending and contributing $35 billion to Australia's GDP. However, tourism investment is lagging, growing at only half the rate of investment in the rest of the Australian economy in the ten years from

[27] China Cruise and Yacht Industry Association (2015). http://www.ccyia.com/en/News/20151118/2674.html

[28] Queensland State Infrastructure Plan (2016). http://www.dilgp.qld.gov.au/resources/plan/sip/sip-part-a.pdf

[29] Queensland Department of Tourism, Major Events, Small Business and the Commonwealth Games (2016). *Queensland Tourism and Transport Strategy*. https://www.dtesb.qld.gov.au/tourism/tourism-and-transport-strategy

2000/01[30]. To rectify this, the Australian Government, in partnership with industry leaders, have endorsed a work program which commits to achieving between $115 billion to $140 billion in total tourism overnight spend.

In addition to this, one of the strategic areas of Tourism 2020 is to *"ensure tourism transport environment supports growth"* which encourages Governments to work with industry to ensure infrastructure continues to move ahead of demand, including understanding the cruise shipping market and related infrastructure needs[31].

Tourism Australia's strategy clearly aligns with the continued support of the cruise ship industry and as previously addressed, the cruise ship industry in Australia is an undeniably strong market for international tourists, especially from Asia. The cruise shipping industry is in a period of unprecedented growth with Australia as a cruise ship destination experiencing rapid growth observed by both rapid growth in demand (passengers) and in supply (infrastructure and destination development). Specifically, the number of total days spent at port has increased 23 per cent from 2005 to 2015 leading to positive economic growth. For example, for the 2014 to 2015 year alone, the net total expenditure[32] generated by cruise ship visits to Australia was approximately $1.2 billion[33]. The increased days spent at Australian ports and the flow on economic impacts demonstrates the inherent need to supply the required infrastructure and destination development to service this growing demand.

The Gold Coast as a cruise ship destination in Australia already has the advantage of being identified as an attractive tourism zone (as per Section 3.3). The development of a new CST would contribute to the Australian Government's priorities as it "*facilitates, rather than hinders, tourism traffic"* leading to growth in Australia's share of key markets, labour force growth and improved industry quality and productivity.

[30] Tourism Australia (2011). Tourism 2020 Overview. http://www.tourism.australia.com/documents/Tourism_2020_overview.pdf

[31] Ibid.

[32] Net total expenditure is the aggregation of all international passenger and crew expenditure, cruise ship operator and corporate expenditure at each port visited by a cruise ship during the 2014 to 2015 year.

[33] Dowling, R. (2016). Australia's Cruising Phenomenon. *Tourism in Marine Environments*. 11(2)

4 Reference Project

4.1 Introduction

This section includes details of the infrastructure included in the Reference Case design for the CST project.

4.2 Options Assessment

The selection of the Reference Project included a detailed options assessment process that was systematic and drew on the legacy assessments for a terminal on the Gold Coast. The process included:

- Consideration of infrastructure and non-infrastructure solutions
- Consideration of optimal location, including potential for utilising existing infrastructure
- Development of functional and technical criteria
- Development of a long list of infrastructure outcomes to meet the service need, functional criteria and technical criteria
- Selection of a preferred infrastructure arrangement option using a multi-criteria analysis (MCA)
- Consideration of design variations of the different infrastructure elements within the preferred arrangement
- Confirming the Reference Project for the Business Case.

A summary of the options analysis process is presented in Figure 12. This figure provides an overview of the options considered and high level assessment criteria used to identify the preferred technical solution and the Reference Project. A detailed options assessment was considered in the Preliminary Business Case and is included in Appendix A. Drawings of options considered are presented in Appendix B.

Reference Project

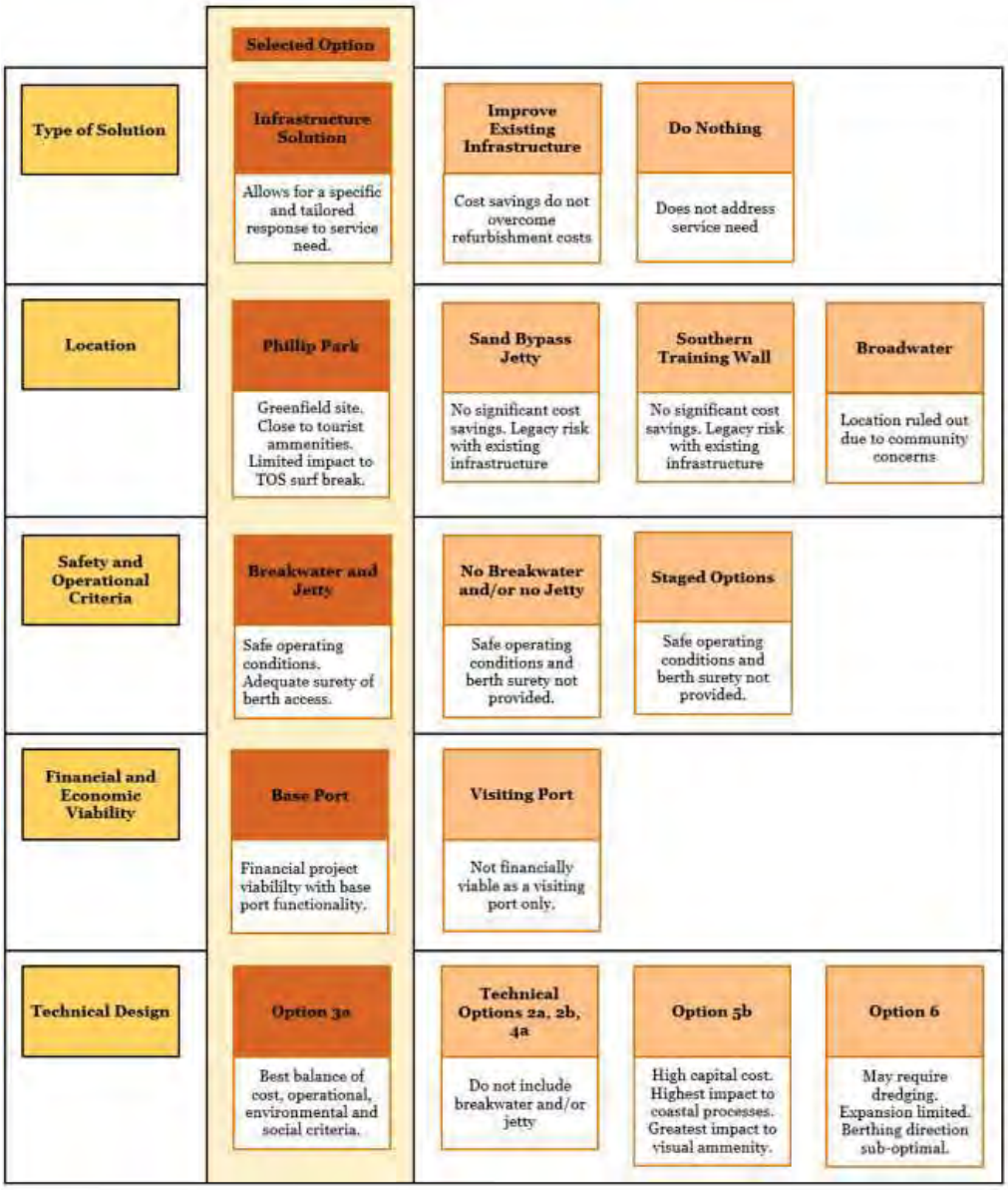

Figure 12: Options analysis map

4.3 Reference Project Overview

This technical solution includes an in-line wharf and jetty sheltered by a breakwater. This layout was selected based on the outcomes of the Preliminary Update Report, subsequent workshops, multi-criteria analysis and PBC. A sketch of this arrangement is shown in plan-view in Figure 13 and in elevation view in Figure 14. Additional Reference Project drawings are included in Appendix C. Marine site characteristics considered in the development of the Reference Project are included in Appendix D.

Reference Project

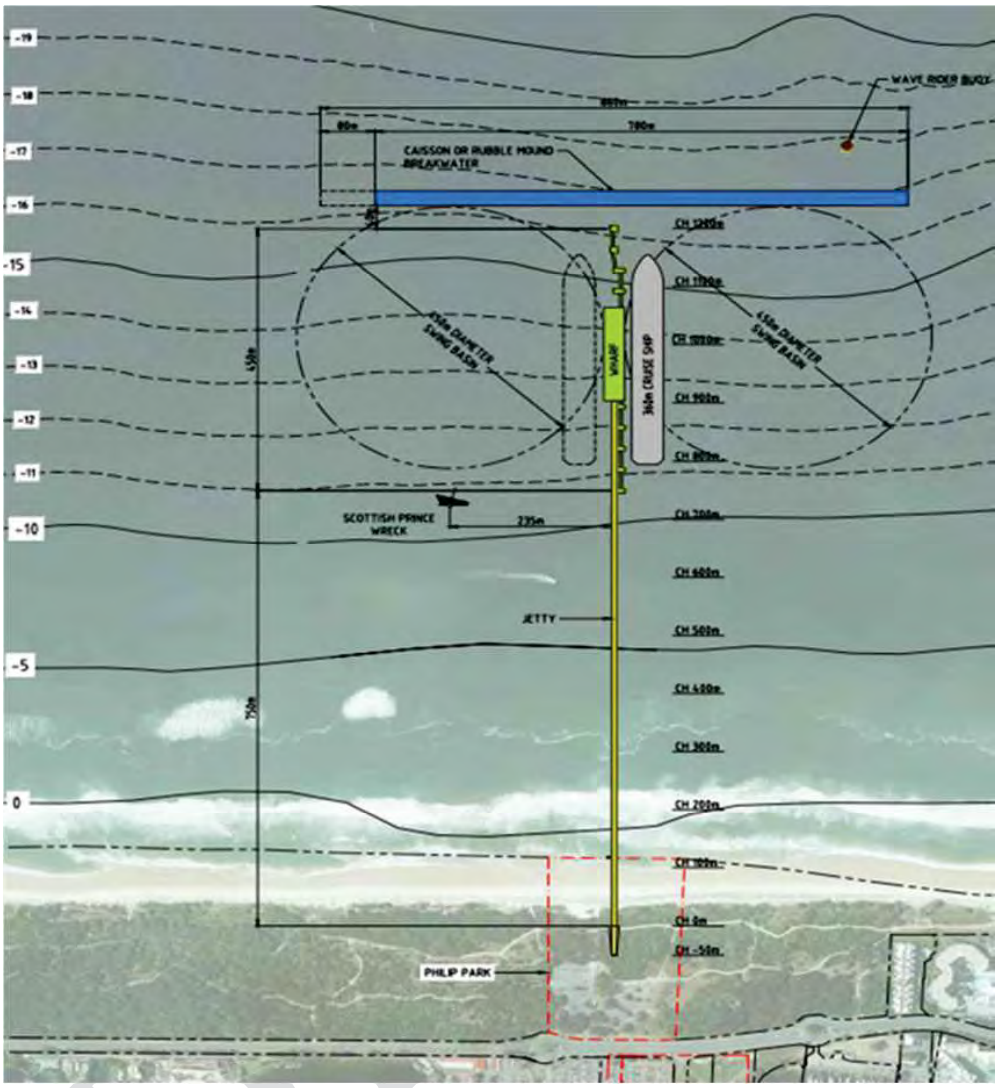

Figure 13: Reference Project layout

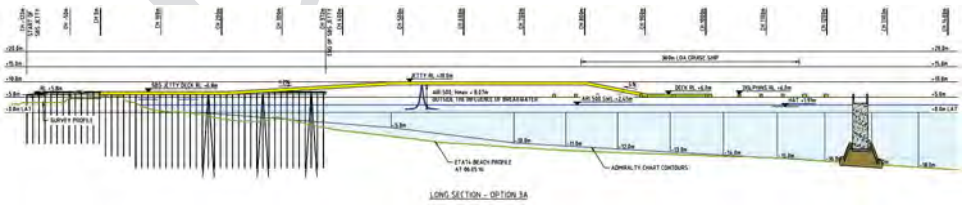

Figure 14: Long section of Reference Project option with distorted vertical scale

This option includes the following primary infrastructure:

- Breakwater – the breakwater is required to provide cruise ships with protection from waves while berthing and at dock. This is necessary to allow passengers to board and disembark the ship safely. The breakwater is approximately 780m long and of concrete Caisson construction

Reference Project

- Jetty – An approximately 900m long jetty extending perpendicular from shore. The jetty is a skeletal framed structure comprising raking piles and headstocks (bents) and a vehicle running surface. The jetty elevation rises above the significant wave height for approximately 800m of its length before sloping down to the wharf deck level. This option includes a 7m wide roadway along the length of the jetty that allows for traffic and pedestrian access

- Wharf and Dolphins – a concrete wharf structure (in line with the jetty) is included for cruise ship access. An independent system of berthing and mooring dolphins is also included at wharf deck level. These structures are at a relatively low level relative to the water line for wave protection

- Berth – a single berth with a 450m swing basin is included. There is a space allowance for future expansion for a second berth on the north side of the wharf. The Reference Project includes a single berth only. A second berth could potentially be added if demand requires

- Onshore infrastructure and services – including the terminal building, roads and access, storm water, sewer, water, electrical, gas, fuel and communications infrastructure.

Additional details of the Reference Project design elements are included in the following sections.

4.4 Breakwater

A breakwater is required to reduce wave loading at the berth to:

- Provide safe berthing of cruise ships

- Provide safe boarding and disembarking of the vessel by passengers

- Provide a suitable level of berth availability for cruise ships.

The breakwater is located (nominally) 40m from the most seaward dolphin. It includes a series of concrete caissons on a 6m high berm and is approximately 780 m in length as shown in Figure 15.

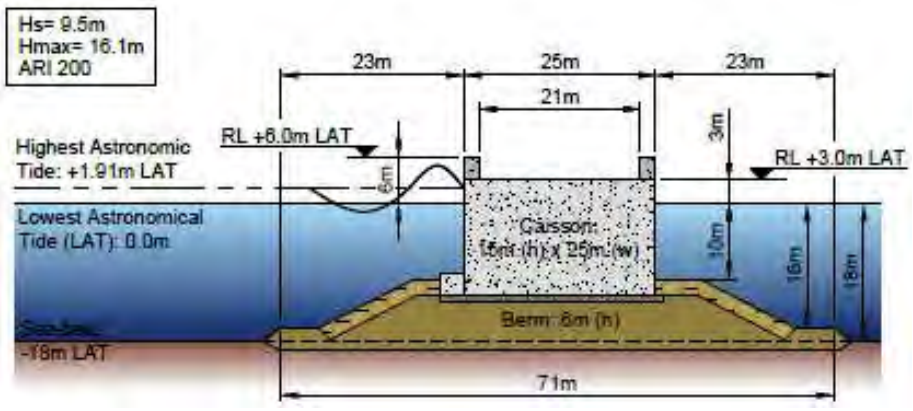

Figure 15: Concrete Caisson Breakwater

Reference Project

4.5 Jetty

The jetty is a skeletal framed structure approximately 900m long with standard pile bents at spacing of approximately 18m. The bent comprises a pair of transverse raking piles (that is piles at a slope to vertical) with a headstock at the top. Anchor bents with additional longitudinal raking piles are located approximately every 200m.

Spanning between the headstocks are two deck support frames. Each frame comprises two longitudinal main beams, cross beams and bracing members. Cantilevering on one side of the jetty will be supports for the pipes required to service the cruise ships. These services would include potable water, sewage, fire water, power and communications.

There is the potential to provide an extended headstock for the support of long term recycled water return pipes (LTRWRP). This would be a potential scope addition and is not provided for in the Reference Project.

A typical cross section of the jetty including additional support for the LTRWRP project (shown dashed) is shown in Figure 16.

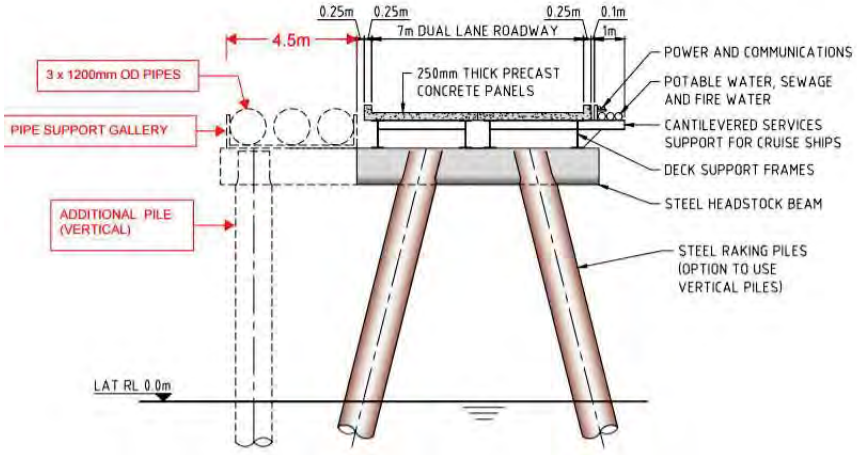

Figure 16: Typical cross section of a 7m roadway

Installed on top of the deck support frames is a series of precast concrete deck segments to form the roadway. A traditional roadway jetty structure is provided with this option. Providing a 7m wide roadway allows for 2 lane (or 2 way) traffic for the entire length. This provides the greatest flexibility for access dependent on shipping, maintenance and tourism requirements. These options are as follows and are depicted in Figure 17:

- 2 vehicle lane, 2 way traffic at periods when there is a docked cruise ship
- 1 vehicle lane, and 1 lane for pedestrians/cyclists for maintenance periods and times when vehicle access to the jetty and/or wharf is required
- Full width shared cycle/pedestrian access for all other times.

With the multiple modes of transport able to utilise the jetty, clear directions must be available to ensure pedestrian, cycle and vehicle interactions are managed. A form of lockout will be required when no general public access is allowed.

Reference Project

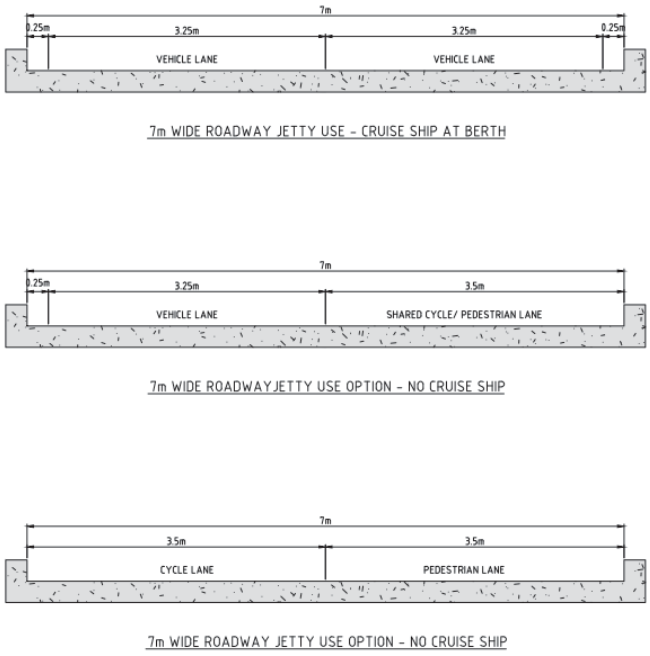

Figure 17: Optional jetty roadway use configurations

The benefits of this jetty design are:

- Allows for use as a Home Port for cruise ship operators to begin and end journeys on the Gold Coast
- Maximises the flexibility of the deck structure for different transport modes
- Provides multi-use recreational and tourism opportunities - casual tourists, fitness users, recreational fishing, and diving in addition to the cruise ship operations
- Reduces the operational costs relative to other options (such as the monorail option)
- Provides services required for docked cruise ships.

4.5.1 Transport on Jetty

Due to the large number of passengers boarding or disembarking a cruise ship, traditional buses or mini-buses may not be deemed adequate. Alternative transport methods may be considered, including multi carriage vehicles towed behind a motor vehicle such as the one shown in Figure 18.

One of the benefits of a vehicle of this type is that the small vehicle can be uncoupled and maneuvered on the wharf to turn around and then be reattached to the carriages. This would be an easier operation than turning a large bus around on the wharf.

Alternative transport options including a monorail system have been considered in the PBC and have been discounted due to capital cost and ongoing maintenance requirements.

Reference Project

Figure 18: Multi Carriage vehicle

4.6 Wharf

Located at the seaward end of the jetty is an in-line wharf structure which comprises a 160m long x 22m wide wharf deck. An independent system of mooring dolphins and berthing dolphins is provided at the same level as the wharf deck. The use of independent mooring dolphins allows the reduction in the wharf deck area.

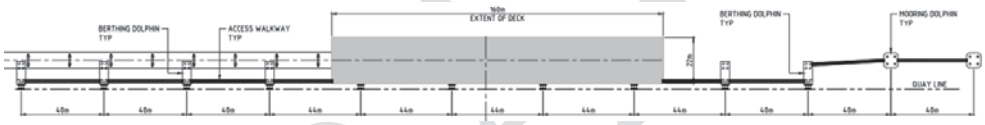

Figure 19: Wharf layout

With this wharf being used as a home port, there is the requirement for passengers to board and disembark the cruise ship at the atrium level. As such, a structure must be provided (including a gangway) to direct passengers from the low wharf deck level up to the atrium level. The gangway can then bridge the elevation differences between the platform and the cruise ship entry point. The platform structure will require an automated access route such as escalator or elevator to ensure availability of access to all passengers. The structure may be in the form of a terminal building, or may be reduced to a simple staircase and escalator to a small platform.

The wharf deck would be 22m wide to provide vehicles with the ability to turn around. It should be noted that the wharf and jetty design described above are assumed to cater for vehicles with a maximum axle load of 25 tonnes. This design vehicle is smaller than the maximum road going trucks, but is expected to be of sufficient size to adequately provide service to the cruise ships.

Reference Project

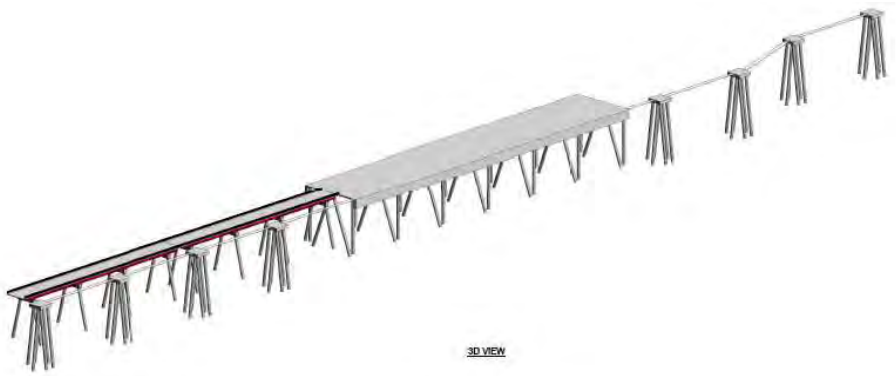

Figure 20: Wharf deck and jetty

4.7 Landside Infrastructure

To support the terminal land side infrastructure will be required within Philip Park. This is to support the on-going operation of the terminal and provide logistic support whilst a ship is berthed.

For the home port option there are a greater number of logistical support functions required reflecting the increased demand on the facility by the ship and passengers. Additional facilities include passenger check-in and luggage handling, passport and immigration control, back of house services in addition to logistical facilities for ship re-provisioning.

The Reference Project includes land side infrastructure suitable for a home port option and the design is based on the following general criteria:

- Provide ultimate arrival departure experience and amplify the experience of the Gold Coast and its surrounds showcasing the cruise ship terminal and coast setting
- Provide clarity of experience and legibility for user that calms and adds to experience for passengers
- Minimise clashes between logistics and passenger services during ship days by providing a flexible site layout
- Undertake all passenger check-in, baggage handling and security checks prior to accessing the jetty and vessel
- Provide appropriate ground transport facilities and drop off areas for passengers arriving or departing the terminal with minimal on-site parking for passengers
- Provide operator efficiency and dependability
- Provide appropriate border control and security services for safety for all users and operators
- Manage and control access of persons to the terminal whilst vessels are at port
- Undertake all passenger check in, baggage handling and security checks prior to accessing the jetty and vessel
- Allow passengers waiting to board the vessel to do so in comfort and the style according to cruise ship brand

Reference Project

- Receive VIPs and clients in an appropriate style and enhanced facilities
- Provide facilities that are accessible to the general public during non-ship days including the jetty and retail outlet
- Provide back of house (BOH) facilities for staff
- Provide office accommodation and rest room/s required for the operation
- Allow the establishment of a command centre for site management, security control and emergency response
- Provide supporting facilities, including WC/rest room and tea facilities, for vehicle management officer (Vehicle Management shelter/gatehouse elsewhere on site).

4.7.1 Functional building layout

To support the development of a general layout a functional assessment of the facility has been carried out which considers movement and flows for passengers from check in through to boarding the vessel.

In addition the flow of goods and services that are delivered to a cruise ship has been considered, assuming that as a Home Port, cruise ships will need to be 'turned over' or cleaned, restocked and refuelled between cruises. It is assumed that would take place prior to boarding and that there would be minimal overlap between embarking passengers and logistics.

Figure 21 shows the functional building and site layout.

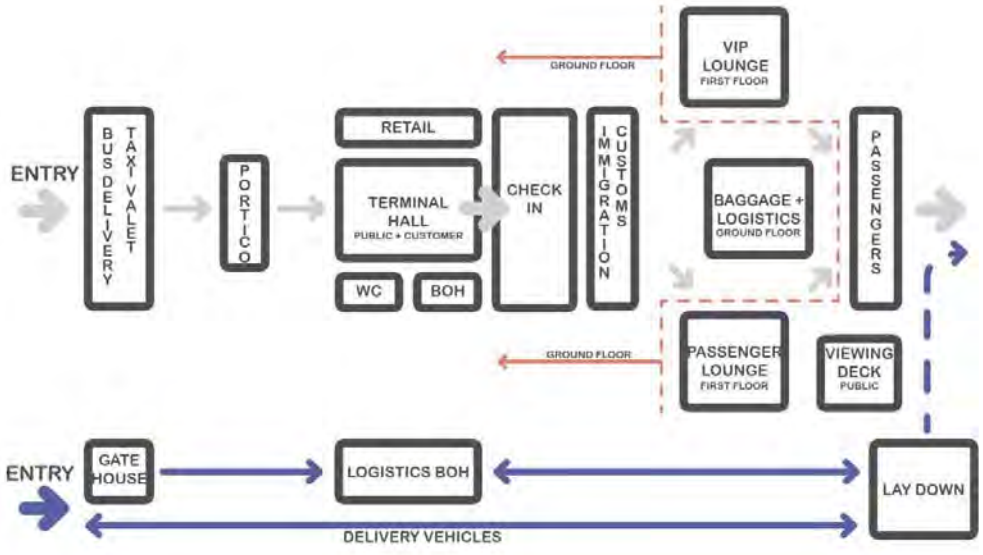

Figure 21: Functional Building Layout

4.7.2 Terminal building and site layout

Philip Park is an existing cleared area within the foreshore area along the Spit and is presently used as a public car park. The sensitivity of introducing new built form into the foreshore area is also recognised and there is a need to create an appropriate sense of arrival

as a gateway to the Gold Coast. Therefore the layout of the site has been developed to take into account:

- Limiting new building footprint to the cleared areas within Philip Park
- Preserving the foreshore and dune vegetation
- Limiting impact (noise and visibility) from operational areas upon the beach area
- Maintaining public thoroughfares such as Federation Walk
- Providing upper levels views of the Pacific Ocean and cruise ship for passengers and public.

Appendix C includes a series of concept development drawings which demonstrate the overall context of the site and selected option.

To demonstrate the feasibility of the Philip Park site a concept site plan has been prepared and is presented in Figure 22. It has been designed based on similar principals applied to airport terminal design and layout. Whereby passengers enter the building on the ground floor at the front of the building and transition to first floor lounges. This allows baggage facilities to be located on the ground floor and screened from the view of the upper floor.

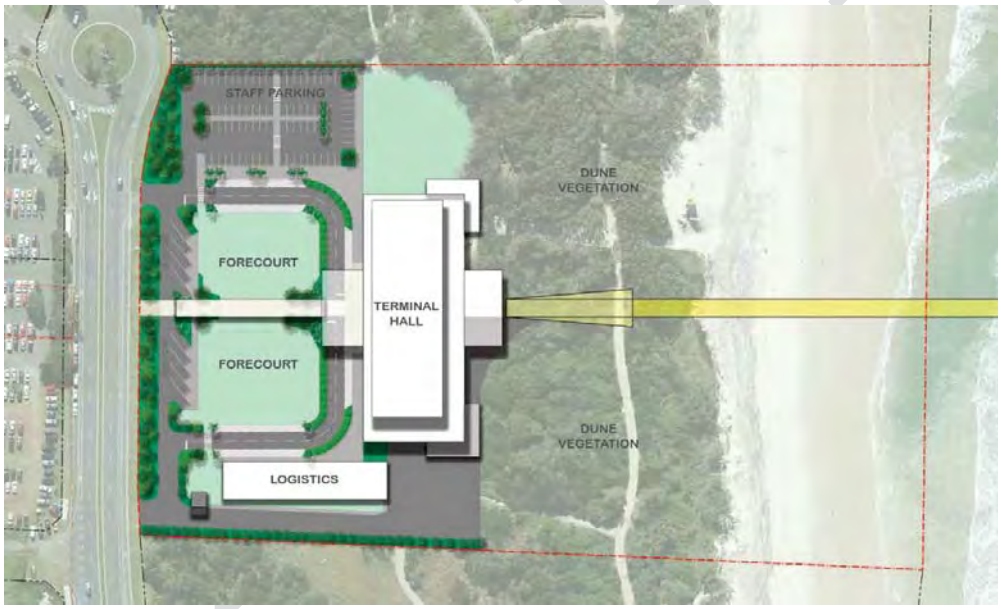

Figure 22: Terminal Building and Site Layout Concept Site Plan

The key components of the site layout include:

- Left in / left out access arrangement from Seaworld Drive with an internal one way ring road within the site
- Private vehicle and taxi drop off zone and porte-cochere
- Bus set down and waiting area
- Two storey terminal building with a GFA of 3,750m^2

- Logistics area including set down area, store building and staff car parking.

The overall summary of key use area of the building are provided in Table 10.

Table 10: Terminal building key use areas

Building Function	GFA (m2)
Entry Hall, Reception and Check In	1,000
Immigration & Customs	500
Passenger Waiting Lounge	550
Retail (café, shop or similar)	300
Baggage Handling Facility	1,000
Back of House (Offices, Meeting Rooms, Training Room, Logistics Building, WC and amenities	400
Total Gross Floor Area	**3,750m²**

4.7.3 Services

A desktop review of available services within the vicinity of the site has been carried out. This is to determine the likelihood of significant upgrades required to service the future development.

Based on the preliminary findings, services are generally available within Seaworld Drive and can be accessed from the site. The extent of works will involve new property connections to these services which may require work within Seaworld Drive. A general summary of services is provided as follows.

Roads and Access

Seaworld Drive is presently a dual carriageway and runs north-south from the Waterways Drive / MacArthur Parade roundabout in the south to the roundabout entrance to Seaworld Theme Park. There is a median separating the dual carriageway. After the Seaworld roundabout the constructed road reduces to a single-lane in each direction. The Philip Park access is approximately 50m south of the Seaworld roundabout on the eastern side of the road. The existing access driveway is approximately 4m wide. There is a bus stop on the northbound lane which indicates that the roundabout can accommodate bus turning movements.

It is expected the access will need to be upgraded to be suitable for bus and service vehicles expected to enter the cruise ship terminal site.

Fuel Supply

Fuel supply logistics will be an integral part of the CST operation. As a part of this Business Case study, interviews were conducted with three marine fuel suppliers including Caltex Australia, British Petroleum and Glencore. Based on these discussions two primary options for fuel supply to the CST were identified:

- Fuel operations by barge
- Local land-based infrastructure for fuel storage complete with pipeline to jetty and wharf.

For the purposes of this Business Case it has been assumed that fuel supply shall be by contracted barge and that the cruise operators would contract directly with fuel suppliers. The costs of fuel supply have been excluded from the cost estimates and the financial analysis. It is recommended that a detailed fuel study be conducted as a part of the ongoing project development to confirm costs, logistics, and to develop a plan for risk mitigation for fuelling activities.

Fuel Supply by Barge

Initial discussions with marine fuel suppliers indicated that fuel supply by barge to vessels in berth is possible. It is likely that fuel supplied by barge would be based out of Brisbane. This arrangement would require that vessels meet appropriate licensing requirements for the journey from the fuel storage base to the CST.

Fuel supply barges would need to either be contracted or purchased. A contracted option has the advantage of reduced risk of supply uncertainty and that fuel supply becomes an ongoing operational cost as opposed to increasing the capital cost of the project. If fuel supply vessels were to be purchased, there would be an additional capital cost, ongoing operations, maintenance and licensing costs in addition to mooring requirements for the vessel.

Land Based Fuel Supply

The second option for fuel supply to the CST is to access land-based fuel supply via a pipeline fixed to the jetty. This option is not preferred because tank farms with sufficient capacity for storage of the range of fuel types required for cruise ship vessel servicing do not currently exist within the local vicinity of the project. This would mean that these facilities would need to either be constructed or existing facilities modified (if available). For the purposes of the Business Case, this has been considered impractical due to:

- High capital cost of setting up a land-based fuel supply terminal
- Zoning restrictions in the adjacent area limiting construction of fuel tank infrastructure.

For example of the scale of storage required, one fuel supplier indicated that it is customary to import 30 million litres to fixed land-based storage facilities via a medium range vessel. In order to accommodate this volume, a tank of approximately 40 million litres would be required to allow a buffer for operational purposes.

It was noted that different cruise ships require different fuel types, which means that storage facilities for a range of product types would be required thus increasing storage requirements. In addition, one fuel supplier indicated that fuel specifications will be changing to lower sulphur fuels in 202o. Cruise ship operators will need to adapt to the changing requirements and have the option of adopting a number of different fuel options which could potentially further increase the need for supply of a diverse range of fuel products.

Stormwater

There is an existing stormwater line that collects road surface drainage in pits on the approach/exits to the Seaworld roundabout. This stormwater from the roundabout vicinity is collected in a manhole 30m south of the Seaworld roundabout on the eastern side of the road and exits via a 600mm diameter pipe, towards the Philip Park site to an unknown point. It is possible that this pipe discharges to a soak-away pit, due to the sandy nature of the site.

The footprint of the proposed cruise ship terminal appears to be a similar size to the bitumen car park and as such post-developed increases in stormwater runoff is not expected due to the impermeable area being similar.

Sewer

SeaWorld Drive has sewer services up to the spit car park. There is an existing 300mm diameter gravity sewerage main (AC pipe) available in the road frontage of the subject site. This sewerage main extends to pick up SeaWorld and SeaWorld Nara resort. There is a sewer rising main connecting into the gravity system manhole just north of the SeaWorld roundabout. There is also a toilet block in the Philip carpark area but it is unknown where the sewer connection point is to the adjacent sewerage main.

The 300mm diameter gravity sewerage main has two manholes along the frontage to the subject site which would allow for suitable sewer connection points.

Water

SeaWorld Drive has an existing 300mm diameter water main (AC pipe) in the northbound verge. A property service connection could be brought across the road to the subject site. Due to this being a large diameter water main preferred connection configuration is to be confirmed with the asset owner. As pressure is unknown, a pressure reducing valve or private booster pump may be required.

It is also noted that there is an existing 1200mm diameter effluent water main existing along SeaWorld Drive, on the eastern side of the road. The exact location past the subject site is unknown as it wasn't marked on the search plans, however there is a SV valve visible that is approximately 30m south of the Philip Park access road adjacent to the carpark kerb in the subject site. It is believed that the effluent water main pumps secondary treated water to the seaway to flow out with the out-going tide.

Electrical

There is existing underground electrical (LV < 33kV) available on both sides of SeaWorld Drive for street lighting and property connections. The main conduit grouping is on the western side of the road with a single conduit only on the eastern side of the road.

Gas

An existing gas main (OD 90mm RE) is available in the eastern verge of SeaWorld drive.

Communication

SeaWorld Drive has existing underground communication cables for both Optus and Telstra in the western verge that would be available for connection.

4.8 Reference Project Staging Options

Throughout the development of the feasibility study and the business case development, the project team has sought to develop a technically feasible staging option for the CST to improve the affordability and to increase the likelihood of it being developed. Based on the ocean-side design, two primary staging options were considered for the primary infrastructure components, the jetty and the breakwater. The staging options were:

- Constructing the jetty and wharf first, adding the breakwater later
- Constructing the breakwater and wharf first, adding the jetty later.

Both of these options would offer significant cost savings however neither is considered feasible due to technical and commercial reasons.

4.8.1 Staging option 1 – jetty and wharf, no breakwater

This was initially considered to be the most likely staging option as it would offer cruise ships a traditional wharf and jetty arrangement to moor at for transit visits. At each consultation with industry, cruise operators and ships captains expressed concern about the amount of movement that a ship would have while berthed at the facility without a breakwater and the impact that would have on passenger comfort and safety. Cruise industry representatives expressed that excessive ship movement while moored could prevent passengers from disembarking and boarding the ship or compromise passenger safety and that the ocean-side terminal cannot provide the required level of surety for cruise ships without a breakwater.

In parallel with this feasibility study the City has commissioned detailed wave modelling, and dynamic mooring assessment to test the operational performance of the facility with a breakwater in a range of wave and wind scenarios.

4.8.2 Staging option 2 – breakwater and wharf, no jetty

It is possible to stage the project by initially constructing the breakwater and wharf without a jetty. This may appear to provide a capital cost saving, however there are a number of drawbacks for such an approach.

Without a jetty structure, it is not feasible to supply vessels with services and provisions. Therefore it would not be feasible to use the cruise ship terminal to be used as a base (or home) port without a jetty. This staged option has been discounted as a feasible visiting port after giving consideration to the following:

Transferring passengers to and from shore

The transfer of passengers between the shore and vessel would need to be done using a ferry and/or the life boats of the cruise ship. This would require the construction of an on-shore terminal with sufficiently deep water access for the ferry vessels to berth. The cost of the construction of this would partly offset the savings from not constructing the jetty. While the cruise ship berthing operation and the transfer of passengers to and from ferry/life boats would be in the shelter of the breakwater from ocean swell, the smaller boats may be impacted by locally generated wind waves making for difficult or unsafe transfer of passengers at times. Furthermore the smaller vessels would have to travel out of the zone protected from the breakwater while travelling between the on-shore terminal and cruise ship. Significant downtime would be experienced due to the wave climate. The extent of downtime can be expected to make this form of the Gold Coast CST unsuitable for cruise ship operators.

Cost of future jetty construction

Constructing the jetty in the future comes with significant additional costs associated with mobilisation and demobilisation of personnel, plant and equipment as well as site establishment costs for a second time.

There would also be an issue with construction of approximately 150m of the jetty adjacent to the mooring and berthing dolphins because of the interaction between cruise ships and construction plant. This will be for a period which is likely to be months in duration. The interaction between cruise ships and construction plant is to be avoided from a safety perspective. Either construction would need to be delayed when ships are at berth, or cruise ship terminal use would need to be suspended while these works are being undertaken. There would be a cost associated with either of these measures.

Cost of mooring cruise ships

In the fully developed cruise ship terminal case with a jetty, accessing mooring dolphins is done using a system of walkway gantries linked to the jetty and wharf structures. If there is no jetty, access to the mooring dolphins will require the use of a lines-boat. This would

increase the cost and would require additional operating procedures to protect the safety of the landside staff.

4.9 Long Term Recycled Water Return Pipes

A potential additional scope item is to incorporate LTRWRP to provide new capacity for recycled water release pipelines. The incorporation of the LTRWRP into the Reference Design would represent synergies between the two projects and the potential for a net cost reduction of implementing the two projects separately. Project details for the LTRWRP project have been sourced from the report 'Long Term Recycled Water Release Plan, Proposed Oceanside Cruise Ship Terminal Based Alternative, Options Assessment Report, 10 March 2017' prepared for the City by Arcadis Design and Consultancy.

It has been assumed that for these synergies to be realised that the Reference Project design would need to be updated to allow for LTRWRP requirements and that construction of the necessary infrastructure to support LTRWRP requirements would occur concurrently with the CST project rather than as a retrofit post-construction.

To provide the best vantage point for tourists, the southern side (overlooking Surfer's Paradise) should have minimal visual obstructions. As such, the LTRWRP should either be located on the northern side or positioned under a walkway on the southern side.

To allow for LTRWRP requirements the following additions and modifications will be required to the Reference Project:

- An elevated standpipe at Phillip Park. This standpipe is anticipated to have a height of approximately 14m above ground level and a diameter of approximately 4m
- Allowance for three 1200mm outer diameter pipes from Phillip Park to the end of the jetty/wharf and connected to an outfall location approximately 3km offshore
- Extension of jetty headstocks to allow space for pipe supports. It is anticipated that this extension would include one additional pile per and a headstock extension of approximately 4.5m per jetty bent
- LTRWRP pipes to transition from top of jetty to seabed level at the intersection of the jetty and wharf transitioning to a single 2400mm outer diameter manifold at this location
- De-aeration structures to be located on the seabed immediately downstream of the vertical drop. These structures would be secured to the seabed floor with a combination of concrete weight blocks and piles
- Six 1200mm outer diameter pipelines along ocean floor to ocean diffusers. Pipe routing to be across a swing basin, around the terminus of the breakwater and continued to the final release location, nominally 3km offshore. A pipe route underneath the breakwater would pose additional construction challenges due to staging and interface risks
- Pipes to be buried well below the seabed in a trench due to the mobile environment of the seabed and the potential for pipes to become exposed during a storm event.

The potential project synergies associated with combining the LTRWRP and the CST are provided in Sections 5.8.

4.10 Potential Additional Scope Items

This section describes potential additional items that could be incorporated into the Reference Project. These items are not currently included in the Reference Project Design and would represent scope additions to the project.

4.10.1 Diving platform

A platform may be incorporated into the structure along the jetty at approximately 750m from shore and located close to Scottish Prince Wreck. The platform would include a concrete deck piled structure and stairs down to water level to allow divers to enter the water. For safety and maritime security reasons, access to this would only be available when there was no cruise ship on the wharf. It is anticipated that if this option is required, that the diving platform would be built concurrently with the wharf and jetty.

4.10.2 Viewing platform

A viewing platform could be incorporated at approximately 300m along the jetty from shore and would include a concrete deck piled structure. It is anticipated that if this option is required, that the viewing platform would be built concurrently with the wharf and jetty.

4.10.3 Pedestrian walkway

An additional pedestrian walkway would allow pedestrian and cyclist access from shore to the optional diving and viewing platforms. The pedestrian walkway would be an independent piled structure, built alongside the first 300m of the jetty (from shore) out to the viewing platform.

The size of the pedestrian walkway would be a 300m long x 4.5m wide concrete deck piled structure which would be built at the same time as the wharf and jetty.

5 Cost Estimates

5.1 Introduction

Preliminary cost estimates and lifecycle costs have been prepared for the Reference Project. These are based on the following:

- All prices exclude GST
- Costs are indicative and based on benchmark data from similar projects
- Costs include design, planning and approval fees, contract administration, construction costs, contingencies, contractor margins and overheads
- Costs are presented in quarter 2 2017 terms. Escalation has been included in the financial analysis
- All extra over options are assumed to be constructed at the same time as the base option. No allowance has been made for staging or delayed construction costs
- Pricing of caissons is based on construction at the Cairncross Dry Dock in Brisbane, if this facility is not available an alternative pre-casting site would need to be identified. This may include casting the caissons overseas and transporting them to site by a heavy lift / semi-submersible ship.

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5.2 Reference Project

The preparation of the cost estimate for the Reference Project has taken into account a number of cost benchmarks and has been market tested to confirm pricing assumptions. Allocation of contingency has been made on an infrastructure line item basis rather than an application of a whole of project contingency percentage. The cost estimate has been made based on the following process and assumptions:

- The project has been benchmarked on international projects of a similar size and scale. This has been actual project construction costs, rather than preliminary estimates
- Adjustments have been made for project benchmarking to take into account varying labour costs, location specific marine environment and general cost of materials
- Allowances have been made for wet weather, down time and shut down periods due to unfavourable wave conditions
- Preliminary cost estimates have been market tested with contractors experienced in similar project in Australia
- Specific infrastructure items have also been bench marked based on comparable marine projects based in Australia.

Cost Estimates

Table 11: Cost Estimate

Description	Cost Estimate ($ millions 2017 terms)
Project Development Costs[a]	[redacted]
Planning, Approvals and Design[b]	[redacted]
Contract Administration	[redacted]
Construction Preliminaries	[redacted]
Landside Civil and Building Works (3637m^2 building GFA)	[redacted]
Jetty (900m with 7m wide deck)	[redacted]
Wharf (160m x 22m with 1000m^2 access structure and gangways)	[redacted]
Dolphins (6 x berthing, 2 x mooring dolphins and 300m gantries)	[redacted]
Caisson Breakwater (780m)	[redacted]
Total (excluding GST)	**463.4**

[a] Costs include procurement and transaction costs incurred in 2017/2018 in the pre-construction phase.
[redacted]
[b] Planning, approvals and design costs have been adjusted from the project cost estimate due to timing of expenditure in pre-construction phase. The balance of the costs are included in the pre-construction phase.

5.3 Operational and lifecycle costs

An assessment of the operational and whole of lifecycle costs has also been carried out based on a 30 year period. It has only been undertaken for the operation and maintenance of the terminal and excludes cruise ship operational costs. This information is summarised in Table 12.

Table 12: Summary of whole of life and operational costs ($ real million)

	Major Refurbishment Cost	Ongoing Costs	Total Cost over 30 Years	Mean Cost p.a. over 30 years
Maintenance	[redacted]	[redacted]	[redacted]	[redacted]
Operations	[redacted]	[redacted]	[redacted]	[redacted]

Costs for ongoing management of salient deposits is not included in the Business Case.

5.4 Staff and administrative costs

The peak operation of the site, and therefore highest demand for operational staff will be during ship days and in particular home port visits by cruise ships. This will place the highest operational and logistic demand upon the cruise ship terminal in terms of disembarking passengers, ship turn over (cleaning and re-supply) and then embarkation by new passengers.

Cost Estimates

An estimate of peak operational staff has been made for the purposes of home port ship days. This has in turn been used to develop Full Time Equivalent (FTE) employee numbers for the purposes of adopting direct employee costs to the operation of the cruise ship terminal. This is on the basis that there is a reduced staffing on non-ship days. Should some services be outsourced on a contract basis further refinement of operation costs will be required.

There are a number of operational and logistics requirements that will have assumed to be borne by the cruise ship operator. Typically such services are procured by a ships agent who are instructed to take responsibility for berthing and port related services, cleaning the ship, re-fuelling, submission of appropriate documentation and passport control for crew and staff. The approach in the preparation of operational costs is to assume that logistic support for such functions occur within terminal. For example provisions would be delivered to the terminal as arranged by the cruise ship and would then be transported to the wharf and ship by terminal staff.

Table 13: Ship day operational staff estimate

Function	Summary	Assumed FTEs	Adopted Direct Employee Cost ($ real million p.a.)
CST Management & Administration	Executive Management General Manager Facilities Manager EA / Administration	8	1.2
Terminal & Ground Staff	Meet and Greet / Traffic Control Baggage Crew Check in staff (15 desks) 25 staff during ship day	12.5	0.9
Passport & Border Control	Team leader / Coordinator 4 Passport Desks 4 security screening points with 3 staff each 18 staff during ship day	9	0.7
Ground Crew and Logistics Staff	24hr site security Logistics Staff Team Leaders x 2 FTEs Admin Staff x 1 FTEs Passenger Transportation x 3 staff Container Operators x 4 staff Forklift Operator x 4 staff Wharf Staff (linesmen, facilities operators) x 6 staff 20 staff during ship day	11.5	1.1
		Total FTE Staff 41	**3.9 million**

5.5 Logistics equipment and machinery

To support the logistics functions of the terminal and to transport goods from the land side terminal to the wharf will require permanent logistics equipment on site. For the purposes of the operational cost estimate it is assumed to be the following, replaced every five years throughout the 30-year operational period:

Table 14: Logistic Equipment

Summary	Quantity	Initial cost ($ real million)	Total Replacement cost over 30 years ($ real million)
Forklift trucks	4	0.2	1.2
Tractor engine units with container trailers	4	1.0	6.0
Laden container handlers	2	0.6	3.6
Passenger vehicles	3	0.9	5.4
Total	**13**	**2.5**	**15.0**

5.6 Potential additional scope items

The Reference Project chapter identifies a number of potential additional scope items that may be included to improve synergy with other potential projects and provide for increased functionality and public amenity. These items are currently excluded from the scope of the Reference Project. All extra over options are assumed to be constructed at the same time as the Reference Project and no allowance has been made for staging.

5.6.1 Other additional scope items

The cost of additional scope items identified in the Reference Project chapter are shown in Table 15.

Table 15: Cost Estimate for Optional Items

Description of Extra Over Item	Additional Cost of Item ($ real million)
Diving Platform	[redacted]
Viewing Platform	[redacted]
Pedestrian Walkway (300m long, 4.5m wide)	[redacted]
Pedestrian Walkway and Viewing Platform	[redacted]
Pedestrian Walkway, Viewing Platform and Diving Platform	[redacted]

5.7 Potential future expansion

5.7.1 Option 1 - Construction of Second Berth Concurrent with CST Project Construction

The Reference Project arrangement allows for potential future expansion for a second berth to the north side of the wharf. This expansion would require additional marine infrastructure including:

- Wharf upgrades
- Additional berthing and mooring dolphins
- Additional walkways for dolphin access.

[redacted]

There is the potential that inclusion of a second berth would increase the breakwater length requirement in order to provide berth utilisation consistent with berth 1. For the purposes of this estimate it has been assumed that an additional 80m of breakwater length would be required and that this breakwater would be constructed concurrent with the CST project.

[redacted]

5.7.2 Option 2 – Construction of Second Berth at a Future Date

If the second berth is constructed as a retrofit to the CST terminal additional costs would be incurred due to, but not necessarily limited to the following:

- Price escalation
- Contingency
- Additional contractor equipment mobilisation
- Project costs and owner costs including project management, contracting and administration
- Environmental approval processes
- Costs associated with construction on an operational site
- Retrofit to an existing structure and site condition assessments.

5.8 Long term recycled water return pipes

Project details and costs for the LTRWRP project have been sourced from the report '*Long Term Recycled Water Release Plan, Proposed Oceanside Cruise Ship Terminal Based Alternative, Options Assessment Report*, 10 March 2017' prepared for the City by Arcadis Design and Consultancy. For the purposes of this cost comparison to assess options and potential for cost saving through combining these two projects:

- Cost values are assumed to be in 2017 real dollar terms
- Only capital cost values have been compared.

Table 16 provides a summary of high level estimated costs for:

- Option A - Construction of the CST and LTRWRP projects as separate projects in separate locations (Arcadis report option A)
- Option B1 - Full integration of the CST and LTRWRP projects with a single release point off Philip Park without project staging of the LTRWRP project (Arcadis report option B, but with full construction of LTRWRP coincident with construction of CST)
- Option B2 - Full integration of the CST and LTRWRP projects with a single release point off Philip Park with project staging of the LTRWRP project (Arcadis report option B)
- Option C - Full integration of the CST and LTRWRP projects with a single release point off Philip Park and South Stradbroke Island (Arcadis report option C).

The PV of these options is presented in Section 9.8.2.

It has been assumed that the dollar values provided for the LTRWRP project do not include costs associated with offshore trenching and pipe burial. An allowance has been made for this item in the cost comparison. An allowance has also been made for an additional 260m of pipe to allow for an offshore routing around the breakwater. This may be refined in future analysis to reduce the length of pipelines by constructing the release pipes under the breakwater.

This high level cost comparison indicates that:

- The capital cost difference between completion of the CST and LTRWRP projects as separate projects and as integrated projects is similar. Given the phase of the project development there is potential for cost synergies through integration of the CST and LTRWRP projects. Additional refinement of cost values, project inclusions and potential for value engineering would be required in the next phase of the CST project to provide a more detailed cost comparison.
- Construction of the CST and LTRWRP projects at the same time would produce greater cost saving than a staged approach for the LTRWRP project.

Cost Estimates

Table 16: Cost Estimate for separate and integrated Reference Project and LTRWRP Projects

Project Description	Capital Cost (Real $millions)
Option A	
Cruise Ship Terminal Reference Project	[redacted]
LTRWRP project located elsewhere (Arcadis report option A)	[redacted]
Option A Total	[redacted]
Option B1	
LTRWRP project integrated with jetty	[redacted]
Cruise Ship Terminal Reference Project with allowance for additional jetty headstock width and additional piling	[redacted]
Allowance for offshore pipe burial during CST construction and additional pipe length to go around breakwater	[redacted]
Option B1 Total	[redacted]
Option B2	
LTRWRP project integrated with jetty	[redacted]
Cruise Ship Terminal Reference Project with allowance for additional jetty headstock width and additional piling	[redacted]
Allowance for offshore pipe burial during CST construction and additional pipe length to go around breakwater	[redacted]
Allowance for offshore pipe burial and additional pipe length in 2036	[redacted]
Allowance for offshore pipe burial and additional pipe length in 2050	[redacted]
Option B2 Total	[redacted]
Option C	
LTRWRP project integrated with jetty (Arcadis report option C)	[redacted]
Cruise Ship Terminal Reference Project with allowance for additional jetty headstock width and additional piling	[redacted]
Allowance for offshore pipe burial and additional pipe length during CST construction	[redacted]
Option C Total	[redacted]
Difference – A - B1	[redacted]
Difference – A - B2	[redacted]
Difference – A - C	[redacted]

6 Risk Analysis

6.1 Introduction

This section of the Business Case provides an overview of the risk management approach that has been applied during the development of the feasibility study for the GC CST and documents the key risks for successful development and delivery of the project.

6.2 Risk Management Process

Risk management has been embedded in every aspect of the development of the project solution, the feasibility study and the Business Case through formal and informal processes. The formal approach to risk management has included establishing a risk management process that complies with ISO31000:2009 and has included risk identification workshops and regular review of project risks. Less formally, risk management recognises that successful project management relies on all team members continually and actively managing risks as they arise and by seeking to reduce the inherent risks in project solutions by undertaking additional analysis and applying professional judgement.

6.3 The Context for Risk Management

Risk has been defined as “the effect of uncertainty on objectives”, in accordance with ISO31000:2009 and therefore the project objectives identified in the SASR stage were fundamental to ongoing risk management. The project also used the service requirements and benefits identified in the SASR in conjunction with the project objectives as the basis for identifying risks, establishing a risk severity rating and developing mitigation strategies.

An example of the risk management approach applied to the GC CST feasibility study was the analysis of the potential to improve the project affordability by developing a staged infrastructure solution by constructing the jetty and wharf without the caisson breakwater. The project team was uncertain that the facility could operate without a breakwater and therefore sought additional analysis and testing of the solution including wave modelling, dynamic mooring assessment, and input from experienced mariners to remove the uncertainty. Through the testing it was established that the breakwater is required for ships to use the facility safely and the design of the breakwater was refined with the additional information.

6.4 The Complete Risk Environment

There three primary categories of risk that were managed through the initial phases of project development including:

- Strategic risks
- Process risks
- Project risks.

6.4.1 Strategic Risks

Strategic risks are those risks that affect the City at a Council or corporate level and require that action is taken by the Executive Leadership Team or the Mayor and Council.

6.4.2 Process Risks

Process risks are risks that affect the process of developing the project through the current and future phases. This set of risks has a level of overlap with strategic risks and are normally recorded and managed in a common risk register to improve transparency for the leadership teams within the project and the City leadership. Process risks do not necessarily have a direct impact on the cost to deliver the infrastructure project, however they may have significant time, reputation and management cost impacts.

The primary purpose of identifying process risks is to develop specific treatment strategies to reduce the likelihood or consequence of the risks occurring. Process risks are temporal and change throughout the development of projects and are therefore continually reviewed and actioned.

6.4.3 Project Risks

Project risks are risks that affect the outcomes of the project and have a range of potential impacts to time, cost, quality, health and safety, reputation and environmental outcomes. The understanding of the project will change as the project proceeds and the assessment of project risks needs to be regularly reviewed and updated to reflect the current status of the project.

[redacted]

6.5 Key Risks

PwC and AECOM facilitated a risk identification workshop on 10 November 2016 with a range of stakeholders including representatives from the City (various directorates), Gold Coast Waterways Authority, Gold Coast based business community representatives, PwC, AECOM, and technical specialists including an experienced construction manager and a former cruise ship captain and maritime pilot. The workshop focused on identifying the key risks that would impact on achieving the project objectives, identifying appropriate mitigation strategies, and assessing the risk severity rating. Risks were identified against the primary categories of strategic, process and project risks and a summary of the key risks is provided below. [redacted]

[redacted]

Risk Analysis

[redacted]

Risk Analysis

[redacted]

7 Market Considerations / Demand Assessment

The purpose of this Chapter is to outline the findings of the demand assessment carried out to inform the financial and economic assessment. The demand assessment outlined in this this chapter has been compiled based on publically available information and through engagement with the industry. PwC has prepared a market sounding report based on this information and this document is included in Appendix F. In preparing the demand assessment, PwC has had to make certain estimates and assumptions. There will inevitably be differences between these estimates and actual values, which may be material.

7.1 Current Market Conditions

The success of the Gold Coast CST will primarily be determined by cruise ship operators including the Gold Coast in its itineraries and using it as a home port for its vessels.

7.1.1 Australian Market

Cruise shipping is one of the fastest-growing tourism sectors in the world and Australia is the second fastest-growing market (behind China) within the industry[34].

There has been a 600 per cent increase in the total passenger numbers for Australian cruises from 2004 to 2015[35] (from 158,000 to 1,000,000 annually or 30.1 per cent year on year growth). Annual passenger numbers are forecast to reach 2 million by 2020. According to Australian Cruise Association's 2015-16 Economic Impact Assessment of the Cruise Industry in Australia (ACA EIA), 1,015 vessels visited Australia across 39 different Australian ports (including coastal islands).

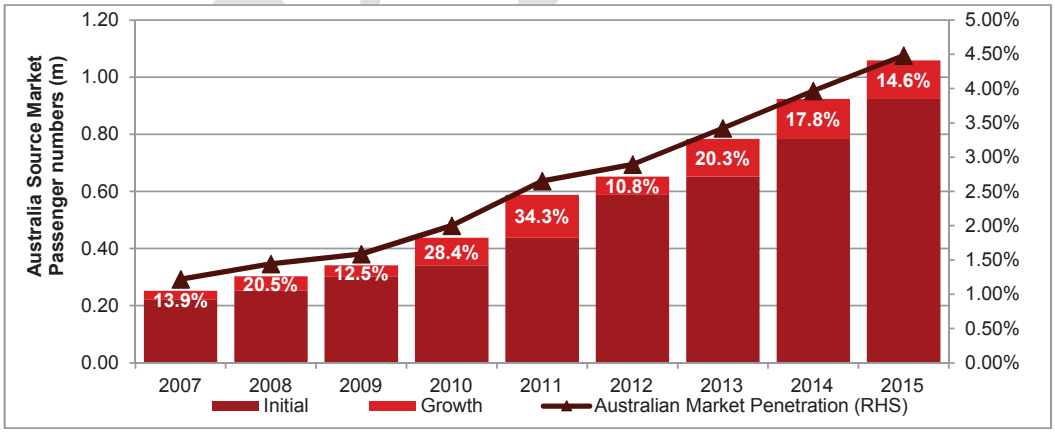

Figure 23: Cruise ship visits to Australian Ports 2013 - 2016

[34] Source: Cruise Line International Association Australasia, Cruise Industry Source Market Report, Ocean Cruise Passengers Australia 2015.

[35] Cruise Lines International Association. Retrieved from: http://www.cruising.org/docs/default-source/research/2016_clia_sotci.pdf?sfvrsn=4)

Market Considerations / Demand Assessment

Strong growth has been achieved in all major ports in Australia as demonstrated in Figure 24.

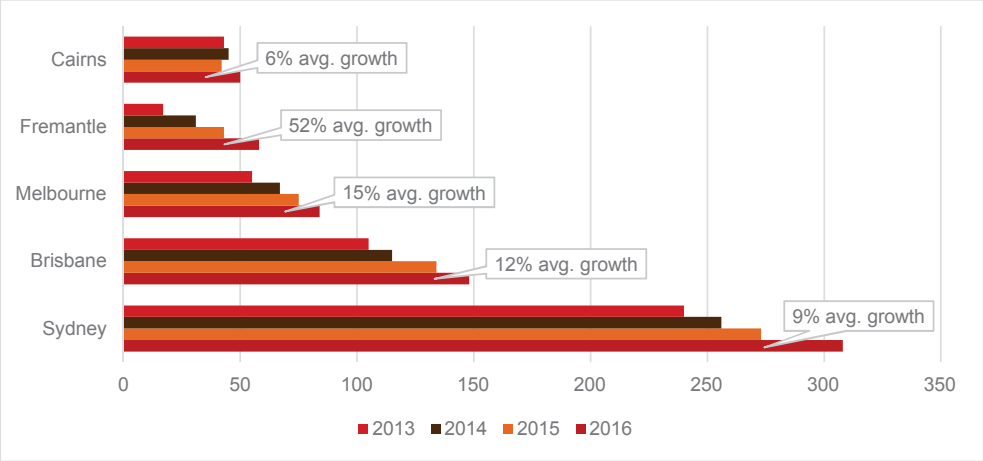

Figure 24: Cruise ship visits to Australian Ports 2013 – 2016

Based on discussions with CLIA, cruise lines are likely to base their vessels in cruise ship destinations where passengers are most concentrated. In 2016, 1.06 million passengers boarded cruises departing Australian ports, 422,000 of which originated from New South Wales and 283,000 originated from Queensland. Figure 25 shows the importance of Sydney to the industry as the primary preferred destination for operators.

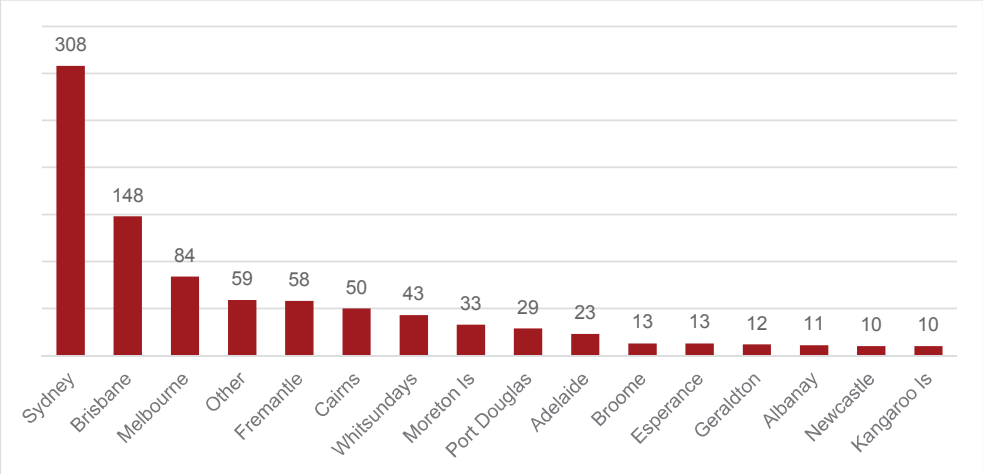

Figure 25: Cruise ship visits to Australian Ports in 2016 (transit and base)

A desktop research exercise revealed that of these 40 ports, 6 did not accommodate vessels larger than a 1,000 passenger capacity. Such ports and associated visits have been excluded from the assumed total cruise market, bringing the assumed Australian cruise destination market to 33 ports, accommodating 1,004 ship visits in 2016.

7.1.2 South East Queensland Market

Brisbane Cruise Ship Terminal is the currently the only major cruise facility that is servicing the people of South East Queensland.

In 2014-15, the Brisbane Cruise Ship Terminal benefitted from 134 cruise ship visits that generated 451,237 passenger days and 83,065 crew days within the city. In terms of expenditure, the benefit is estimated at $170.9 million from passengers and $20.6 million from crew[36]. If the Gold Coast CST attracted only one third of the cruise ships compared to Brisbane and supported 150,000 passenger days within the city, there would be an expenditure benefit of approximately $56.8 million attributed to passengers with an additional $7.5 million attributed to crew.

On a passenger basis, Queensland represents 26 per cent of the total cruise ship market. In 2015-16 Queensland welcomed 326 ship visits[37], representing 32 per cent of the 1,004 total ship visits.

7.2 Market Projections

After recording growth of 15.9 per cent in 2016, cruise ship visits to major Australian ports are expected to increase by approximately 24 per cent, contributing to an estimated 1,260 ship visits in 2017. This is higher than the growth trend over the last decade, with preliminary estimates for 2018 indicating a further 10 per cent growth in cruise ships visiting Australia[38].

Forecasting patronage of cruise ships domestically is inherently uncertain:

- There are no explicit forecasts generated by any of the industry bodies for future cruise passengers, and
- Cruise ship operators rarely organise itineraries with a look ahead that extends beyond two to three years.

Based on our engagement with industry we are expecting that the recent strong growth and increased market penetration rates (measured as number of passengers divided by a population of people) are expected to continue in the near term. The market expects that growth will be effectively capped at a 'steady state' market penetration rate. Australia already has the largest market penetration rate of any country in the world with regard to cruising, however the market engagement suggests that the current market penetration levels are expected to grow further.

Future growth prospects in the global industry and Australia are supported by the number of new ocean vessels on order in 2017 and the outlook for future orders. As determined during market sounding activities, by 2020, Royal Caribbean will have introduced a new, larger fleet of 'Quantum Class' cruise ships with increased passenger capacity. New and even larger P&O Australia ship orders are also forecasted from 2020 at 4,200 passenger capacity[39]. Other cruise ships accommodating approximately 2,000 passengers are expected to be de-commissioned in about five years' time.

[36] Cruise Down Under EIA Report 2014-15, AEC Group

[37] This number excludes Townsville as it did not accommodate larger than 1,000 passenger vessels in the relevant year.

[38] Tourism Australia, Economic Impact Assessment of the Cruise Industry in Australia, 2015-16.

[39] Ibid.

Table 17: New ocean vessel orders 2017 - 2026

Year	Ocean vessels	River vessels	Ships ordered	New capacity
2017	13	13	26	30,006
2018	15	2	17	29,448
2019	20	2	22	51,824
2020 – 2026	32	0	32	119,510
Total	**80**	**17**	**97**	**230,788**

Future growth in the Australian cruise market is expected to be heavily linked to the further development of marine infrastructure. Whilst recent moves in the industry suggest a shift to bigger ships (based on passenger capacity) there is still a shortage of suitable facilities available on the east coast to accommodate the expected expansion in the industry.

Market engagement suggest the focus remains on Sydney and securing additional infrastructure there is a priority, as this remains the overwhelming preference for operators. With limited scope for expansion of the Sydney facilities, an inability to provide the requisite infrastructure in Sydney may necessitate a move of cruise ships to Queensland.

The expansion of the Brisbane Terminal, which is currently being contemplated by Port of Brisbane owners and the Queensland State Government would assist in supporting the forecast demand, however it is not expected to significantly inhibit the Gold Coast CST. Likewise it is not expected that the Gold Coast CST would be inducing demand from Brisbane. Industry engagement has expressed a view that future market growth can accommodate both facilities. Preliminary estimates from Port of Brisbane indicate the new terminal will support 1,100 vessel calls within the first 5 years of operations, which leaves significant latent demand in the industry to satisfy.

Further growth from Asian markets remain an area of significant growth potential for the cruise industry. Market engagement to date suggests that the immediate preference of the Asian cruising market is for shorter domestic trips, however this may change into the future as the Asian market becomes accustomed with cruising and looks to expand beyond the domestic and proximal destinations.

7.3 *Estimated cruise ship visits for the Gold Coast CST*

The Demand Assessment for the Gold Coast CST has been undertaken based on the following process:

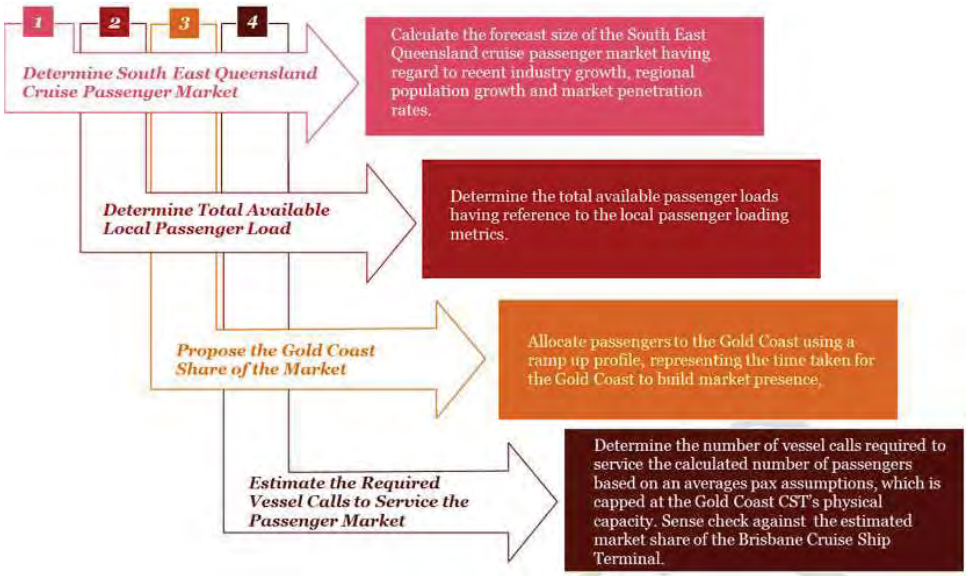

Figure 26: Demand estimate process

The key inputs required to undertake the process set out in Figure 26 are set out in the Table 18.

Table 18: Demand Input Assumptions

Assumption	Value	Justification / Source
2015 Australian cruise passengers	2016: 1.06m	Cruise Industry Source Market Report 2015, CLIA.
SEQ Population Growth	• 2011: 3.36m • 2016: 3.65m • 2021: 3.97m • 2026: 4.36m • 2031: 4.77m • 2036: 5.20m	Growth rate linearly interpolated based on data points provided by Queensland Government Population Projections LGA Snapshot.
Current SEQ base Passengers	2015: 213,198	Maritime Safety Queensland cruise schedule.
Current Market Penetration Rate	5.9%	Cruise Industry Source Market Report 2015, CLIA.
Market Penetration Cap	8% to 10%	
Passenger Growth Rate	8%-14%	Passenger growth rate range of 8% to 14% per cent has been assumed due to the high demand for additional marine infrastructure and cruise ship facilities. The highest growth rate of 14.2 per cent is the observed, which refers to the actual year on year growth of cruise ship visits to Australian ports from 2011 to 2016.
Local Passenger Loading	60%	Industry rule of thumb based on market feedback.
Weighted average pax	2,200	Informed by market sounding and desktop research of cruise ship deck plans. Maritime Safety Queensland cruise schedule.

Assumption	Value	Justification / Source
Allocation of SEQ market to the Gold Coast for	Scenario 1 and 2 • Yr 1: 20% • Yr 2: 35% • Yr 3: 50% • Yr 4: 50% • Yr 5+: 50% The Observed Scenario considers 50% market allocation at Yr 1.	Based on a gradual development of market presence, given Brisbane's incumbency advantage. In the long term it is expected the Gold Coast will service 50% of the SEQ market. The Observed Scenario aims to test the 50% cruise ship market allocation at Yr 1.
Facility Capacity	212 ship calls per annum	The Gold Coast CST is assumed to reach maximum capacity at 212 ships per year, based on minimum turnaround time of 1 day per ship, a single cruise ship berth, a seasonal capacity of 1 ship per day (summer) and observed seasonality in Sydney.
Transit Ships for Base Port Scenarios	12 in the first year of operations with 5% growth year on year.	A conservative approach in assuming the number of transit ship visits. This is based on the current trends observed in Brisbane Cruise Ship Terminal cruise ship visits. The number of different cruise ships transiting through Brisbane are found to be relatively infrequent and few in number, at approximately one transit ship visit per month[40].
Seasonality (% of annual calls)	• Summer (Jan to Mar) – 40 per cent • Autumn (Apr to Jun) – 15 per cent • Winter (Jul – Sep) – 10 per cent • Spring (Oct – Dec) – 35 per cent	Benchmarked against the seasonal cruise ship visits observed in Sydney for the 2017 shipping schedule.
Transit Port only Scenario	20 in the first year of operations with 8% growth year on year.	

Based on the assumptions outlined Table 18 as well as the discussions with the cruise industry we have estimated four demand scenarios which form the basis of our financial and economic assessment.

- **Transit Scenario** – growth rate 8%
- **Scenario 1** – growth rate 8%, market penetration rate of 8%
- **Scenario 2** – growth rate 10%, market penetration rate of 9%
- **Observed** – growth rate 14.2%, market penetration rate of 10%

Table 19 outlines the number of cruise visits at 5 year increments for each of the above scenarios.

[40] Ship movement records retrieved from Maritime Safety Queensland at https://qships.tmr.qld.gov.au/webx/

Table 19: Demand Assumptions

Year	Transit Scenario	Scenario 1	Scenario 2	Observed
2022	20	59	65	158
2027	29	144	160	176
2032	42	160	178	195
2037	62	178	197	212
2042	93	199	212	212
2047	138	212	212	212
2052	201	212	212	212

The demand scenarios are presented graphically in Figure 27.

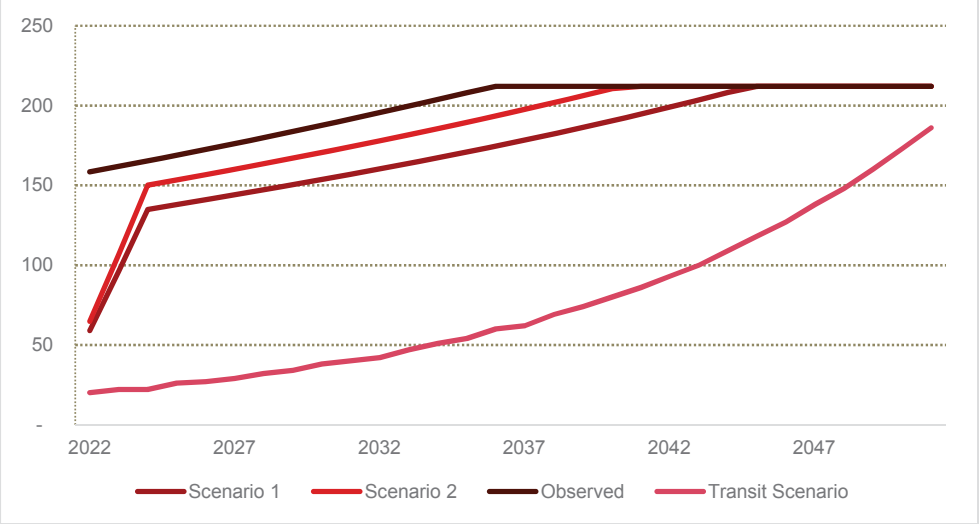

Figure 27: Vessel Calls

Figure 27 above shows the number of forecast vessel calls over the 30 year assessment period for each of the four scenarios.

Under all three scenarios (exc. Transit) by the commencement of operations in January 2022 it is assumed that the steady state market penetration rate has been reached. The Observed scenario starts with a 50 per cent market share immediately whereas Scenario 1 and 2 ramp up over the first 5 years. Beyond this point vessel calls are expected to grow roughly in line with general population growth for SEQ before reaching the facility capacity cap.

The transit scenario assumes a constant growth rate from a base of 20 vessels per annum.

8 Economic Analysis

8.1 Benefit Cost Analysis

This chapter presents an assessment of the benefit cost ratio (BCR) of the proposed Gold Coast CST. This assessment is designed to provide an overview of the potential scale of the costs and benefits associated with the preferred technical solution.

The BCR assessment is informed by the various construction and ongoing costs associated with the CST, and various associated benefits. Due to the nature of the proposed CST, providing capacity as both a base port and transit port for visiting cruise ships, these benefits include:

- Increased visitor days and associated expenditure attributed to the cruise ship terminal and estimated demand
- Resupply expenditure at shore of cruise ship companies (for base porting).

8.1.1 Methodology

The methodology used for the BCR assessment has been informed by the guidelines presented in the Project Assessment Framework – Cost-benefit analysis published by Queensland Treasury in July 2015. As per these guidelines, this assessment has provided a comparison of the total estimated direct project costs and direct project benefits.

8.1.2 Base Case

To undertake the detailed economic analysis, we need to define the 'Base Case' or 'do nothing' case against which the Project Case will be assessed. For the purposes of this Business Case, the Base Case assumes that:

- There is no CST on the Gold Coast
- There is no other commercial use of the Philip Park site
- The proposed Brisbane CST progresses.

8.1.3 Project Case

The Project Case is defined as the scenario in which the project occurs. For this analysis, the project case assumes that the preferred technical solution is developed.

The BCR analysis has been completed for the preferred technical solution as defined earlier in this report. This is an adaptation of Option 3A which will deliver a protected wharf facility connected to shore by a jetty structure. Importantly, this development option supports the opportunity for base porting on the Gold Coast, which is assumed to support an enhanced range of operational opportunities and benefits including:

- Refueling and resupply opportunities – As the CST will provide a base port capacity, it is assumed that cruise ships will have the opportunity to refuel, resupply and access other necessary services while at port
- Induced tourist visitation – The CST will act as the origin/destination for a number of cruises and there will therefore be an increase in local tourist visitor nights and expenditure as a result of people departing and/or arriving through the Gold Coast

The cost and benefits have been assessed based on scenario one, scenario two and observed estimated demand scenarios. These demand scenarios and other assumptions that have informed the BCR are outlined below.

8.1.4 Assumptions

Table 20 provides a summary of the key general assumptions underpinning the economic analysis.

Table 20: General assumptions

Assumption	Input
Inflation	2.5%
Discount rate	7% real
Construction start date	Jan 2019
Construction duration	3 years
Operations start date	Jan 2022
Visitor spend (per day)	$246 per passenger $110 per crew member *Source: Economic Impact Assessment of Cruise Shipping Industry in Australia 2015-16*
Port charges	Average charge per ship - $143,739 (calculated from an upper limit of $159,459 and lower limit of $128,018)
Resupply expenditure (include foods and beverages)	Base port ships - $582,354 Transit ships - NA *See section 9.22 for further details*
Induced visitation	Percentage of passengers to have extended stay on the Gold Coast before and/or after cruise – 30% Average length of stay – 3 nights per person Average expenditure (per person per night) - $212 *Source: Tourism Queensland and MacroPlan Dimasi*
Disembarkation rates	Passengers at a base port – 100% Crew at a base port – 39% Passengers at a transit port – 75% Crew at a transit port – 25% *Source: Economic Impact Assessment of Cruise Shipping Industry in Australia 2015-16*

Source: MacroPlan Dimasi unless otherwise stated

Demand forecasts

As detailed in Chapter 7 three demand scenarios have been assessed, representing low, medium and high demand scenarios. These demand scenarios have been informed by market sounding with a number of cruise ship operators including Carnivale and Royal Caribbean.

The CST will have the capacity to support a range of cruise ship sizes based on gross registered tonnage and passenger capacities. The cruise ship specification assumptions used in this financial analysis are detailed in Table 21.

Table 21: Cruise ship specification assumptions applied

Ship type	Passenger capacity	Gross Registered Tonnage (GRT)
Average base port vessel	2,300	120,400
Transit	2,300	120,400

The demand for the CST is expected to increase year on year, until the total capacity is reached in the peak summer months. The capacity of the terminal is assumed to be one ship per day.

Table 22 shows the expected demand and associated increase in visitors days for the first year of operations and the long term potential based on market growth and capacity onsite.

Table 22: Annual demand profile

Demand	Observed	Scenario 2	Scenario 1
Cruise arrivals			
• Base port ships	146-212	53-208	47-185
• Transit ships	0-24	4-29	12 - 36
• Total ships	158-212	65 - 212	59 - 212
Passengers/Crew			
• Passengers	363,400 – 487,600	148,863 – 487,600	135,390 – 487,600
• Crew	224,453 – 301,165	91,945 – 301,165	83,623 – 301,165
Days at port			
• Passengers	255,760 – 341,320	105,584 – 341,735	96,153 – 344,398
• Crew	85,150 – 117,454	33,472 – 116,737	30,266 – 112,132
Induced Visitation			
• Persons	100,740 – 146,280	36,379 – 143,791	32,377 – 127,815
• Total visitor nights	302,220 – 438,840	109,137 – 431,374	97,011 – 383,444

Costs

The project cost inputs have been adopted from section 5 of this report and discounted using a 7 per cent real discount rate, are summarised in Table 23.

Table 23: Summary of construction and operations - $ PV million

Item	Estimated cost
Construction cost	[redacted]
Maintenance and refurbishment cost	[redacted]
Staff and organisational costs	[redacted]
Total	451.9

Note: Organisational costs include machinery acquisition costs and leasing costs.
Source: AECOM

Benefits

The benefits determined from the BCR assessment have been summarised under the following four categories, with specific benefits outlined for each below.

- **Port charges revenue**: this includes all port charges and docking fees for visiting cruise ships.

- **Passenger and crew expenditure**: this includes expenditure by passengers and crew at shore while disembarked (i.e. during 'days at port'). Note: this does not include induced visitation expenditure outlined below.
- **Induced visitor expenditure**: this includes tourism expenditure (including accommodation, dining, entertainment, shopping) for passengers that stay overnight on the Gold Coast before and/or after a cruise.

(Note: Estimated annual benefits are indicated as at 2022 as well as at 2047 following long term growth.)

Table 24: Estimated annual benefits - $ million pa

Benefits	Observed	Scenario 2	Scenario 1
Port charges revenue	[redacted]	[redacted]	[redacted]
Passenger and crew expenditure	$72.3M to $96.9M pa	$29.7M to $96.9M pa	$27.0M to $97.1M pa
Induced visitor expenditure	$64.1M to $93.0M pa	$23.1M to $91.5M pa	$20.6M to $81.3M pa
Commercial rent income	[redacted]	[redacted]	[redacted]

Source: Macroplan Dimasi

8.1.5 Benefit Cost Ratio

The BCR summarises the ratio of the overall benefits of a project against the costs of that project. A BCR of greater than 1 indicates that the project has benefits exceeding its costs and therefore can be considered to be an economic project. Projects with BCRs less than 1 may still be suitable for Government investment if there are project benefits which are not able to be monetised for inclusion in the BCR (e.g. equity considerations or social benefits).

Table 25 provides preliminary estimates of the BCR based on the various demand scenarios (calculated over a 30 year period).

Table 25: Estimated range of BCRs

	Observed	Scenario 2	Scenario 1
Total PV benefits*	$1.74B	$1.51B	$1.37B
Total PV costs	$0.45B	$0.45B	$0.45B
Benefit cost ratio	3.9	3.3	3.0

**It is noted that if resupply expenditure is included as a direct benefit, the benefit cost ratios are increased and range from 4.6 to 5.9.*
Source: MacroPlan Dimasi

This analysis shows that all three demand scenarios have the potential to realise BCRs of greater than 1, indicating that the project has the potential to be economically viable based on current demand scenarios and project assumptions.

8.2 Economic Impact Analysis

The cruise ship terminal will have a positive economic impact for Gold Coast City and Queensland through increased visitation and output. The purpose of this section is to consider the qualitative increases generated by the unique proposition of the project.

8.2.1 Methodology

For the purpose of assessing the economic impacts of the CST project, an Input-Output (I-O) assessment has been applied to determine the economic impacts of the project. The input-output assessment is a form of economic analysis based on the interdependencies between economic sectors. It is used for estimating the impacts of positive or negative economic effects throughout the economy. In the simplest form of input-output analysis, input-output multipliers are applied to determine estimates of indirect impacts, or the economic flow on effects of an initial direct impact.

Measuring the economic impact

The economic impact or benefit is normally assessed in three aspects:

- **Output** represents the gross revenue generated by businesses/organisations in each of the industry sectors in a defined region. Gross revenue is also referred to as total sales or total income.
- **Value-added** represents the marginal economic value that is added by each industry sector in a defined region, otherwise interpreted as a contribution to regional economic growth.
- **Employment** measures the number of people that are employed by businesses/organizations in each of the industry sectors in a defined region, measured on a full time equivalent basis.

Direct and indirect economic impact

A local economy often benefits most from the initial direct impact associated with an increase in output, with indirect impacts typically dispersed more broadly throughout the state-wide and national economy. However, indirect impacts can also regularly generate significant additional benefits if there is sufficient productive capacity within the associated industry sector. This distribution of indirect impacts is considered in this assessment by incorporating both regional (Gold Coast LGA) and state (Queensland) I-O multipliers.

8.2.2 Assumptions

General assumptions adopted in Economic Impact Analysis are consistent with these stated in Table 16 in Section 9.1.4. Additional assumptions used in relation to Input –Output Analysis are summarised below:

Resupply expenditure

It is anticipated that there will be benefit associated with the resupplying of cruise ship vessels while at the Gold Coast CST. This benefit is however significantly dependent on regional capacities and supply chains. This benefit has the potential to grow related industry sectors, and may require the establishment of new businesses (and supply chains) directly associated with this economic need. As such, this benefit has been included and analysed in the following regional economic benefits assessment, however has not been included as a benefit item in the BCR assessment (given the uncertain capacity and costs associated).

We assume that the resupply of cruise ship mainly consists of food and beverage. Table 26 of provisions has been adopted for the Celebrity Cruise Ship Constellation (Passenger 1,950 and crew 999) for a seven day cruise. Pricing has been obtained from Queensland wholesalers. Since there can be a wide range of prices depending on quality and brand, median prices have been assumed.

It is noted that the provisions list Table 26 is indicative of the majority of food stores (but not all food inventory) maintained on-board during a seven day cruise, which includes surplus

supplies. It is assumed that an average of 50% of this inventory is resupplied at the beginning of each seven day cruise.

Table 26: Example of provisioning for a 1,950 passenger cruise ship for a seven day Cruise

Item	Unit	Quantity	Unit Cost	Total
Beef	Kg	10,993	$22.0	$241,296
Lamb	Kg	2,290	$15.3	$35,037
Pork	Kg	3,273	$6.9	$22,584
Veal	Kg	2,100	$14.0	$29,295
Sausage	Kg	760	$7.0	$5,320
Chicken	Kg	4,632	$7.5	$34,740
Turkey	Kg	1,432	$15.0	$21,480
Fish	Kg	6,283	$25.0	$157,075
Crab	Kg	160	$22.7	$3,632
Lobster	Kg	950	$40.0	$38,000
Fresh Vegetables	Kg	11,674	$2.0	$23,348
Potatoes	Kg	6,870	$3.5	$23,702
Fresh Fruit	Kg	9,073	$2.0	$18,146
Milk	L	12,300	$1.3	$15,375
Cream	L	1,870	$4.4	$8,135
Ice cream	L	2,300	$1.8	$4,209
Egg	Dozen	9,235	$2.8	$26,043
Sugar	Kg	5,750	$1.5	$8,453
Rice	Kg	1,700	$2.3	$3,927
Cereal	Kg	790	$2.0	$1,580
Jelly	Kg	200	$1.0	$200
Coffee	Kg	1,115	$27.9	$31,053
Cookies	Kg	878	$10.5	$9,219
Tea bag	per box	2,450	$4.0	$9,800
Herbs and Spices	Kg	54	$23.0	$1,242
Wines	Bottle	3,400	$20.0	$68,000
Champagne	Bottle	200	$13.9	$2,782
Gin	Bottle	200	$37.3	$7,458
Vodka	Bottle	290	$38.2	$11,064
Whiskey	Bottle	350	$37.9	$13,248
Rum	Bottle	150	$37.9	$5,678
Sherry	Bottle	45	$21.4	$964
Liqueurs	Bottle	600	$25.6	$15,330
Beer	Bottle	10,100	$2.6	$25,755
Total				$923,166
Average per head per trip (pax & crew)				$157

Source: Celebrity Cruises shipboard literature, MacroPlan Dimasi

Resupply expenditure breakdown

It is assumed that 90% of the total resupply expenditure, or increase in output, is attributed to the wholesale retail sector (associated with food and beverage purchasing) whilst the remaining 10% is attributed to the freight and logistics sector (on transport and warehousing).

Passenger, crew and induced visitor expenditure breakdown

Table 27 shows the breakdown of output generated from cruise ship passenger, crew and induced visitors:

Table 27: Breakdown of Passenger, crew and induced visitor expenditure

	Passenger	Crew	Induced Visitor
Food and Drink	15%	31%	54%
Organised Tours	47%	4%	4%
Entertainment	12%	6%	8%
Shopping	17%	52%	20%
Transportation	7%	4%	10%
Other	2%	3%	4%
Total	**100%**	**100%**	**100%**

Source: Cruise Down Under (2012), TRA Database, MacroPlan Dimasi

8.2.3 Impact Analysis

To evaluate the wider impacts associated with those abovementioned economic benefits, and assess and analyse Gold Coast industries in an input-output framework, Gold Coast specific I-O data has been utilised.

Economic output impacts

Economic output impacts reflect the overall increase in economic production related to activities both directly and indirectly associated with the construction and operation of the Gold Coast CST. The various direct impacts, or increases in economic output, which will act as a catalyst for those indirect impacts include:

- Construction expenditure
- Passenger, crew and induced visitor expenditure
- Resupply expenditure.

Table 28 provides estimates of the direct and indirect economic output impacts based on the various demand scenarios (calculated over a 30 year period).

Table 28: Summary of output impact - $millions

Demand	Observed		Scenario 2		Scenario 1	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Electricity, Gas, Water and Waste Services	$4	$1.9	$4	$1.9	$4.0	$1.9
Construction	$322.4	$274.1	$322.4	$274.1	$322.4	$274.1
Wholesale Trade	$588.8	$253.2	$492.9	$212.0	$438.2	$188.4
Retail Trade	$216.7	$88.9	$184.4	$75.6	$165.8	$68.0

Demand	Observed		Scenario 2		Scenario 1	
Accommodation and Food Services	$364.7	$145.9	$307.8	$123.1	$275.3	$110.1
Transport, Postal and Warehousing	$167.1	$75.7	$152.6	$65.6	$139.1	$59.8
Professional, Scientific and Technical Services	$53.4	$27.8	$53.4	$27.8	$53.4	$27.8
Arts and Recreation Services	$353.9	$148.6	$304.5	$127.9	$276.0	$115.9
Other Services	$31	$8.4	$26.3	$7.1	$23.6	$6.4
Total Output Impact	$2,111	$1,024.4	$1,848.3	$915.0	$1,697.8	$852.4

Employment impact

The increase in economic output will in turn support a substantial increase in employment opportunities across related industry sectors. These jobs are represented as full time equivalents (FTEs) jobs and are anticipated across a range of construction and tourism related sectors, as well as additional indirect industry sectors.

Note that the maximum number of job created in a single year over 30 years period was adopted for each industry in the impact table. For instance, the maximum number of jobs supported in construction industry (666 FTEs jobs) was showed in year 2020, whereas the annual expenditure will facilitate up to 383 jobs in wholesale industry from year 2033 onward.

Table 29: Summary of employment impact (FTE jobs)

Demand	Observed		Scenario 2		Scenario 1	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Electricity, Gas, Water and Waste Services	1	1	1	1	1	1
Construction	666	609	666	609	666	609
Wholesale Trade	383	170	370	164	329	146
Retail Trade	353	61	347	60	328	56
Accommodation and Food Services	531	93	518	91	475	83
Transport, Postal and Warehousing	122	56	120	55	111	51
Professional, Scientific and Technical Services	98	45	98	45	98	45
Arts and Recreation Services	292	100	291	100	287	98
Other Services	47	6	46	6	43	5

Demand	Observed		Scenario 2		Scenario 1	
Total Employment Impact	2,495	1,141	2,458	1,130	2,338	1,095

Value added impact

The increase in economic output will have a contributing effect to the value added impact at an industry level, and in turn contribute to growth in gross regional product (GRP). The value added impact for the range of relevant direct and indirect industry sectors is outlined in Table 30.

Table 30: Summary of value added impact - $millions

Demand	Observed		Scenario 2		Scenario 1	
	Direct	Indirect	Direct	Indirect	Direct	Indirect
Electricity, Gas, Water and Waste Services	$1.9	$0.8	$1.9	$0.8	$1.9	$0.8
Construction	$90.3	$106.4	$90.3	$106.4	$90.3	$106.4
Wholesale Trade	$294.4	$117.8	$246.5	$98.6	$219.1	$87.6
Retail Trade	$130.0	$41.2	$110.6	$35.0	$99.5	$31.5
Accommodation and Food Services	$175.0	$65.6	$147.8	$55.4	$132.1	$49.5
Transport, Postal and Warehousing	$74.0	$35.2	$64.1	$0.8	$58.4	$27.8
Professional, Scientific and Technical Services	$24.6	$13.4	$24.6	$13.4	$24.6	$13.4
Arts and Recreation Services	$120.3	$70.8	$103.5	$60.9	$93.9	$55.2
Other Services	$13.6	$4.0	$11.6	$3.4	$10.4	$3.1
Total Value added Impact	$924.2	$455.2	$800.8	$404.4	$730.1	$375.4

Summary of impacts

The summary indicated in Table 31 presents an overview of the scale and diversity of economic benefits created by the project, including overall impact, employment and value added effects, throughout the 30 year project timeframe.

Table 31: Summary of impacts

Demand	Observed	Scenario 2	Scenario 1
Output			
Direct	$2,111.0M	$1,848.3	$1,697.8M
Indirect	$1,024.4M	$915.0	$852.4M
Total	$3,135.4M	$2,763.3	$2,550.2M
Employment (FTEs)			
Direct	2,495	2,458	2,338

Demand	Observed	Scenario 2	Scenario 1
Indirect	1,141	1,130	1,095
Total	3,636	3,587	3,433
Value Added			
Direct	$924.2M	$800.8	$730.1M
Indirect	$455.2M	$404.4	$375.4M
Total	$1,379.4M	$1,205.2	$1,105.5M

In comparison to the Gold Coast level impact scenario, the I-O data for Queensland was also employed to assess the economic impact on state level.

Table 32: State level economic impacts

Demand	Observed	Scenario 2	Scenario 1
Output			
Total	$4,254.1M	$3,748.9M	$3,459.6M
Employment (FTEs)			
Total	4,089	4,036	3,869
Value Added			
Total	$1,946.5M	$1,704.9M	$1,566.6M

As illustrated in Table 33, it is estimated that majority of the impacts generated by the CST project will be specific to Gold Coast region.

Table 33: Percentage of economic impact in Gold Coast

Impacts	Percentage
Output	74%
Employment (FTEs)	89%
Value Added	72%

9 Financial and Commercial Analysis

9.1 Approach to Financial Assessment

The purpose of this chapter is to provide an overview of the financial analysis outcomes and funding requirement for the proposed ocean-side CST development on the Gold Coast during the construction and operational phases. The financial analysis presented in this chapter aims to provide the City with the estimated whole-of-life costs for the project. This includes all direct costs and revenues associated with construction and operations over the evaluation period.

In undertaking this financial analysis, PwC has had to make certain estimates and assumptions. There will inevitably be differences between these estimates and actual values, which may be material.

The whole-of-life financial analysis of the different parts of the project has been undertaken in accordance with the requirements of the PAF and BQ's Business Case Guidelines.

The financial analysis is presented in real, nominal, and PV terms, defined as follows:

- Real Terms: represents the cost of the facility in today's (2017) dollars.
- Nominal Terms: includes the effect of expected inflation on forecast costs and benefits.
- PV: The discounted present value of a stream of costs or benefits over time.

The project cash flows modelled in the financial analysis comprise:

- Capital costs
- Operating costs
- Revenue and demand.

The estimated cash flows for the new ocean-side CST are examined below. With exception of Section 9.7, which assess the financial outcomes of a transit only port, the financial analysis presented in this Chapter is based on the Reference Project as described in Chapter 4.

9.2 Assumptions

9.2.1 Key data sources

The key assumption categories in the financial model are detailed in Table 34.

Table 34: Data sources

Input assumption	Source
Risk-adjusted capital cost	AECOM
O&M and lifecycle	AECOM
Lease costs	City of Gold Coast
Revenue drivers	Port of Brisbane; Port of Melbourne; Sydney Ports; Port of Newcastle The port charge assumptions applied have been tested with the cruise ship industry
Cruise ship visits demand	MacroPlan/PwC

9.2.2 Methodology

A financial model was developed to capture the construction and operating period cost and revenue assumptions to present the net cash flows to the end of the analysis period (31 December 2051). This approach reflects a typical cash flow analysis methodology for the assessment of port developments. The cash flows are calculated on an Earnings Before Interest, Tax, Depreciation and Amortisation (EBITDA) basis.

9.2.3 Financial Assessment Assumptions

This section summarises the key assumptions that have been incorporated into the financial model and the sources of those assumptions as at 23 March 2017. As the project progresses, the financial analysis will need to be updated and refined for further development of the CST, towards the pre-procurement phase. Broad assumptions, including general timing and escalation, which underpin the financial model, are presented in Table 35. The general approach to these assumptions were confirmed with key project stakeholders.

Table 35: General assumptions

Item	Assumption	Source
Base date for PV analysis	31 Dec 2017	PwC
Period of analysis • Procurement • Design and Construction • Operations	 1 Jan 2018 – 31 Dec 2018 1 Jan 2019 – 31 Dec 2021 1 Jan 2022 – 30 Jun 2051	PwC / AECOM
Escalation rates • Capital costs • Operating costs • Revenue	 4.00% p.a 2.50% p.a 2.50% p.a	PwC
Discount rate	5.00%	PwC
Periodicity	Quarterly	PwC
Basis of cash flows	Nominal	PwC
Seasonality of cruise ship visits	Summer: 40.0% Autumn: 15.0% Winter: 10.0% Spring: 35.0%	Benchmarked from the seasonal cruise ship visits observed in Sydney.

Item	Assumption	Source
Residual asset value[41]	N/A	The value at the end of the 30 year assessment period (whether retained under City ownership, sold or leased) has not been considered in this financial analysis.

For the results presented below, some totals may differ due to rounding differences.

9.2.4 *Discount rate assessment*

Given that the CST is a net cost project and the absence of any private sector party means the City must bear all the systematic risk of the project, the appropriate discount rate for the financial appraisal will be the risk-fee rate as proxied by the long term Australian Government Bond. A pre-tax, nominal discount rate of 5.00 per cent has been applied in this financial analysis based on a 20-year average of the 10-year Australian Government Bond Rate (3.96 per cent) combined with the Queensland Treasury Corporation (QTC) administration rate of approximately 1.114 per cent.

9.3 *Delivery Phase*

Delivery Phase extends from January 2018 to December 2021 and includes procurement, design and construction of the preferred option.

9.3.1 *Capital Costs*

This section summarises the capital costs for the proposed ocean-side CST. The cost estimate contains the direct costs, preliminaries and overheads, with each cost item incorporating a contingency component. Table 36 summarises the risk adjusted capital costs in real, nominal and PV terms for the new ocean-side CST.

[41] While we acknowledge that beyond the 30 year Assessment period, the City may still be able to derive value from the CST through continuing operations or via a sale or lease of the Asset, given the level of uncertainty beyond a 30 year timeframe we have not included this value in the Financial Assessment.

Table 36: Capital costs - New ocean-side CST – $ million

Description	Real	Nominal	PV
Project Development Costs[a]	[redacted]	[redacted]	[redacted]
Planning, Approvals and Design[b]	[redacted]	[redacted]	[redacted]
Contract Administration	[redacted]	[redacted]	[redacted]
Construction Preliminaries	[redacted]	[redacted]	[redacted]
Landside Civil and Building Works (3637m^2 building GFA)	[redacted]	[redacted]	[redacted]
Jetty (900m with 7m wide deck)	[redacted]	[redacted]	[redacted]
Wharf (160m x 22m with 1000m^2 access structure and gangways)	[redacted]	[redacted]	[redacted]
Dolphins (6 x berthing, 2 x mooring dolphins and 300m gantries)	[redacted]	[redacted]	[redacted]
Caisson Breakwater (780m)	[redacted]	[redacted]	[redacted]
Total (excluding GST)	**463.4**	**510.4**	**452.6**

[a] Costs include procurement and transaction costs incurred in 2017/2018 in the pre-construction phase
[b] Planning, approvals and design costs have been adjusted from the project cost estimate due to timing of expenditure in pre-construction phase. The balance of the costs are included in the pre-construction phase.

Source: AECOM

9.4 Operating Phase

Operating Phase extends from January 2022 to December 2051 and includes all revenue, and operating and maintenance costs of the preferred option.

9.4.1 Revenue

The revenue assumed for the purposes of this financial analysis is primarily determined by the number of cruise ships that will use the CST in conjunction with the revenue pricing assumptions set out in Table 37 and therefore directly relies on the demand assessment completed in Chapter 7.

Table 37: Revenue Input Assumptions

Assumption	Value	Source / Benchmark
Ship passengers	2,300	Weighted average of current cruise ship pax capacity calling in Brisbane and having in regard to market sounding findings and the markets preference to move towards larger vessel size.
GRT	120,400	Weighted average of current cruise ship pax capacity calling in Brisbane and having in regard to market sounding findings and the markets preference to move towards larger vessel size.

Assumption	Value	Source / Benchmark
Port charges per ship – Upper Bound	[redacted]	ACA EIA total cruise ship operational expenditure by number of cruise ship visits in Brisbane for 2016 (see Appendix G for further detail)
Port charges per ship – Lower Bound	[redacted]	Estimated equivalent, based on Port of Brisbane published port charges (see Appendix G for further detail)

The revenue input assumptions applied for the purposes of the financial analysis are considered to be conservative, based on publicly available information and based on the City adopting a cost-competitive approach in pricing its charges in comparison to other Ports such as Brisbane and Sydney. This approach has been validated through engagement with cruise operators.

Table 38 presents the revenue estimates from the financial analysis based on the Gold Coast CST commencing operations in January 2022. The financial analysis concludes in 2051.

Table 38: Project revenue - $million

	Lower Bound		Upper Bound	
Sum of Revenue	Nominal	PV	Nominal	PV
Home Port—Scenario 1	[redacted]	[redacted]	[redacted]	[redacted]
Home Port—Scenario 2	[redacted]	[redacted]	[redacted]	[redacted]
Home Port—Observed	[redacted]	[redacted]	[redacted]	[redacted]

9.4.2 *Terminal building rental income*

PwC have then assumed a gross occupancy cost (the proportion of a tenants sales that is sustainably payable by a retail food operator) of 10%, which again is at the conservative end of the commonly observed 8%-16% range for food retail operators. [redacted]

9.4.3 *O&M and Lifecycle Costs*

The O&M and lifecycle costs for the proposed CST are provided in Table 39. Major refurbishments are recognised as an operating cost.

Table 39: O&M and Lifecycle Costs - $million

Cost Breakdown	Nominal	PV
Major refurbishment	[redacted]	[redacted]
Ongoing maintenance	[redacted]	[redacted]
Minor replacement	[redacted]	[redacted]
Cleaning costs	[redacted]	[redacted]
Utility costs	[redacted]	[redacted]
Machinery (Cargo and transport)	[redacted]	[redacted]
Employee expenses[a]	[redacted]	[redacted]
Lease costs	[redacted]	[redacted]7
Total O&M and lifecycle	[redacted]	[redacted]

[a] Inclusive of 50 per cent scale back assumption for the number of full time equivalents to build the employee expenses assumed to be scaled back 50 per cent on non-cruise ship visit days.

9.5 *Whole of Life*

The following analysis summarises the financial appraisal of the Gold Coast CST. Table 40 and Table 41 summaries the total costs and revenues in PV terms over the entire Assessment Period (i.e. Delivery Phase and Operating Phase) for lower bound and upper bound revenue cases, respectively.

Table 40: Whole-of-Life Net Project Cost (Lower Bound Revenue) - $million PV

Item	Scenario 1	Scenario 2	Observed
Delivery Phase costs	[redacted]	[redacted]	[redacted]
Operating Phase costs	[redacted]	[redacted]	[redacted]
Gross Project cost	[redacted]	[redacted]	[redacted]
Lower Bound Revenue	[redacted]	[redacted]	[redacted]
Net Project cost	**(186.2)**	**(154.4)**	**(114.1)**

Table 41: Whole-of-Life Net Project Cost (Upper Bound Revenue) - $million PV

Item	Scenario 1	Scenario 2	Observed
Delivery Phase costs	[redacted]	[redacted]	[redacted]
Operating Phase costs	[redacted]	[redacted]	[redacted]
Gross Project cost	[redacted]	[redacted]	[redacted]
Upper Bound Revenue	[redacted]	[redacted]	[redacted]
Net Project cost	**(85.4)**	**(45.8)**	**4.3**

The results suggest that direct CST revenue is not sufficient to recover the significant capital outlay required for construction of the Gold Coast CST, with the exception of the Observed scenario at upper bound revenue, allocated with half the market share at operational year 1.

From an operational perspective the results indicate that the CST has positive operational cash flows, i.e. if capital costs are excluded, operational CST is cash flow positive. [redacted]

9.6 Sensitivity Analysis

Sensitivity testing has been undertaken on key economic assumptions against the core CST results of the Observed Scenario. This analysis included testing construction cost increase/decrease, operation cost increases, and increase/decrease in discount rate and escalation rate. These are presented in Table 42 [redacted]

Table 42: Financial sensitivity analysis results – Observed Scenario – $million

Code	Sensitivity	Lower Bound Revenue PV	Upper Bound Revenue PV
Core	**Observed Scenario**	[redacted]	[redacted]
A	Construction costs up by 10 per cent	[redacted]	[redacted]
B	Construction costs down by 10 per cent	[redacted]	[redacted]
C	Gold Coast assumed SEQ cruise ship market share at 40 per cent instead of 50 per cent	[redacted]	[redacted]
D	Gold Coast assumed SEQ cruise ship market share at 60 per cent instead of 50 per cent	[redacted]	[redacted]
E	Discount rate up 100 basis points to 6 per cent (Cost of Funding)	[redacted]	[redacted]
F	Discount rate down 100 basis points to 4 per cent (Cost of Funding)	[redacted]	[redacted]
G	Construction escalation rate up 100 basis points to 5 per cent	[redacted]	[redacted]
H	Construction escalation rate down 100 basis points to 3 per cent	[redacted]	[redacted]
I	Operations costs increase by 25 per cent	[redacted]	[redacted]
J	Operations escalation rate up 100 basis points to 3.5 per cent	[redacted]	[redacted]
K	Both Construction and Operations escalation rate up 100 basis points to 5 per cent and 3.5 per cent	[redacted]	[redacted]

9.7 Transit Port Scenario

Additional analysis has been conducted to test the financial outcomes if the CST operated as a Transit Port only. The high-level findings are provided in Table 43, in comparison to the Observed Scenario. The transit scenario demand is forecast to start at 20 ships, growing at 8 per cent year on year.

Table 43: Transit Port only scenario analysis - $million PV

Breakdown	Home Port Observed	Transit	Difference
Capital costs	452.6	439.3	(13.3)
O&M and Lifecycle costs			
Revenue (Lower Bound / Upper Bound)			
Present Value			

The differences outlined in Table 43 can be attributed to the following:

- **Capital costs:** The transit scenario includes the monorail infrastructure as part of the reference project. Proposed capital costs for the transit scenario are assumed to be lower due to less complexity in constructing the CST. It includes decreased costs required for contract administration, construction preliminaries and other landside civil works, with the breakwater structure remaining constant.
- **O&M and Lifecycle costs:** A transit only CST would be expected to require a lower scale of operational and maintenance costs to a Home Port as it will be less utilised for cruise ship visits. On the other hand, the terminal building and jetty itself may warrant increased operational maintenance if there is a large demand from non-cruise shipping visitors. The main differentiating factor between the operational costs of a home port and a transit port is mostly attributable to decreased frequency in maintenance costs, including cleaning and utility costs. Fewer cargo and people transit machinery would also be required in a transit scenario.

- [redacted]

[redacted]

[redacted]

9.8 Affordability

There is currently no committed finance to this Project. All levels of government, whether that be Federal, State or Local face fiscal constraints that limit the range of investments they are able to fund through traditional funding sources. As outlined in Chapter 5 the construction cost of the CST will require a significant outlay of funds that may not be fully recovered by user charges will represent one of the most significant infrastructure projects undertaken on the Gold Coast.

This Section of the Business Case outlines the available options that Council may consider. It is important that the terms financing and funding are not used interchangeably as they relate to entirely different concepts. In the context of the CST Financing relates to how the Council will pay for the construction of the facility. Funding relates to how the council pays for the facility over time.

This section deals with the two questions relating to affordability:

- How does the Council **finance** the delivery of the infrastructure?
- What **funding** options are available to Council for the ongoing operation and maintenance of the infrastructure?

Financial and Commercial Analysis

[redacted]

[redacted]

9.8.2 Funding

User Charges

User charges are the most obvious source which Council can use to fund the facility. User charges in this sense relate to the users of the Terminal and its facilities which would predominantly be the charges levied on the visiting cruise ships (whether basing or transiting) and the charges levied on the passengers. As outlined in Section 9 the estimates for the net operating position of the facility is still uncertain and depends on a number of factors. Based on the market sounding done to date we consider it unlikely that the facility will generate a commercial return (i.e. the facility will be unlikely to generate enough revenue to offset the upfront construction and provide a commercial return.

User charges could further be supplemented through the use of the facilities by private vessels including charter vessels and super yachts. Charter vessels for activities including whale watching, fishing, and sight-seeing may use the facility and pay a berth access charge. The level of the access charge would need to be commensurate with other berths on the Gold Coast including the Southport Yacht Club and other berths within the Broadwater.

Similarly, superyachts could use the cruise terminal infrastructure and would pay access charges commensurate with other berths on the Gold Coast. The opportunities for significant revenue from superyachts is tempered by the design of the cruise terminal facility being a single wharf and the expected public access on days where there is not a cruise ship in port

LTRWRP Project

The LTRWRP was identified as having potential to be incorporated into the design of the CST, the idea being that the LTRWRP could be delivered at a cheaper price than if delivered completely separate to the CST, with the cost savings more than offsetting the additional cost imposed on the CST.

As outlined in Section 5.8, three options have been identified for the concurrent delivery of the CST and the LTRWRP. [redacted]

Additional Commercial Opportunities

There is opportunities for Council to rent facilities to private operators to help offset the ongoing costs to operate and maintain the facility.

Beyond the retail space that can be leased at the terminal facility opportunities relate to ancillary operations that may serve the facility or the passengers who embark and disembark vessels. These may include:

- Event hire for filming movies, television shows, and advertisements
- Event hire for weddings / photography etc
- Use of facilities for markets when cruise ships are absent
- Charges to use the facilities for recreational fishing, and
- Use of facilities by scuba diving companies given the proximity to the Scottish Prince shipwreck.

Whilst these potential income streams would be of benefit to the City, they are not expected to make a material impact on the financial viability of the CST.

Value Capture

Value capture is a term which is currently at the forefront of the discussion on how to fund new infrastructure in Australia. The core idea of 'value capture', is that a new piece of infrastructure such as a freeway or railway line creates economic value and that some of that value which accrues could provide a source of funds to contribute towards the cost of the project.

Some infrastructure projects, especially in transport, can increase the value of nearby landholdings and other assets over time. Where the taxpayer has made a financial contribution, it is desirable that a share of this value should be recovered by the procuring authority.

Value capture mechanisms have been devised which can contribute to the funding for new projects. Most of these schemes involve a charge on owners of assets whose value is enhanced by new infrastructure provision. Value capture mechanisms can include betterment levies and new taxes imposed on the community (residents and business owners), however it is often difficult to clearly identify the beneficiaries, quantify the gains and crystallise these benefits. Unlike the Gold Coast Light Rail which was partly funded via the Council's transport betterment levy, such a mechanism may not receive as much community support given there is not as a direct link between the CST and improved liveability of the Gold Coast.

In the context of a CST on the Gold Coast the direct beneficiaries are likely to be local businesses (existing and new) who directly benefit from increased patronage that cruise ships bring to their respective businesses. For example there would be a strong case that were the facility built, existing businesses [redacted] and new businesses ([redacted] would directly benefit and from increased exposure and patronage and as such may be willing to funds to construct the facility. Overall, value capture is unlikely to provide a substitute for the other funding strategies set out in this section.

Future Lease

Based on the demand assessment (Section 7) and the financial assessment conducted in Section 9 the CST is expected to deliver a net operating profit during operations. Once patronage at the facility has been established, there would be the opportunity to enter into a long term lease to effectively crystallise the income stream derived from the facility. The funds could then be used to repay the debt facilities or recycled back into new infrastructure for the City.

10 Environmental Analysis

10.1 Environmental Assessment

The proposed Gold Coast CST will be located both on land and within Queensland State waters, extending from Philip Park, Main Beach, to approximately 1,200m off the east coast of Australia.

Given the overall scale of the project, extended timeframes to construct and the dynamic nature of the ocean environment, there will be a number of management measures required in response to the specific environmental conditions, construction methodology and operational requirements.

This section provides a preliminary overview of the environmental characteristics of the site, potential impacts of the proposal and key management issues that require further development. It is also acknowledged that detailed environmental impact assessment will be required for this project and that this will be undertaken following the completion of the business case. This will involve engagement with all levels of government and stakeholders.

10.1.1 Assessment Approach

A desktop review of available literature relevant to the project area and online sources was used to characterise site context, physical features and ecological values of the proposal area. An ecologist from AECOM conducted a preliminary site inspection of the landside portion of the proposal area on 22 December 2016 to identify and assess the site condition and broad conservation values of vegetation communities and fauna habitat present in the area. Digital photographs were taken throughout the site for future reference.

A further and detailed two day site survey was conducted on the 10th to 11th April 2017. The survey involved the following activities:

- Walking slowly through the entire study area from sunrise for the first four hours after sunrise to survey for birds, identifying bird species by direct observation using 10x40 Leica binoculars or by their characteristic calls, and recording all birds detected per 20-minute survey period to assess relative frequency of occurrence
- Searching for threatened plant species by conducting a random meander through the study area (McCaffrey et al. 2014), focused particularly on the proposed direct impact area of Lot 3/SP104014, recording all flora species detected
- Describing vegetation communities by means of one detailed secondary site assessment and a total of 15 quaternary site assessments following methods outlined in Neldner et al. (2012) for surveying and mapping of vegetation communities
- Identifying any reptiles encountered during all survey activities
- Recording the numbers of people, dogs and vehicles present on Main Beach at intervals during the survey, as an indicator of shorebird disturbance.

Biodiversity data was acquired from online sources from the following key references:

- DoEE protected matters search
- DoEE species profile and threats (SPRAT) database

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- DoEE conservation advice
- Department of Environment and Heritage Protection (DEHP) wildlife online database
- DEHP 1:100,000 pre-clearing and regional ecosystem mapping v.8
- DEHP 1:100,000 mature regrowth
- DEHP essential habitat mapping
- DEHP environmentally sensitive areas (ESA) mapping
- DEHP koala habitat mapping
- Species distribution maps from various current field guides
- DEHP groundwater dependent ecosystem mapping
- Queensland Herbarium (Herbrecs) records
- Review of migratory shorebird survey data for the Gold Coast Broadwater held by the Queensland Wader Study Group (QWSG) that was provided as part of a data sharing agreement with the QWSG.

Online database enquiries targeted Philip Park (Lot 3 on Plan SP104014), Main Beach, or a search area that applied a 10 km buffer to a central coordinate (-27.96214, 153.42815), which incorporates the proposed infrastructure and foreseeable underwater noise propagation zone. However the search area does not extend to the Commonwealth marine areas more than 150 km offshore. In addition to online survey, additional databases held by the AECOM ecological team have been reviewed to determine likely migratory shorebirds present within the area.

The following existing reports were consulted and referenced:

- PricewaterhouseCoopers (2016). Ocean-side Cruise Ship Terminal: Preliminary Update Report
- City of Gold Coast (2013). Three Point Plan for Coastal Protection: Referral of proposed action
- Ecosure Pty Ltd (2012). Ecological site analysis. Prepared for City of Gold Coast, dated June 2012
- GHD. Notional Seaway Project EIS
- Griffith Centre for Coastal Management (2007). An overview of available information on sandy beach ecology, coastal sand dunes, rocky reefs and associated biota on the Gold Coast. Prepared by R. Noriega for City of Gold Coast
- Planit Consulting Pty Ltd (2012). Gold Coast Ocean Terminal: Referral of proposed action. Prepared for Gold Coast Ocean Terminal Pty Ltd, October 2012
- Planit Consulting Pty Ltd (2012). Gold Coast Ocean Terminal: Response to request for further information (EPBC Reference 2012/6610). Prepared for Gold Coast Ocean Terminal Pty Ltd, October 2012.

10.1.2 Location and Tenure

The project is proposed for Philip Park, Lot 3 on Plan SP104014, and extend approximately 1,200 m offshore into open coastal waters entirely within Queensland State waters. The location and context of the cruise ship terminal is shown in Figure 31.

Philip Park is located on Main Beach toward the southern end of the Spit. The land is highly modified with a large proportion of the lot sealed for car parking facilities and amenities. Unsealed pathways cut through a narrow band of remnant coastal vegetation to access the open surf beach. The Federation Walk starts from the car park in Philip Park, which is a designated pathway that provides north-south access through the Coastal Reserve to the Gold Coast Seaway.

This location is close to the existing Sheraton Mirage Hotel, Seaworld theme park entrance and car park, and within 500 m of the Versace Hotel and Marina Mirage Shopping Centre. The site is also directly opposite the proposed Integrated Resort Development site which is currently being assessed by Queensland State Government. This location offers a number of advantages, including: ·

- No impact on the existing infrastructure or complex dynamics of the existing seaway, southern seaway wall or sand bypass jetty
- No impact on surfing amenity and function of nearby surfing breaks on South Stradbroke Island
- Proximity to existing and proposed tourist attractions
- Opportunity to enhance amenity due to proximity to Scottish Prince Shipwreck (diving) and safe swimming beach (from benign wave environment inside the breakwater).

For the purposes of this document, the proposal area includes the landside development area (approximately 6 hectares) and proposed infrastructure components, allowing a 200 m buffer to accommodate construction activities such as equipment mobilisation, materials delivery and construction activities; discussion of indirect and facilitated impacts outside this proposal area are discussed on a case by case basis.

The activities to occur as part of the proposed action require consultation with the DoEE due to the potential presence of EPBC Act listed species and/or their habitats within and in the vicinity of the proposal area.

Environmental Analysis

Figure 31: Ocean side cruise ship terminal location and context

10.1.3 Physical Environment

This section provides a general description of the physiographical setting of the proposed site and surrounds. This description has been collated from a desktop review of available information.

Climate

The Gold Coast has a subtropical climate with mild temperatures and predominantly south easterly (and less frequently north easterly winds) with moderately high rainfall (BOM, 2017). Average temperatures in summer range between 20-30 degrees Celsius (°C) and average winter temperatures range from 12-22°C. February is the wettest month, receiving on average 173 mm of rain with the driest month being September, only receiving 44 mm on average.

Oceanography

The proposal is located along a relatively high energy, dynamic coastline, subject to ocean swells from the Coral Sea, predominantly south-easterly and north-easterly, that show strong seasonal variability. The coastal location and dynamic processes are affected by east coast lows, with the major influence being waves, and minor influence of tides and cyclones.

In this location, the coast can be affected by strong coastal surge that can result in more suspended sediment particles and reduce the visibility in nearshore waters. Coastal hazard maps published by the Department of Environment and Heritage Protection (2016) indicate a large proportion of the site is prone to erosion and inundation due to storm impact and long term trends including sediment supply deficit and channel migration.

Natural sand transport (longshore drift) can naturally vary depending on coastal processes and can result in accretion or erosion of the beach. A sand bypass system has been installed by the Queensland State Government to preserve the Seaway from being filled by the sand transport along the coast.

Topography and bathymetry

Philip Park primarily comprises low lying coastal land and foreshore dunes with gently sloping, sandy beaches down to the surf break. The proposal extends from the intertidal area out to a depth of approximately 18m below the lowest astronomical tide (LAT) over the 1,200m extent of the proposal (i.e. 1m decline every 60m travelled out along the seabed).

This is a dynamic coastal environment subject to natural variations. Seasonal change is dominated by natural longshore drift involving migration of sand in a northerly direction. The Spit sand bypass jetty system installed by the State Government provides artificial sand transport to nourish beaches and manage coastal erosion.

Seabed geology, geomorphology and features

The open ocean and smooth bathymetry indicate mobile, soft-sediment and unvegetated seabed. Seabed geology is expected to be comprised of a sandy substrate typically associated with high energy sandy beach coastlines. Further site-specific assessments will be undertaken as part of the detailed environmental assessment of the proposal.

The only substantial seabed features in the vicinity of the proposal area is a wreck, the Scottish Prince (1887); a 64m iron barque ship located approximately 800m from the shore and approximately 150m to the north of the jetty alignment, in approximately 10-15m of water.

Cultural heritage

Prior to European settlement, literature indicates the existence of thriving Aboriginal communities in the vicinity of the site that the region supported with rich food resources available year round (Jabree, 2013). The historical and archaeological record produced by the Department of Aboriginal and Torres Strait Islander Partnerships (DATSIP) indicates Indigenous heritage items at Southport and South Stradbroke Island. There is potential for heritage items such as shell middens, artefact scatters and possibly burials to be found on site.

Historical aerials of the Spit, Main Beach and Southport taken in 1955 shows limited development; at this time, the Spit comprised a barrier dune system with some internal water, possibly perched waterholes, but most likely estuarine in nature, while mangroves grew further south on the Nerang River side. Land resumption in the late 1950s spurred development of the Spit.

The DATSIP search identified a number of historic shipwrecks located in the Gold Coast Broadwater, Gold Coast Seaway and open coastal waters. In the vicinity of the proposal, the 'Scottish Prince' historic shipwreck is listed in the Australian National Shipwrecks Database (Shipwreck Id Number: 3107). The potential impacts on the Scottish Prince, and possible mitigation strategies are described in the following section.

10.1.4 Biological Environment

There is a range of flora and fauna (including terrestrial and marine) that has been identified within the study area that may be impacted on during the construction and operations phases of the Project. It is expected that the impacts can be mitigated through appropriate construction management techniques and operational management plans.

The flora and fauna species that have been identified in the study area are listed in Appendix H.

10.1.5 Potential Impacts and Proposed Mitigation Measures

Based on the preferred option for this project several key potential project impacts have been identified:

- Increased marine vessel traffic with potential to increase interactions with marine fauna and risk of fauna strike causing stress, injury or fatality in proposal area and on associated cruise ship and supply vessel routes through Moreton Bay Marine Park or Commonwealth marine areas
- Marine transport of fuel and refuelling activities, and potential risk that a plume resulting from a loss of containment may impact on the adjacent coast or sensitive areas
- Construction activities, particularly piling, generating a noise propagation zone underwater that introduces short term temporary risks for marine species
- Construction activities, particularly dredging, in the marine environment are expected to generate sediment plumes that have the potential to impact on water quality
- Anthropogenic lighting during construction and operation of the cruise ship terminal
- Increased traffic and noisy activities during landside construction has the potential to cause a temporary disturbance to the ambient acoustic and air environments and local habitats

- Minor loss of already degraded native vegetation on the coastal fringe of Philip Park and temporary disturbance of coastal habitats
- Introduction of weed and pest species.

In all instances, appropriate construction, operational and risk management plans would be prepared and adopted to address these project impacts. This would be based upon a detailed assessment of the project, prevailing environment and ongoing operation of the facility as part of a State assessment process for project approval.

Flora values

The proposal lies 3 km south of the offshore waters of the Moreton Bay Marine Park, South Stradbroke Island and Gold Coast Seaway (to the Ramsar wetland within the Bay), all of which maintain conservation significant flora species. The Queensland Herbarium maps the vegetation of The Spit as non-remnant vegetation. The field survey confirmed that much of the vegetation on The Spit has derived from revegetation plantings comprised of a diverse mix of native species characteristic of both eucalypt and dry rainforest communities. Five different vegetation communities were identified and mapped across the study area, namely foredune complex, grassland, Acacia sophorae shrubland, littoral woodland and littoral forest. Notably, no threatened ecological community, no coastal heath vegetation and no freshwater wetlands occur within the investigation area.

The proposal will result in minor loss of already degraded native vegetation on the coastal fringe of Philip Park to accommodate the jetty landing, vehicle and passenger access, terminal building, logistics and laydown areas. The layout of the landside development will retain as much of the existing vegetation in the coastal stand and fore dunes as possible; therefore the area to be impacted is relatively small.

The field survey recorded a total of 122 flora species, nearly 25% of which are introduced weed species. No flora species listed as threatened or near threatened flora species under either the EPBC Act or Queensland Nature Conservation Act 1992 (NC Act) were found during the field survey, including during intensive searches of Lot 3/SP104014. Due to the recent origins of the vegetation of The Spit, no listed threatened flora species are expected to occur unless they were included in the palette of species planted as part of revegetation plantings.

On this basis, the loss of vegetation is not considered detrimental to the overall ecological values of the area, given similar and higher quality vegetation and habitats are available immediately to the north, south and west of the proposed site. Supplementary planting and revegetation as part of final landscaping of the site will enhance native species populations and reduce weed infestation in the vicinity of the proposal.

The coastal vegetation and its habitat value are susceptible to introduction and spread of weeds. A Weed Management Plan and weed hygiene procedures will be developed and implemented to ensure weeds are not introduced to the site or spread to the surrounding area during clearing and construction activities. Cleared vegetation management and vehicle wash down procedures will be central to any weed management strategy.

Fauna values

Important habitat

The bay and offshore waters of the Moreton Bay Marine Park maintain high value habitats for feeding and breeding conservation significant marine fauna and migratory and resident shorebird and wetland bird populations. The proposal will not directly impact on these environmentally significant areas; however there may be indirect impacts due to marine vessel traffic associated with equipment and materials transport during the construction phase and fuel transport during the operations phase.

The vegetation in this area represents a very narrow band and contains weeds; however, it is recognised as habitat that has the potential to provide connectivity along the eastern coast to the Spit, and potential roosting and foraging habitat to grey-headed flying-fox, New Holland mouse and birds, including resident and migratory shorebirds, wetland birds and raptors. Prior to and during clearing, a qualified fauna spotter-catcher will inspect the vegetation to detect presence of fauna. Any fauna present will be translocated to a suitable nearby habitat (not long distances).

Given the highly modified nature of the site (mainly used for car parking), vicinity to large man made establishments (Sheraton, Seaworld, etc.) and exposed coastal location, the site is considered unlikely to provide core habitat for any of the threated or migratory species. Removal of mature vegetation may reduce perching opportunities for birds, as well as foraging and nesting resources for terrestrial mammal species.

Field survey has confirmed that no fauna species listed as threatened or near threatened species under either the EPBC Act or NC Act were recorded on the eastern side of The Spit that includes the Project area, and none are considered likely to occur in the Project area. One threated species has potential to occur, namely Grey-headed Flying-fox (Pteropus poliocephalus; EPBC Act: vulnerable). There is no flying-fox camp present on The Spit; therefore Grey-headed Flying-fox only has potential to occur as a rare seasonal visitor to flowering trees in littoral forest and woodland habitats that contain suitable food trees for Grey-headed Flying-fox.

The 2014/15 shorebird surveys of the Gold Coast Broadwater identified two migratory shorebird species listed as threatened species under the EPBC Act and a further one resident shorebird species listed as a threatened species under the NC Act using roosting and feeding habitats in the Broadwater. QWSG surveys over the period 1995-2014 recorded an additional five migratory shorebird species listed as threatened species under the EPBC Act using a roost site in the Broadwater. While these species are known to use habitats in the Broadwater, there is no suitable habitat for these species on the eastern side of The Spit that includes the Project area.

Layout of landside development will retain existing native vegetation as much as possible to minimise the permanent loss of native vegetation and disruption to habitat connectivity. The proposal will retain and reinstate these habitat values to encourage local wildlife in the final landscaping of the site.

Availability of similar habitat values immediately adjacent to Philip Park and in the surrounding area indicates that the proposed vegetation clearing and temporary disturbance of habitats during construction will not have a significant impact on populations or availability of habitat for birds or terrestrial mammal species during construction.

Fauna strike

Increased marine traffic and ocean-based activities may result in vessel strike, when vessels are transiting to and from the works area during construction or cruise ship or ancillary vessel traffic during operation. The risk of vessel strike whilst transiting to site would be managed through the implementation of vessel speed restrictions. During construction, all vehicles and equipment will keep to designated traffic routes and observe traffic controls (e.g. speed limits) to minimise risk of fauna strike.

Commercial and recreational vessels have recorded vessel strikes. Recreational vessels, however, account for 96.9% and commercial vessels only 0.001% of registered vessels in Queensland in 2003 (MSIAR, 2003). The Department of Environment and Heritage Protection (DEHP) of Queensland keeps a stranding and mortality database for dugongs, cetaceans and turtles, which indicates the mortality of each group and species due to boat strike. From 2008 to 2011, there were three boat strike incidences reported on cetaceans in Queensland: at Mission Beach, Hayman Island and Fairway Buoy off Gladstone (Meager, Winter, Biddle, & Limpus, 2012).

Of 126 marine turtles that were recorded as killed or injured by vessels (Meager & Limpus, 2012b), 51 were recorded in Moreton Bay. Green turtles in particular are at risk of vessel strike as they have a habit of basking at the water's surface. Green turtles are unlikely to occur within the proposal area, due to lack of suitable or known green turtle habitat; however, they may pass through or near to the proposal area and associated underwater noise propagation zone in a transitory capacity.

Underwater noise

Construction of the jetty, wharf and mooring/berthing dolphins will involve installation of a number of raked piles – concept design indicates 3- 4 piles per bent, up to 220 piles in total. Piling activities during construction are estimated to take 1-2 hours per pile in a series of 3-4 piles, every 3-5 days.

Piling is known to generate underwater noise that has the potential for direct impacts to species; these may be physiological or behavioural effects on cetaceans, marine reptiles and fish. Piling methods will be designed to minimise unnecessary noise and procedures such as slow-start will be employed to reduce the risk of impacts due to sudden changes in noise and vibration levels.

Physiological effects of underwater noise relate to effects on the auditory system; exposure to high level sound for a specific duration can damage animals hearing and result in either temporary threshold shift (TTS) or permanent threshold shift (PTS), which corresponds to either temporary or permanent damage to the animals hearing.

Marine mammal behavioural responses to noise include changes in vocalisation, resting, diving and breathing patterns, changes in mother-infant spatial relationships and avoidance of the noise source (NRC, 2005) masking of biologically important sounds may interfere with communication and social interaction, and cause changes in behaviour as well (DPTI, 2012).

Baleen whales are classified as low-frequency cetaceans. There are known criteria for behavioural and physiological impacts on cetaceans from impact pilling published by National Oceanic and Atmosphere Administration (NOAA) (2011). Further assessment of underwater piling noise propagation will determine zones of impact.

Zones of impact can be applied to define the likely environmental footprint of a noise source and indicate how far away a noise source is likely to have an impact on marine mammal species. These zones of impact have been defined (by Richardson et al. 1995) as:

- Zone of audibility – extent to which an animal may hear the noise source but not show any behavioural response
- Zone of responsiveness – area within which the animal might react behaviourally to the noise source
- Zone of hearing injury – area closest to the noise source that may cause TTS or PTS.

These zones can vary depending on ambient noise. As part of the detailed environmental assessment for the proposal, an investigation will be conducted by a specialist underwater acoustics consultant to identify the site-specific underwater noise propagation zone for piling in an open ocean environment.

To maximise safety and effectiveness of the monitoring zone, piling will not occur at night. It is unlikely to be feasible to install piles outside of the three months period of the southern humpback whale migration (September to November), which will result in the possibility of mother and calves being present in the works area. Observations with safety zones (based on the zones of impact) will be used to identify approaching marine mammals to minimise impacts and operational procedures will be implemented to minimise the risk of impacts upon them.

Sediment and turbidity

At this Business Case stage, dredging is one option being considered to fill caissons. If required, dredging is likely to occur at or near to the site of the caisson breakwater, i.e. at approximate depth of 18 m, and water-logged material would be directly placed into the caisson limiting potential for increased levels of turbidity or dust. Experience of similar activities in the general area indicates that sand is general clean, with reduced silt or muddy deposits and has limited plume generation capability.

It is recommended that methods such as the use of silt curtains are investigated to ascertain their likely practicality and effectiveness in reducing the migration of disturbed sediments and plumes from dredging.

Lighting

Anthropogenic lighting can attract and disorientate turtle hatchlings and can result in hatchlings pooling under artificial lights; this can increase the likelihood of predation and interfering with hatchlings natural nearshore orientation and swimming movements. Lighting can also deter female turtles from nesting in an area.

Sporadic nesting of Loggerhead turtles has been recorded along the coast where the proposal is located therefore there is a potential that nesting female turtles may be recorded in the proposed area. If turtle nests are recorded than appropriate lighting management and mitigation measures, such as low sodium lights, light shades and directing lights away from the beach may need to be implemented. It is suggested that the beach adjacent to the proposed area is scanned for any nesting activity daily (by the Marine Fauna Observer), between October and March.

Increased lighting (and noise) also has potential to impact on migratory shorebird species, including threatened migratory shorebird species. However, the habitats used by these species in the vicinity of the Project occur in the Gold Coast Broadwater, at least several hundred meters from the western edge of the Project area, with the most important habitats for these species located at least 1 km from the Project area. Therefore, increased noise and night lighting is not expected to significantly impact on any terrestrial vertebrate species listed as a threatened or migratory species.

It is not anticipated that works will be undertaken on a 24 hour basis during the construction phase, due to the requirement to be able to observe the distances of marine fauna from piling activities therefore lighting impacts on turtle populations is likely to be minimal, if construction lighting is turned off at night.

Pest and feral animals

It is unlikely that the proposed works will result in further introductions of feral vertebrate species. Furthermore the proposal is not considered likely to exacerbate current populations of pest animals given they are already established in the region.

The introduction of exotic ant fauna is a risk to the proposal. Yellow crazy ants (*Anoplolepis gracilipes*) and fire ants (*Solenopsis invicta*) are exotic ants that have the potential to seriously impact native flora, fauna and ecological communities. They are capable of being transported from infested sites to new construction sites on equipment or within materials. Whilst many colonies of both species have been eradicated, spreading ants to new areas is a potential issue and needs to be managed during construction.

Environmental Management Plans

Through the development of the design concept and preliminary environmental assessment of the project a number of project specific environmental management plans have been identified. These are required to successfully mitigate the site specific and operational impacts associated with the CST. There will be a number of other general management plans

required for the project and these will be prepared at a later stage in the project. The key management plans include:

Underwater Noise Management and Mitigation Plan: This is required to manage the impact associated with underwater noise propagation during pile construction for the jetty. Typical response will likely include:

- Pre-start procedure to check from the presence of marine fauna in the construction zone
- Soft start procedure to gradually commence piling activity to ensure that any marine fauna present in the area have opportunity to move away from construction zone
- Normal operational procedures would require trained crew to undertake continual visual monitoring for marine fauna and highlight need for stand by procedures to be implemented should marine fauna be identified within the observation or construction zone
- Stand by procedure should marine fauna be spotted moving toward the construction zone piling activity would be placed on stand-by to shut down should the marine fauna not move away from the construction zone
- The contractor conducting the piling will be required to engage a suitably qualified marine mammal observer(s) (MMO) when migratory, vulnerable or endangered marine mammals are likely to be present within the area surrounding the piling activity.

Lighting Management Plan: This will be required for both operational and construcution lighting to ensure that it lighting minisise distruption to migratory, breeding or feeding patterns of fauna, Measures would include:

- Light sources will be directed onto the structure, or recessed or shielded in such a way that avoids shining on the beach or reflecting on the water. Avoid lighting reflective surfaces
- Minimise light intensity as low as reasonably practical. Use low pressure sodium (LPS) vapour lighting (or high pressure sodium lights when LPS lighting is impractical) or yellow/amber/red lighting (LED or less than 25 watts or less for incandescent and 9 watts or less for compact fluorescent) over white incandescent, fluorescent and high intensity lighting.

Vessel Strike Management Plan: Whilst the instances for vessel strike with commercial vessels is low, to protect cetaceans, marine turtles and dugongs from increased risk of vessel strike, the following management measures will be incorporated into a future environmental management plan and operational plans associated with the proposed development:

- Construction vessel crew and cruise ship terminal operational staff will undertake site induction by appropriately trained project personnel
- Construction vessel speeds will be under the control of the Vessel Master who requires that vessels operate in a safe manner with due respect to ongoing operations, navigational constraints and environmental considerations
- The construction Vessel Master will be advised of environmental matters from on-site environmental staff, including trained vessel crew, as applicable
- Trained construction vessel crew will monitor and report marine fauna sightings from construction vessels during daylight hours during the construction phase

- Trained cruise ship terminal operational staff will monitor and report marine fauna sightings to the Harbour Master (or similar authority) and this will be reported to incoming cruise ship vessels during the operation of the facility

- Any incidents or injuries to fauna will be documented and reported.

Refueling and Spill Management Plan: Whilst fuel management strategy for the operational cruise ship has not been determined, it is likely that re-fuel activities will occur at the terminal. This could also include the transfer of other liquids includes potable water and removal of grey water from the cruise ship. Standard mitigation measures (for either refuelling at the jetty or via a bunker barge) to reduce the risks of hydrocarbon spills include:

- Visual monitoring of hose couplings and the sea surface during refuelling of vessels or during the transfer of other materials or liquids which pose environmental risk of released

- Continuous radio contact between the vessel and the wharf

- The use of dry-break couplings and breakaway couplings where practicable

- Spill response equipment and procedures to be kept up to date and in an easily accessible place

- Create and implement an Oil Spill Contingency Plan.

Pest Management Plan: As identified within the associated field survey work, there is potential for pest specicies to be transferred to the project area. A standard management plan would likely include:

- Checking and cleaning of vehicles which have been exposed to vegetated areas

- Management of vegetated / organic material to be transferred to or from the subject site to prevent un-controlled movement of pest species

- Implementation of weed control plan for the project site and surrounding area in order to physically reduce spread of weeds

Heritage values

Section 23 of the *Aboriginal Cultural Heritage Act 2003* (Qld) places all persons in Queensland under a duty of care to take all reasonable and practicable measures to ensure they do not harm Aboriginal cultural heritage (tangible and intangible) whenever they undertake an activity. An unexpected finds protocol will be implemented to provide guidance to site personnel in the event that an unexpended heritage find is encountered.

Scottish Prince historic shipwreck

The Scottish Prince historic shipwreck is listed in the Australian National Shipwrecks Database (Shipwreck ID Number: 3107). This ship wreck is protected under the Commonwealth Historic Shipwrecks Act 1976; however does not lie within a protected or no-entry zone.

The Scottish Prince lies at a depth of approximately RL -10.5m (LAT). Only the upper deck of the 64m long vessel is exposed with much of the original hull having deteriorated over time. Sections of the Scottish Prince are known to be covered and uncovered by sand depending on prevailing marine conditions.

The Reference Project shows the Scottish Prince located nominally 235m from the northern edge of proposed jetty and in excess of 450m from the Breakwater. The wreck would be 50m beyond the eastern edge of the northern swing basin which is part of a possible expansion

option to provide a second cruise ship berth. The wreck is outside the normal operational area for navigation of cruise ships to and from the future second berth.

There is potential for the wreck to be impacted during both the construction and operation of the CST. In terms of mitigating this risk, during construction the wreck would be nominated as an exclusion zone and hazard to construction vessels. Noting that main construction activities would be well separated from the wreck in any regard.

During the operation of the CST there is risk to the wreck from potential vessel strikes. There is also potential for the wreck to be influenced by forces or movement of sand associated with propellers or bow and stern thrusters located to the hull of the cruise ship. The potential impact of cruise ship propellers and thrusters would be evaluated and suitable management plans would be developed during the EIS.

As currently proposed the wreck is located outside of the swing basin of the southern berth. Should the additional northern berth be constructed, the northern swing basin will be closer to the wreck but outside the normal operational area for navigation of cruise ships to and from this future second berth.

In the unlikely event that a cruise ship was to navigate beyond the normal operational area, there would still be sufficient clearance from the underside of the ship's hull to the wreck. The largest cruise ships in the world have a draft of 9.15m, whilst the majority of cruise ships have a draft of less than 9.0m, with the exception being the Queen Mary 2 which has a draft of 10.3m.

If the Queen Mary 2 was to call in at the CST it would likely be scheduled to call in at the southern berth and hence physically separated from Scottish Prince Wreck. The largest cruise ships with a draft of 9.15m (e.g. Oasis Class ships at 360m long) would still have a minimum under keel clearance of 2m over the top of the shipwreck at a typical low tide.

If this was still considered as an unacceptable risk to the wreck, a similar schedule constraint could be placed on these largest cruise ships to only call at the southern berth.

The wreck would be located within the shadow of the proposed breakwater and it is expected that this area, generally, would experience a more benign wave environment. Existing tidal and oceanic currents travelling parallel to the shore line would remain unchanged. A potential impact of the breakwater, at the wreck site, is that sand may accrete in this area. The accretion of sand in these deeper waters would, however, impact ship navigation and should this occur a sand management regime would be implemented.

Based on this it is anticipated that the wreck would remain beyond the extent of changes to the existing beach profile. However, this would need to be confirmed via further coastal process modelling. This would also include an assessment to determine the potential zone of influence of ship movements upon the wreck, which may require a greater exclusion zone to ensure the wreck is sufficiently protected.

10.1.6 Next Steps

Given the habitat available onsite, adjacent to and surrounding the site, the proposed action is not considered likely to have a significant impact on availability or quality of habitat, or long term size of regional populations.

In all instances, appropriate construction, operational and risk management plans would be prepared and adopted to address these project impacts. This would be based upon a detailed assessment of the project, prevailing environment and on-going operation of the facility.

Environmental Impact Assessment

The City has commenced the next phase of environmental assessment by referring the Project to the DoEE to determine if the Project will be a Controlled Action in accordance with the EPBC Act. The assessment process is described in Chapter 14.

11 Public Interest Considerations

11.1 Purpose and overview

The purpose of this section of the Business Case is to assess the proposed CST's consistency with the public interest. This is an integral part of the business case development process as it ensures that equitable processes and principles are applied in assessing the feasibility of the Project. The PAF provides some guidance on matters that typically need to be addressed, including (but not limited to):

- Public access and equity
- Consumer rights
- Safety and security
- Privacy
- Accountability and transparency
- Impact on stakeholders.

These matters encapsulate the key concepts of public interest. On balance, the CST development is considered to be for the greater good of society and provides equitable outcomes for all Project stakeholders so long as it proceeds with high levels of process transparency. On high-profile infrastructure projects such as the proposed CST, process transparency is particularly important given the number of individuals and stakeholder groups that may benefit or be impacted as a result of the Project.

11.2 Public access and equity

The CST development proposal work to date has been developed having regard to public access and equity imperatives. At the highest level, the CST development is intended to achieve improved economic outcomes for the Gold Coast, the benefits of which will be directly realised by the broader community, including persons from disadvantaged groups.

At a more granular level, the design of the CST development has been designed in a way that would support flexibility of use. In this regard, there is scope for effective use of the facilities by several stakeholders for recreational and commercial purposes, thereby providing benefits to the wider community.

11.3 Consumer rights, safety and security

Consumer rights are the legal and moral duties of protection owed by a supplier to a purchase or user of goods or services. The fundamentals of consumer rights include:

- Right to safety
- Right to be informed
- Right to choose

- Right to be heard.

The public community, domestic and international cruise ship passengers and crew, and local residents are intended to be the main users of the CST facility. Other ancillary users are most likely to be recreational or commercial users (e.g. fishermen, divers, videographers etc.). On this basis, any risks associated with consumer rights for the CST development have the potential to be low. To ensure that the risk of consumer rights complexities are minimised, it will be essential to develop and implement policies which protect the existing rights of the public and ensure that these protections are communicated clearly to the public.

The proposed CST development has been designed to address relevant safety and security considerations, including corruption, crime, public health, service quality, and security supply.

11.4 Privacy, accountability and transparency

As a Local Government, the City is subject to the requirements under the Information Privacy Act 2009 (Qld) (IP Act). The IP Act regulates the way personal information is collected and handled in the public sector environment, as described through the Information Privacy Principles. The IP Act also provides a process for providing individuals with access to personal information in the government's possession.

Given the nature and scope of the CST development, it is unlikely that issues associated with personal information would impact in any significant way on the implementation of the CST. With that said, it is expected that cruise ship companies and any commercial businesses using the facility would need to implement their own privacy of information protocols, when handling and collection personal information of their passengers and customers.

Aside of from cruise ship visitations, early success of the CST development can also be measured by the public acceptance as a result of transparency of information and effective communication to all involved stakeholders.

11.5 Impact on stakeholders

The Gold Coast region is well serviced in social infrastructure, including community services and facilities. The Spit extends into the seaway and the landmass consists mostly of public parkland which is popular for fishing, rockwall fishing, boating and general leisure. The Spit provides a 3.5km walking track, Federation Walk, which leads through a vegetated area.

A stakeholder scan was conducted to identify the holistic overview of the potential impacts on various stakeholders as a result of the proposed CST development.

Table 45: Stakeholder scan

Stakeholder	Overview
Local residents	During construction, the local residents will be most impacted by increased traffic, noise and accessibility to the site. The CST operation will create direct impacts to those local residents in close proximity to the CST site. This being, the creation of a new perspective of the City, which in some cases may be perceived as an obstruction to the current horizon view. A change to the City's local character and vista may be the primary driver in the perceived loss of public space.
Spit Local Businesses	For the Spit local businesses, construction of the CST may create additional demand for the local workforce to service. This may include providing additional accommodation in proximity of the site to cater for additional tourists, which may warrant opportunities for contractual arrangements between the city and existing private accommodation providers on/near the Spit. On the other hand, the Spit local businesses will be subject to increased noise and traffic impacts and potential staff accessibility issues during construction and operations.
City Businesses (business neighbours)	There is a potential for the City's neighbour business to be positively impacted by the CST's development and activity. From a construction perspective, domestic and international suppliers may have the opportunity to participate in the Gold Coast's cruise ship industry. From an operational perspective, the jetty can potentially be a site of: educational excursions; film/production sets; wedding/reception venues; television and broadcasting sites.
Construction Industry	The CST, as a major infrastructure project, will greatly benefit the region's construction industry providing increased construction jobs, training and trades, education institution expansion and maintenance jobs over the life of the asset.
Re-creational Groups	The CST will have both positive and negative impacts on stakeholders that use the area for recreational purposes. Enhancement of the public amenity may increase the recreational activity and enjoyment of visitors, whereas changes recreational accessibility for surfers, dog walkers, fishers, kite-boarders and the like may be negative impact on this stakeholder group.
Special Interest Groups	CST construction and operation will have negative impacts on special interest groups focused on the environment and the loss of public land and public assets. This includes Save Our Spit, Gecko, Save our Broadwater, Main Beach Associates, Friends of Federation Walk, Gold Coast Surf City, and Sea Shepherd Australia etc.

12 Social Impact Considerations

12.1 Approach

The approach to the Social Impact Evaluation (SIE) was based on the Building Queensland guidance material for development of a Business Case, as well as the supporting guidelines for conducting a SIE. This SIE focus on the social impacts of the proposed CST development, relative to the Social Impact Baseline (SIB). Some preliminary steps of the SIE were completed in the Preliminary Business Case stage and while key stakeholders were engaged in the identification of social impacts, an extensive and formalised stakeholder engagement process with the broader community was not conducted due to the scale of concurrent, high-profile community consultation programs for the Gold Coast IRD, led by the Department of State Development.

12.1.1 Identify social impacts

A high-level desktop review has been conducted to identify the potential social impacts and determine the SIB. This has been supported by several workshops which were held with a range of stakeholders to collaboratively consult on various critical decision points, including identifying the service needs, developing the options for a solution, identifying the risks and prioritising a proposed solution. At the beginning of each workshop a 'Brainstorming Blitz' session was held to allow each individual to voice their opinions and insights, at a holistic level, of the proposed development.

The existing social environment was discussed at these workshops as informed by prior stakeholder conversations, and reviews of community and social impacts of current activity on the Spit. From this, existing problems associated with the current social environment were identified and informed our development of the SIB.

Recognising that different stakeholders attended different workshops, this approach was considered to better capture a wide variety of perspectives as opposed to one specific workshop dedicated to drawing out the likely social impacts. This approach allows an iterative form of preliminary stakeholder consultation, as the proposed development continues to attract political and media attention over the course of the project. Another method of capturing the social impact perspectives was during market sounding activities and one-on-one stakeholder consultation meetings.

The stakeholders from whom input was gathered are presented in Table 46.

Table 46: Stakeholders consulted over the Project

Sector	Organisations	
Professional Services	• PwC • AECOM	• MacroPlan • Ocean Park Consulting
Local Statutory Bodies	• City of Gold Coast • Gold Coast Chamber of Commerce	• Gold Coast Waterways Authority
Tourism and Economic Growth	• Gold Coast Tourism	• Regional Development Australia
Cruise Industry Bodies	• Cruise Lines International Australia	
Cruise Line Companies	• Royal Caribbean International • Carnival (P&O) Cruises	• Norwegian Cruise Line • Ponant Cruises
Local Businesses	• Pacific Mirage Ltd • Sheraton Grand Mirage Resort	• Palazzo Versace
Environmental Protection	• International Coastal Management	
Educational Institutions	• Griffith University	• Southern Cross University

The social impacts of the proposed development, relative to the SIB were also identified as part of the workshop process. These impacts were explored further and refined through a desktop review, which included reference to previous proposed cruise ship terminal projects and relevant literature. This research identified revealed the key drivers and indicators behind each impact. The Building Queensland Social Impact Evaluation decision tree was used to identify whether each of these impacts could be monetised, quantified or qualitatively described.

12.1.2 Impact risk assessment to determine materiality of impacts

An Impact Risk Assessment (IRA) was completed to determine the materiality of the social impacts. This was achieved through the development of an IRA matrix that identifies the likelihood and severity of each identified impact. The impacts that were deemed to be material were further assessed as demonstrated in Chapter 6.

Further detail on the related risks and mitigation strategies can also be found in Chapter 7 Risk Analysis. Operational impacts which may arise during the operation of the proposed CST, for example an increased risk of vessel strike, or the risk of fuel spills during re-fuelling stages (and the subsequent impact on society) are also addressed in Chapter 7, which identifies the risks and risk mitigation strategies for each stage of the project.

It is important to highlight that while some impacts may need mitigation considerations, other social impacts have a positive impacts and may need further enhancement to improve the outcomes of the Project.

12.1.3 Summarising the results

An extensive desktop review was conducted to determine whether impacts could be appropriately quantified for the SIE. Potential metrics for quantifiable social impacts were identified along with a methodology to determine their value. Due to significant uncertainty in the quantifiable metric and the proposed development, the majority of social impacts identified as part of this process have not been quantified to be included in the economic assessment. The only social impact included in the Economic Analysis in Chapter 8 is the additional attraction of tourists to the area. Additionally, the traffic impacts have been discussed in further detail in the Legal and Regulatory Requirements in Chapter 14. All of the remaining impacts that could not be quantified due to the nature of the impact were qualitatively described.

12.2 Identified social impacts

12.2.1 Social impact baseline

The SIB describes the current social environment without the CST development.

Social amenity and use of the study area

The Gold Coast region is well serviced with social infrastructure, including community services and facilities. The Spit extends into the seaway and the landmass consists mostly of public parkland which is popular for fishing, rockwall fishing, boating and general leisure. The Spit provides a 3.5km walking track, Federation Walk, which leads through a vegetated area. The southern area of the Spit is occupied by tourist facilities, hosting major resorts and restaurants, including Fisherman's Wharf, Marina Mirage, Sea World, Sheraton and Palazzo Versace. The land east of Seaworld Drive consists of regenerated sand dunes and is often used by the public for walking and swimming. Land subject to the proposed development is held under reserve by the State Government.

Despite the Spit's proximity to the major hubs on the Gold Coast, it provides residents and tourists alike with access to parkland and beach front without the associated crowds of most other Gold Coast areas. The beach near Doug Jennings Park is one of the beaches on the Gold Coast allowing an off-leash dog area. Arts and cultural activities play a large part in shaping the identity of the Gold Coast. Known for its peaceful atmosphere, The Spit hosts several events during the year, including polo tournaments and music festivals.

The proposed development area is located both on land and within Queensland State waters, extending from Philip Park, Main Beach. The potential social impacts are discussed further below.

Table 47 describes the SIB for this Project, which is the benchmark that the social impacts have been compared against.

Table 47: Summary of Social Impact Baseline

Summary of Social Baseline		
Social Impact Baseline (*Summary*)	The proposed site at Philip Park, Main Beach remains as an open space for residents and tourists to use for land and marine-based recreational activities.	
Social Impact Baseline *(Brief Descriptions)*	*Problems / Opportunities / Service needs identified in the Social Impact Baseline*	*Key Drivers*
	A changing holiday dynamic has led to flat tourism activity on the Gold Coast	Lack of more than one significant tourism drawcard and lack of more than just natural attractions
	Absence of significant marine infrastructure means the Gold Coast is missing opportunities to access a lucrative and growing market	Lack of marine infrastructure in an environment of a growing cruise ship markets
	Lack of contemporary attractions are diminishing the Gold Coast's tourist brand upkeep and international reputation as a world class tourist destination	Lack of a variety of things to see and do and lack of experiences on offer
	Lack of clarity of development on the Spit leads to community uncertainty regarding the extent of development	Criticality of ensuring considerable public access regions and open spaces driven by a clear, concise and widely supported plan for the Spit.

The proposed CST development largely covers each problem identified in the SIB through addressing the key drivers. A CST will provide additional tourism attraction and infrastructure to access the growing cruise ship market. A dedicated CST will also alleviate uncertainty of ownership and development of the Spit area.

12.2.2 Social impact evaluation

Community views on the proposed development have historically been extremely polarised, with residents having a strong view one way or the other. Outcomes of the social identification process has revealed the same tendency. The Gold Coast hosts lobby groups, such as the Save Our Spit and Gecko organisations, which are (and have been in the past) publicly against a CST on the Gold Coast. On the other hand, other Gold Coast residents are highly supportive of a CST on the Gold Coast.

The positive and negative social impacts identified for the proposed CST development, including key drivers and assumptions are described in Table 48. Assumptions were made in order to describe the nature of the relationship between the key drivers and social impacts.

Table 48: Social Impact Assessment

Code	Social Impact	Description	Key Driver / Assumption
	Positive Impacts		
P1	Upskilled Gold Coast residents	Gold Coast local residents have the opportunity to upskill and develop new skills in newly introduced industries including bio/marine security and customs.	Access to experienced personnel with the capability to deliver training which both develops on residents' existing skill set and enables them to enter these new industries.
P2	Increased construction jobs and operational jobs in marine and cruise ship industries (supply and services)	Creation of additional construction jobs and ongoing operational jobs as a result of the CST construction and operation.	The operational capacity of and demand for the CST.
P3	Attraction of additional tourists	Additional tourists to the Gold Coast will create various direct and indirect economic benefits	Adequate access to the Gold Coast which may require changes to nearby airport capacity and relevant flight paths.
P4	New business service offerings	Businesses around the study area will be able to develop new business offerings to support the provisioning of cruise ships and the additional tourists.	Existing business owners' aptitude for embracing new opportunities.
P5	New public amenity	Jetty and wharf will provide a new community amenity of the Gold Coast, which is unlike any other in Australia.	Competing infrastructure developments that may be progressing in parallel may hinder the uniqueness of the site.
P6	Improved use of the area	Potential to alleviate the issues regarding the Spit's high underutilisation and attraction of unwelcome squatters who leave behind waste.	The area is not well-serviced with some roads unformed, with little recreational infrastructure.
P7	Increased security of the area	CST development and operation will warrant increased security of the area, with less opportunity for criminal or undesirable activity, than if the open public space remained as is.	Security scheduling and locations.
P8	Increased safety for divers	Safety of divers around the Scottish Prince wreckage and the breakwater (potential) is enhanced due to legal and supervised diving instructors.	The structure of the CST allows for a safe diving environment close to the wreckage and the calm waters and vertical structure created by the breakwater. This assumes that diver businesses are not operational on cruise ship arrival days.
P9	Increased safety for surfers and swimmers	The breakwater will provide a shelter from harsh waves, creating a safer surfing beach.	The structure of the CST allows for a safe diving environment. This assumes that surfers and swimmers are restricted from accessing operational areas.

Social Impact Considerations

Code	Social Impact	Description	Key Driver / Assumption
	Neutral impacts		
A1	Increased concentration of tourists with different demographics	There may be concerns from businesses whose targeted demographic differs from those disembarking the cruise ship.	Some resorts/restaurants on the Spit may only target the high-end, wealthier demographic, however the growing demographic trend on cruise ships are younger generations travelling on a budget. This impact applies vice versa, to those businesses which do target the demographic of disembarking passengers.
A2	An unobstructed view is changed	Impacted satisfaction levels (positive or negative) of those visiting the Spit and those who have businesses on the Spit due to the changed unobstructed view of the Gold Coast.	This will be driven by the size and height of the CST. It is expected that only a small portion of the population to be affected.
A3	Impact to beach and coastline	The physical development of the CST may change the nature of coastal processes, impacting the sand budgets and surf breaks. Surfers may be negatively impacted and forced to find another beach with desired surfing conditions. However, significant changes can be broadly predicted and communicated to the affected stakeholders due to numerous works on the Gold Coast such as Narrow Neck Reef and the Sand Bypass System.	Any potential restrictions placed on the beach and coastline use after the construction of the CST.
	Negative impacts		
N1	Decreased level of accessibility during construction and operation	Decreased satisfaction due to perception of taking away a free, accessible public space available to all community members and replacing it with a locked site, only available at certain times. There will be restrictions on accessing parts of Philip Park and Federation Walk during the construction of the jetty, particularly when the construction is occurring closer to shore.	The length and scheduling of the construction period. Any additional service offerings of the CST may minimise the accessibility impacts. This would mean that businesses may operate and make use of the site when cruises are not docked, which could provide additional accessibility outside the expected timeframes.
N2	Increased potential for navigational issues for smaller vessels	The CST development may create potential navigational issues for smaller vessels to access the marina around the vicinity of the offshore jetty and wharf.	Hampered accessibility to the marina.

Code	Social Impact	Description	Key Driver / Assumption
N3	Impact on personal and cultural values	Individuals with strong personal values towards environmental views, cruise ship working conditions, and the feeling of 'home and belonging' may be challenged as a result of the CST development.	There may be: • Strong community environmental views • Perception that the cruise ship industry facilitates unfair working conditions[43] • Perception of 'home and belonging' being challenged among the disembarkation of 3,500+ international tourists at once.

Table 48 represents the potential social impacts of a CST today. As addressed in Section 2.3, the Spit is undergoing several new developments and redevelopments. The social impacts arising from the proposed CST development may, in the future, be mitigated or exacerbated as a result of the other infrastructure developments on the Spit.

12.3 Categorisation of social impacts

The identified social impacts were divided into three categories through the application of Building Queensland' SIE decision tree. These categories include:

- Social impacts that can be quantified and monetised (and included in the CBA)
- Social impacts that can be quantified and not monetised
- Social impacts that cannot be quantified or monetised.

The allocation of social impacts to these categories is summarised in Table 49. Overall, only impact P3 was identified as being able to be reliably quantified and monetised for inclusion in the economic analysis.

[43] Work on cruise ships can be characterised by long hours, 12 to 16 hours per day. An International Transport Workers Federation study found that more than half of cruise ship workers earned less than US$1,000 per month, including 16 per cent who earned less than US$500. In contrast, Leisure and Hospitality workers in the US earn on average US$1,450 per month, working 26 hours per week. (Source: http://library.sasb.org/wp-content/uploads/Services/SV0205_CruiseLines_Provisional_Brief.pdf)

Table 49: Treatment of impacts in SIE

		Impact categories		
Code	**Identified social impacts**	**Qualitative**	**Quantitative**	**Monetised**
P1	Upskilled Gold Coast residents		✓	
P2	Increased construction jobs and operational jobs in marine and cruise ship industries (supply and services)		✓	*Included in CBA*
P3	Attraction of additional tourists			✓
P4	New business service offerings		✓	
P5	New public amenity	✓		
P6	Improved use of the area	✓		
P7	Increased security of the area	✓		*Included in SIE*
P8	Increased safety for divers		✓	
P9	Increased safety for surfers and swimmers		✓	
A1	Increased concentration of tourists with different demographics		✓	
A2	An unobstructed view is changed	✓		
A3	Impact to beach and coastline	✓		
N1	Decreased level of accessibility during construction and operation	✓		
N2	Increased potential for navigational issues for smaller vessels	✓		
N3	Impact on personal and cultural values	✓		

12.4 Impact Risk Assessment

An Impact Risk Assessment (IRA) was used to assess and determine which social impacts are material in terms of their significance and relevance to stakeholders. As per the Building Queensland guidance, material social impacts have been defined as those that they could alter the circumstances of stakeholders. Each social impact is identified in an IRA matrix through a code assigned in Table 49. The allocation decisions and mitigating factors of the 15 social impacts are described in Figure 32.

		Consequence				
		Insignificant	**Minor**	**Moderate**	**Major**	**Significant**
Likelihood	Almost certain			P5, P6		
	Likely			P7, P8, P9	P1, P4, N1	P3
	Possible	A2	A3	P2, N2, N3		
	Unlikely	A1				
	Rare					
Positive Impacts		*Minimal positive change on social characteristics or values of the communities of interest and communities marginally benefit from the change.*	*Short-term positive changes to social characteristics or values of the communities of interest and communities have limited benefit from the change.*	*Medium-term positive changes to social characteristics or values of the communities of interest and communities have some benefit from the change.*	*Long-term positive changes to social characteristics and values of the communities of interest or community have substantial benefit from the change.*	*Permanent positive changes to social characteristics and values of the communities of interest or community easily has benefit from the change.*
Negative Impacts		*Local, small, easily reversible change on social characteristics or values of the communities of interest or communities can easily adapt or cope with change.*	*Short-term recoverable changes to social characteristics and values of the communities of interest or community have substantial capacity to adapt and cope with change.*	*Medium-term recoverable changes to social characteristics and values of the communities of interest or community has some capacity to adapt and cope with change.*	*Long-term recoverable changes to social characteristics and values of the communities of interest or community have limited capacity to adapt and cope with change.*	*Irreversible changes to social characteristics and values of the communities of interest or community has no capacity to adapt to cope with change.*

Figure 32: IRA scatter diagram for CST development

The dark brown boxes are classified as high risk or beneficial social impacts, brown are medium risk or beneficial social impacts and light brown are low risk or beneficial social impacts.

The IRA matrix identifies that the CST has nine high positive social impacts and only one high negative impact. High risk social impacts are considered material and require further consideration, depending on whether they can be monetised, quantified or qualitatively described.

12.5 Mitigating social impacts

The following alternative solutions, mitigation and management measures are recommended to ensure that the proposed development (including design, construction and operation) is delivered in a way that minimises the impact on the community living in the immediate and regional areas around the development zone. Key components of the impact risk assessment are included in Table 50.

Table 50: Impact Risk Assessment

Code	Social Impact	Allocation	Mitigation or Enhancement Strategy
Code	**Social impact**	**Allocation**	**Mitigation or Enhancement Strategy**
	Positive Impacts		
P1	Upskilled Gold Coast residents	Major/Likely	Establishment of working partnership arrangements with cruise line companies which allow opportunity for Gold Coast residents to be employed by cruise line companies under Australian standard employment regulations
P2	Increased construction jobs and operational jobs in marine and cruise ship industries (supply and services)	Moderate/ Possible	Establish a framework that prioritises local participation in the marine and cruise ship industry.
P3	Attraction of additional tourists	Significant/ Likely	Incorporation of the CST in the Gold Coast and Queensland's marketing strategy to the global tourism market. Develop appropriate strategies in partnership with Brisbane and Gold Coast Airports to ensure adequate access to the CST from local and international destinations.
P4	New business service offerings	Major/Likely	DestinationQ and the City to work together and support the development of new industries in the Project area to act as facilitators between the cruise ship operators and the local businesses, where required.
P5	New public amenity	Moderate/ Almost Certain	Development of a communication strategy to inform local residents and tourist of the alternative uses and offerings on the site.
P6	Improved use of the area	Moderate/ Almost Certain	Development of a communication strategy to inform local residents and tourist of the alternative uses and offerings on the site.
P7	Increased security of the area	Moderate/ Likely	Install technology and deterrent signage to support security in patrolling the area.
P8	Increased safety for divers	Moderate/ Likely	Engagement with local dive centres to ensure all of their requirements are appropriately met to enhance diver safety. It may be possible to make minor adjustments to the CST to better enable this additional use of the site.
P9	Increased safety for surfers and swimmers	Moderate/ Likely	Safer surf conditions in the shadow of the Breakwater. Ensure all local lifeguards are adequately trained to patrol the new marine conditions. Implement and update appropriate signage to inform residents and tourists of any safety concerns prior to accessing the waterways.

Social Impact Considerations

Code	Social Impact	Allocation	Mitigation or Enhancement Strategy
	Neutral impacts		
A1	Increased concentration of tourists with different demographics	Insignificant/ Unlikely	Development of an information sharing strategy between cruise operators and local businesses to support local businesses in ensuring their offerings are best suited to the visiting demographics.
A2	An unobstructed view is changed	Insignificant/ Possible	Conduct a re-vegetation program to re-vegetate areas of open space which surround the CST. The program could potentially be completed in partnership with local schools and to facilitate educational learnings of the Gold Coast's dune and vegetation ecosystem and raise awareness of protecting the environment
A3	Impact to beach and coastline	Minor/Possible	Establishment of compensatory habitats for organisms which may be disturbed, aiming to support local business that would lose marine habitat that is critical to the successful running of their businesses
	Negative impacts		
N1	Decreased level of accessibility during construction and operation	Major/ Likely	Development and implementation of a communications plan to actively disclose dates and times of the cruise ships and any machinery that will be in the area. Maintain access during construction in accordance with industry practice.
N2	Increased potential for navigational issues for smaller vessels	Moderate/ Possible	Implementing an educational program or collateral to inform small vessel owners and others navigating the surrounding areas of the CST
N3	Impact on personal and cultural values	Moderate/ Possible	Developing a community engagement group, in partnership and consultation with project developers or owners and contractors, with the City and the State Government. The community engagement group may be able to host key project briefings open to public attendance

Not all of the social impacts caused by the proposed project can be mitigated, managed or enhanced. For example, the temporary removal of public open space for the CST cannot be mitigated, however the impact is arguably not as severe in comparison to historical CST proposals as the current proposal for the CST is to be offshore. Similarly, the loss of public access to public space in the relatively 'untouched' environment is also an impact which cannot be alleviated without ceasing the project in its entirety.

With that said, regardless of whether the CST is constructed, the Gold Coast will still be home to arguably Australia's largest network of beaches, parks and gardens, including the popular sites of Broadbeach, Surfers Paradise and Burleigh Heads.

In all instances, appropriate construction, operational and risk management plans would be prepared and implemented to address these social impacts. It is expected that further consultation and understanding of the social impacts will be undertaken should this Project be progressed through to implementation.

13 Transport Impact Assessment

The traffic impacts of the proposed development were assessed by estimating the additional traffic flows:

- Into the CST location (north bound), and
- Out of the CST location (south bound).

In particular, the analysis has centred on Seaworld Drive, Main Beach, as it is assumed all traffic to the CST will access and depart via this road (based on the current road network and not considering any other proposed developments in the area such as the IRD). The impacts further from the development such as at the roundabout intersection of Seaworld Drive and MacArthur Parade, along Main Beach Parade, and around Waterways Drive and the Gold Coast Highway have also been considered. The analysis was done based on the amount of traffic that would be generated with the development as opposed to the current levels.

13.1 Current traffic Levels

Analysis of the current level of traffic in the Spit area was undertaken based on the latest, available traffic survey data, spanning the week of Thursday 19 January 2012 to Wednesday 25 January 2012. The location of this analysis was on Seaworld Drive, Main Beach, just north of Macarthur Parade (i.e. past the roundabout to the Spit that all traffic to the Spit must take). Figure 33 shows the traffic (vehicles per hour) observed. It should be noted that the survey fell between summer school holidays in Queensland and are therefore may not represent a typical working week throughout the year[44]. With that said, the assumption that cruise ship visits are forecasted to peak in summer provides a level of comfort that the survey results are able to provide an acceptable base level assumption.

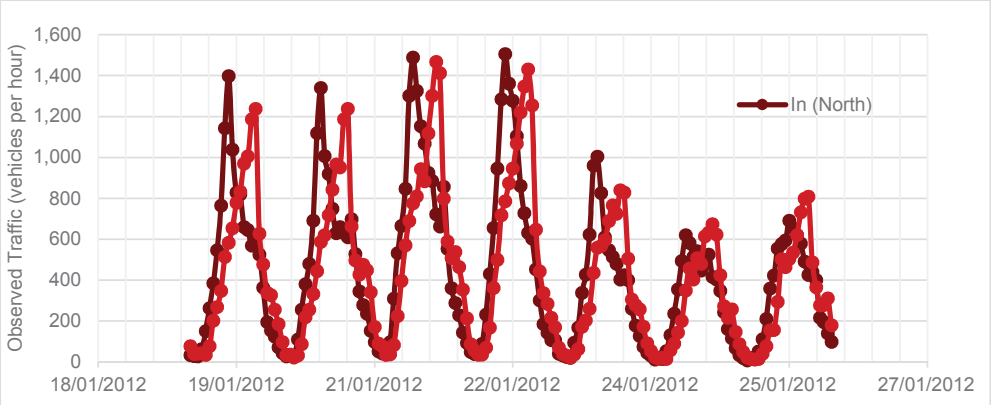


Figure 33: Existing Traffic - Seaworld Drive

[44] Queensland Government - Department of Education, Training and Employment (Nov 2011). Queensland State School Holidays 2012. Retrieved from: http://education.qld.gov.au/public_media/calendar/pdf/2012-school-calendar.pdf

This data is further summarised in Table 51 and Figure 34. As can be seen, the AM peak is in the hour of 10-11am, which is later than a typical urban area peak hour, as the Spit is a leisure/tourist area. The PM peak is in the hour of 4-5pm. Weekday peak traffic observes less than 800 vehicles per hour and weekend traffic is peaks at less than 1,500 vehicles per hour, which is almost twice weekday traffic. For the purposes of this impact assessment, the weekend traffic will be focused on.

Table 51: Average hourly traffic volumes

	Weekday		*Weekend*	
Hour	***In (NB)***	***Out (SB)***	***In (NB)***	***Out (SB)***
6:00	261	112	481	196
7:00	380	167	660	378
8:00	513	205	896	535
9:00	711	360	1,294	704
10:00	**721**	506	**1,497**	781
11:00	644	478	1,343	842
12:00	614	535	1,215	945
13:00	548	567	1,087	976
14:00	536	666	893	1,169
15:00	527	696	806	1,325
16:00	437	**771**	676	**1,449**
17:00	417	753	633	1,334
18:00	395	472	655	723
19:00	301	314	427	516

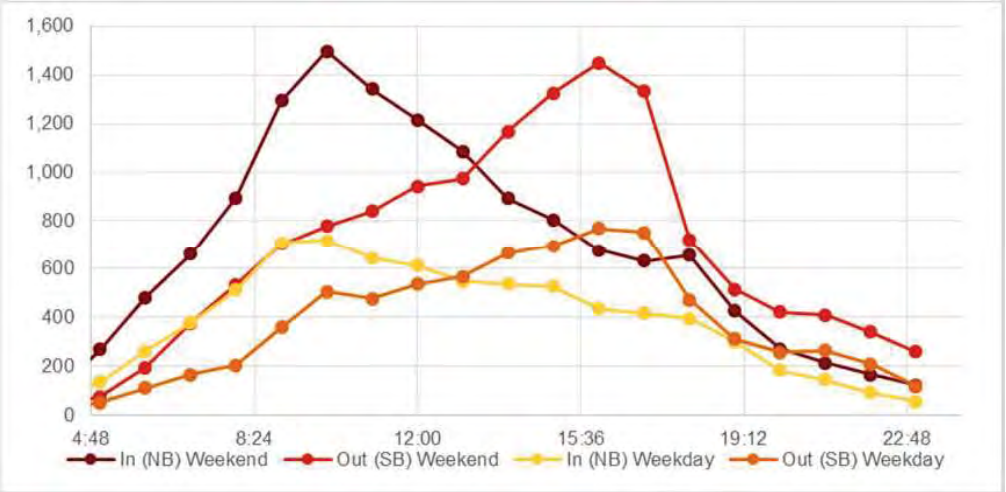


Figure 34: Average hourly traffic volumes

13.2 Traffic impact analysis methodology

Broadly the analysis has been to identify potential development scenarios and estimate the additional trips generated. The following scenarios have been identified for analysis:

- Scenario A: Home Port – 4,000 passenger vessel
- Scenario B: Home Port – 2,500 passenger vessel
- Scenario C: Standalone Tourist Attraction.

These scenarios have been selected to generate a reasonable range of traffic level impacts on the local area due to the introduction of the facility where Scenario A represents the 'high' level case, Scenario B represents an 'average' level case and Scenario C represents a 'low' level impact case. The traffic analysis has adopted a 4000 passenger vessel as the high case to develop a conservative estimate of the traffic impacts.

Scenario A and B have been selected on the basis that the CST is a home port. Two cruise ship sizes have been selected because the number of passengers have a proportional impact on the traffic generated. Scenario C has been included because it is expected that even without cruise ships using the terminal, the facility (i.e. a jetty and wharf) would induce a level of new trips to the Spit as a tourist attraction as it will likely include viewing platforms, opportunities for diving and fishing, potential for whale watching, potential for safe ocean swimming, walking on the jetty and seeing the Gold Coast from the water, etc.

13.2.1 Additional trip generation

Guidelines for trip generation based on land use are often provided by road and transport authorities, however for a unique land use such as the CST, guidelines are not suitable because the amount and distribution of trips is highly dependent on factors such as the size of cruise ship, parking availability and operational procedures such as arrival and departure times. A logical approach has been undertaken, considering the number of passengers, the time period of arriving and departing from the CST, movement of cruise ship staff, movement of CST operational staff (e.g. customs, terminal operators, etc.) and commercial operations (e.g. trucks to provide supplies for the cruise ship, take laundry, etc.).

In the trip generation analysis, the following has been assumed:

Table 52: Additional trip generation assumptions and descriptions

Assumption	Description
Car parking	No car parking available for passengers at the CST.
Boarding and disembarking movements	Passengers depart over a 3-hour period (7am-10am) and then the next round of cruise ship passengers arrive over a 5-hour period 11am-4pm.
Modal share to the CST	• 70 per cent of traffic is via car (including private vehicles, taxi and ridesharing services), 20 per cent coach and 10 per cent public transport • Overall mode shares for the Gold Coast, Queensland or Australia cannot simply be adopted in this analysis because the mode share for travel to a cruise (with significant luggage) and usually by tourists, will be different to commuting travel • The estimates used have been informed by the EIS for the White Bay Cruise Terminal in Sydney which assumed 78 per cent car and 28 per cent bus/coach.
Number of passenger per vehicle by vehicle type	• Car: Two cruise ship passengers per vehicle for car transport (private cars or taxi). This does not include non-cruise ship passengers that may also be in the vehicle • Public transport (bus): 25 cruise ship passengers can travel per bus vehicle, factoring in that there will already be non-cruise ship passengers using the services • Coach: 30 cruise ship passengers per vehicle.
Other CST traffic	• Heavy vehicles (for supplies, waste removal, luggage, laundry etc. leaving the ship and being loaded back as required) will use 50 vehicles per day for a Home Port, evenly distributed throughout • Landside staff (terminal staff, customs, etc.) will use 50 vehicles per day, evenly distributed throughout.
Other assumptions	• Cruise ships are assumed to be at capacity in regard to vacancy rates (i.e. a 4,000 pax capacity vessel has 4,000 passengers that need to access and egress the ship). This is effectively an upper bound analysis – note that not all cruise ships will be fully booked • Cruise ship staff: the number of staff is assumed to be 10 per cent of the number of passengers. In a Home Port scenario, 20 per cent of staff depart the ship during the day • A base level of additional trips has been assumed as a 'Standalone Attraction' (Scenario C) for all scenarios. This is based on 500,000 visitors per year, with 50 per cent of these being uniquely attracted to the CST, and not merely going to the CST because they were already visiting another attraction (e.g. day trip to Seaworld). This assumption has been assumed to be evenly distributed evenly throughout the 7am-6pm period for all days of the year • The traffic analysis does not consider the impact of other proposed developments in the area such as the Integrated Resort Development (IRD).

13.2.2 Impacts

Based on the trip generation assumptions and methodology, Figure 35 shows the amount of additional trips generated in each scenario for the AM (10am) and PM (4pm) peaks on a weekend.

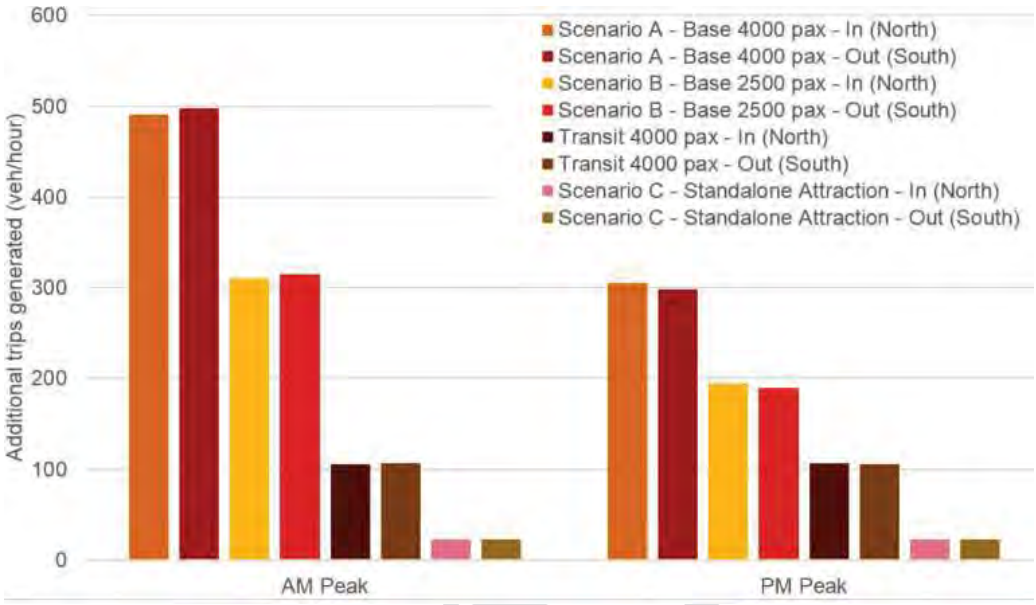


Figure 35: Additional traffic generated by scenario

The traffic impacts for each scenario are provided in Table 53.

Table 53: Gold Coast CST Traffic Scenarios

Scenario	Impacts
Scenario A – Home Port, 4,000 passengers	There is an increase of 491 vehicles per hour (in and out) from 7am-10am. A level of additional traffic is also assumed throughout the day as a 'standalone attraction' – refer to Scenario C. For a weekend, the daily maximum hourly traffic volume increases from 1,497 vehicles per hour to 1,807 vehicles per hour, approximately a 20 per cent increase.
Scenario B – Home Port, 2,500 passengers	Morning peak traffic increases by 310 vehicles per hour (in and out) from 7am-10am. The daily maximum hourly traffic volume on a weekend increases to 1,626 vehicles per hour, an approximate 9 per cent increase from the existing maximum.
Scenario C – Standalone tourist attraction (Non-cruise day)	As a standalone tourist attraction (i.e. on a day with no cruises departing), the total traffic estimated per day is an additional 247 trips (in and out). With demand distributed evenly between 7am to 6pm, this results in 23 vehicles per hour. This demand is not significant at approximately 2.4 per cent additional traffic per day.

13.2.3 Intersection Capacity

PwC understands that key intersections in the area around the Spit including the Gold Coast Highway / Waterways Drive, Waterways Drive / MacArthur Parade, and the Seaworld Roundabout all operate at over capacity during peak times. The Gold Coast CST will increase

the traffic loading on the Spit and will increase the level of congestion at the key intersections particularly during peak times.

13.3 Traffic impact mitigation strategies

Potential mitigation strategies include:

- Where possible, **schedule the movements of passengers** around the existing traffic peaks for the Spit area. AM peak traffic occurs 10-11am, and therefore it is feasible in both the Home Port and Transit Port scenarios to schedule passenger movements to be before this peak period (i.e. 7am-10am). Similarly, the PM peak is 4-5pm, and can passenger movements can be scheduled to be before

- **Provide car parking** for passengers if the CST is used as a Home Port. Without car parking facilities available, passengers would need to either: be dropped off by car (e.g. take a taxi, use a ridesharing service, or be dropped off by family/friends); or use public transit (which may not be a feasible or attractive option if they have significant luggage; or use a coach service if available. By providing car parking, passengers can park at the CST, reducing the amount of trips to and from the area. Car parking could be provided by building a new facility or by negotiating access to existing car parks in the area such as at Seaworld or the nearby parks (security however would be a key consideration for passengers). It should also be noted that car parking is a significant revenue component for many airports, so there is potential for this to be considered for the CST)

- **Provide coach transport** to the CST which is integrated with the existing transport network (e.g. Gold Coast Airport, etc.) and major hotels on the Gold Coast. Given that the majority of cruise ship passengers will be interstate or international tourists, their trip origins to the CST will likely be either from a hotel or airport (Gold Coast or Brisbane Airport's). The amount of vehicle trips to the Spit area can be reduced by encourage the use of transport modes which carry a higher amount of passengers per vehicle (e.g. coach, bus, light rail). As passengers will have significant baggage to carry, public transit (i.e. bus) may not be an attractive mode. Coach is the recommended mode as it would allow services to be provided from the specific locations where passengers are likely to depart from (e.g. major hotels in the area), at the required times. Coaches can also be scheduled to smooth the demand over a few hours before cruises depart and after then arrive back, to reduce the peak traffic flows. Coaches could be provided via several arrangements such as by the CST operator, by hotels (who may offer this as a convenience to guests, similar to what some do with airport pickups and drop-offs), or by independent operators

- Upgrading **key intersections** including the Gold Coast Highway / Waterways Drive, Waterways Drive / MacArthur Parade, and the Seaworld Roundabout to increase capacity and to accommodate better traffic movements. PwC understands that the City is planning upgrades to the Gold Coast Highway / Waterways Drive, Waterways Drive / MacArthur Parade intersections in the near future and this would be expected to provide sufficient capacity for the traffic impacts of the CST

- Development and implementation of a detailed **Traffic Management Plan (TMP)** for both construction and operation. The TMP would include all transport routes and modes and address safety concerns for cyclists and pedestrians.

14 Legal and Regulatory Requirements

14.1 Introduction

This section provides an overview of the legal and regulatory requirements associated with implementing the CST project. It includes an overview of the process for establishing a port authority, addressing native title issues and environmental regulatory requirements including environmental impact assessment (EIS).

14.2 Port Authority

This section provides a preliminary overview of the process for establishing a port authority and possible alternative legal structures and ownership of the port authority entity.

14.2.1 Establishment or declaration of a port authority by regulation

The State Government has the power under the *Transport Infrastructure Act 1994* by regulation to establish new port authorities or declare that a government-owned corporation (**GOC**) is a port authority. The establishment or declaration of a new port authority by regulation is a relatively rare event so there is no standard procedure or supporting documents prescribed by the State Government or the Department of Transport & Main Roads for an application to become a port authority. Therefore, the approval process will need to be developed in consultation with the State Government and other stakeholders, in particular the offices of the two Ministers who are responsible for the *Transport Infrastructure Act* and whose support will be required to instigate the regulation, being the Minister for Transport and Minister for Infrastructure and Planning (currently the Deputy Premier, the Hon Jacklyn Trad) and the Minister for Main Roads, Road Safety and Ports (currently the Hon Mark Bailey).

It is expected, however, that drafts of the following documents will need to be provided to the State Government in support of the proposed regulation, in addition to other requirements identified in the consultation process.

Port Limits: The limits of the CST port will need to be defined in the regulation approving a new port authority. (All current ports have their limits defined in the *Transport Infrastructure (Ports) Regulations 2016*.) The limits are set by reference to latitude and longitude coordinates but exclude areas above the high-water mark and with the rivers and creeks flowing into the port area either excluded or included (depending on the port and the navigable status of the rivers and creeks).

Proposal for land tenure: The tenure arrangements for the land beside the CST port will need to be determined and negotiated with the State Government, but the port authority will either need to obtain title to the land or obtain the right to occupy and use it, presumably under a long term lease from the State Government. Once it holds title to the land or holds it directly from the State, then this land will be 'port authority land' under the legislation.

Land Use Plan: Each port authority is required to submit a Land Use Plan (**LUP**) to the Minister every 8 years in relation to its port authority land which is on or near the interface between the land and the waters within the limits of the port and used or may be used for domestic or international trade; by industries requiring close proximity to a port; for the integration of sea transport with other transport modes; as port buffer lands; as a boating facility or for other purposes of a port authority prescribed under regulation. The LUP must specify details of this land and its current or proposed use of it. It must also identify the desired environmental outcomes for the land and include measures that will help achieve the desired environmental outcomes.

Preparation of a LUP requires consultation with local governments for the local government area in which the port area is situated and for any adjoining areas, prior to its approval by the Minister.

14.2.2 Port Authority entity

Based on the legislation and the nature of current port authorities in Queensland (set out in Table 54), there are broadly two options for the identity of an initial port authority. The optimum nature and structure will need to be determined based on the requirements of the City, State Government and other stakeholders, including requirements relating to financing, governance, future divestment plans (if any) and the availability of technical expert capability.

- **GOC**: Nearly all port authorities in Queensland are **GOC**s established under the *Government Owned Corporations Act 1993*. Either a new GOC could be established and then declared to be the port authority or one of the existing GOCs (listed in Table 54 could be declared the port authority for the CST port.

- **Another body corporate**: Regulations can also establish a new port authority as a body corporate that has a seal and may sue or be sued in its corporate name. This form of body corporate would be exempt from some of the requirements of the Corporations Act, including directors' and other officers' duties, certain registration obligations and some winding up provisions. Although the legislation does not expressly state that such a body corporate is not to be a private entity, public ownership of such a body corporate is implied by the legislation, particularly the exclusions from the Corporations Act.

In addition to a GOC or other body corporate, the legislation allows transfer of the management of a port from a port authority to the **State** or **a local government** by regulation. If the management of a port is transferred to the State or a local government, the Minister or the local government has, for the port, all the functions, powers and obligations, of a port authority. If the City or the Department of Transport & Main Roads wished to manage the CST port, then these transfer powers might be used after the initial establishment of a port authority.

If it is determined that the management of the CST port area should be by a privately owned entity and not a publicly owned port authority or by State or local government, then the Port of Brisbane legislation could be used as the basis for granting such entity rights to manage the port area. When the Port of Brisbane was privatised, the port authority previously held by the Port of Brisbane Corporation Limited was revoked. The privatisation process also enacted changes to the *Transport Infrastructure Act* which allowed the Port to be managed by a privately owned entity, including giving the private entity some of the powers and obligations of a port authority in relation to the management of the land surrounding the port.

Table 54: Queensland Port Authorities

Port	Port Authority	Entity type
Abbot Point	North Queensland Bulk Ports Corporation Limited	GOC
Brisbane	N/A	N/A
Bundaberg	Gladstone Ports Corporation Limited	GOC
Burketown	Far North Queensland Ports Corporation Limited	GOC
Cairns	Far North Queensland Ports Corporation Limited	GOC
Cape Flattery	Far North Queensland Ports Corporation Limited	GOC
Cooktown	Far North Queensland Ports Corporation Limited	GOC
Gladstone	Gladstone Ports Corporation Limited	GOC
Hay Point	North Queensland Bulk Ports Corporation Limited	GOC
Karumba	Far North Queensland Ports Corporation Limited	GOC
Lucinda	Port of Townsville Limited	GOC
Mackay	North Queensland Bulk Ports Corporation Limited	GOC
Maryborough	North Queensland Bulk Ports Corporation Limited	GOC
Mourilyan	Far North Queensland Ports Corporation Limited	GOC
Port Kennedy	Far North Queensland Ports Corporation Limited	GOC
Quintell Beach	Far North Queensland Ports Corporation Limited	GOC
Rockhampton	Gladstone Ports Corporation Limited	GOC
Skardon River	Far North Queensland Ports Corporation Limited	GOC
Townsville	Port of Townsville Limited	GOC
Weipa	North Queensland Bulk Ports Corporation Limited	GOC

The process for establishing the Gold Coast CST will include the declaration of a Port and establishing the Port Authority. A final determination will be made during the Project Development Phase however it is expected to be:

- Declared the port in accordance with the Transport Infrastructure Act
- Transfer Port Authority powers to either an existing or new GOC, or to the City of Gold Coast as the port manager.

Transferring the Port Authority powers to an existing authority including the Port of Brisbane is not considered feasible at this stage due to the sole purpose of the Gold Coast as a Cruise Terminal and the level of demand risk that the Port Authority would need to take on.

14.3 Environmental Assessment

14.3.1 Relevant Legislation

The proposed CST will be developed in accordance with Commonwealth, State and Local Government requirements.

Following the Business Case, the City will consult with relevant agencies to understand requisites specific to the location, scale and nature of the proposal. This section describes the proposed approval framework for the proposal and relevant legislation to be addressed.

Commonwealth context

The proposal is subject to relevant Commonwealth legislation applicable to environmental assessment presented in Table 55.

Table 55: Commonwealth legislation relevant to the proposal

Legislation	Description and relevance
Aboriginal and Torres Strait Islander Heritage Protection Act 1984	This Act preserves areas and objects under threat that are significant to or in accordance with Aboriginal tradition.
Australian Maritime Safety Authority Act 1990	This Act provides for protection of the marine environment from pollution from ships and other environmental damage caused by shipping, and response to pollution or potential pollution of the sea, or harm to the marine environment by oil or hazardous and noxious substances.
Biosecurity Act 2015	In 2016, this Act replaced the *Quarantine Act 1908* providing the Commonwealth with powers and tools to manage modern biosecurity threats, including: • Biosecurity risks such as Weed of National Significance (WONS) • Risk of contagion of a listed human disease • Risk of listed human diseases entering Australian territory or a part of Australian territory, or emerging, establishing themselves or spreading in Australian territory or a part of Australian territory • Risks related to ballast water • Biosecurity emergencies and human biosecurity emergencies.
Environment Protection and Biodiversity Conservation Act (EPBC Act) 1999	This Act provides a scheme for protection of Commonwealth interests and conservation of nationally significant environment and heritage. A search of the EPBC Act database identified a number of nationally significant flora and fauna that may potentially occur in the area of the proposed action.

Legislation	Description and relevance
Environmental Protection (Sea Dumping) Act 1981	This Act protects the environment by regulating dumping into the sea, incineration at sea and artificial reef placements. The Act applies in all Australian waters and in respect of all Australian vessels and aircraft anywhere at sea. A permit is required under the Act for dumping dredged material at sea. The National Assessment Guidelines for Dredging (2009) provides a framework to assess environmental impacts from disposal of dredged material at sea. The City has current approvals to dredge for beach replenishment and erosion control. This proposal does not require capital or operational dredging for the maneuvering or berthing of ships. Dredging of sand is an option that may be considered for filling the caissons once installed on the breakwater; or alternative fill sources will be identified. The breakwater design may also consider placement of rock armour as a bedding material and for protection of the caisson structure. On this basis, sea dumping triggers will need to be assessed.
Historic Shipwrecks Act 1976	Protects historic wrecks and associated relics in Commonwealth waters.
Native Title Act 1993	This Act provides for the recognition and protection of native title property rights, which reflects Indigenous relationship to land related to religion, culture and wellbeing.
Navigation Act 1972	This Act regulates the transport of material by waterways that do not come under the jurisdiction of the states and territories.
Sea Installation Act 1987	Governs certain installation in the sea and regulates permits for sea installations.

State context

Following confirmation of a sustainable business case, regulatory context and approval pathways will be confirmed in consultation with State Government and other stakeholders. The subsequent State environmental assessment of the proposal is subject to relevant State legislation, policy and guidance presented in Table 56.

Table 56: State legislation relevant to the proposal

Legislation	Description and relevance
Aboriginal Cultural Heritage Act 2003	The Act establishes a duty of care that requires an activity to be carried out with all reasonable and practicable measures to ensure the activity does not harm Aboriginal cultural heritage.
Coastal Protection and Management Act 1995	The Act provides for protection, conservation, rehabilitation and management of the coast, including its resources and biological diversity, and sustainable development of the coastal zone. Coastal management plans must be prepared to identify how the coastal zone within the State coastal management district will be managed. The coastal location of the proposal sits within the coastal management district and coastal hazard areas.

Legislation	Description and relevance
Environmental Protection Act 1994	The Act provides for a general environmental duty of care and does not permit activities that may cause environmental harm unless all reasonable and practical measures have been employed to prevent or minimise such harm. The associated regulations provide for authorisation of prescribed environmentally relevant activities that have the potential to harm the environment such as extraction and dredging. Associated policies identify objectives to protect quality of coastal waters, acoustic and air environments.
Fire and Rescue Service Act 1990	Prevention of and response to fires and certain other incidents endangering persons, property or the environment.
Fisheries Act 1994	The Act protects commercial and recreational fisheries resources and their habitats through sustainable use and conservation of values such as marine plants.
Land Act 1994	This Act provides for allocation of tenure over State land.
Nature Conservation Act 1992	This Act declares and manages protected areas and provides for the protection of threatened flora and fauna species, listed as endangered, vulnerable or near threatened, regardless of their location within Queensland.
Queensland Heritage Act 1992	This Act protects non-indigenous cultural heritage by listing heritage places on the Queensland Heritage Register.
Sustainable Planning Act (SPA) 2009	The Act provides for integrated assessment and approval of development aspects, including material change of use, reconfiguring a lot, operational work, building work, and plumbing and drainage work. Under the Act, the Queensland Government established the State Planning Policy (2013) to define the specific matters of state interest in land use planning and development, specifically the coastal environment. As this proposal is located within the coastal zone, the Coastal Protection State Planning Regulatory Provision applies in coordination with the local planning scheme. The relevant local government planning scheme for land based development is the Gold Coast Planning Scheme 2003, Version 1.2 amended November 2011.
State Development and Public Works Organisation Act (SDPWOA) 1971	The Act aims to facilitate timely, coordinated and environmentally responsible infrastructure planning and development. The Act gives the Coordinator-General powers to declare a project to be a 'coordinated project' and coordinate the environmental impact assessment of the project.
Transport Infrastructure Act 1994	Integrated planning and management of an efficient system of transport infrastructure and for the regulation of development that will impact on State-controlled roads.
Transport Operations (Marine Safety) Act 1994	Regulates the maritime industry safety.

14.4 Approvals pathway

The City will be required to complete an appropriate environmental impact assessment and to obtain development approvals for the Project to proceed. There are a number of different approval pathways through the impact assessment and development approval process that must be considered prior to selecting and commencing the preferred process.

14.4.1 Impact Assessment Process

Commonwealth Government

The City has commenced the impact assessment process by lodging a referral to the Commonwealth Government under the EPBC Act. The referral was lodged on 10 March 2017 and a decision is expected in late April 2017 as to whether the Project will be declared as a Controlled Action under the EPBC Act.

The declaration of Controlled Action is reflective of the assessed level of potential impact that the project may have on MNES and the control measures that would need to be put in place. A Controlled Action (or Not a Controlled Action) declaration does not signify approval (or not) by the Commonwealth, it reflects the level of impact assessment that is required to be undertaken and the role that the Commonwealth will have in assessing the Project.

If the project is declared a Controlled Action, the final impact assessment will be undertaken by the DoEE and the Commonwealth Government to determine the conditions of approval. This is common practice for major infrastructure projects and is not expected to cause significant risks or delays to the Project.

State Government

It is expected that the City will prepare an Environmental Impact Statement (EIS) for the Project under the provisions of the SDPWOA. This would require the Coordinator-General (CG) declaring the Project a Coordinated Project for which an EIS is required in accordance with Section 26.1.(a) of the SDPWOA. This is considered to be the preferred impact assessment option for a number of reasons including:

- The Project satisfies a number of the criteria that the CG considers when making the declaration, including the scale of the infrastructure to be constructed, the complexity of approvals required for the project, and the strategic significance to the region and the state
- The Project may impact on a number of MNES as defined by the EPBC Act and will require a rigorous impact assessment to be undertaken. An EIS prepared under the SDPWOA would satisfy the requirements of the EPBC Act process under the terms of the bilateral agreement between the Commonwealth and State Governments
- Using the SDPWOA EIS process provides certainty to the City in terms of the assessment process and its consistent application by the CG. The process is a legislative process and the findings of the CG are not subject to third party appeals
- The CG conditions of approval under an EIS process would be used by the assessment manager as the basis for a Development Approval under the Sustainable Planning Act 2009 (SPA).

14.4.2 Development Approval Process

Subsequent to the City gaining approval under the Impact Assessment process, it will need to obtain Development approval to construct the Project. The recommended option for obtaining Development Approval is to submit an application under the SPA to DILGP as the

assessment manager under the State Assessment and Referral Agency (SARA) provisions with the SPA.

It may be possible for the Development Approval to be gained through an alternative mechanism such as Priority Development Area (PDA) under the Economic Development Act however this would require the State Government to declare a PDA for the Southport Spit or to amend the existing Southport PDA.

15 Sustainability Assessment

15.1 Introduction

The concept of sustainability for an infrastructure-based project is that it is "...designed, constructed and operated to optimise environmental, social and economic outcomes of the long term"[45]. This chapter presents a sustainability assessment process for the Reference Project based on the four key principles of:

- Governance
- Environment
- Social impacts
- Economics.

The detailed sustainability assessment process results in an overall sustainability assessment rating on a spectrum of poor, compliant, basic, moderate and advanced. A minimum expectation is that projects will at least achieve a compliant assessment rating.

15.2 Sustainability assessment principles

15.2.1 Governance

The assessment rating applied to the Reference Project for this sustainability assessment principle is Moderate. The key drivers for this assessment rating, as aligned against elements of the governance assessment principle in the BQ guidance material, are summarised in Table 57.

Table 57: Governance sustainability assessment principle

Element	Reference Project performance
Context	• The Reference Project is based on the service needs critical to the City's strategic plan for economic growth and development including development of tourism amenity, investor certainty, business confidence and employment sustainability. • The Reference Project is a single element in a broader plan for development of tourist and community infrastructure the Spit. While the Reference Project is not dependent on other projects, if multiple projects in the portfolio are developed there is the opportunity for complementary infrastructure and development of a tourist and community destination.

[45] Infrastructure Sustainability Council of Australia

Element	Reference Project performance
Strategic planning	• The service needs identified include accessing the lucrative and growing cruise market, providing contemporary Gold Coast tourist attractions, providing community amenity and providing business clarity regarding development. The Reference Project is the option assessed to be the most efficient and effective solution to addressing these service needs. • Business case development has included an investment logic mapping process which allowed for development of non-infrastructure and infrastructure options to address the identified problems and service requirements. • The Reference Project has been designed with expansion potential for a second berth if required in the future. • There is the potential for project synergies and overall cost savings if the LTRWRP project is implemented in conjunction with the Reference Project.
Leadership, knowledge sharing and innovation	• The City is committed to sustainability and innovation. Selection of the leadership team for the implementation and operation of the Reference Project would include these metrics. • The Reference Project would be implemented using a design and construction, early contractor involvement (D&C ECI) procurement model. This model has been selected so that there is the opportunity to incorporate design and construction innovation into the project development.
Procurement and supply chain	• Procurement activities are not expected to have any material adverse impacts on human rights, society or the environment. • Where best for the project, materials and resources would be sourced locally to maximise sustainable procurement. For example, it has been assumed that breakwater caisson elements would be constructed in south-east Queensland.

15.2.2 Environment

The assessment rating applied to the Reference Project for this sustainability assessment principle is Basic. The key drivers for this assessment rating, as aligned against elements of the environment assessment principle in the BQ guidance material, are summarised in Table 58.

Table 58: Environment sustainability assessment principle

Element	Reference Project performance
Material use	• The Reference Project is not anticipated to use construction materials with an adverse environmental impact. • The Reference Project will include marine transport of fuel and refuelling activities, thus there is a potential risk that a plume resulting from a loss of containment may impact on the adjacent coast or sensitive areas. Fuel transport and fuelling activities would occur in accordance with applicable legal requirements and environmental standards. This is noted as a potential project risk and risk mitigation strategies will be developed as a part of the ongoing project development.

Sustainability Assessment

Element	Reference Project performance
Climate change mitigation	• The Reference Project is not anticipated to present a material advantage or disadvantage to climate change. • Transport planning for the Reference Project includes an emphasis on the use of public transport and coaches for site access. • There is the opportunity to investigate the use of alternate energy sources (such as solar power) for the terminal building as the Reference Project design is further developed in future project stages.
Water management	• A water management plan for construction and operations phases would be developed as a part of the project development. This plan would include no water discharge to the sea or sensitive environments. • The construction phase is not expected to have high water usage or discharge requirements. • The operations phase will require loading of potable water and discharging of wastewater from vessels while in port. Existing water mains for these activities have been identified and it is not anticipated that there will be any issues with the additional system loading. This would be investigated further in subsequent project stages.
Resource recovery	• A waste management plan for both construction and operations would be developed as a part of ongoing project development. This plan would address issues of project waste management and resource recovery.
Land selection	• A detailed process has been used to identify the Reference Project location. This process involved consideration of impacts on local land and habitat. • The Reference Project location is currently a public park and is not located on previously undisturbed land. • The Reference Project would be developed in accordance with applicable Commonwealth, State and Local Government environmental requirements. Compliance with regulation and approval processes would include provisions for establishment of compensatory habitats for organisms if required.
Ecology	• A thorough environmental assessment is being completed for the Reference Project in accordance with Commonwealth, State and Local Government requirements. This assessment outlines Reference Project impacts on local ecology and provides recommendations for impact mitigation. • Appropriate construction, operational and risk management plans would be prepared and adopted to address project environmental impacts based upon a detailed assessment of the project, prevailing environment and ongoing operation of the facility as part of a State assessment process for project approval.
Green infrastructure	• The Reference Project is not anticipated to present a material advantage or disadvantage to 'green' infrastructure concepts. • There is the opportunity to investigate the use of alternate energy sources (such as solar power) for the terminal building as the Reference Project design is further developed in future project stages.
Sustainable procurement	• There is the opportunity to investigate the use of environmentally friendly products for the terminal building as the Reference Project design is further developed in future project stages.

Element	Reference Project performance
Employees	• The Reference Project will create construction jobs for the local population during the construction phase. • The Reference Project will create ongoing operations phase employment. This includes operation of the facility and increased employment opportunities for local businesses that support the cruise ship industry.

15.2.3 Social

The assessment rating applied to the Reference Project for this sustainability assessment principle is Moderate. The key drivers for this assessment rating, as aligned against elements of the social assessment principle in the BQ guidance material, are summarised in Table 59.

Table 59: Social sustainability assessment principle

Element	Reference Project performance

Social return	• The Reference Project will create a social benefit for the Gold Coast community through:
	  • Ocean access for leisure activities
	  • Improved public space and associated infrastructure
	  • Improved area security with reduced opportunity for criminal or undesirable activities

Community and stakeholders	• The feasibility study, PBC and Business Case development has involved a consultation process to gather and incorporate community and business stakeholder input into the development of the Reference Project. • The first phase of the project implementation plan includes additional provisions for community consultation and engagement with the local business community to communicate accurate project messaging, to gather community feedback and to incorporate feedback into the project as relevant. • The legacy of this project will be a community space that provides unique ocean access for recreational and leisure activities.
Heritage	• The Reference Project is not anticipated to affect heritage sites or similar areas highly valued by the community. • The Reference Project would be implemented in accordance with native title approval processes. • The Scottish Prince Shipwreck is located adjacent to the jetty area. Project implementation and operation would include provisions for protection of this shipwreck as described in the Environmental Analysis chapter of this Business Case.

15.2.4 Economic

The assessment rating applied to the Reference Project for this sustainability assessment principle is Moderate. The key drivers for this assessment rating, as aligned against elements of the economic assessment principle in the BQ guidance material, are summarised in Table 60.

Table 60: Economic sustainability assessment principle

Element	Reference Project performance
Equity	• The Reference Project is likely to share the benefits in an equitable way. Much of the benefits of the CST will accrue to staff in a range of industries including accommodation and food services, and retail and wholesale trade, rather than predominantly to the owner of capital.
Whole-of-life impacts	• The Reference Project is anticipated to be a long term asset. This analysis has included both the costs (including ongoing O&M and major refurbishments expenses) and benefits over the assumed 30 year life.
Valuing externalities	• The analysis of the Reference Project has considered the potential externality impacts of the CST, including: o The immediate environment o The transport network o The social impact on a wide range of stakeholders.

15.3 Overall sustainability assessment rating

Based on this qualitative assessment of the sustainability performance of the Reference Project against the four sustainability assessment principles the overall sustainability assessment rating applied is Moderate. The Reference Project aligns to the relevant summary criteria for this overall assessment rating in the BQ guidance material:

- Solutions to significant issues result in multiple benefits through social, economic and/or environmental outcomes
- Meets immediate community and user needs and will be resilient and efficient into the future
- Significant innovation and leading practice incorporated into the project.

16 Packaging and Procurement Options

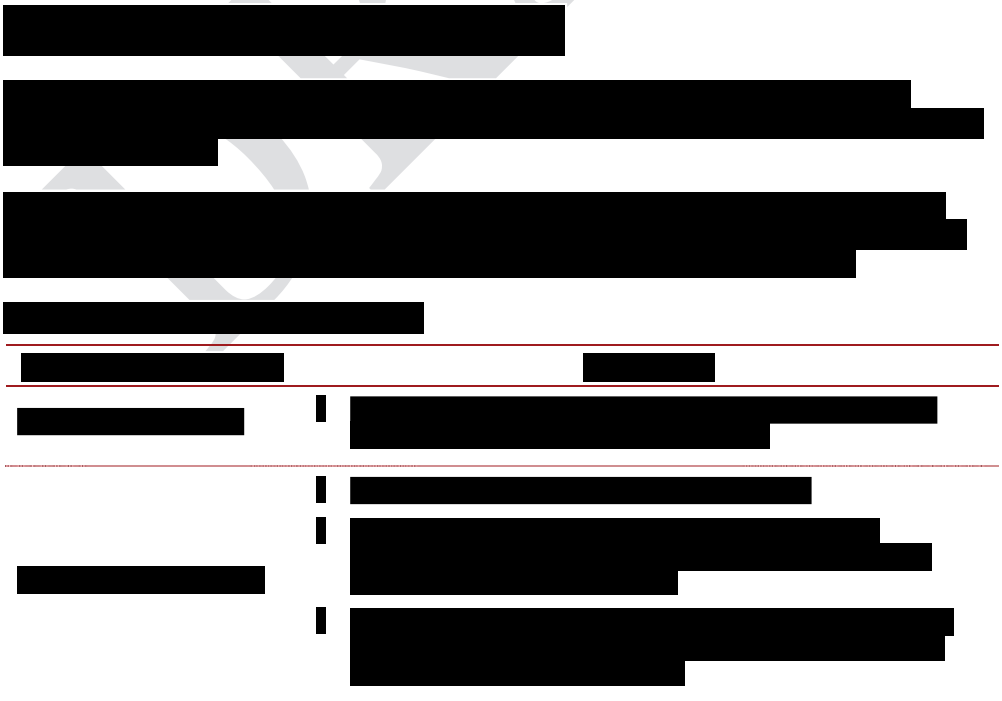
16.1 Introduction

Determining an appropriate delivery and procurement model is a critical step in the project development. The key objective of the packaging and procurement assessment process is to identify, assess and select the most appropriate packaging and procurement model that is likely to provide the best value for money outcome, whilst meeting the service requirements and project objectives.

A major constraint in assessing the appropriateness of delivery and procurement options for a Gold Coast CST is the availability of an appropriate level of design for the project. The design at this stage remains relatively preliminary. As part of the pre-procurement activities a detailed Reference Design will be developed to support the EIS and procurement documents.

This chapter includes a high level considerations of the packaging and procurement options available for the Gold Coast CST. Subsequent to the Business Case a detailed procurement plan will be prepared for the Project which will include activities such as detailed market sounding with contractors to further refine the preferred packaging and procurement strategy.

This chapter is not attempting to select the most appropriate method of procurement via detailed quantitative assessment but rather seeks to present an initial consideration of the issues and challenges of involving the private sector in project procurement and to assist in determining the requirements and the focus for further analysis.



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Packaging and Procurement Options

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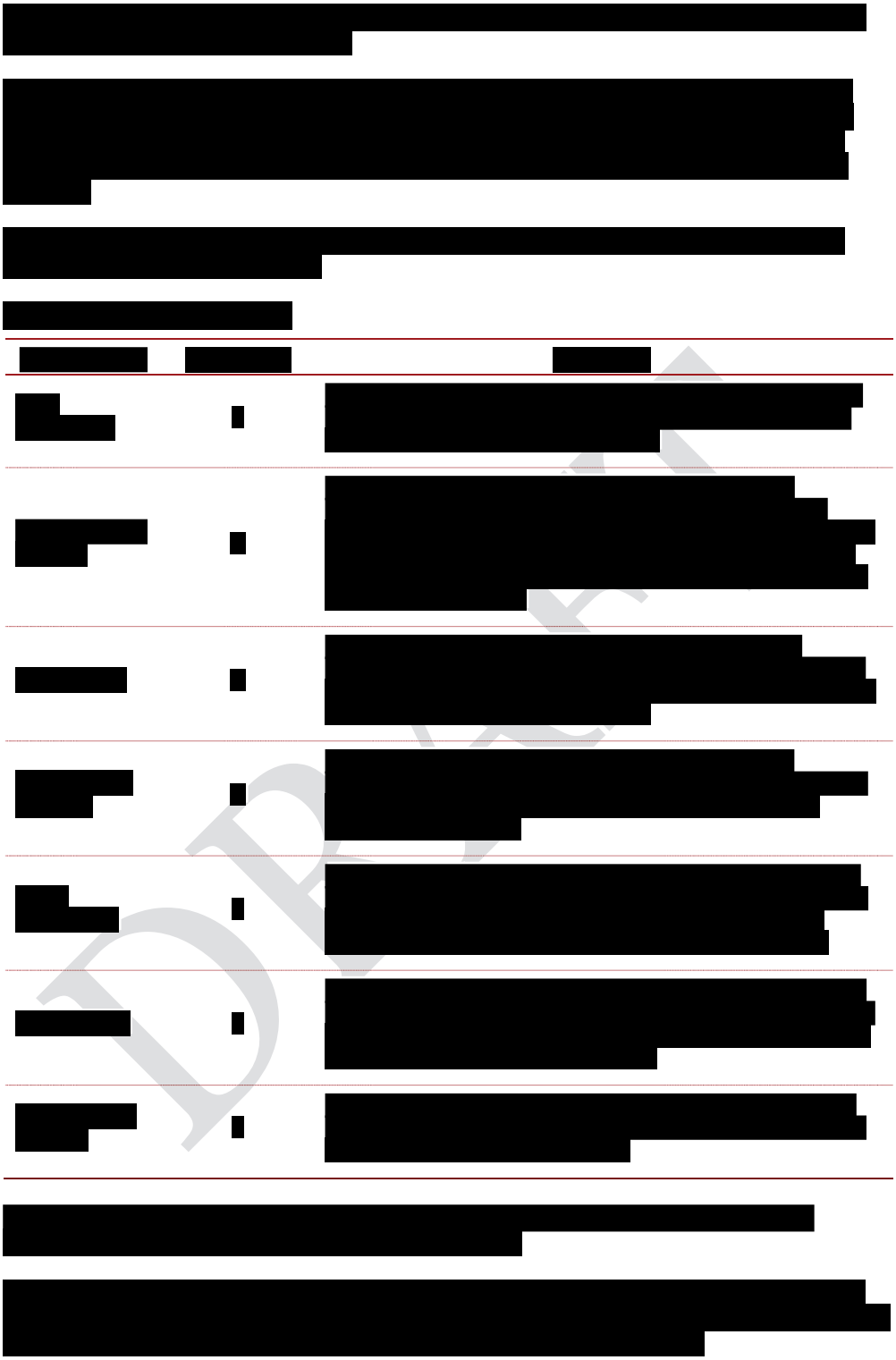


Packaging and Procurement Options

[redacted]

17 Implementation Plan

17.1 Introduction

This chapter describes project governance, resourcing, project management, timeframes, and change and risk management strategies for the CST project implementation process. It provides detail of the key project phases post Business Case including project development and design and construction. These implementation process phases for the CST project are shown in Figure 36. Additional details of these project phases are presented in the following sections.

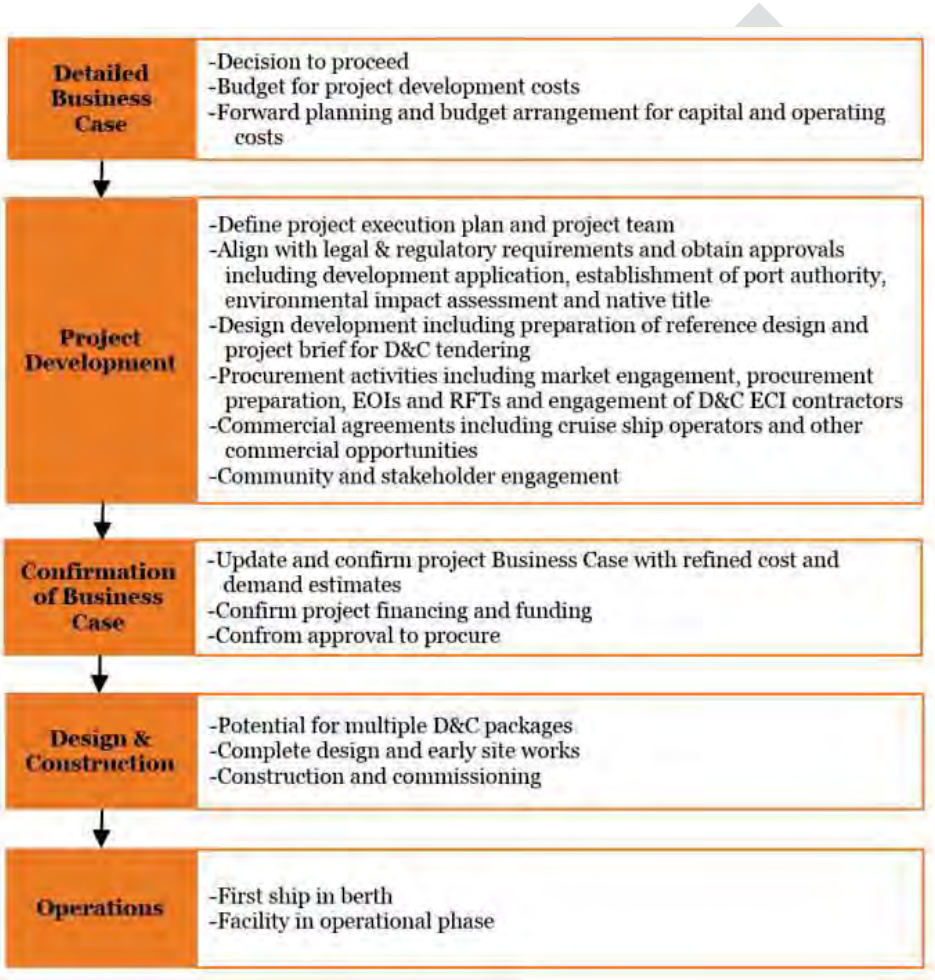


Figure 36: Project implementation map

17.2 Project Governance and Resourcing

The City of Gold Coast would be responsible for delivery of the CST project utilising contracted resources as required to address any gaps in expertise and/or resource availability. It is envisioned that the project governance organisation would be as shown in Figure 37. Additional information on project governance and responsibilities is presented in Table 64.

Implementation Plan

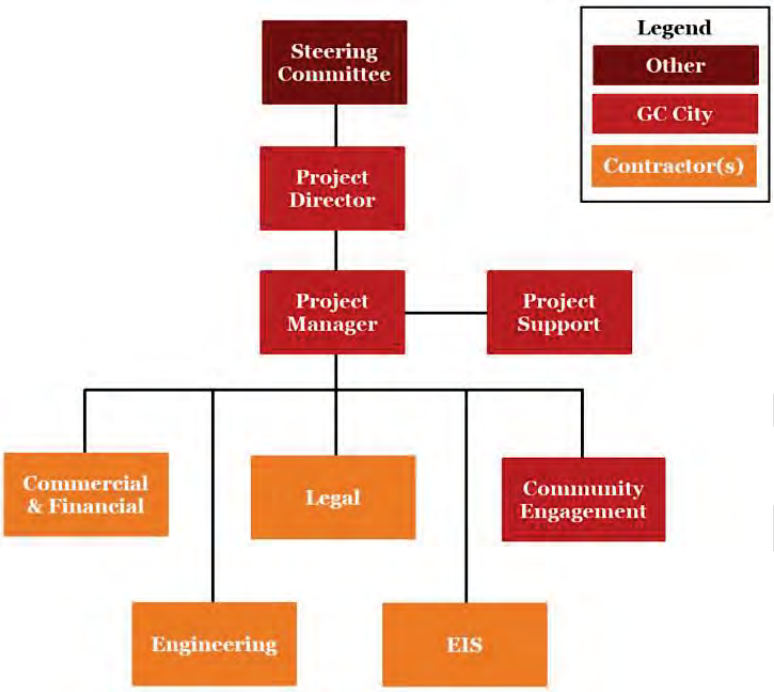


Figure 37: Project governance organisation chart

Table 64: Project governance

Activity	Description	Responsibility
General project management	• Project management • Contract administration • Risk assessment and management	City to self-perform or engage suitable consultant depending on available resources
Commercial, Financial and Procurement	• Project financing and funding • Project execution planning • Cruise operators market engagement • Agreements with cruise operators and other potential facility users • D&C contractor market sounding • Procurement strategy • Contract documentation • Services agreements • Port authority charges • Fuel supply • Facility operations plan	City to manage in consultation with legal and commercial advisors
Community engagement	• Community and stakeholder engagement and communications	City to self-perform or engage suitable consultant depending on available resources

Activity	Description	Responsibility
Legal	• Legal and regulatory issues • Port authority establishment • Native title	City to manage in consultation with legal council
Environmental Impact Assessment (EIS)	• Complete EIS • State government approval • Commonwealth approval	City to manage in consultation with other advisors
Engineering	• Completion of Reference Design • Preparation of project brief for procurement • Site assessment	City to engage engineering consultant

17.3 Project Development Activities

This section describes the project development phase key activities. Procurement activity details relevant to this phase are outlined in Section 17.4.

17.3.1 Project Initiation

This project phase includes project planning and engagement activities required for project set-up. Project initiation planning activities for the CST project include:

- Develop project plans including a project implementation plan that defines
  - Project team
  - Project governance
  - Responsibilities
  - Resources
  - Timeframes
  - Costs
- Engage external advisors including engineering, EIS, commercial and financial, and legal
- Review and update project cost estimate.

17.3.2 Legal, Regulatory and Approval Requirements

Legal and regulatory issues to be addressed during the project development phase are:

- Completion of development application under SARA or relevant PDA
- Establishment of a port authority
- Address any native title issues associated with the proposed location and develop plan for compliance

- Progress environmental approval requirements including incorporation of outcomes from the EPBC referral process and progress environmental impact statement (EIS) process required for environmental compliance.

Additional details of the requirements for these processes are outlined in the Legal and Regulatory chapter and Environmental Chapter of this Business Case document.

[redacted]

17.3.5 Community and Stakeholder Consultation

This activity is required to provide accurate information to the community regarding the project impact and to seek project feedback. Community and stakeholder consultation will include the following activities in addition to the mandatory community consultation to be undertaken through the EIS process:

- A series of 'town hall' style information sessions on the project to share project information and developments where members of the public can ask questions of the City and voice concerns
- Additional engagement with the local business community
- Development of an online project information site which would include a project web-site and portal for community comments and use of social media for sharing project messaging.
- An information campaign to include mail-outs and select advertising
- Process for consolidation of comments, addressing community concerns through project modifications (as appropriate) and sharing the results of community feedback on the planning process.

17.3.6 Development of Project Brief and Reference Design

A project brief serves to define the functional and technical project requirements and forms a part of the contract documentation for engagement of the D&C contractor. This project brief would include, but not necessarily be limited to the following documentation:

- Reference Project design
- Existing design reports
- Technical design criteria including applicable design codes and any site specific technical criteria
- Functional design criteria including but not limited to service life, vessel parameters and berth utilisation
- Material specifications
- Site condition reports including bathymetric study, geotechnical investigation and metocean data. If not already completed, these studies would be commissioned.

Additional development of the Reference Project design by an engineering consultant will be required as a part of defining the project brief and for support of EIS activities. The Reference Project design will build on the design work completed as a part of the Business Case to provide greater definition of technical and functional scope, to allow for refinement of project cost estimates and to reduce project design risks.

[redacted]

Implementation Plan

[redacted]

[redacted]

17.7 Project Development [redacted]

An initial estimate of the cost of the project development phase is provided in Table 65. These costs are estimated on the basis of the project development phase timeframes shown in Figure 39.

Table 65: Project Development Costs

Project Development Activity	Owner Cost Range	Comments
City of Gold Coast Project Team		City of Gold Coast Internal Project Team. To include allowance for project initiation and administration
EIS and Supporting Studies	[redacted]	Based on forecast cost to complete EIS process and supporting technical studies
Reference Design / Design Brief	[redacted]	Allowance based on approximately 0.5% of jetty, wharf, dolphins and terminal, plus 1% of breakwater capital costs
Geotechnical Investigations (Offshore)	[redacted]	Geotechnical investigations allowance to reduce design and construction risk pricing
Procurement planning	[redacted]	Allowance for confirming the procurement strategy, developing procurement documents, commercial principles for contracts, and coordinating the procurement transaction
Commercial Market Engagement	[redacted]	Allowance for planning and coordination of market engagement with cruise operators, property developers and ancillary commercial users, includes term sheets
Legislative and Regulatory Approvals	[redacted]	Allowance for legal and commercial support to resolve native title, land tenure for site and port authority set-up
Development Applications	[redacted]	Allowance for preparing and lodging development applications to DILGP through SARA, or to State Government through PDA

Project Development Activity	Owner Cost Range	Comments
Community Consultation	[redacted]	Allowance for community consultation support through project development phase
Legal Advisors	[redacted]	Allowance for project legal advisors to document D&C contract terms and commercial deals
Totals	[redacted]	

17.8 Change Management

The City would be responsible for managing organisational change throughout the delivery of the CST project and into the operations phase. This would include, but not necessarily be limited to the following:

- Development of construction phase plans for stakeholder and community communications, transportation, safety, schedule and costs
- Development of a facility operations plan including governance, stakeholder management, communications, execution plan, emergency and risk plan, maintenance plan, safety plan, and operational costs plan
- Management of legal, policy and regulatory issues related to facility implementation and operations
- Implementation of service agreements with potential facility users
- Implementation of service agreements for supply of water, fuel, power, waste removal and communications.

17.9 Risk Management

Risk management during the implementation phase shall comply with ISO31000:2009 and would include regular risk workshops with the project management, technical and construction teams and other stakeholders as required to identify risks and develop agreed risk mitigating measures. This process has been initiated in the feasibility study and Business Case development phases of the project through the initiation of a risk register and completion of risk workshops.

[redacted].

18 Conclusions and Recommendations

The Business Case has established the case for Gold Coast CST on the back of the burgeoning cruise ship industry and Gold Coast's position as a popular and internationally recognised tourist destination. Despite its long history of assessments, a CST would now complement the timing of the Commonwealth Games in 2018 and dove tail nicely with the proposed Integrated Resort Development on the Spit.

Despite the challenging marine environment and the functional requirements of an Oceanside CST, the Business Case has identified a design that the cruise industry can adopt with confidence.

The Business Case has determined that while it is possible for a Gold Coast CST to generate a financial return in a limited number of scenarios, it is likely that the facility would represent a net cost to the City over the term of the analysis (30 years). A Gold Coast CST however would generate a significant economic return for the region and would generate new industries and job opportunities for local residents. The scale of the economic benefits make this a worthwhile investment for the City to pursue its growth and liveability agenda.

It is recommended that the Council notes the findings of the Business Case and approves that the project proceed to the Project Development Phase.

It is recommended that the Council approves sufficient resources (funding and personnel) to undertake the Project Development Phase. The key activities in the Project Development Phase will include:

- Developing a detailed project plan
- Establishing project governance including Steering Committee and Project Team
- Engage external advisors including:
  - Engineering and impact assessment advisors (Reference Design and EIS)
  - Commercial, financial and transaction advisor
  - Legal advisor
- Commence EIS and supporting technical studies
- Develop the project Reference Design to support the EIS and procurement process
- Develop a procurement strategy
- Continue market engagement with cruise operators to develop term sheets and contractors to refine the approach to project delivery
- [redacted]

[redacted]

Appendix A Options Analysis

Introduction

This appendix provides details of the options analysis performed and justification for selection of the Reference Project Option.

Potential Infrastructure and Non-Infrastructure Options

The Queensland State Infrastructure Plan 2016 provides a framework to help decision makers categorise potential project options against a scale of minimal business changes (such as, new regulations or policy reforms) to significant business changes (such as, refurbishing existing assets or developing new assets). Table 66 uses the priority model framework to categorise the potential options in response to the problems identified in section 2.2.

Table 66: Priority model for project options

Options	Description	Potential option
Do nothing/ Reform	Typically non-asset initiatives	Tendering facilities Partnerships with other cruise terminal operators and cruise line companies
Better use/ Improve existing	Typically improving service performance	Augmentation of existing infrastructure
New	Typically new assets	Cruise Ship Terminal

In response to the need to improve the Gold Coast's tourism offering in relation to the cruise ship market, there needs to be further consideration of the type and location of infrastructure provided. If there are no facilities to allow cruise ships to visit the Gold Coast then there will be no benefits realised and captured.

The potential business changes and/or assets in response to the service needs are outlined below. These are specific to the provision of a CST at the northern end of the Gold Coast.

Do nothing

Presently there are no facilities for cruise ships on the Gold Coast. Tendering options may provide a temporary solution; for example, using smaller boats to transport passengers from the ocean to the Broadwater via the Seaway. This option is highly reliant on favourable weather conditions and is unlikely to be palatable to cruise line operators due to the inherent risks to passenger safety and the potential for damage to tender vessels in the prevailing weather conditions.

Access to the Broadwater via the seaway is also limited by channel depth and can be impacted during adverse weather conditions. Navigational channels within the Broadwater are limited to a minimum depth of 4.5m at low water spring tides, whereas cruise ships would require a minimum depth in excess of 10m. Presently there are no alternative permanent ocean side moorings or facilities for large vessels.

Another option for the City may be to arrange for additional Gold Coast day tours for passengers arriving at other cruise ship terminals along the SEQ coast. However, time restrictions and inconvenience may limit the appeal of this option to passengers.

In the absence of appropriate berthing facilities and associated navigation channels, there is limited opportunity for cruise ships to visit the Gold Coast.

Improve existing infrastructure

Excluding the provision of a CST within the Broadwater, ocean-side options have been considered for this study. Within the study area there are two existing pieces of ocean-side infrastructure on the Spit, including:

- The Southern Training Wall of the Seaway
- The Sand Bypass Jetty.

Consideration of the existing infrastructure is on the basis that re-use of those structures could offer a capital cost saving to the Project, compared with new infrastructure and this must be considered in the context of locational suitability, age and condition, and suitability for adaptive reuse.

In both instances existing infrastructure is located at the most northerly end of the Spit, separate from any existing or proposed development. Both structures are approximately 30 years old having been constructed in the late 1980s and therefore the possible cost savings from improving the existing assets is not sufficient to overcome the shortfalls of using these assets (such as refurbishment costs).

New asset

The construction of new infrastructure would allow for a specific and tailored response to both locational characteristics (physical and environmental) and vessel operational requirements. As the site for the CST can be selected without restriction (within reasonable parameters) the economic benefits of the project and synergies with associated land use can be optimised.

In consideration of the design options for new infrastructure, to achieve an economically viable option, there will need to be a balanced approach to the provision of new infrastructure, capital project cost and community acceptance. In summary, the key technical criteria for the CST include:

- Appropriate access to deep water
- Ability to achieve safe navigation for a range of vessel sizes taking into account adverse weather conditions and prevailing wave patterns
- Reliability and availability of docking berths taking into account the degree of frequency of extreme weather conditions and final infrastructure
- Broader impact upon the Spit, surrounding environmental and coastal processes
- Ability to contribute to shared infrastructure outcomes associated with other Council priority projects.

Location

Historically, the public debate surrounding the possibility of a Gold Coast CST has been intrinsically linked to its suggested location on the Spit. Figure 40 depicts the process undertaken in assessing suitable locations for the proposed CST development.

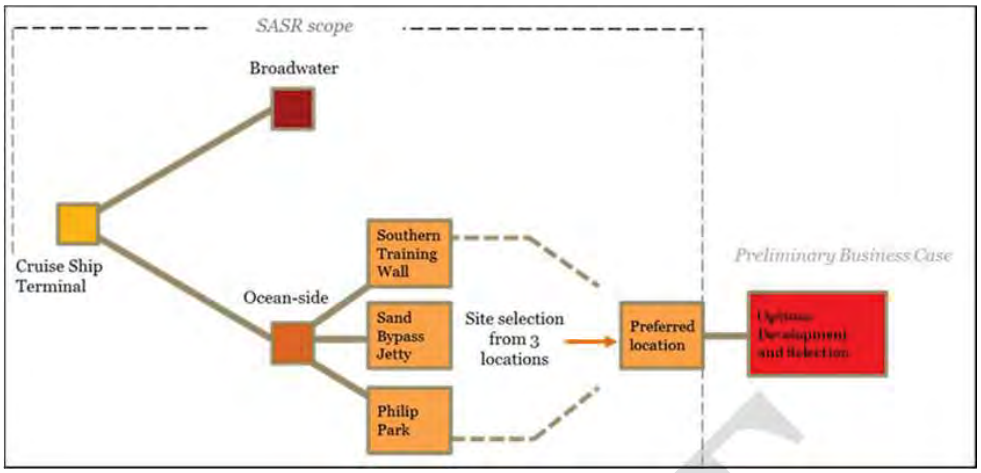


Figure 40: Process to Assessing Suitable Locations

Broadwater and Wave Break Island

Strong community opinions were previously raised in relation to the environmental hazard constraints of a CST in the relatively shallow southern Broadwater. At the time, the location options in closer proximity of the Seaway and Wave Break Island were considered to be more feasible. The Queensland Government has responded to the community concern by ruling out a cruise ship terminal at Wave Break Island or within the Broadwater on the Spit, north of Seaworld. As Wave Break Island and the northern end of the Spit were identified as the best locations for a CST in the Broadwater, we have excluded the possibility of a Broadwater CST.

The City therefore decided that the remaining opportunity to deliver 'strategic marine industry infrastructure' for the cruise market, and thus aligning with Government priorities, was for the cruise ship terminal to be offshore, ocean-side.

Ocean-side options

An ocean-side CST is an option which provides a sustainable port facility that can accommodate the new generation of larger cruise ships, service future needs and is sensitive to environmental and social impacts.

For the purposes of the exercise to determine the best location, the type of CST infrastructure provided was applied consistently to each identified possible location. The base infrastructure applied to the location assessment included:

- Trestle pier structure (incorporating existing ocean side infrastructure when possible) capable of accommodating vehicular traffic
- Wharf option for berthing of cruise ships, either perpendicular or parallel to the trestle pier
- Breakwater structure at the end of the pier (either conventional rock/concrete or caisson structure)
- 450m diameter swing basin with no dredging required. A 1,5oo metre pier will provide access to water greater than 15 metres in depth.

Extension of the existing southern training wall of the Gold Coast Seaway

The existing seaway is at the northern end of the Spit approximately 4km from the Seaworld Drive and Waterways Drive intersection and 3km from the main cluster of activity around the shopping centre, marina, hotels and theme parks also located on the Spit. Access is via Seaworld Drive which is a four-lane median divided carriageway in the vicinity of Marina Mirage, reducing to a single carriageway in either direction north of Seaworld.

The area at the northern end of the Spit is largely used for recreational purposes with facilities including a large car park, small café and amenities block. Beach access is to the east and Doug Jennings Park and Broadwater access available to the west. The Seaway is also used by surfers to access The Other Side (TOS) surf break on South Stradbroke Island and is also a popular dive destination.

The Southern Training Wall extends approximately 450m eastwards from the beach with a pedestrian footpath extending along the top of the sea wall. It is a popular destination for both walkers and anglers.

Table 67: Extension of the existing southern training wall of the Gold Coast Seaway

Advantages	Disadvantages
• Enhance the role of the Seaway wall as a visitor destination and provides expansive ocean views • Ability to use cleared areas at the existing car park for parking, bus layover and general logistics • Location is well separated from any sensitive residential receptors • Opportunity to enhance the public realm and open space associated with Doug Jennings Park • Small scale improvements to existing amenities, cafe and facilities at northern end of the Spit	• Detrimental impact on TOS surfing break • Possible additional maintenance dredging at Seaway channel entrance • Exclusion zone requiring much longer route for small craft to exit and enter Seaway • Increased capital costs to widen and upgrade existing southern training wall with savings in shorter jetty offset by these wall upgrade costs • Expansion on northern side of jetty may be limited to 310m LOA cruise ships • Physcially separate from existing and planned tourist destinations on the Spit

Extension of the existing Sand Bypass Jetty

The Sand Bypass Jetty is included within the general position of Location 1 being located 250m south of the Southern Training Wall of the Seaway. The description for Location 1 remains relevant to Location 2.

The Sand Bypass Jetty's core function is the transfer of sand from the Spit to South Stradbroke Island, delivering approximately 500,000m^3 of sand each year. Public access is available to the deck of the jetty. It is a popular walking destination and fishing spot. There is a small kiosk at the head of the jetty.

To the rear of the jetty and visible from the car park is a small industrial building and associated sand bypass infrastructure. This occupies a fenced (restricted access) area of approximately 6,000m^2.

Table 68: Extension of existing sand bypass jetty advantages and disadvantages

Advantages	Disadvantages
• Enhance the role and function of the jetty as a visitor destination • Ability to use cleared areas at the existing car park for parking, bus layover and general logistics • Location is well separated from any sensitive residential receptors • Opportunity to enhance the public realm and public open space associated with Doug Jennings Park • Small scale improvements to existing amenities, cafe and facilities at norhtern end of the Spit • 6,000m^2 associated with the sand bypass pump infrastructure potentially available for co-location with terminal facilities	• Detrimental impact on TOS surfing break • Exclusion zone requiring much longer route for small craft to exit and enter Seaway • Increased capital costs to widen and upgrade existing Sand Bypass Jetty with savings in shorter jetty offset by these upgrade costs • Land side connection will be shared with sand bypass system – potentially poor aesthetics and noise issues • Physically separate from existing and planned tourist destinations on the Spit

New offshore facility from Philip Park

Philip Park is located toward the southern end of the Spit and positioned close to the existing Sheraton Mirage Hotel, Seaworld entrance and car park, and within 500m of the Versace Hotel and Marina Mirage Shopping Centre. The location is also directly opposite the proposed Gold Coast IRD site.

Philip Park is located on the eastern side of Seaworld Drive and includes an existing carpark comprising approximately 250 spaces. There is also a small amenity block.

The park includes a number of footpath connections extending along the foreshore area and connects with Federation Walk which continues north to the seaway and south linking to Surfers Paradise.

Whilst the area close to the existing car parking has been selected, there may be opportunity to adjust the location further south, if that was shown to be appropriate, noting the increased proximity to the Sheraton Hotel and residences.

Table 69: New offshore facility from Philip Park advantages and disadvantages

Advantages	Disadvantages
• No impact on TOS surfing break • No impact on existing sand bypass system or seaway • Lowest capital costs of all 3 Locations • Opportunity to create greater amenity and visitor gateway to the Gold Coast linked with other land use activities • Proximity to Scottish Prince wreck as a dive attraction • Potential to create a safe swimming beach (north facing) from benign wave environment in shadow of breakwater • Close proximity to existing and proposed tourist attractions • Opportunity for economically feasible solution of day visit port without breakwater • Better suited to accommodate Long Term Recycled Water Return demand from the South	• Higher visual amenity impact and closer proximity to sensitive residential receptors • Benign wave climate in shadow of breakwater may impact (but could be turned into a positive through creation of protected beach area) • Potential loss of public car parking to accommodate terminal logistics facilities and buildings

Preferred location

In summary, the identified northern Spit locations were developed largely on the basis that the upgrade of existing infrastructure to include ocean-side CST facilities could occur with an associated cost saving. In the absence of the detailed condition assessments of the Seaway training wall or Sand Bypass Jetty, it is assumed that substantial upgrading and strengthening of the structures would be required. Any legacy condition problems would transfer as a risk for the future design, construction and operation of the CST.

In both instances, the Sand Bypass Jetty and Southern Training Wall are of insufficient width to accommodate large passenger vehicles or buses, and other infrastructure. With cruise ship passengers likely to exceed 3,000 in number, a larger operational space will be required for vehicles. This would necessitate upgrades to the footprint of the structure. This excludes any additional upgrades to the structure required in relation to prevailing wave and weather conditions.

In addition, due to the protected status of Doug Jennings Park and prevailing community attitudes, the ability to undertake associated land side development would be restricted. A modest terminal building could be accommodated and it is unlikely to extend to a more comprehensive retail precinct and visitor destination facilities. Ultimately this would diminish the sense of gateway arrival to the Gold Coast and economic opportunity associated with the CST infrastructure.

In contrast, the provision of new CST infrastructure at Location 3 (Philip Park) will still involve the same technical challenges associated with an ocean-side CST, but would not need to address the legacy issues of existing or aged infrastructure. This could ultimately reduce design, construction and operational risks.

By clustering with both existing and proposed retail, hotel and entertainment facilities, there is a substantial enhancement to the CST visitor destination experience. This includes the ability for passengers to directly access amenities and attractions and for the project to share other infrastructure, for example potential public transport facilities, road upgrades and

tourist services (for example day trips). Finally, Location 3 (Philip Park) is not expected to negatively impact the TOS surf break.

Whilst all three locations could offer a technically achievable solution to the delivery of a CST, Location 3 (Philip Park) is considered to be the preferred option.

Functional and Technical Criteria

Functional Criteria

Prior to considering the potential options for a CST on the Gold Coast, it is necessary to determine the desired functional requirements. Table 70 outlines the relative importance of various functional requirements of the CST. The functional requirements have focussed predominantly on the customer experience.

Based on the benchmarking analysis undertaken and industry experience, the following tables indicate the key functional requirements for a CST to operate as both a home port and a visiting port. A home port is defined as a terminal where cruise ships begin and/or end their journey and requires additional facilities for passenger boarding and provisioning of supplies to ships. A visiting port is defined as a terminal that is used solely for day trips.

In addition, the type of itinerary and onward destination for cruise ships creates differing demand for terminal facilities. Visits by cruise ships from international origins or start of journeys with an international journey, create the need to provide additional passport and border control facilities which are operated by the Australian Government.

Table 70: Relative importance of functional requirements

Criterion	Home Port	Port of Call	Beneficiary of service offering
Proximity to international airport	✓✓	X	P
Ease of access to terminal from city, airport and suburbs. May include car parking, car rental, drop-off and pick-up facilities and integration into public transport network	✓✓	X	P
Provision of dedicated bus parking facilities	✓	✓✓	P
Proximity to range of hotels, including five star hotels	✓✓	X	P, B
Proximity to major attractions	✓	✓✓	P, B
Tourist infrastructure provided at terminal or directly outside. May include retail, dining, bars	✓	✓✓	P, B
Ability to berth vessels of 300m	✓✓	✓✓	C
Demand for location from cruise ship companies and passengers	✓✓	✓✓	P, C
Access to independent tour operators, onshore excursions	✓	✓✓	P, B
Ease of embarking and disembarking	✓✓	✓✓	P, C
Amenity of surrounding area	✓	✓✓	P
Check in desks and customer service counters	✓✓	✓	P, C
Luggage check in and handling facilities	✓✓	X	P, C
Passport and immigration control (for international visitors)	✓✓	✓✓	P, C, G
Bio-security and border control (for international visitors)	✓✓	✓✓	P, C, G
Security control and passenger screening	✓✓	✓✓	P, C, G

Criterion	Home Port	Port of Call	Beneficiary of service offering
Ground handling to support tourist operators, passenger movement and logistics	✓✓	✓	P, C
Vessel services including fuel, restocking supplies, port pilots, stevedore teams	✓✓	✓	P, C
Legend: ✗ = not required, ✓ = desirable, ✓ ✓ = critical, P = Passengers, C = Cruise line companies, G = Government, B = Businesses on the Gold Coast			

Technical Criteria and Assumptions

The following technical criteria and assumptions govern design development and selection of the preferred option. These criteria are based on the relevant marine standards and a marine site characteristics assessment.

Maritime Site Characteristics

This assessment included the following attributes:

- Metocean conditions – consideration of wind and wave conditions including significant and maximum wave height, wind speed, predominant wind and wave directions, and wind / wave correlation to generate extreme and operating conditions
- Coastal processes – consideration new infrastructure on the dynamic coastal environment
- Navigation – consideration of the vessel particulars for a range of vessels anticipated to use the facility to assess design draft and swing basin requirements.

A summary of the key technical considerations are presented in the following sections.

Wind and wave regime

The site is exposed to open ocean and thus is fully impacted by the wind and wave climate. Investigation of meteorological and oceanic (metocean) conditions and consultation with cruise ship operators has determined that a breakwater would be required to provide protection to cruise ship vessels whilst at berth. The breakwater is also to limit wave heights in order to achieve the necessary safety standards for passengers embarking and disembarking the vessel, to provide certainty of berth access, and to improve operability parameters such as berth manoeuvring, ship movements and mooring.

Navigation requirements

Structure locations including the breakwater, wharf and dolphins are based on providing sufficient water depth and clearance for safe navigation including approach, berthing, de-berthing and departure.

Berth depth and dredging requirements

Suitable depth to accommodate the draft and required under keel clearance of anticipated vessels has driven the length of the jetty structure. For the purposes of the technical design it has been assumed that the terminal will be constructed in sufficient water depth so that dredging (capital or maintenance) is not required.

Berth alignment

Alignment of the berth perpendicular to the shoreline is technically preferential for two reasons. First it allows for the bow of the vessel to be aligned with the predominant wind direction which is beneficial for vessel manoeuvring. This alignment has a secondary benefit in that it provides flexibility to expand to two berths in the future if required for a lower capital cost relative to a berth that is parallel to the shore / in-line with the breakwater. In

this arrangement the facility could be expanded to include two berths by providing additional berthing and mooring structures. Additional breakwater should not be required.

Possible Infrastructure Solutions (Long List)

The primary focus of the long list assessment was to identify solutions which maximised operational capacity of the facility and promoted safe navigation of vessels. Key considerations included:

- Ship navigational and mooring requirements
- Berthing orientation relative to prevailing wind and wave climate
- Operational capacity of the terminal and likelihood of lost ship days due to unfavourable wave climate
- General feedback provided from the cruise ship industry
- Relative project costs and operational capacity of the infrastructure provided
- Acceptability of the option taking into account likely community expectations.

The first round concepts considered an initial list of 12 options which are summarised in Table 71.

Table 71: Long List Options

Layout Option No.	Description	Jetty	In-Line Wharf	L-Head – Wharf	Breakwater	Dredging	Swing Basin	Shore Harbour	2nd Berth Opportunity
1	• Jetty • Caisson breakwater (umbrella shape) • Wharf (1 berth only)	✓		✓	✓		✓		
2A	• Jetty • Caisson breakwater (straight) • Wharf	✓		✓	✓		✓		✓
2B	• Caisson breakwater • Wharf only			✓	✓		✓		✓
2C	• Similar to 2A and closer to shore and requires dredging	✓		✓	✓	✓	✓		✓
3A	• Jetty • In-line wharf • Detached breakwater (caisson or rubble mound)	✓	✓		✓		✓		
3B	• Similar to 3A and greater clearance to shipwreck	✓	✓		✓		✓		
3C	• Similar to 3A and short caisson offset for southern berth	✓	✓		✓		✓		
3D	• Similar to 3A and 200m further south	✓	✓		✓		✓		
4A	• Jetty • In-line wharf • No breakwater	✓	✓				✓		✓
5A	• Shore connected harbour • Navigation channel from ESE		✓	✓	✓	✓	✓	✓	✓

Layout Option No.	Description	Jetty	In-Line Wharf	L-Head – Wharf	Breakwater	Dredging	Swing Basin	Shore Harbour	2nd Berth Opportunity
5B	• Shore connected harbour • Navigation channel from ENE		✓	✓	✓	✓	✓	✓	✓
5C	• Future development opportunity for 5B		✓	✓	✓	✓	✓	✓	✓

Following the early initial assessment, a selection of shortlisted options were taken forward through a multi criteria analysis (MCA) process. Options taken forward through this process were selected on the basis that:

- It has the potential to offer an enhanced project outcome in terms of operational, navigational or user experience
- It offered a potentially significant capital cost saving
- A potential technical solution needed further input before a selection decision could be made.

The options assessed were limited to the following shortlisted options.

Table 72: Shortlisted Options

Option
Option 2B: Combined wharf / breakwater, no jetty
Option 4A: In-line wharf and jetty, no breakwater
Option 2A: Combined wharf / breakwater with jetty
Option 3A: In-line wharf and jetty with breakwater
Option 5B: Shore connected harbour
Option 6: T-head wharf and jetty with breakwater

Appendix D sets out provisional technical sketches of the shortlisted options.

Infrastructure Options (Short List)

Multi Criteria Analysis

A MCA is a qualitative assessment process designed to establish preferences between options by reference to an explicit set of criteria. The MCA process was used to identify a preferred technical solution for the Gold Coast CST from the short list of options identified in Table 72.

The MCA process was undertaken in consultation with a broad stakeholder group including City representatives, local business representatives, cruise industry representatives, marine engineers, construction contractors, vessel navigation pilots and the PwC project team.

The MCA process was undertaken using the following steps:

- Agree the specific MCA methodology to be used
- Agree the MCA evaluation criteria

- Confirm the options to be evaluated
- Complete preliminary scoring with the PwC and City project team
- Detailed MCA workshop with broad stakeholder group to confirm preferred option.

A key feature of the MCA process was that it drew on the collective experience and judgement of the project team and the broader stakeholder group to establish the evaluation criteria and to apply those criteria to identify the preferred option.

MCA scoring

The evaluation criteria for the MCA process are shown in Table 73. These criteria were developed in consultation with the project team and were confirmed with the broader stakeholder group during the MCA workshop.

Table 73: MCA Criteria

Criteria	Description
Operational Viability	Degree to which the technical solution is exposed to operational limitations
Cost	Relative cost of the option (including capital and ongoing costs)
Environment and Coastal Impacts	The impact which the technical solution may have on the environment and the coastal processes
Demand and Economic Benefits	The perceived degree to which the selected technical option may deliver economic benefits
Social impacts and benefits	The degree to which the selected technical option delivers public amenity.

Participants were asked to assess each of the options identified in Table 73 in the open forum of the workshop against a set of six criteria and rate them relative to the other options based on a 5-point colour relative scoring system outlined in Figure 41.

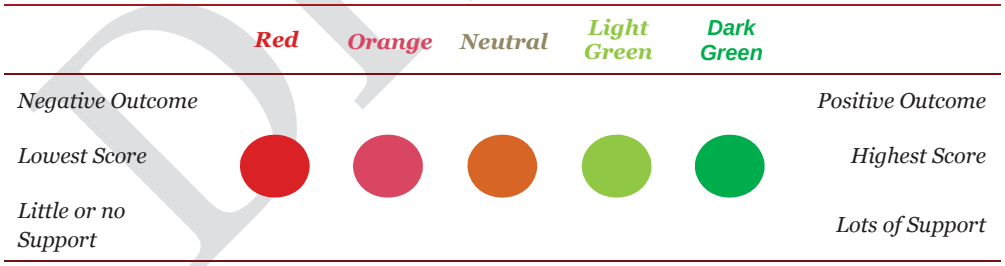


Figure 41: MCA Scoring Guide

MCA scoring summary

Table 74 sets out the scoring of the assessment of each of the 6 options against the established criteria. A full documentation of the results of the multi criteria analysis is set out in Appendix B.

Table 74: MCA Summary

Option	Operational Viability	Cost	Social Impacts and Benefits	Demand and Economic Benefits	Environmental and Coastal Impacts
Option 2b: Combined wharf / breakwater, no jetty					
Option 4a: In-line wharf & jetty, no breakwater					
Option 2a: Combined wharf / breakwater with jetty					
Option 3a: In-line wharf & jetty with breakwater					
Option 5b: Shore connected harbour					
Option 6: T-head wharf & jetty with breakwater					

MCA Analysis Details

This section presents the detailed outcomes of the MCA workshop.

Table 75 to Table 79 set out the scoring and commentary relating to the assessment of each of the 6 infrastructure options against the assessment criteria.

Options Analysis

Table 75: MCA results - Criteria 1 (Operational Viability)

Option	Commentary	Scoring
Option 2b: Combined wharf / breakwater, no jetty	• Would require a number of separate vessels to transport passengers to shore • Not an optimal passenger experience due to the time taken to transfer passengers to shore • Raises passenger safety concerns during boarding and alighting • Manageable from a mooring and ship safety perspective provided suitably sized breakwater is constructed	
Option 4a: In-line wharf & jetty, no breakwater	• Lack of breakwater raises serious questions regarding ability to moor and also the safety of the ship when docked • It is unlikely vessels would be prepared to dock if the facility did not have a breakwater due to reduced surety around vessel safety and timetables/scheduling	
Option 2a: Combined wharf / breakwater with jetty	• Technical design unlikely to be able to accommodate home porting • Breakwater to provide sufficient protection from wind and wave conditions giving cruise operators sufficient surety to dock	
Option 3a: In-line wharf & jetty with breakwater	• Can be augmented to provide home porting facilities • Breakwater to provide sufficient protection from wind and wave conditions giving cruise operators sufficient surety to dock. • Expected number of dockable days expected to provide surety to operators around timetabling	
Option 5b: Shore connected harbour	• Can provide home porting and transit facilities • Technical design provides sufficient protection from wind and wave conditions giving cruise operators sufficient surety to dock. • May be more onerous for ships to navigate • Expected number of dockable days expected to provide surety to operators around timetabling.	
Option 6: T-head wharf & jetty with breakwater	• Can be augmented to provide home porting facilities • Prevailing wind direction may pose issues regarding movement of vessels when docked, however is expected to provide sufficient protection from wind and wave conditions giving cruise operators sufficient surety to dock • Expected number of dockable days expected to provide surety to operators around timetabling	

Table 76: MCA results - Criteria 2 (Cost)

Option	Commentary	Scoring
Option 2b: Combined wharf / breakwater, no jetty	• Lack of jetty will make this option marginally cheaper to construct than other options with jetties • Wil have materially higher operational costs due to requirement to operate passenger ferries to and from the moored vessel	
Option 4a: In-line wharf & jetty, no breakwater	• Lack of breakwater makes this option significantly cheaper to construct than other available options • Restricting use to a transit port means limited land side infrastructure requirements and less on going operational expenses	
Option 2a: Combined wharf / breakwater with jetty	• Material construction cost expected • Complimentary infrastructure requirements on the Spit and surrounding area may be significant • Restricting use to a transit port means limited land side infrastructure requirements and less on going operational expenses	
Option 3a: In-line wharf & jetty with breakwater	• Material construction cost expected • Landside infrastructure requirements would be significant if augmented to serve as a home port • Complimentary infrastructure requirements on the Spit and surrounding area may be significant	
Option 5b: Shore connected harbour	• Would have the highest construction cost of all options by some margin • Potential for significant up front and ongoing dredging requirement • Would likely incur higher operational costs from Council • Would likely require more landside infrastructure requirements.	
Option 6: T-head wharf & jetty with breakwater	• Material construction cost expected • Landside infrastructure requirements would be significant if augmented to serve as a home port • Complimentary infrastructure requirements on the Spit and surrounding area may be significant • May necessitate dredging due to closer proximity to shore	

Table 77: MCA results summary - Criteria 3 (Social impacts and benefits criterion)

Option	Commentary	Scoring
Option 2b: Combined wharf / breakwater, no jetty	• Lack of jetty restricts the development of any ancillary public facilities which significantly limits public use of the facility • Breakwater will create a wave shadow thereby making the beach behind it more controlled	
Option 4a: In-line wharf & jetty, no breakwater	• Creation of public amenity with new facility for tourists and local residents to use the jetty and wharf	
Option 2a: Combined wharf / breakwater with jetty	• Creation of public amenity with new facility for tourists and local residents to use the jetty and wharf • Breakwater will create a wave shadow thereby making the beach behind it more controlled	
Option 3a: In-line wharf & jetty with breakwater	• Creation of public amenity with new facility for tourists and local residents to use the jetty and wharf • Can be augmented to function as a home port • Home porting would require significant landside infrastructure, which would put greater burden on the surrounding area in terms of traffic flows • Breakwater will create a wave shadow thereby making the beach behind it more controlled	
Option 5b: Shore connected harbour	• Creation of significant public amenity and public space • Would create a safe beach environment protected from the wave climate • Loss of some existing beach access and lack of beach continuity • This option will likely to create the most public concern.	
Option 6: T-head wharf & jetty with breakwater	• Can be augmented to function as a home port • Home porting would require significant landside infrastructure, which would put greater burden on the surrounding area in terms of traffic flows • Breakwater will create a wave shadow thereby making the beach behind it more controlled	

Table 78: MCA results summary - Criteria 4 (Demand and Economic Benefits)[46]

Option	Commentary	Scoring
Option 2b: Combined wharf / breakwater, no jetty	• Facility is limited to serving as a transit port meaning the economic benefits are constrained to being derived through day visitors • Will provide very limited opportunities for any ancillary commercial operations • Expected to generate significant jobs during construction and ongoing operations	
Option 4a: In-line wharf & jetty, no breakwater	• Facility is limited to serving as a transit port meaning the economic benefits are constrained to being derived through day visitors • Economic benefit will be further limited given the reduced number of dockable days due to a lack of breakwater • Expected to generate significant jobs during construction and ongoing operations	
Option 2a: Combined wharf / breakwater with jetty	• Facility is limited to serving as a transit port meaning the economic benefits are constrained to being derived through day visitors • Potential for ancillary commercial operations • Expected to generate significant jobs during construction and ongoing operations	
Option 3a: In-line wharf & jetty with breakwater	• Greater economic benefit can be achieved through the ability to berth two vessels at once and double the possible patronage • Possibility to augment the design to accommodate home porting would significantly increase passenger time spent on the Gold Coast and thus increase the economic benefits derived by the region • Greater potential for ancillary commercial operations • Expected to generate significant jobs during construction and ongoing operations	
Option 5b: Shore connected harbour	• Greater economic benefit can be achieved through the ability to berth two vessels at once and in theory double the possible patronage • Significantly more scope for commercial space development which could be leased • Would be able to accommodate home porting and • Significantly more construction work than other options may contribute to local employment opportunities.	
Option 6: T-head wharf & jetty with breakwater	• Possibility to augment the design to accommodate home porting would significantly increase passenger time spent on the Gold Coast and thus increase the economic benefits derived by the region • Greater potential for ancillary commercial operations • Expected to generate significant jobs during construction and ongoing operations	

[46] When assessing the demand and economic benefits expected to accrue under each option it is assessed on the basis of the option's ability to provide the necessary infrastructure to support demand not the option's capacity to attract demand from cruise ship terminals.

Options Analysis

Table 79: MCA results summary - Environmental and coastal impacts criterion

Option	Commentary	Scoring
Option 2b: Combined wharf / breakwater, no jetty	• Breakwater would essentially be an island off shore • No significant impacts in beach and wave zone • No impact on Philip Park • Breakwater will create wave shadow behind it, may be some changes to the coastal processes including accumulation of sand behind breakwater	
Option 4a: In-line wharf & jetty, no breakwater	• Will be environmental impacts of constructing terminal infrastructure in Philip Park • Will be environmental impacts of constructing jetty through dunes and wave zone, and jetty and wharf in ocean including potential disruption to marine animals • Lack of breakwater means there are minimal to low environmental and coastal impacts	
Option 2a: Combined wharf / breakwater with jetty	• Breakwater will create wave shadow behind it, may be some changes to the coastal processes including accumulation of sand behind breakwater • Will be environmental impacts of constructing terminal infrastructure in Philip Park • Will be environmental impacts of constructing jetty through dunes and wave zone, and jetty and wharf in ocean including potential disruption to marine animals	
Option 3a: In-line wharf & jetty with breakwater	• Breakwater will create wave shadow behind it, may be some changes to the coastal processes including accumulation of sand behind breakwater • Will be environmental impacts of constructing terminal infrastructure in Philip Park • Will be environmental impacts of constructing jetty through dunes and wave zone, and jetty and wharf in ocean including potential disruption to marine animals	
Option 5b: Shore connected harbour	• Highest level of environmental and coastal processes impacts due to extent of breakwater construction and the impact on the south to north sand transport • Extent of breakwater and rock walls will create more habitat for marine creatures.	
Option 6: T-head wharf & jetty with breakwater	• Breakwater will create wave shadow behind it, may be some changes to the coastal processes including accumulation of sand behind breakwater • Breakwater would likely be closer to shore than other options • Possibility to augment the technical design to allow for base port • Will be environmental impacts of constructing terminal infrastructure in Philip Park • Will be environmental impacts of constructing jetty through dunes and wave zone, and jetty and wharf in ocean including potential disruption to marine animals	

Preferred infrastructure option

Based on the results of the MCA workshop Option 3a was confirmed as the preferred technical solution to progress to full assessment. The MCA process was completed and the preferred option was identified by combining the scoring for the individual evaluation criteria as shown in Table 74. The preferred option was selected as the option that demonstrates the most positive scores across the individual criteria and taking account of the supporting commentary where required. Option 3A was identified as the preferred option to carry forward into the options refinement process.

Option 3A provided the best balance between providing a suitable technical design that provided the necessary surety and security of use for cruise ship operators, whilst limiting impact on the environment and coastal processes. Option 3a also provided the best balance between the upfront construction cost and the expected economic benefits the city could derive given it's the capacity for Option 3a to be augmented to service as a home port.

Based on market engagement undertaken with cruise ship operators a suitably sized breakwater was determined as an absolutely necessary component of the technical design to provide operators with:

- Enough security for their vessel from adverse wave and wind conditions
- Enough surety around timetabling to allow itinerary planning.

Based on preliminary cost estimates, the breakwater is the single biggest capital expenditure requirement and is expected to contribute 51 per cent of the overall facilities construction cost.

Augmenting the original Option 3a design, to accommodate home porting is expected to have a relatively marginal cost increase on the overall construction cost of the facility (in the order of five to ten per cent) and a home port would be expected to significantly increase the economic benefits derived by the City over a purely transit facility[47].

On the basis that the increase in economic benefits of home porting would far outweigh the marginal cost increase of augmenting the base design of Option 3a, it was concluded that Option 3a augmented to serve as a home port would be the preferred option to take forward for further assessment.

Development of Preferred Option – Sub-Options Considered

Option 3A has been identified as the preferred technical solution based on a MCA of functional, technical, financial, operations and other criteria. This option includes the following infrastructure elements:

- Breakwater – for wave protection at the berth.
- Wharf – for vessel access and as a platform for vessel loading and unloading to be aligned parallel to the jetty
- Dolphins – berthing/mooring dolphins and mooring only dolphins to allow for vessel berthing and de-berthing operations, and for mooring while at the berth.

[47]According to CLIA, domestic passengers spend roughly three times as much per day in a homeport than in a transit port.

- Jetty – a skeletal framed structure complete with a running surface to provide access between the shore and wharf

- Onshore infrastructure and services – including the terminal building, roads and access, storm water, sewer, water, electrical, gas, communications infrastructure and provision for fuel supply.

In order to arrive at the Reference Project design, various sub-options have been considered in terms of:

- Types of infrastructure / infrastructure variations

- Potential for staging.

Infrastructure Options

As a part of developing the preferred technical solution infrastructure option variations for the breakwater, jetty and wharf were considered. These alternatives were:

- Breakwater – consideration of two different construction methods including concrete caisson and rubble mound options

- Jetty and Wharf – consideration of three potential roadway arrangements along the jetty and associated wharf infrastructure:

  – Jetty with a 7m wide roadway – with an allowance for two lane traffic

  – Jetty with a 4.5m wide roadway – with an allowance for single lane traffic with the provision for passing bays at regular intervals

  – Jetty with a monorail – with no provision for vehicle or pedestrian traffic.

The Reference Project includes a concrete caisson breakwater and a jetty with a 7m wide roadway. Details of the additional options considered and reasons for discounting technical alternatives are detailed in this section. Additional details of the technical solution selected as the Reference Project are included in Chapter 4.

Breakwater Options

Two construction methods have been investigated for the breakwater and include a concrete caisson breakwater and a rubble mound breakwater.

The concrete caisson breakwater is preferred for the following reasons:

- Breakwater size. The sketch of the breakwater options shows the relative size of the two breakwaters. It can be seen from this that the base of the rubble mound breakwater (approximately 115m) is significantly larger than the caisson option (approximately 71m). To ensure the base of the rubble mound breakwater does not interfere with the wharf construction and/or the wharf structure in the future, the breakwater would need to be moved approximately 30-40m further away from the end of the wharf than the caisson option

- Availability of material. Concrete is readily available whereas the significant amount of various sized rock material would need to be sourced from specific locations

- Transport to site. The concrete caissons can be constructed at a dry dock such as Cairncross Dock. From this location they can be floated to site towed by tug vessels and placed in the final location. For rubble mound material, this will need to be transported

from a quarry to the port. From there the rubble will need to be loaded onto a barge to be transported to the site for placement.

Jetty Options

Three different jetty surface options were considered as a part of the development of Option 3A. These options included:

- Jetty with a 7m wide roadway – with an allowance for two lane traffic
- Jetty with a 4.5m wide roadway – with an allowance for single lane traffic with the provision for passing bays at regular intervals
- Jetty with a monorail – with no provision for vehicle or pedestrian traffic.

A 7m wide roadway is necessary for the facility to function as a base port, which is a key functional criterion for the project. This option allows for unimpeded bi-directional traffic flow to the vessel and has the provision for pedestrian access. Given the peak traffic flow demands when a vessel is in port, the 7m wide roadway best accommodates the necessary vehicle movements to provide supplies to the ship and to embark/disembark passengers and allows for pedestrian access. These factors are not accommodated in with the 4.5m wide roadway or monorail options.

Details of the 4.5m wide roadway option and the monorail jetty option including a summary of advantages and disadvantages are presented in the following parts of this section.

Alternate jetty option 1 – 4.5m wide roadway

This option has been discounted as it would not provide sufficient capacity for a base port option.

In this option, the jetty is an approximately 900m long skeletal framed structure with standard pile bents comprised of two raking piles and a steel headstock spaced at approximately 18m. Deck support frames span between the headstocks. A 4.5m wide roadway is supported by two deck support frames. This arrangement is shown in Figure 42.

The 4.5m wide roadway limits the traffic flow to one direction at any time. To alleviate this problem two 7m wide by 40m long passing bays would be provided (refer to Figure 43). By providing passing bays, two-way traffic can operate and the passing bays be utilised to allow vehicles travelling in opposite directions to manoeuvre past each other.

Options Analysis

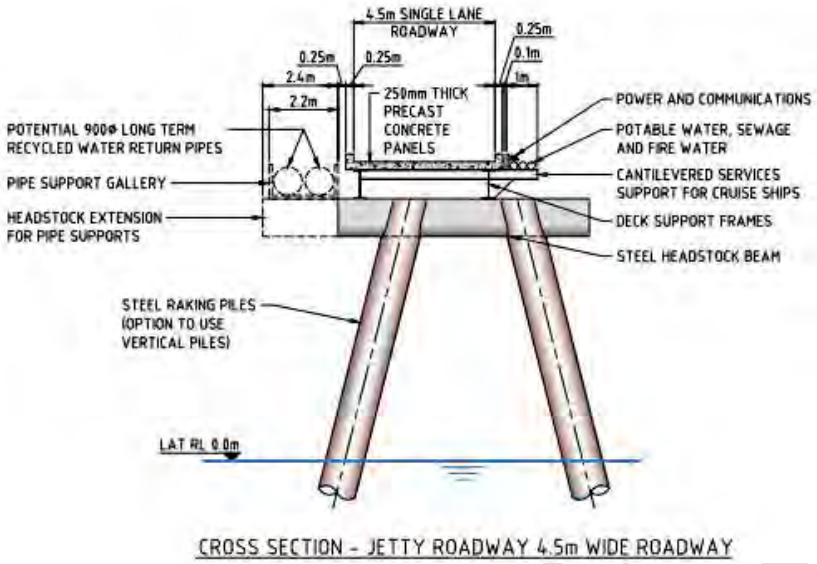


Figure 42: Typical cross section of a 4.5m roadway

Figure 43: 4.5m wide roadway concrete deck with 7m wide passing bay

This 4.5m wide roadway option provides a small initial capital cost saving relative to the full length 7m wide roadway. This benefit is offset by the reduction in functionality of the narrower roadway width, and based on the expected traffic requirements for a base port visit, this option would not provide sufficient capacity.

Alternate jetty option 2 – monorail option

A monorail based jetty was considered as an alternative to constructing a trafficable concrete roadway to reduce the capital cost of the jetty and the potential impact of very large waves on the structure.

This option has been discounted as it does not meet the transport requirements for a base port option. The use of a monorail vehicle is not seen as viable mode of transport for cargo and supplies that would be required for a home port. In addition, the proposed monorail jetty does not allow for the inclusion of services such as potable (drinking) water, sewage and power which are required to service home port ships.

The jetty is an approximately 900m long skeletal framed structure comprising a monorail travelling beam supported by a pile bent spaced approximately every 18m. Anchor bents are located approximately every 200m. This is the simplest form of structure comprising hollow steel tube piles, a hollow steel box beam headstock and a single hollow steel box beam monorail support beam. The monorail beam would support any power cables necessary for the operation of the monorail.

Figure 44: Skeletal frame to accommodate monorail vehicles only

Benefits of this Option

The monorail beam jetty provides a capital cost saving over a traditional concrete deck roadway jetty. However, this is partially offset by the requirement to purchase a monorail vehicle. Cost savings are achieved through the following:

- Minimised structure weight
- Minimised surface area of jetty structure that is exposed to extreme wave events which reduces the design requirement of the pile foundations
- Significantly reduced on site and over-water construction works required to be undertaken over a traditional decked roadway, resulting in a lower construction cost.

Limitations of this Option

- The monorail system would not allow the terminal to function as a home port
- The monorail system provides no access for traditional road going vehicles or pedestrians. This reduces the attraction of the facility for tourists or use by the local public
- In the event of a monorail breakdown, there will be no means of accessing the wharf. Should the monorail break down mid transit, no simple means of access to service the monorail or retrieve passengers is available
- As well as the requirement to purchase a monorail vehicle, there will be an increased operational expenditure for monorail maintenance.

Wharf Options

Two different wharf options were considered as follows:

- Wharf with allowance for vehicle and pedestrian traffic (consistent with 7m wide roadway and 4.5m wide roadway jetty options)
- Wharf with provision for monorail transport

The Reference Project includes a wharf with an allowance for vehicle and pedestrian traffic. Details of the discounted wharf with monorail option are presented below.

Alternate wharf option – monorail option

This wharf option has been discounted as the monorail option does not meet transport requirements for a base port.

At the seaward end of the jetty is an in-line wharf structure (i.e. in the same direction as the jetty) which comprises a nominal 35m long monorail platform on both sides of the jetty. A cross section of the monorail platform is shown in Figure 45.

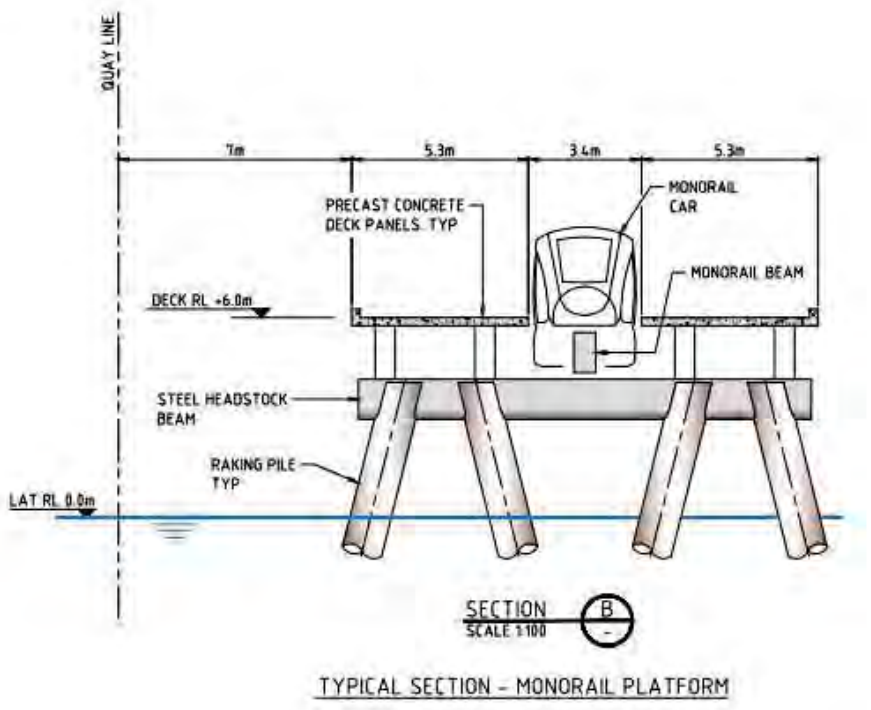


Figure 45: Monorail Platform Section at Wharf

The wharf consists of a 72m long x 14m wide wharf deck and an independent system of mooring dolphins and berthing dolphins provided at the same level as the wharf deck. The use of independent mooring dolphins allows the reduction in the wharf deck area.

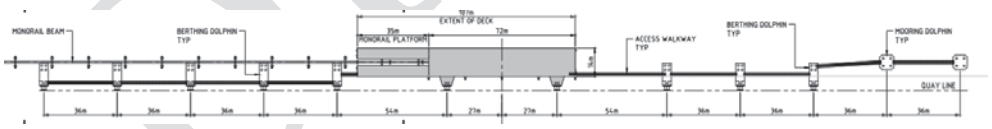


Figure 46: Plan view of wharf and dolphin arrangement

As wave protection is provided by the breakwater, the wharf would be constructed at a lower elevation that provides access for passengers from lower level cruise ship access ways. This is consistent with visiting port usage where passengers use lower level cruise ship doorways rather than higher level atrium entry used during initial embarkation.

Option costs

As part of the options analysis, potential technical alternatives were identified. These options included:

- Jetty with a 4.5m wide roadway with an allowance for single lane traffic and provision for passing bays at regular intervals
- Jetty with a monorail with no provision for vehicle or pedestrian traffic.

These technical alternatives were rejected as they provide capacity for transit port operations only and do not provide sufficient access capacity for home port functionality. Consistent with transit port functionality, this allows for reductions to the size and function of some of the key infrastructure.

These options demonstrate that the incremental cost of a base port is compared to a transit port is in a range from $14 million to $27 million or three to six per cent of the total capital cost.

Project option – monorail transport

Table 80: Day visit only port with inline wharf and jetty (no deck) with monorail system and break water

Description	Indicative Cost Estimate ($ real million)
Project Development Costs [a]	[redacted]
Planning, Approvals and Design[b]	[redacted]
Contract Administration	[redacted]
Monorail System	[redacted]
Construction Preliminaries	[redacted]
Landside Civil and building Works (1500m^2 building GFA)	[redacted]
Jetty (no decking)	[redacted]
Wharf (72m x 14m with 600m^2 access structure and gangways)	[redacted]
Dolphins (8 x berthing dolphins, 2 x mooring dolphins and 420 gantries)	[redacted]
Caisson Breakwater (780m long)	[redacted]
Total (excluding GST)	**449.9**

[a] Costs include procurement and transaction costs incurred in 2017/2018 in the pre-construction phase
[b] Planning, approvals and design costs have been adjusted from the project cost estimate due to timing of expenditure in pre-construction phase. The balance of the costs are included in the pre-construction phase.

Project option –reduced width roadway

Table 81: Day visit port only with in line wharf and jetty (4.5m wide with 7m passing bays) and breakwater

Description	Indicative Cost Estimate ($ real million)
Client costs (including procurement, Reference Project, EIS and transaction costs)	[redacted]
Planning, Approvals and Design	[redacted]
Contract Administration	[redacted]
Construction Preliminaries	[redacted]
Landside Civil and Building Works (1500m^2 building GFA)	[redacted]
Jetty (4.5m deck with 7.5m wide passing bays)	[redacted]
Wharf (72m x 14m with 600m^2 access structure and gangways)	[redacted]
Dolphins (8 x berthing dolphins, 2 x mooring dolphins and 300m gantries)	[redacted]
Caisson Breakwater (780m)	[redacted]
Total (excluding GST)	**435.8**

[a] Costs include procurement and transaction costs incurred in 2017/2018 in the pre-construction phase
[b] Planning, approvals and design costs have been adjusted from the project cost estimate due to timing of expenditure in pre-construction phase. The balance of the costs are included in the pre-construction phase.

Appendix B Options Drawings

This appendix sets out high level sketches of the different technical designs that were assessed as part of the MCA process. An augmented version of Option 3a was chosen as the Reference Project.

Options Drawings

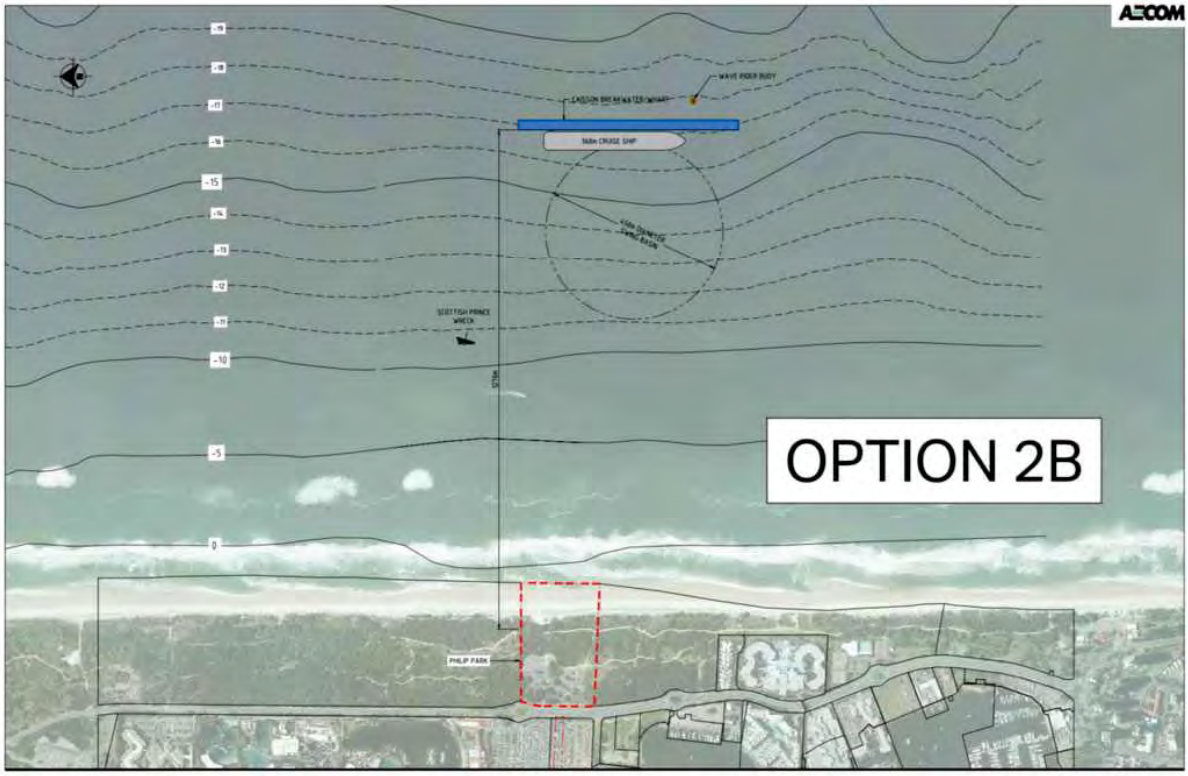


Figure 47: Shortlisted Option 2B Layout

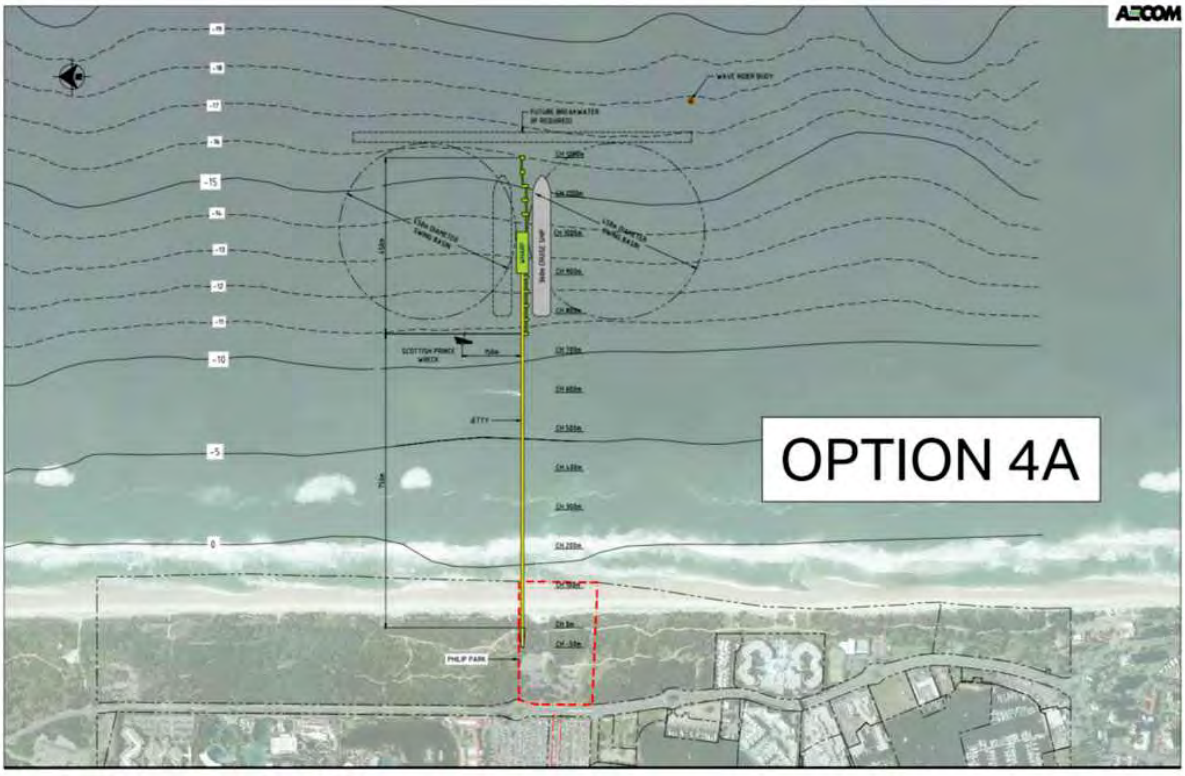


Figure 48: Shortlisted Option 4A Layout

Options Drawings

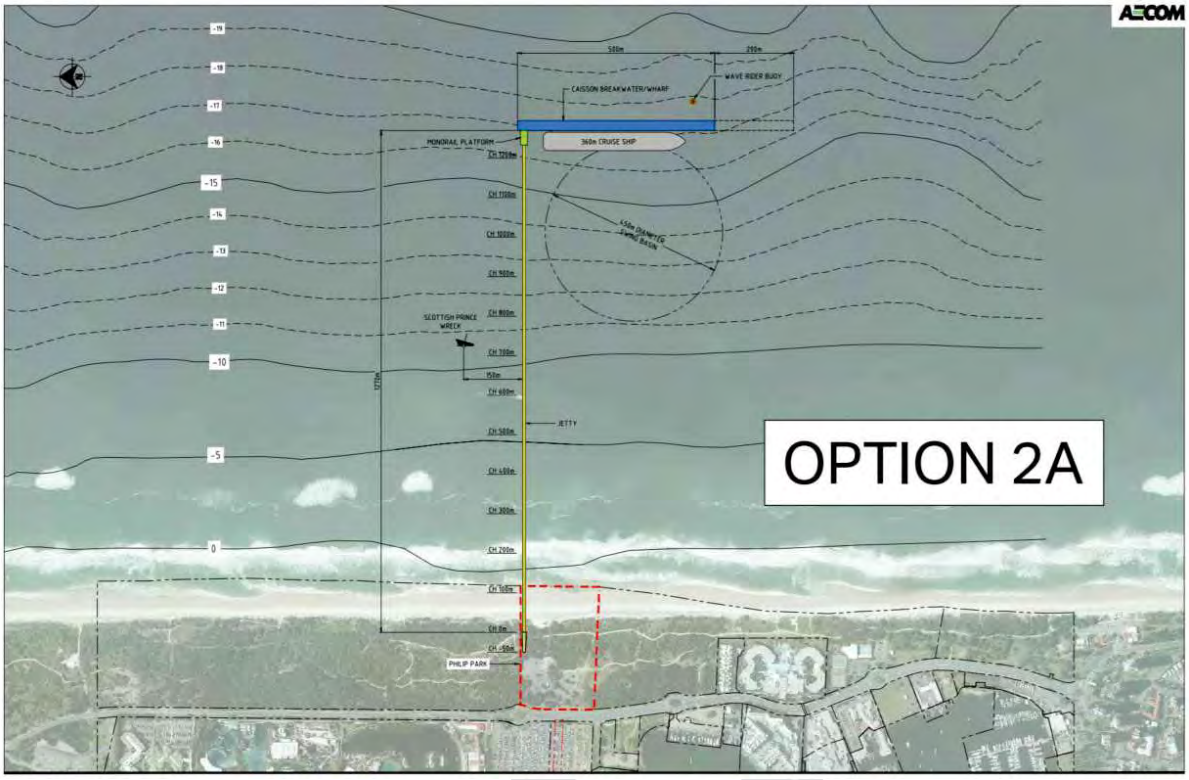


Figure 49: Shortlisted Option 2A Layout

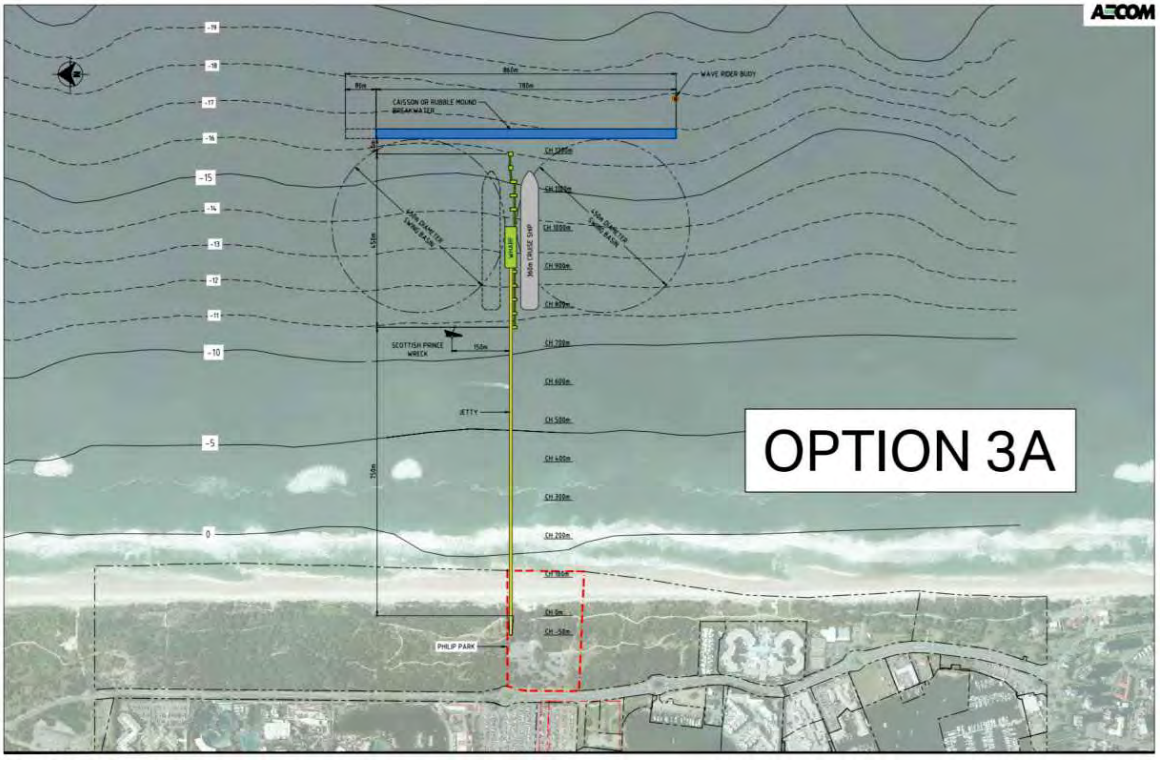


Figure 50: Shortlisted Option 3A Layout

Options Drawings

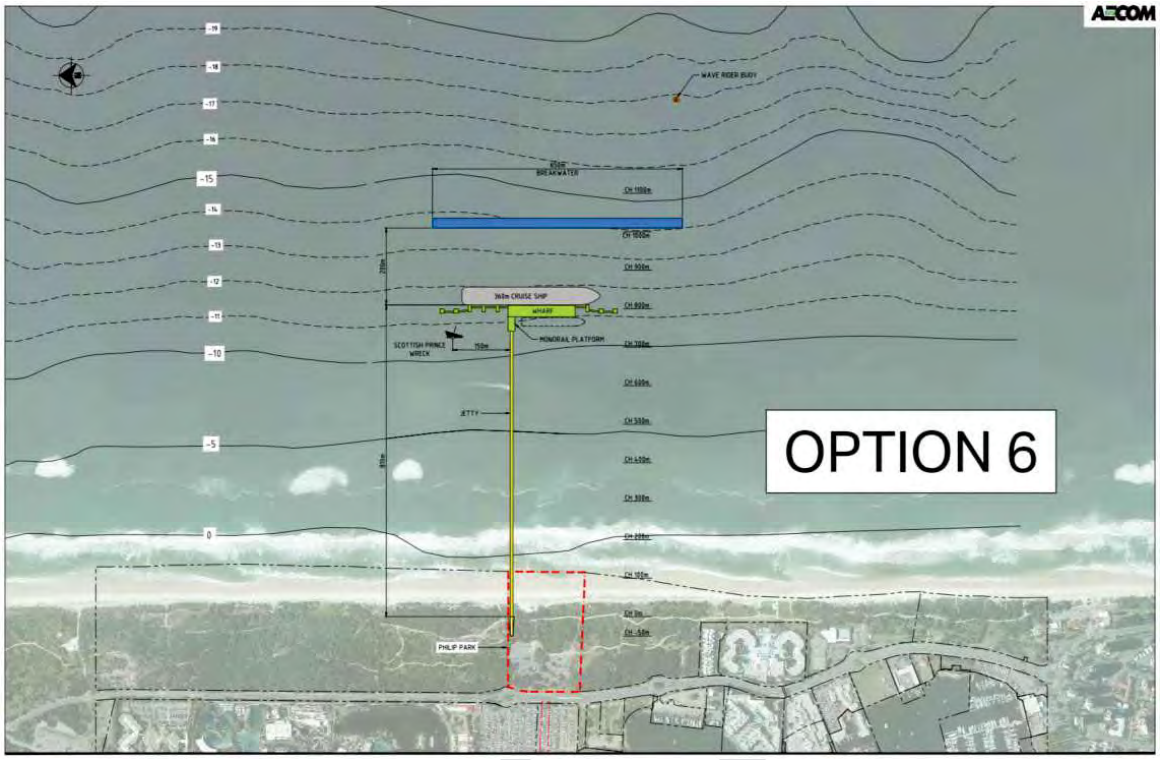


Figure 51: Shortlisted Option 6 Layout

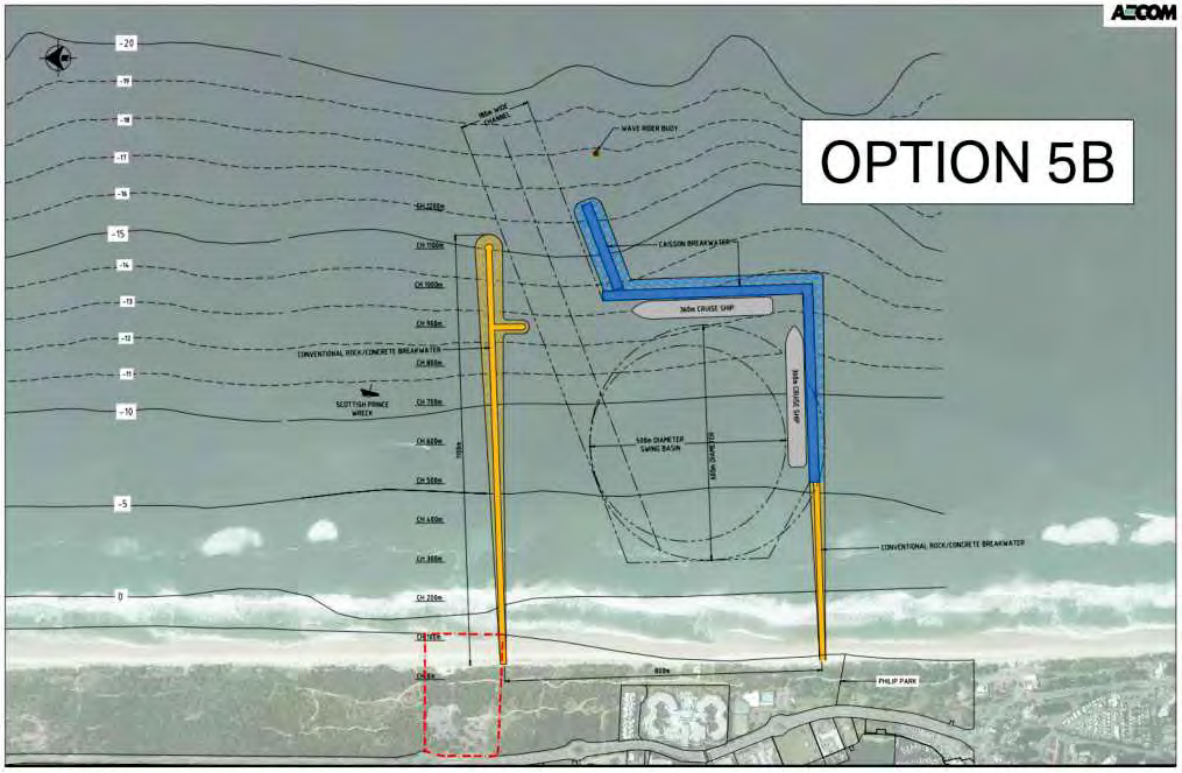
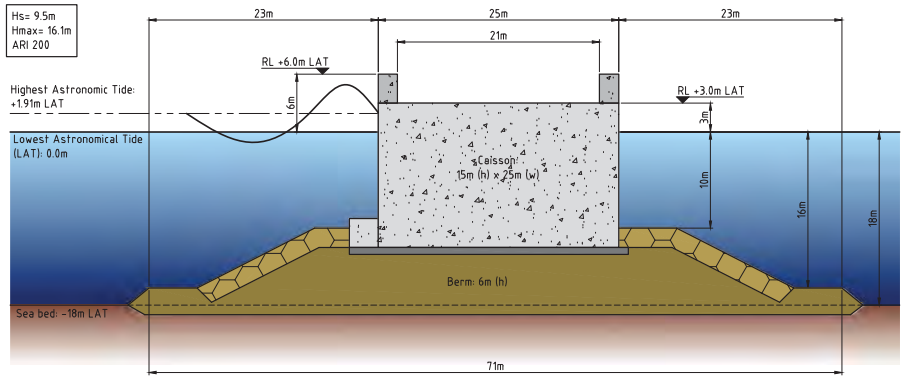


Figure 52: Shortlisted Option 5B Layout

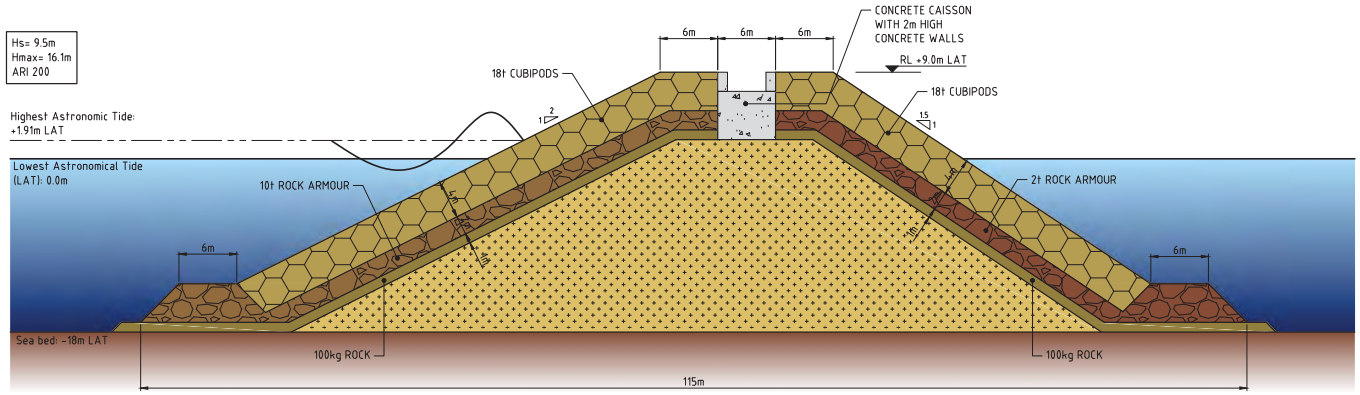
Appendix C Reference Project Drawings

L

AECOM



PREFERRED OPTION: DETACHED BREAKWATER - CAISSON WITH DOUBLE CROWN WALL



ALTERNATIVE OPTION: DETACHED BREAKWATER - RUBBLE MOUND BREAKWATER

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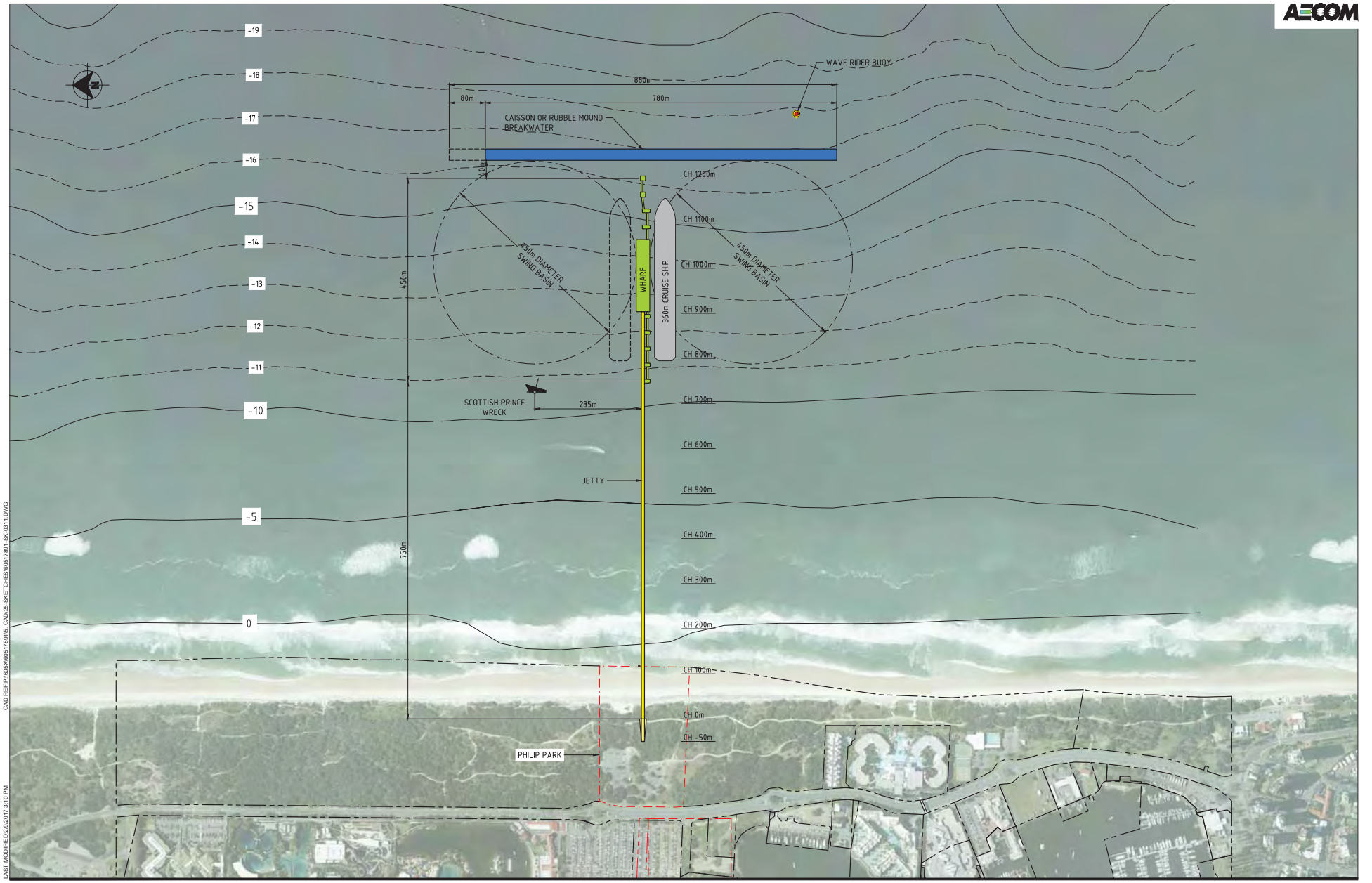
SCALE C

OCEAN-SIDE CRUISE SHIP TERMINAL
BREAKWATER OPTIONS

60517891-SK-0304



OCEAN-SIDE CRUISE SHIP TERMINAL
GENERAL ARRANGEMENT
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0311

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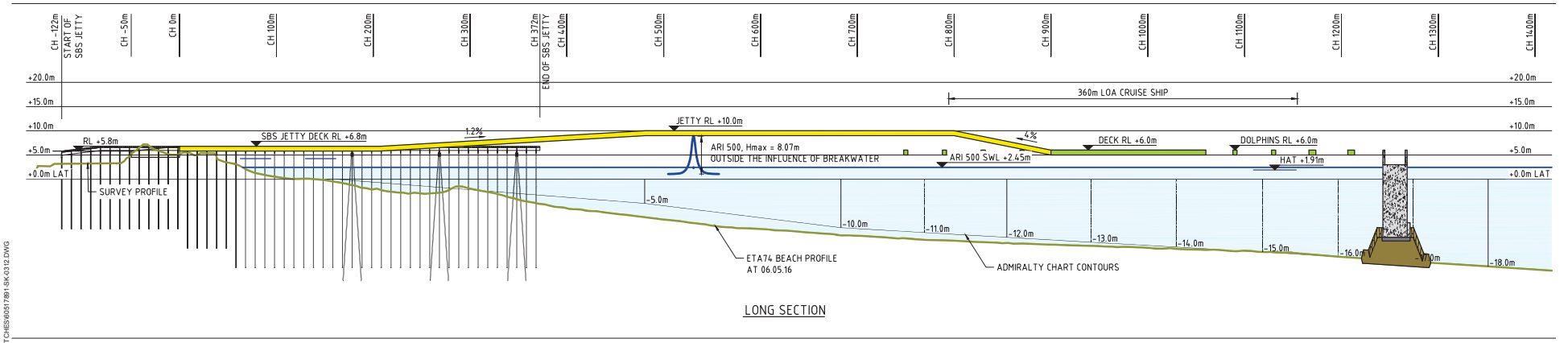

LONG SECTION

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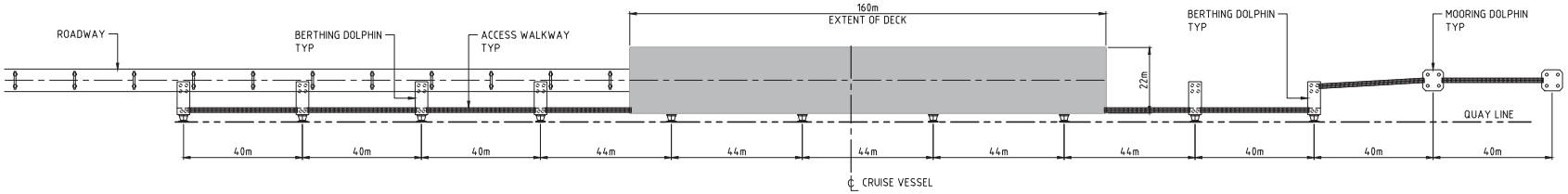
VERTICAL 1:100 (A3) 1:200 (A1) 0 4 8 12 16 20

OCEAN-SIDE CRUISE SHIP TERMINAL
LONG SECTION
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0312

AECOM



PLAN - WHARF STRUCTURE
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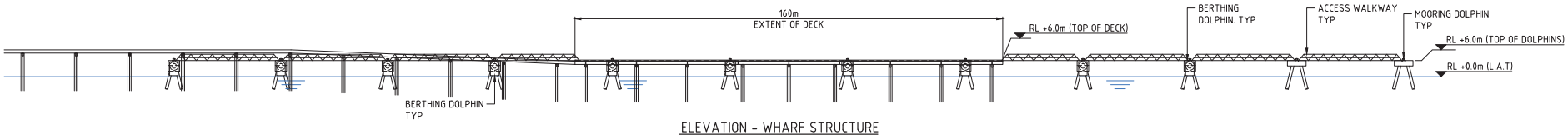
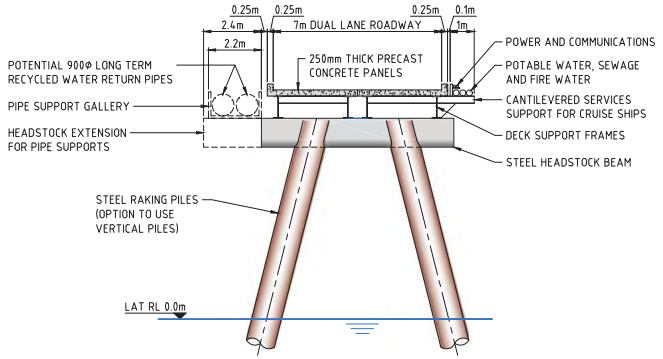
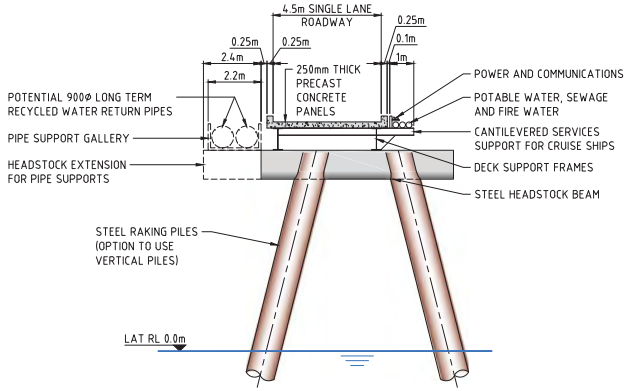


ELEVATION - WHARF STRUCTURE
SCALE 1:750



CROSS SECTION - JETTY ROADWAY 7m WIDE ROADWAY
SCALE 1:100



CROSS SECTION - JETTY ROADWAY 4.5m WIDE ROADWAY
SCALE 1:100

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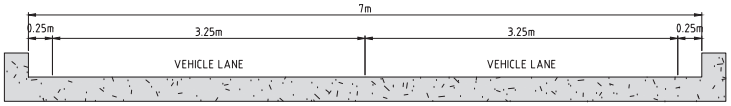
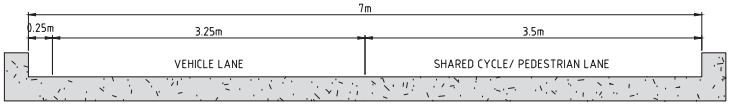
SCALE E 0 1 2 3 4 5m
1:200 (A3) 1:100 (A1)

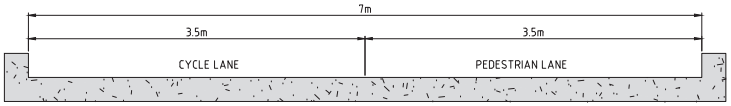
OCEAN-SIDE CRUISE SHIP TERMINAL
PLAN & SECTIONS
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0314



7m WIDE ROADWAY JETTY USE - CRUISE SHIP AT BERTH



7m WIDE ROADWAYJETTY USE OPTION - NO CRUISE SHIP



7m WIDE ROADWAY JETTY USE OPTION - NO CRUISE SHIP

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1:1500 (A3) 1:750 (A1)

SCALE E 0 1 2 3 4 5m
1:200 (A3) 1:100 (A1)

OCEAN-SIDE CRUISE SHIP TERMINAL
ROADWAY USE OPTIONS
PREFERRED LAYOUT - HOMEPORT OPTION
60517891-SK-0315

Appendix D Marine Site Characteristics and Assessment

Metocean conditions

Key technical considerations for design of a CST on the Gold Coast are the wave and wind climates, the coastal processes and the navigation characteristics of cruise ships likely to use the facility.

The wave climate is used as a key input to designing infrastructure solutions including any jetty, wharf and breakwater structures. The wind climate can affect the navigation and berthing of cruise ships, particularly modern large cruise ships due to their height and shape.

Metocean design conditions

The data used in the analysis has been obtained from Cardno, using work previously undertaken for the Gold Coast Dive Attraction in 2014. It is noted that the previous study drew on the extensive data set available from the wave rider buoy located just offshore from the site.
Wave data has been derived following the same methodology as the previous study for the Gold Coast Dive Attraction (refer to Section 8.1.1 of Report No 721804: Technical Assessment and Development Application by Cardno, 10 April 2014). In summary, the SWAN model was used to derive wave transfer coefficients at mean sea level (MSL) for all onshore propagating wave directions occurring at the offshore wave dataset. The model was run for all directions from north through east to south, with wave periods (Tp) from 4 to 20 seconds. Transfer coefficients were also based on a range of offshore wave heights to include the effects of wave breaking and bed friction. The modelled wave transfer coefficients were then applied to the offshore NOAA wave dataset to derive a corresponding significant wave height, period and direction at two output locations at each time step in the offshore wave dataset.

Data was taken from the model at two depths, being:

1. -18m AHD (543,605m E, 6,907,001m N)
2. -7m AHD (542,683m E, 6,907,000m N)

The location of these locations on the profile is presented in Figure 53.

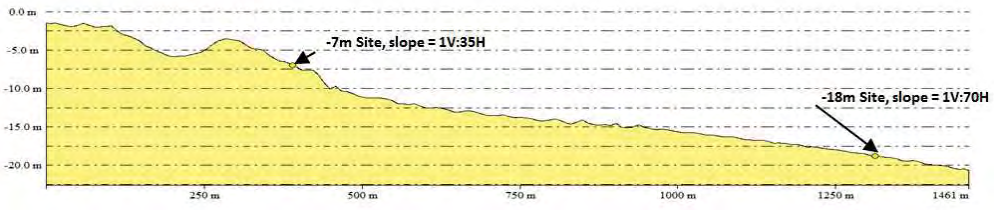

Figure 53: Beach Profile

The following descriptions are used when interpreting wave characteristic data:

- Significant wave height (Hs) is the measured average height of 1/3 of the biggest waves. As waves progress towards the shore the size of the wave changes (typically less) due to refraction and shoaling
- Spectral significant wave height (Hmo) is a spectrally derived wave height that is approximately equivalent to Hs (significant wave height)
- Maximum wave height (Hmax) is the largest wave that occurs in a series of waves. Compared to Hs this wave is typically 1.6 to 2 times larger
- Breaking wave height (Hb) is the largest wave that can be sustained in a given depth of water. This depends on the wave shape, bed slope and wind (~0.8 x depth). Once wave breaking starts Hb is used instead of Hmax
- Zero crossing wave period (Tz) is the average time between consecutive waves
- Spectral mean wave period (Tmo1) is similar to Tz and derived from analysis of wave energy spectrum
- Peak spectral wave period (Tp) describes the wave period in the energy spectrum where most of the wave energy is found. Note that Tp > Tmo > Tz
- Direction of wave travel (Dir) is described as the direction the wave travels from. Due to refraction wave direction changes as the shore is approached with waves transforming towards contours perpendicular to movement as they approach shore
- Water depth reflects the combination of normal depth plus storm tide. For rare events the water depth is greater because the storm tide is higher.

Extreme Wave Climates

The extreme wave climate data shown below are only relevant to the design of fixed infrastructure such as the breakwater and the jetty. During these extreme events all shipping would be put to sea well ahead of time.

Offshore, these events comprise large waves as shown in Table 82. At the -18m AHD location the larger waves for the events rarer than 50 year ARI (0.2% Annual Exceedance Probability) are so large that wave breaking occurs, effectively limiting the maximum wave height. This factor means that the design conditions for the 200 year ARI event are not significantly more than for a 50 year ARI event.

Table 82: Extreme Wave Heights at the -18m AHD Site

ARI[a] (years)	Water depth (m)	Hmo (m)	Hmax (m)	Tz (sec)	Tp (sec)
10	19.31*	6.3	12.0	9.4	13.2
20	19.37	7.2	13.7	9.9	13.9
25	19.40*	7.4	14.0	10.1	14.2
50	19.47	8.2	15.6**	10.5	14.7
100	19.54	8.8	15.9**	10.8	15.1
200	19.62	9.5	16.1**	11.2	15.7
500	19.69	10.4	16.3**	11.6	16.2

ARI[a] (years)	Water depth (m)	Hmo (m)	Hmax (m)	Tz (sec)	Tp (sec)

* interpolated from GHD study
** Hmax = breaking wave height
[a]ARI refers to Annual Recurrence Interval

- Closer to shore at the -7m AHD contour, all the extreme events have breaking waves. Again as seen in Table 83 the difference between a 50 year ARI and 200 year ARI is not significant.

Table 83: Extreme Wave Heights at the -7m AHD Site

ARI (years)	Water depth (m)	Hb (m)	Tz (sec)	Tp (sec)
50	8.47	7.78	10.5	14.7
100	8.54	7.87	10.8	15.1
200	8.62	7.98	11.2	15.7
500	8.69	8.07	11.6	16.2

Ambient Wave Conditions (operational)

The ambient waves are the potential operational wave conditions that the CST. In assessing the wave climate the following two sources have relied upon.

- Recorded swell wave data captured by a wave buoy between 2007 and 2015 (duration of directional data)
- Model data from the Cardno study.

An overview of the data is provided below:

- Recorded swell wave data was captured by a large (1.2m) Datawell Directional Waverider Buoy
- Numerical model results taken form the lengthy record of wave climate data used in the Cardno study and have been validated against the wave rider buoy data
- A visual summary of the wave climate at the site is presented in the wave roses shown in Figure 54 and Figure 55. These wave roses present the distribution of wave heights and wave periods over the whole year
- The comparison of the data sets is limited by the adopted bin sizes (10^{o} for recorded data vs 22.5^{o} for model data). The use of the wider directional bins in the model data makes interpretation of swell wave direction spread more difficult
- The model data captures short crested local seas that have been missed by the recorded wave buoy data. This is due to the dynamic response of the buoy favouring longer period waves. This is seen in the spread of wave periods recorded by the buoy with approximately 15% of recorded waves having a period less than 6s compared with the model data with approximately 27% of waves having a period of less than 6s
- An overall appreciation of the wave climate at the site is best achieved by considering both data sets, while remaining conscious of the individual limitations for each set of results. For the reasons described above the recorded data is relied on for swell wave

directionality, while model data is relied on for all other features including wave period distribution.

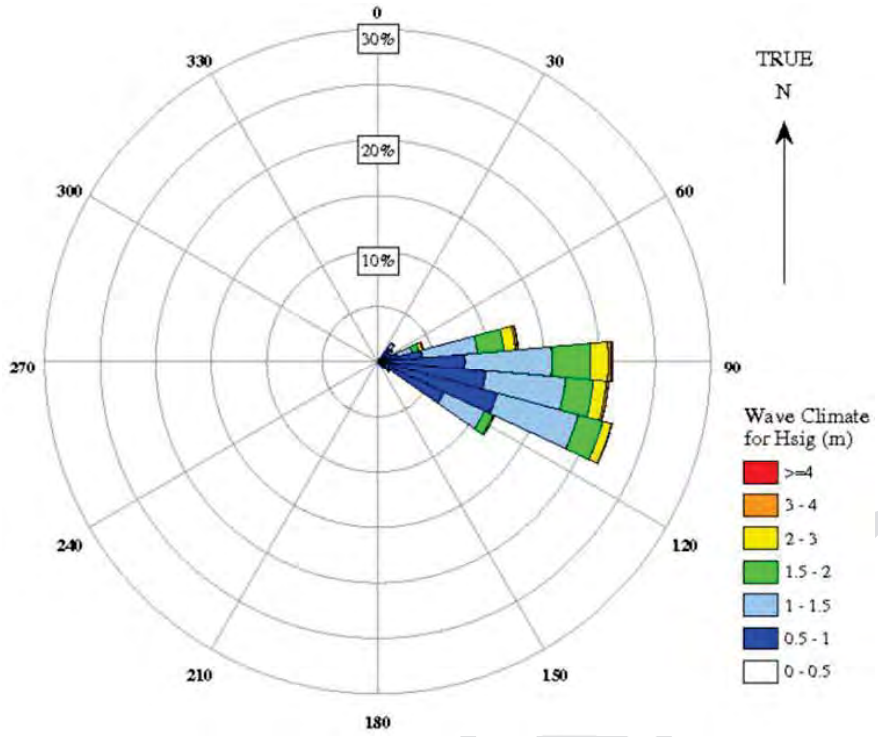

Figure 54: Recorded Annual Swell Wave Climate Rose at -18m AHD (Gold Coast Wave Buoy 2007 to 2015)

An overall description of the recorded data reveals the following for swell waves:

- Strong E through ESE directional bias
- Larger waves (Hs >2m) are further biased towards the East.

From Figure 54 the recorded swell wave directional distribution is summarised in Table 84.

Table 84: Recorded Swell Wave Height and Direction Spread at -18m AHD

	Wave Direction (°N)										
H_s (m)	35-45	45-55	55-65	65-75	75-85	85-95	95-105	105-115	115-125	125-135	Total
<1.0	1.60%	1.20%	1.00%	1.90%	4.00%	7.90%	9.80%	11.20 %	6.70%	0.70%	46.0%
1.0-1.5	0.60%	0.50%	0.10%	1.40%	5.00%	7.90%	7.30%	7.60%	4.10%	0.70%	35.2%
1.5-2.0	0.00%	0.00%	0.00%	0.60%	2.40%	3.60%	2.50%	2.30%	0.90%	0.00%	12.3%
2.0-3.0	0.00%	0.00%	0.00%	0.50%	1.10%	1.70%	1.15%	0.90%	0.10%	0.00%	5.45%
3.0-4.0	0.00%	0.00%	0.00%	0.00%	0.20%	0.30%	0.30%	0.05%	0.00%	0.00%	0.85%
>4.0	0.00%	0.00%	0.00%	0.00%	0.05%	0.10%	0.05%	0.00%	0.00%	0.00%	0.20%
Total	2.2%	1.7%	`1.1%	4.4%	12.8%	21.5%	21.1%	22.0%	11.8%	1.4%	100%

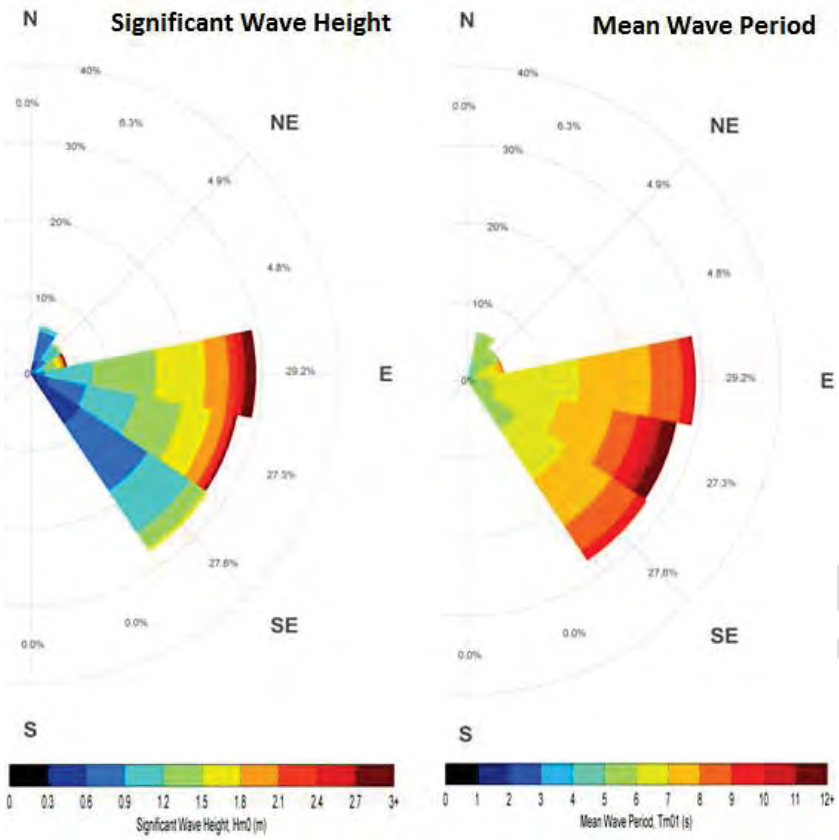

Figure 55: Annual Wave Climate Roses at -18m AHD (Cardno model with wave heights left and wave periods right)

Although the roses appear different, inclusion of sea waves from the SE and N to NE combined with the different bin ranges makes direct comparison difficult.

Longer period waves (Tm01 > 8s) are biased towards the ESE and are seen with some regularity from E through to SE. This data for the -18m AHD site and a summary is presented in Table 85 and Table 86.

The data demonstrates the short period waves generated as sea under local winds, are biased to the NNE and SE. The local sea from the east will exist but is presumably swamped by the swell.

The direction spread from Table 85 indicates an E directional bias during the summer months and a SE directional bias during the winter months. Further analysis of the wave height data reveals that during the winter months, although generally calmer, there is a higher proportion of large wave events (Hs>3m) reflecting the importance of temperate climate storm systems, such as east coast lows, on the extreme wave climate at the site.

Table 85: Wave Direction Spread at -18m AHD Site

Period	Wave Direction (°N)							
	337.5-22.5 N	22.5-67.5 NE	67.5-112.5 E	112.5-157.5 SE	157.5-202.5 S	202.5-247.5 SW	247.5-292.5 W	292.5-337.5 NW
Year Round	0%	12%	43%	45%	0%	0%	0%	0%
During Winter (Apr to Sep)	0%	10%	36%	54%	0%	0%	0%	0%
During Summer (Oct to Mar)	0%	15%	49%	36%	0%	0%	0%	0%

The significant wave height table indicates that 93.4% of waves are 2m or less. This equates to 341 days per year.

Table 86: Significant Wave Height at -18m AHD Site

Wave Height, Hmo (m)	Total	Cumulative Total	Days per Year
<0.5	6.38%	6.38%	23
0.5-1.0	37.91%	44.28%	162
1.0-1.5	33.43%	77.72%	284
1.5-2.0	15.71%	93.42%	341
2.0-2.5	3.99%	97.41%	356
2.5-3.0	1.60%	99.02%	361
3.0-3.5	0.55%	99.57%	363
3.5-4.0	0.25%	99.82%	364
4.0-4.5	0.12%	99.94%	365
4.5-5	0.03%	99.97%	365
>5	0.03%	100.00%	365

Table 87: Mean Wave Period at -18m AHD Site

	Mean Wave Period, Tm01 (sec)							
	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16
Total	0.0%	0.0%	26.7%	53.8%	15.8%	2.7%	0.9%	0.2%
Cumulative Total	0.0%	0.0%	26.7%	80.5%	96.3%	99.0%	99.8%	100.0%
During Winter (Apr to Sep)	0.0%	0.0%	22.7%	52.4%	19.5%	3.8%	1.3%	0.3%
During Summer (Oct to Mar)	0.0%	0.0%	30.9%	55.1%	12.0%	1.5%	0.4%	0.1%

The data set presented in Table 87 shows that 80.5% of waves have a mean period less than 8 seconds and 96.3% of waves have a mean period less than 10 seconds.

Wind

Wind can have a significant impact on modern cruise ships due to their shape and size. It is important to understand the wind climate at the Gold Coast in the design and operational characteristics of the terminal.

Seaway wind data from 2000 to 2014 was sourced from the Australian Bureau of Meteorology and was analysed to better understand the historic wind conditions.

A histogram of the 10 metre sustained 1 minute wind speeds over the approximate 14 years of available measurements is displayed in Figure 56. This reveals that wind speeds exceeding 40kts occur approximately 0.04% of the time, or approximately 4.4hrs per year on average. Sustained winds over 20kts occur 3.5% of the time while winds over 25 kts occur approximately 1% of the time.

These stiff winds may be important to ships berthing or departing, though analysis of their impacts has not yet been assessed.

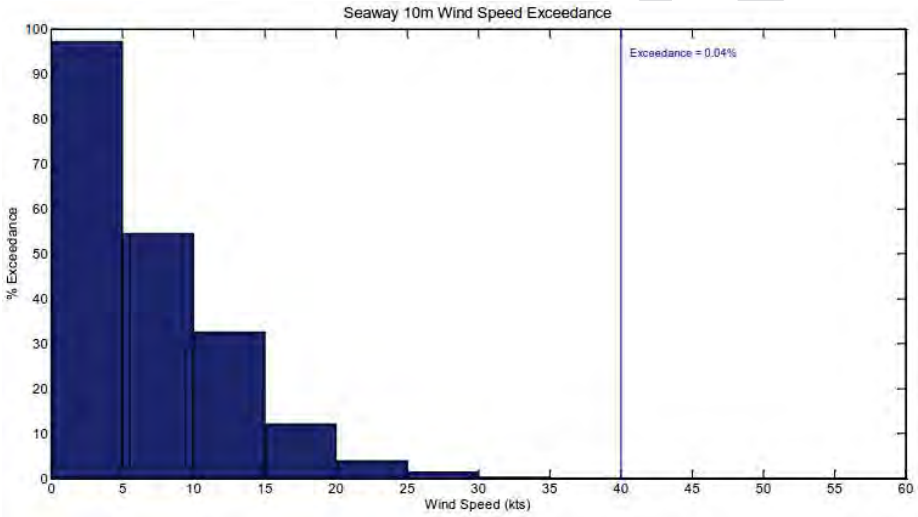

Figure 56: Wind Speed Histogram

The wind rose presented in Figure 57 reveals that the wind has a strong bias to the South through SE. The wind rose reveals that winds exceeding 20 kts (~10m/s) are strongly biased to the SE quadrant with stiff winds for the north of East or the west of South being rare.

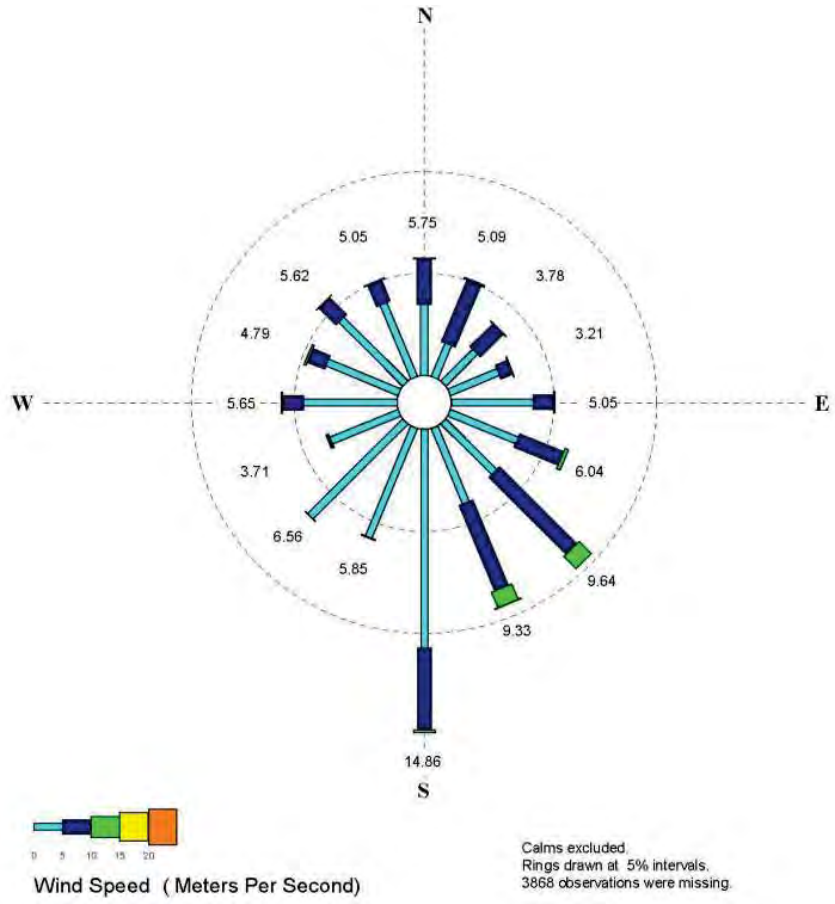

Figure 57: Wind Rose Gold Coast Seaway

Wind Wave Correlation

A critical issue for the assessment of usability of any terminal is the correlation between critical winds and waves, as both of these contribute to the movement of ships at the berth. The critical wave and wind combinations vary for different scenarios but broadly winds over 20 kts and significant wave heights greater than 2.5m are conditions that may impact ship mooring and navigation.

Strong winds are associated with high seas. During storm events, persistent high winds result in large waves. Typical wind and wave conditions are more important for the terminal function rather than storm events. During stiff winds the sea condition can rise quickly with short crested waves being produced. However, longer period swell waves require sustained winds and travel time to form. As such the correlation between long period swell waves and stiff winds is weak, meaning the association is random. When the stiff winds (not during a storm event) do occur, local generated waves with periods of less than 6s are expected.

Coastal Processes

Natural Systems

The ocean beaches are an important asset to the Gold Coast. The dynamic nature of the coast line is determined by interaction between the sand supply, waves, currents and winds. The coastline and near shore bathymetry represent a dynamic stability of these forces and the available sand. Any structure or works that interfere with the dynamic forces will result in a

change in the equilibrium and a change in the coastal processes and therefore beach behaviour. The dynamic sand transport zone on the Gold Coast coastline extends out to the depth of the proposed structure, though the deeper areas are typically only mobilised during the more extreme events.

By far the most dominant force for coastal processes are the waves. At a high level overview the waves drive sand transport on the Gold Coast to the north with a net transport rate of approximately 640,000m^3 per annum. This rate of sand transport is variable from one year to the next and comprises both the dominant northerly transport and some southerly transport, with a gross transport rate estimated to be approximately 740,000m^3 per annum. The transport of sand occurs all year round, but is significantly greater during storm events, when large waves widen the active transport zone, create intense bed shear, drive strong currents and as a result mobilise large volumes of sand.

The sand budget is not only long shore. During storm events sand is redistributed cross-shore, with the upper profile (beach) eroding while areas offshore accrete. During calmer conditions the beaches of the Gold Coast slowly recover, with sand migrating back on shore. The beach profile that exists on the beach on any given day represents the dynamic response of the sand to the previous conditions. In considering the cross shore transport impacts we need to be conscious of the impact the breakwater or dredging and beach nourishment might have on beach equilibrium. In considering the cross shore transport impacts we need to be conscious of the impact the breakwater or dredging and beach nourishment might have on beach equilibrium.

The upper beach is also influenced by windblown sand. This typically drives the migration of the sand towards the land and is the primary force behind the formation of dunes. The role of dune vegetation in trapping windblown sand is a vital element in the formation of dunes and in creating an onshore sand buffer against future storm erosion events.

Water movements offshore are driven by large scale currents (e.g. East Australian Current) that typically flow towards the south. Tidal movements also influence the currents, especially near the Seaway. These currents however, are not sufficiently fast to drive extensive sediment transport in the vicinity of the proposed development.

Previous Interventions

Over the years both the council and state government have undertaken numerous works on the Gold Coast that were intended to deliberately interfere with the coastal processes and the sand budgets. A review of these structures reveals much about the nature of coastal processes and offers insights and opportunities for this project. Two prominent local examples are the Narrow Neck Reef and the Gold Coast Seaway with sand bypass system. Both these interventions have had impacts on the coastal processes, though the impacts have not been exactly as intended.

- The Narrow Neck reef, located 2km south the current site, was intended to interfere with the wave climate and encourage sand to accumulate (salient) on the beach along the vulnerable Narrow Neck section. The impact of the structure on the beach has been measured by the UNSW's Water Research Laboratory (WRL) using ARGUS coastal imaging system. This analysis reveals that the beach has responded to the reef with the salient, approximately 50m in depth. The level of response is hard to see on the ground with most beach users unaware of any build up, and is less than the anticipated design impacts, but the impact on the beach as measured has been positive. Further the construction of the reef has provided a hard strata for colonisation by a wide range of marine life. Overall this project demonstrated that offshore structures do impact the beach and the impact can be seen as broadly positive with coastal defence/stability improvements and environmental impacts, however, it also reveals that the scale of structure needs to be significant to appreciably interfere with the coastal processes. A good rule of thumb is whether the structure changes the angle of waves approaching the beach.

- The Seaway and associated sand bypass system, 3km north of the site, is intended to maintain good navigation into the Broadwater through a stable entrance. The bypassing jetty is located to the south of the southern training wall and intercepts sand trapped south of the training wall, delivering it to the beach north of the entrance via a subsea pipeline. The training wall acts to trap the northerly sand transport providing a reservoir of sand for the bypass, with the intent that the bypass would starve the entrance area of sand discouraging the formation of the ebb tide bar. Although the bypass does shift an average of 630,000m^3 (reference WBM Gold Coast Broadwater Preliminary Coastal and Hydrodynamic Investigations for the Cruise Ship Options, July 2013) of sand a year, close to the net longshore transport rate a large ebb tide bar has formed. Today the bar extends approximately 1,200m offshore and equilibrium has not yet been achieved. Further there has been significant loss of sand from the Broadwater associated with the improved entrance conveyance. This project demonstrates that if the works do create a significant disturbance that extends to deep water the coastal processes can take decades to approach a new dynamic equilibrium.

Overall the coastal processes for the Gold Coast are well understood and the impact of the proposed works on the coast can be broadly predicted. Some previous projects have failed to fully appreciate the coastal processes and this has led to issues. Although our understanding is greatly enhanced today we still need to appreciate the complex nature of the coastal processes.

Navigation Criteria

Parameters for various cruise ship vessels around the globe are identified in Table 88.

Table 88: List of Cruise Ship Vessels

Cruise Ship	Cruise Ship Attributes					Comments
	Length Overall (m)	Beam (m)	Draft (m)	Displacement Tonnage (t)	Propulsion & Steerage System	
Queen Victoria	294.0	32.26	8.0	43,533	2 x Azi Pods (inward turning) Bow thrusters	Typical class of vessel with modern propulsion and steerage systems
Emerald Princess	289.6	36.05	8.5	53,719	2 Propellers 2 Rudders Bow, Stern thrusters	Typical class of vessel with conventional propulsion and steerage systems
Voyager of the Seas	311.1	38.6	8.6	60,704	3 x Azi Pods (2 turntable + 1 fixed) Bow thrusters	Typical class of vessel now common throughout the world with modern and powerful propulsion and steerage systems
Regal Princess	245.06	32.25	7.8	36,557	2 Propellers 1 Rudder Bow, Stern thrusters	Smaller class of vessel with conventional propulsion system and only 1 rudder – very difficult vessel to manoeuvre
Oasis of the Seas	361.9	47.0	9.15	101,244	3 x Azi Pods (3 turning) Bow thrusters	Largest cruise ship in the world with modern and very powerful propulsion and steerage systems

Queen Mary 2	345.0	41.0	10.3	79,827	2 x Azi Pods 2 x Fixed Pods Bow thrusters	Deepest draft cruise ship in the world with modern and very powerful propulsion and steerage systems
Sun Princess	261.3	32.3	7.95	37,890	2 Propellers 2 Rudders Bow, Stern thrusters	Smaller class of vessel with conventional propulsion characterised by its underpowered stern thrusters

Design Draft

A design draft of 9.0m has been adopted with a nominal 2.0m under keel clearance (UKC). This gives a minimum water depth of -11.0m LAT datum. Queen Mary 2 with draft of 10.15m can still berth and would be restricted to berthing at high neaps tide (or higher) to maintain 2m UKC. Once the vessel is alongside the berth it can remain with a minimum 1m UKC.

Swing Basin

The minimum swing basin is determined as 360m LOA vessel + 45m fore and aft, or 450m diameter. Further input is required from Cruise Ship operators as to threshold wave conditions for ships to navigate, manoeuvre, berth and remain alongside.

Impact on waves – Boussinesq wave modelling

A Boussinesq wave model was established to examine the wave climate in the vicinity of the proposed breakwater. Boussinesq wave models are computationally demanding but reasonably accurately represent the mechanism of wave diffraction, occurring as the waves pass the end of the breakwater. Diffraction is seen as semi-circular waves radiating from the end of the breakwater, as shown in Figure 58 and Figure 59.

The modelling program focussed on the extreme operational conditions of significant wave heights (H_s) 2.5m approaching from the extreme swell orientations of 80° and 120°, as defined by the recorded data Figure 54. The numerical modelling of large waves represents conditions that are uncommon, being exceeded less than 2.6% of the time. Also considering the extreme directional spread, the modelling represents swell wave conditions in the lee of the breakwater that would be exceeded less than 1% of the time.

Snapshots of the water surface revealing wave interactions (for the waves described above) are presented in Figure 58 and Figure 60. These images reveal a number of features of the wave climate that occur when a caisson breakwater is constructed. The pattern of the waves behind the breakwater reveals the diminished wave crests radiating from the ends of the breakwater. The individual waves would appear gentle (long and flat). The interaction between the waves travelling from either end of the breakwater results in water surface excitation (observed wave heights) that are larger than the individual wave trains approaching from the north and south.

The same information is presented in plots of measured wave height (refer to Figure 59 and Figure 61) demonstrating the wave climate behind the breakwater is substantially reduced, with wave heights reduced to less the 50% of the offshore conditions over a triangular area extending more than 1,000m towards the shore. In the vicinity of the terminal the wave climates are reduced to less than 25% the offshore conditions.

Though the wave period significantly alters the wave lengths, as seen in Figure 58 and Figure 60, it has little impact on the extent of the wave shadowing, as seen in Figure 59 and Figure 61. The area is considered well sheltered (waves less than <0.5m or 20% of offshore conditions) is similar for both periods considered. There is a small impact on the measured

wave height, in the most sheltered areas. With longer period waves there is more wave energy in the area immediately behind the breakwater.

On the seaward side of the breakwater the water surface has a more extreme excitation (wave heights appear larger than 2.5m). This is the result of waves reflecting off the breakwater. The use of a caisson breakwater will result in a vertical face into the waves with nearly 100% reflection. Even during normal conditions the conditions in front of the breakwater will be significantly more severe than surrounding areas. If this is considered an issue it can be significantly addressed with a less reflective structure (e.g. rubble breakwater).

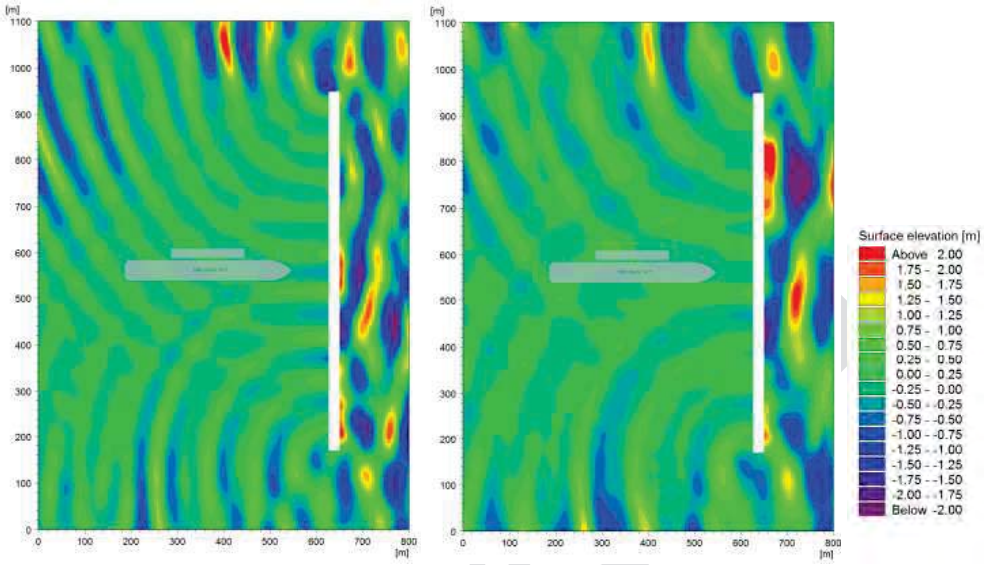

Figure 58: Water Surface Snapshot for offshore waves H_s=2.5m from 80°, T_p=9s (left), T_p=13s (right)

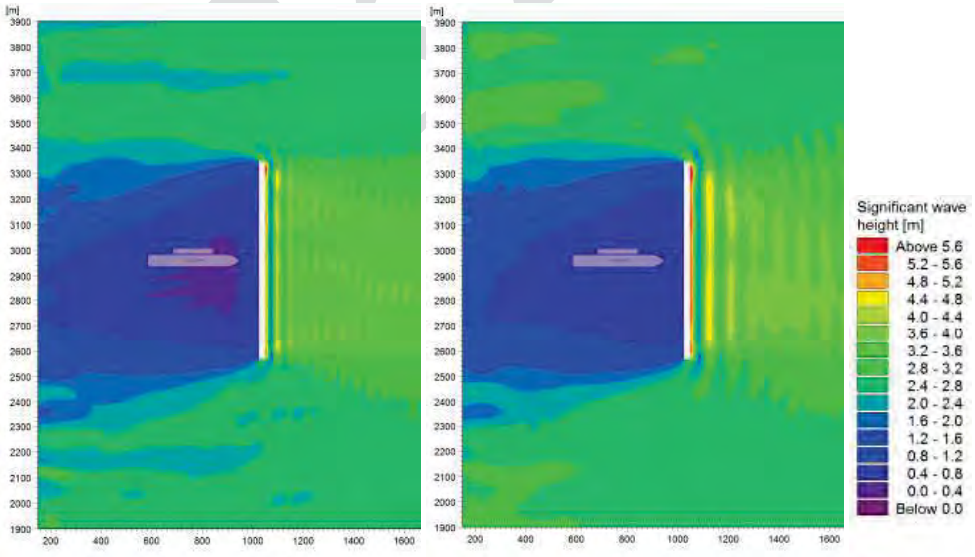

Figure 59: Modelled wave heights for offshore waves H_s=2.5m from 80°, T_p=9s (left), T_p=13s (right)

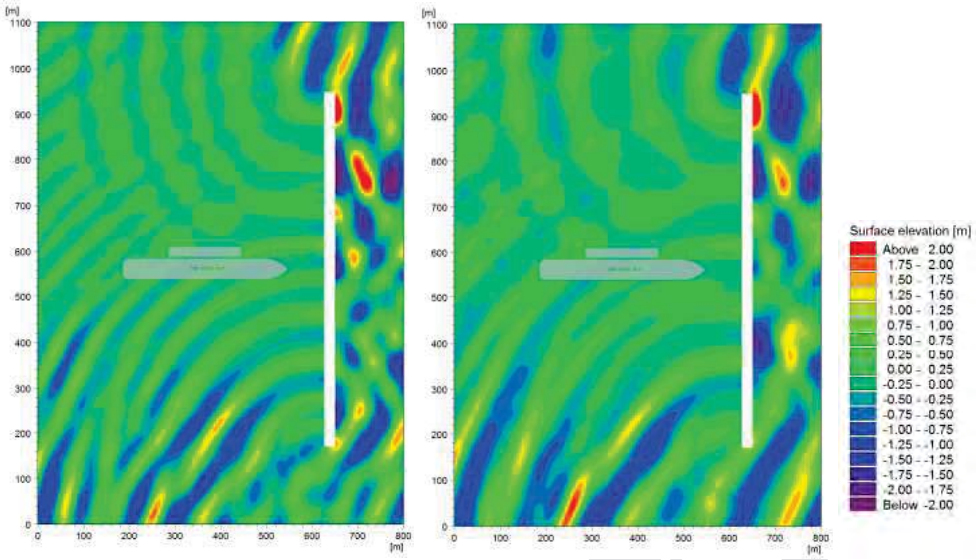

Figure 60: Water Surface Snapshot for offshore waves H_s=2.5m from 120°, T_p=9s (left), T_p=13s (right)

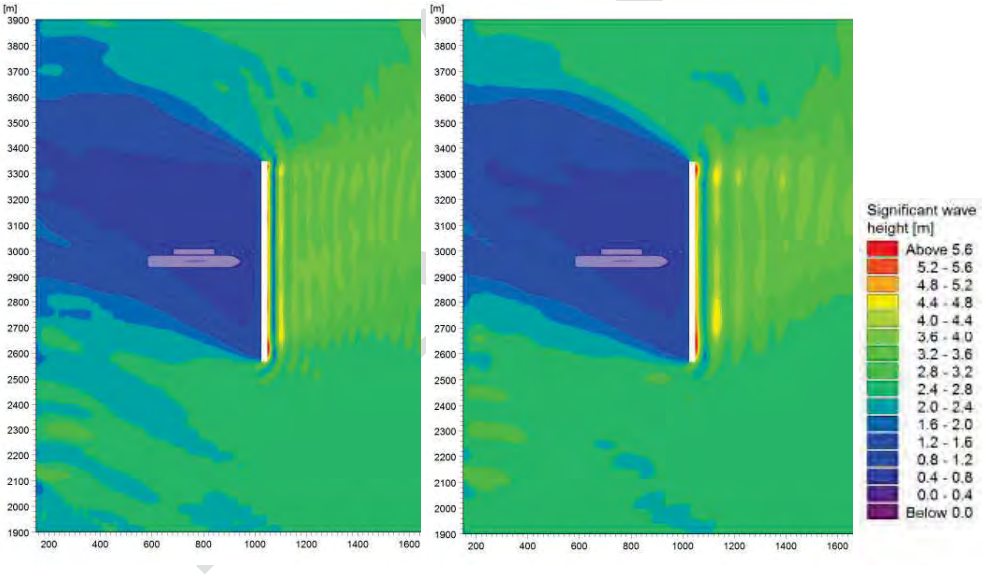

Figure 61: Modelled wave heights for offshore waves H_s=2.5m from 120°, T_p=9s (left), T_p=13s (right)

Impact on coastal processes – beach salient

If an offshore structure that interferes with the waves (breakwater) is constructed, the wave climate reaching the coast will be impacted and sand will tend to accumulate in the lee of the structure. Over time the beach and near shore areas will find a new dynamic equilibrium. The size (breadth and depth) of the sand accumulation caused by a breakwater is dependent on the length of the breakwater and the proximity to the shore. Longer breakwaters and breakwaters closer to shore result in greater impacts.

Analyses of potential salient formations were undertaken utilising a range of empirical models to forecast the ultimate size of the beach response. The exact size of the salient formation is impacted by the range of wave directions impacting the site. This has resulted in a various interpretations (formulae) to describe the size and shape salient formations.

United Kingdom Environmental Agency guidelines for detached near shore breakwaters has been used to provide an indicative estimate of salient formation. An upper envelope or worst case estimate has been adopted from the other models. The results demonstrate that a 780m long breakwater located 1,200m offshore will likely produce a salient that is 120m wide and extends several hundred meters north and south along the beach. An upper limit salient is also presented based on an analysis of the range of results calculated, indicating the salient could be as large as 300m across with impacts on the beach that extend more than a kilometre to the north and south.

Similar to a groyne, the sand accumulating behind a breakwater represents an interruption to the longshore transport mechanism until a new equilibrium is reached. The accumulation of sand behind the breakwater has the potential to cause erosion on adjacent beaches, primarily to the north of the project. Initially the interruption will be severe, but over time as the beach profile changes the rate of bypassing will increase. Once a stable beach profile has been achieved full bypassing will occur. The potential erosion is related to the length of the beach eroding and the speed of the change. If sand supply issues are not managed theoretical models indicate that the erosion of the Spit Beaches may be expected to be in the order of 10% of the salient depth (12m t0 30m)

To manage the salient formation and beach erosion impacts there are a number of options available. These include:

- Do nothing and let the Spit beach experience a period of beach erosion
- Manage beach conditions by monitoring the beach and altering sand bypassing rates at the Seaway
- Nourish the beach as part of the construction program to accelerate the development of a stable profile
- Implement a system to on-move sand behind the breakwater (e.g. a slurry pumping system).

If the beach salient is allowed to develop naturally the upper beach and near shore areas will respond most quickly, with the salient expected form and achieve its final extent within a few years, depending on the exact size of the salient that forms and the amount of wave energy. Impacts in deeper waters will be slower and driven by large marine events. As seen with the Seaway project these areas could take decades to achieve a stable profile.

Offshore the salient will initially steepen the profile but over time the salient will lead to a shoaling in the lee of the breakwater. This shoaling in deeper water will be driven by storm events and may eventually require dredging to maintain navigable conditions. If required the rate and frequency of dredging would be considered minor, though ongoing monitoring (surveying) would be required to ensure safe navigation conditions are being maintained.

Beyond the impact on the waves and the development of a salient on the beach with associated impact on sediment budgets the construction of a jetty and breakwater would have little impact on other coastal processes. The following metocean impacts are expected.

- The currents travel largely shore parallel (typically to the south) so the shore parallel breakwater will have minimal impact on currents
- There will be no impact on tides

- There will be a small wind shadow on the lee side of the structure but this will be localised
- On the beach the wave climate will be reduced and the waves will approach from different directions compared with the beaches further north and south.

Marine Site Characteristics and Assessment

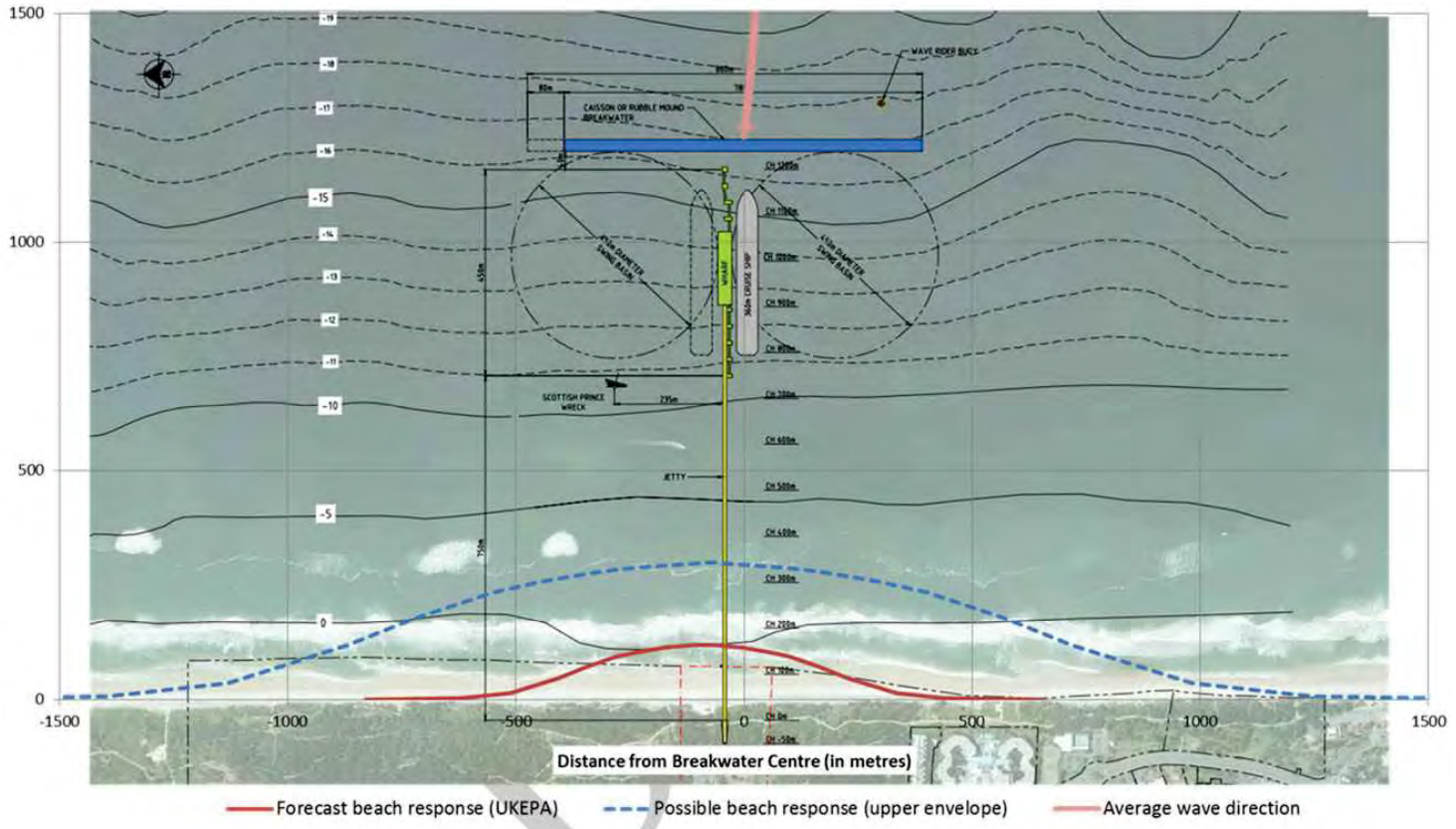

Figure 62: Impact of Coastal Processes

Mooring Analysis

The issue of breakwater length and mooring configuration has been assessed using a software package linked to the MIKE 21 modelling suite. The mooring analysis considers the influence of waves, wind and currents on ships at berth. The purpose of the analysis is to determine if the berthing conditions are suitably sheltered for a given ship with nominated fender and line configurations. This analysis has not been exhaustive; rather it has been focussed on assessing whether the proposed configuration is adequate for the intended use. During future design a more thorough analysis would be required to possibly optimise breakwater length and define suitable fender, bollard and line configurations.

Simulations

The adopted wind plus wave plus current combinations are presented in Table 89. The typical scenario of a 25knot (12.8m/s) sustained wind combined with waves approaching from either the NE (80°) or SE (120°) are considered to be examples of extreme ambient conditions, with rare probability of combined occurrence. Despite the low probability of these conditions occurring with a ship at berth, these are considered ambient conditions, when the ship might reasonably expect to be at the berth.

The intense 40knot (20.6m/s) sustained wind is not considered an ambient condition, especially when combined with the large waves. It would be expected that the weather conditions resulting in the loading are so severe that the ship would have forewarning, and that the ship would have put to sea or not berthed.

A current of 0.2m/s towards the south was applied in all model runs. This current was selected based on regional hydrodynamic models and was selected as representative of a stiff current for the site.

Three vessels were considered for the simulations. These vessels were selected to represent the typical to large ships that might use the facility. The vessels considered were:

- P&O's Pacific Dawn - length – 245m, beam – 32.3m, displacement – 69,845t, draft – 8.2m
- Royal Caribbean's Quantum of the Sea - length – 348m, beam – 41.0m, displacement - 154,400t, draft – 8.5m
- Royal Caribbean's Voyager of the Sea - length – 311m, beam – 38.6m, displacement - 137,276t, draft – 8.8m.

Because the time intensive nature of this modelling, linking the Boussinesq wave modelling the berth modelling was not used as a design tool, rather it was applied to assess the feasibility of the proposed solution. Further, the adopted fender, bollard and line and configurations are areas where the designers have flexibility.

Marine Site Characteristics and Assessment

Table 89: Mooring analysis

Run	Ship	Wind Speed & Direction (knots, from)	Wave Height (H_s) Period (T_p) & Direction (m, s, from)	Current to South (m/s)	Maximum Line Tension (t)	Maximum Fender Compression (%)	RMS Angular Motion (Roll) Criteria (2.5°)	RMS Vertical Acceleration (Heave) Criteria (0.05g)	RMS Lateral Acceleration (Surge) Criteria (0.04g)	RMS Lateral Acceleration (Sway) Criteria (0.04g)
1	Pacific Dawn	25, N (0°)	0	0.2	46	24	0.1	<0.01	<0.01	<0.01
2	Pacific Dawn	25, NE (45°)	0	0.2	62	31	0.1	<0.01	<0.01	<0.01
3	Pacific Dawn	25, SE (135°)	0	0.2	20	35	0.1	<0.01	<0.01	<0.01
4	Pacific Dawn	25, S (180°)	0	0.2	17	34	0.1	<0.01	<0.01	<0.01
5	Pacific Dawn*	25, N (0°)	2.5, 13, 80°	0.2	*139*	100	1.6	<0.01	<0.01	<0.01
5	Pacific Dawn*	25, NE (45°)	2.5, 13, 80°	0.2	108	*Crushed*	1.7	<0.01	<0.01	<0.01
6	Pacific Dawn	25, N (0°)	2.5, 9, 80°	0.2	68	87	0.6	<0.01	<0.01	<0.01
6	Pacific Dawn	25, NE (45°)	2.5, 9, 80°	0.2	*78*	86	0.6	<0.01	<0.01	<0.01
7	Pacific Dawn*	25, SE (135°)	2.5, 13, 120°	0.2	*Snapped*	*Crushed*	1.2	<0.01	0.01	<0.01
7	Pacific Dawn*	25, S (180°)	2.5, 13, 120°	0.2	*Snapped*	*Crushed*	1.2	<0.01	0.01	<0.01
8	Pacific Dawn	25, SE (135°)	2.5, 9, 120°	0.2	68	88	0.6	<0.01	<0.01	<0.01
8	Pacific Dawn	25, S (180°)	2.5, 9, 120°	0.2	62	86	0.6	<0.01	<0.01	<0.01
9	Pacific Dawn*	40, SE (135°)	2.5, 13, 120°	0.2	*Snapped*	*Crushed*	N/A	N/A	N/A	N/A
10 A	Quantum	25, N (0°)	2.5, 13, 80°	0.2	*104*	100	1.4	<0.01	<0.01	<0.01
10 A	Quantum	25, NE (45°)	2.5, 13, 80°	0.2	*107*	100	1.4	<0.01	<0.01	<0.01
10 B	Quantum	25, SE (135°)	2.5, 13, 120°	0.2	*107*	100	1.0	<0.01	<0.01	<0.01
10 B	Quantum	25, S (180°)	2.5, 13, 120°	0.2	*97*	100	1.3	<0.01	<0.01	<0.01
11	Quantum	40, SE (135°)	2.5, 13, 120°	0.2	100	*Crushed*	0.68	<0.01	<0.01	<0.01
12 A	Voyager	25, N (0°)	2.5, 13, 80°	0.2	*81*	96	1.4	<0.01	<0.01	<0.01
12 A	Voyager	25, NE (45°)	2.5, 13, 80°	0.2	*86*	100	1.2	<0.01	<0.01	<0.01
12 B	Voyager	25, SE (135°)	2.5, 13, 120°	0.2	*87*	100	2.3	<0.01	<0.01	<0.01
12 B	Voyager	25, S (180°)	2.5, 13, 120°	0.2	*92*	100	1.9	<0.01	<0.01	<0.01
13	Voyager	40, SE (135°)	2.5, 13, 120°	0.2	*Snapped*	*Crushed*	N/A	N/A	N/A	N/A

Notes: Adopted maximum line tension was 146t (*exceeding 50% loading at 73t is presented in italics*)

Feasibility

The early results are presented in Table 89 and assessed below to inform the engineering assessment of the viability of the preferred configuration.

All ship simulations considered performed adequately when considering ship motion (roll, heave, surge and sway), with movements and accelerations below acceptable limits. The roll of the large Voyager ship was the only motion to approach the nominated limit.

The fenders and lines both experienced loads that exceeded the nominated ranges. The results for the 2.5m waves with longer period waves (T_p=13s) when combined with the 25 knot winds indicate that the line loads were regularly over the safe levels and the fenders were overloaded for all three ships. For wind speeds of 40 knots the lines and fenders were both overloaded for all three ships.

In considering the fender and line loads it should be noted that there are design options available that could overcome these issues through fender selection and improved bollard and mooring line configurations.

The fender loading can be addressed by using more or stiffer fenders. As such the identified cases of crushing or 100% loading of fenders is not seen as a constraint for the proposed configuration.

The assessment of lines is more complicated, with issues including number of lines adopted configuration and the length of the tails (set to 15m in the modelling). In the model assessment of Pacific Dawn, 20 lines were typically used, though 24 lines were considered for some more severe conditions. These are identified in Table 89 with an astricts (*). The analysis adopted a maximum line strength of 146t with a 50% loading of 73t in an area where there may also be some alternatives.

Overall the preliminary results indicate that the proposed solution can be made to work, with optimisation undertaken during detailed design phases.

Appendix E Risk Register

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[redacted]

Risk						Further Risk Description					
Reference Number	Risk status	Risk type	Project Phase	Risk Category	Risk Name	Description	Causes / Sources	Impacts	Controls	Stakeholders	Risk Severity Rating
[redacted]											Medium
											Low
											High
											Low
											Medium
											Low
											Low
											Medium
											Medium
											Low
											Low
											Low
											Medium
											Low
											Low

[redacted]

Risk							Further Risk Description				
Reference Number	Risk status	Risk type	Project Phase	Risk Category	Risk Name	Description	Causes / Sources	Impacts	Controls	Stakeholders	Risk Severity Rating
[redacted]											Low
											Low
											Low
											Low
											Medium
											Low
											Medium
											Medium
											Medium
											Low
											Medium
											Low
											low
											Low
											Medium

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[redacted]

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[redacted]

Risk							Further Risk Description				
Reference Number	Risk status	Risk type	Project Phase	Risk Category	Risk Name	Description	Causes / Sources	Impacts	Controls	Stakeholders	Risk Severity Rating
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Medium
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Medium
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	Medium
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	low
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	medium
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	medium
[redacted]											
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Appendix F Market Sounding Report

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Market Sounding Report

Business Case

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[redacted] RELEASE OF CONFIDENTIAL REPORTS OR INFORMATION may be an offence under the Local Government Act 2009 and other legislation and could result in disqualification from office and a penalty of up to 100 units.

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Introduction

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SASR Market Sounding

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SASR Market Sounding

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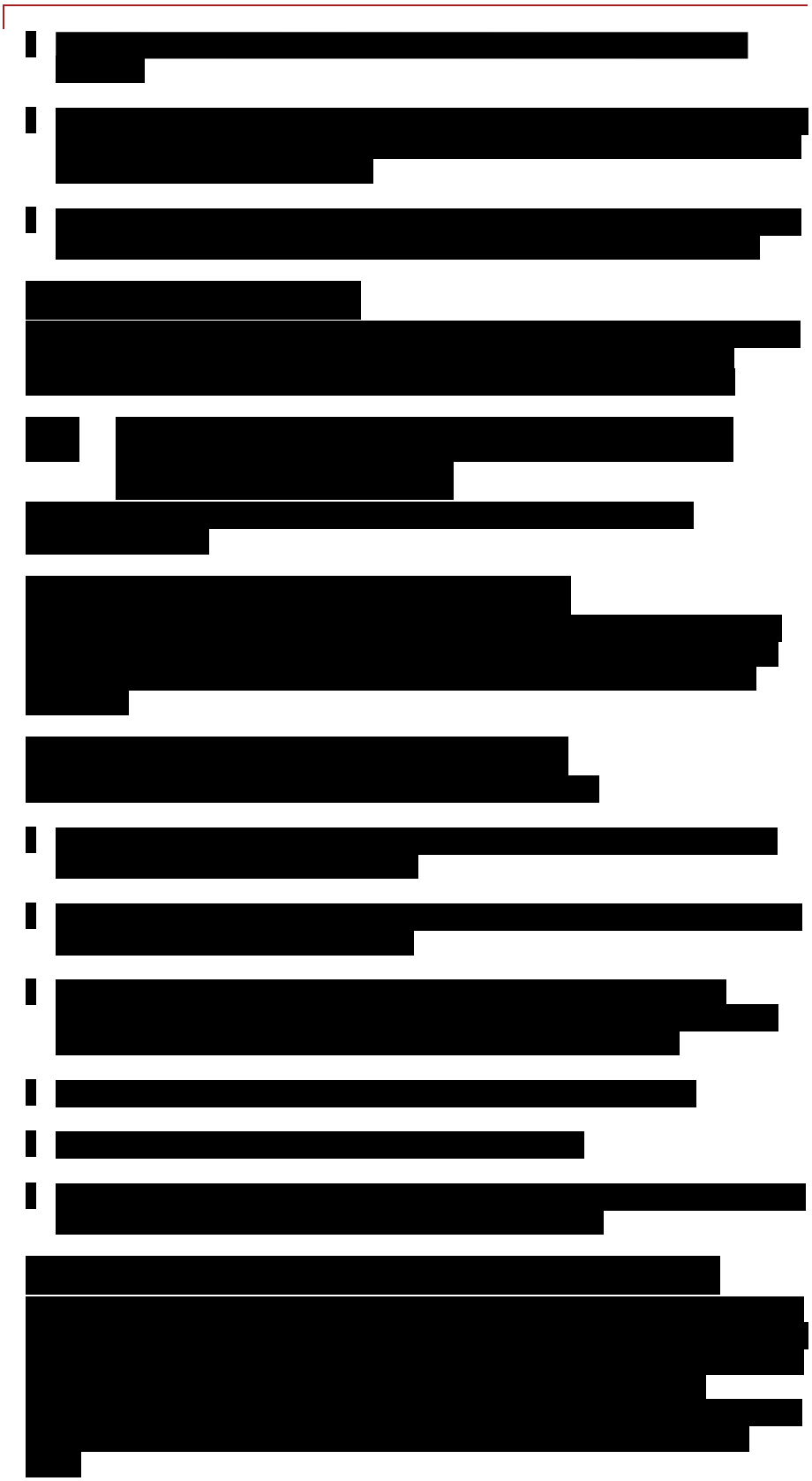
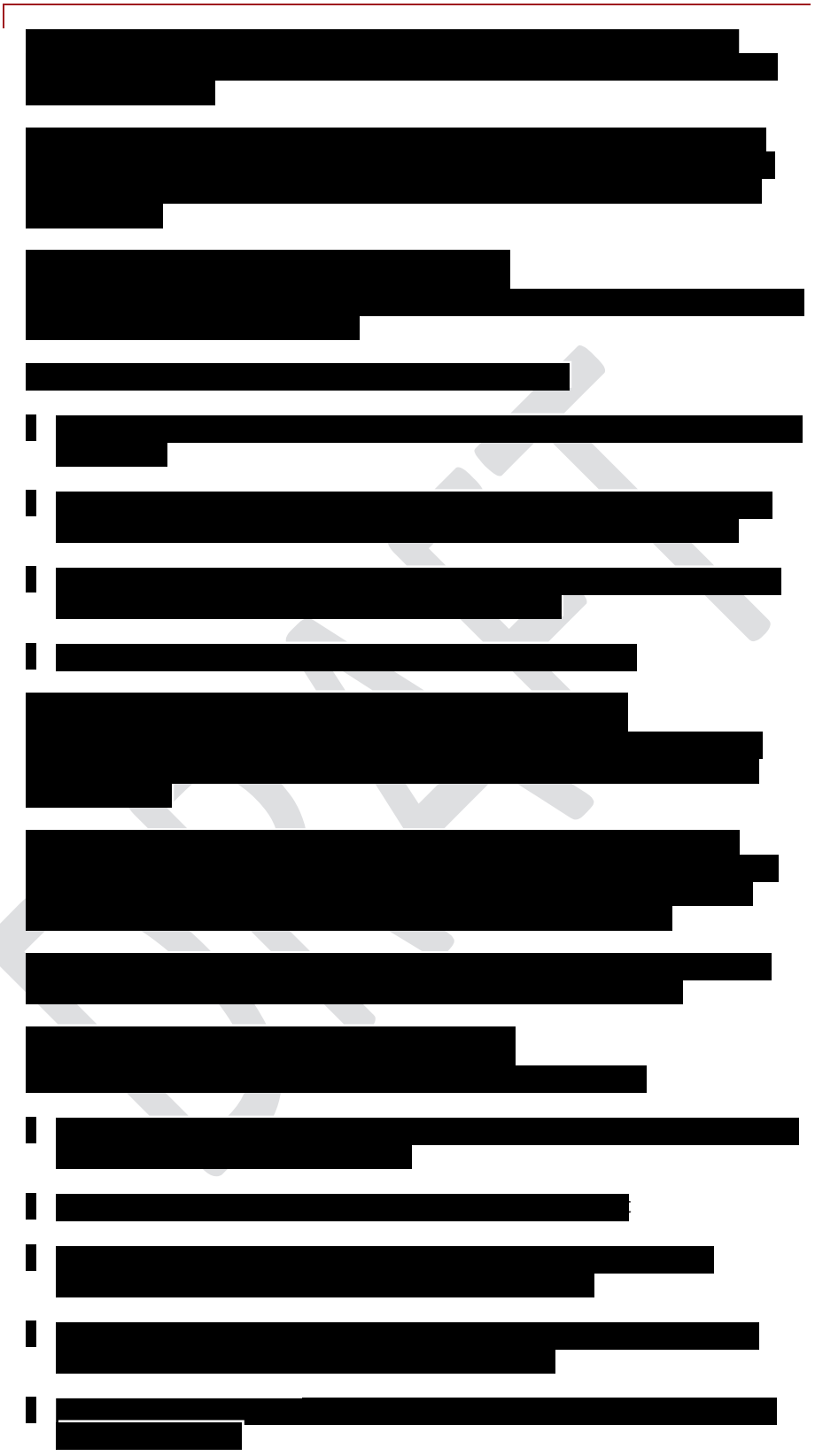
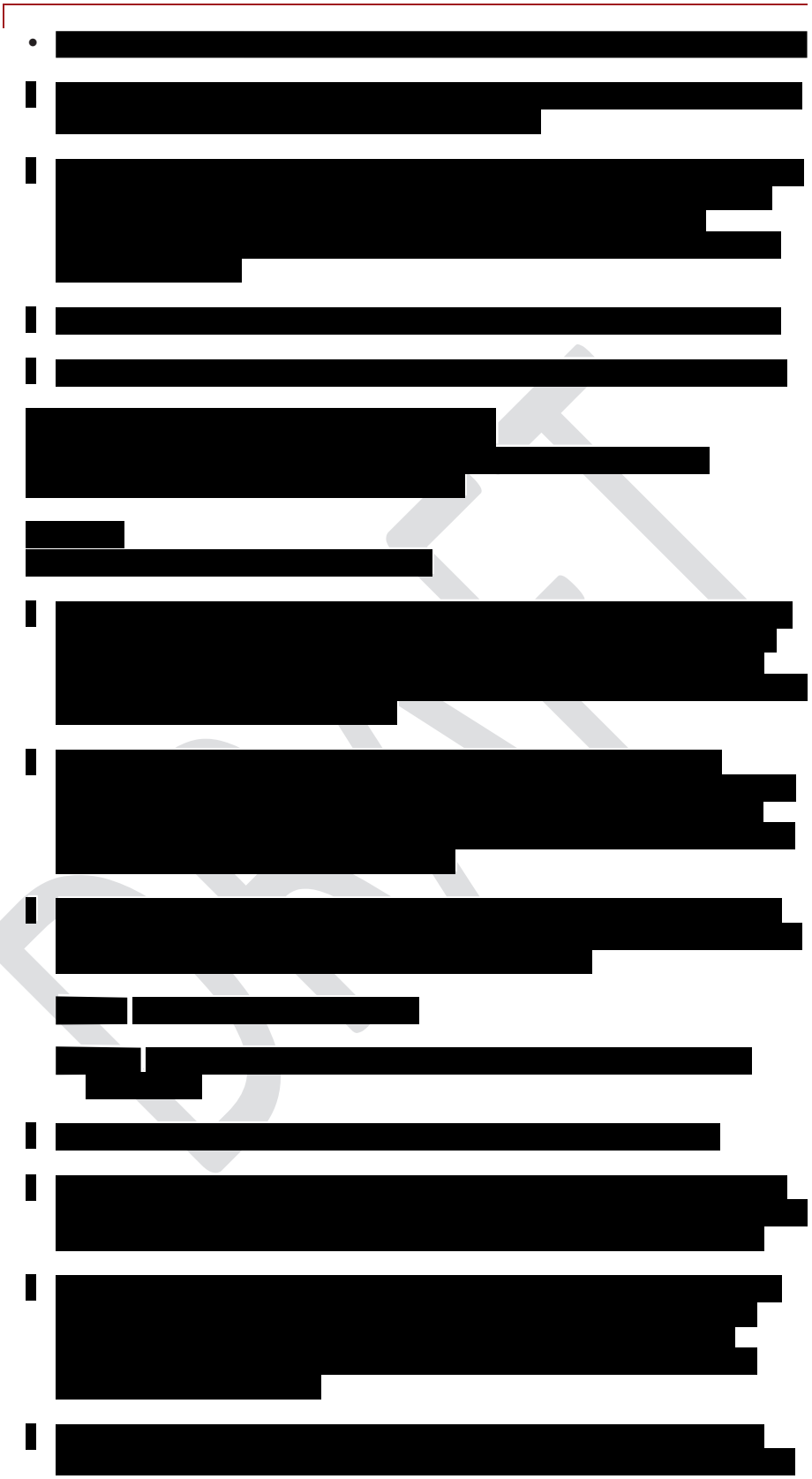
Preliminary Business Case



Preliminary Business Case



Preliminary Business Case



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Business Case Market Sounding

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Business Case Market Sounding

Business Case Market Sounding

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Future Market Sounding Activities

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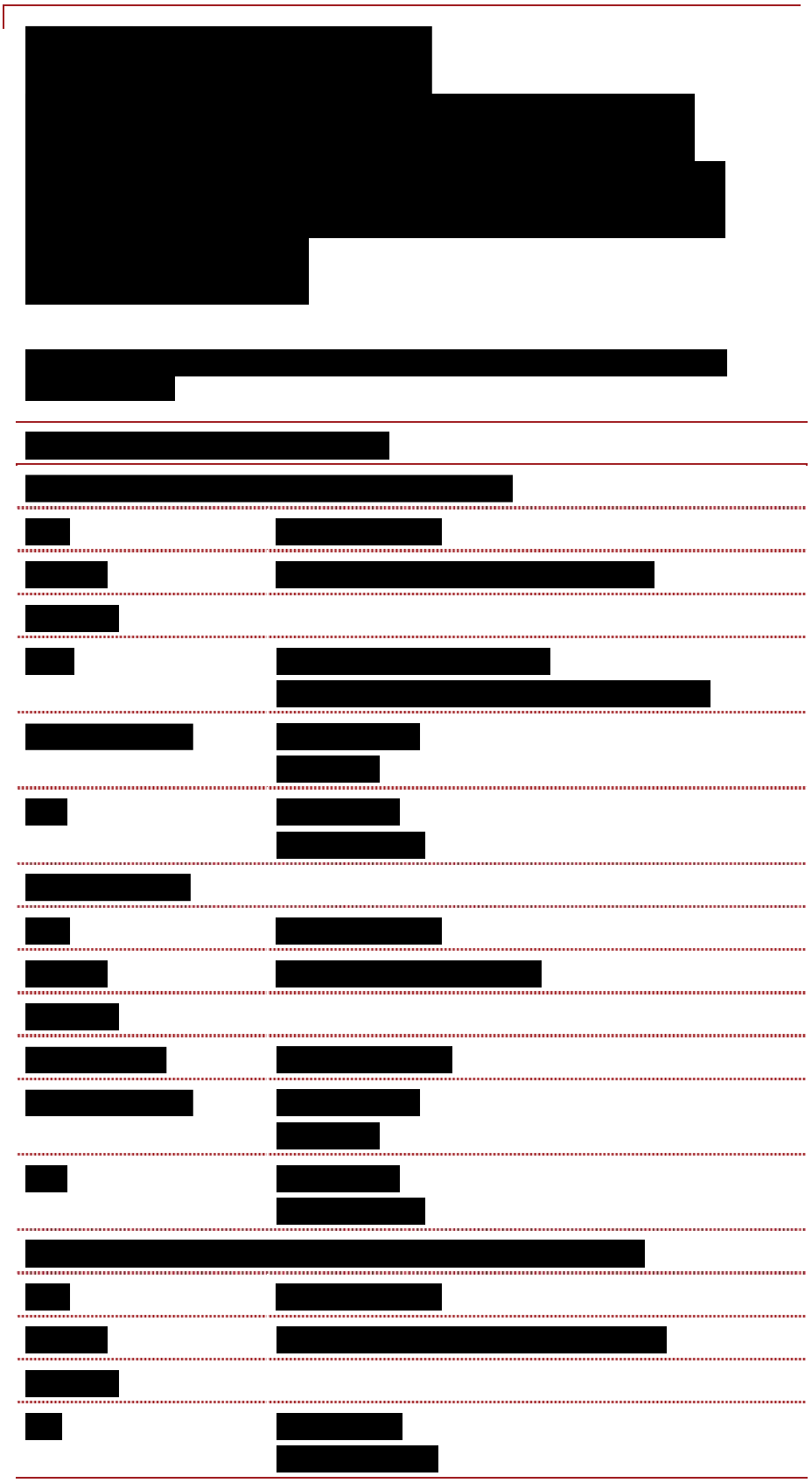
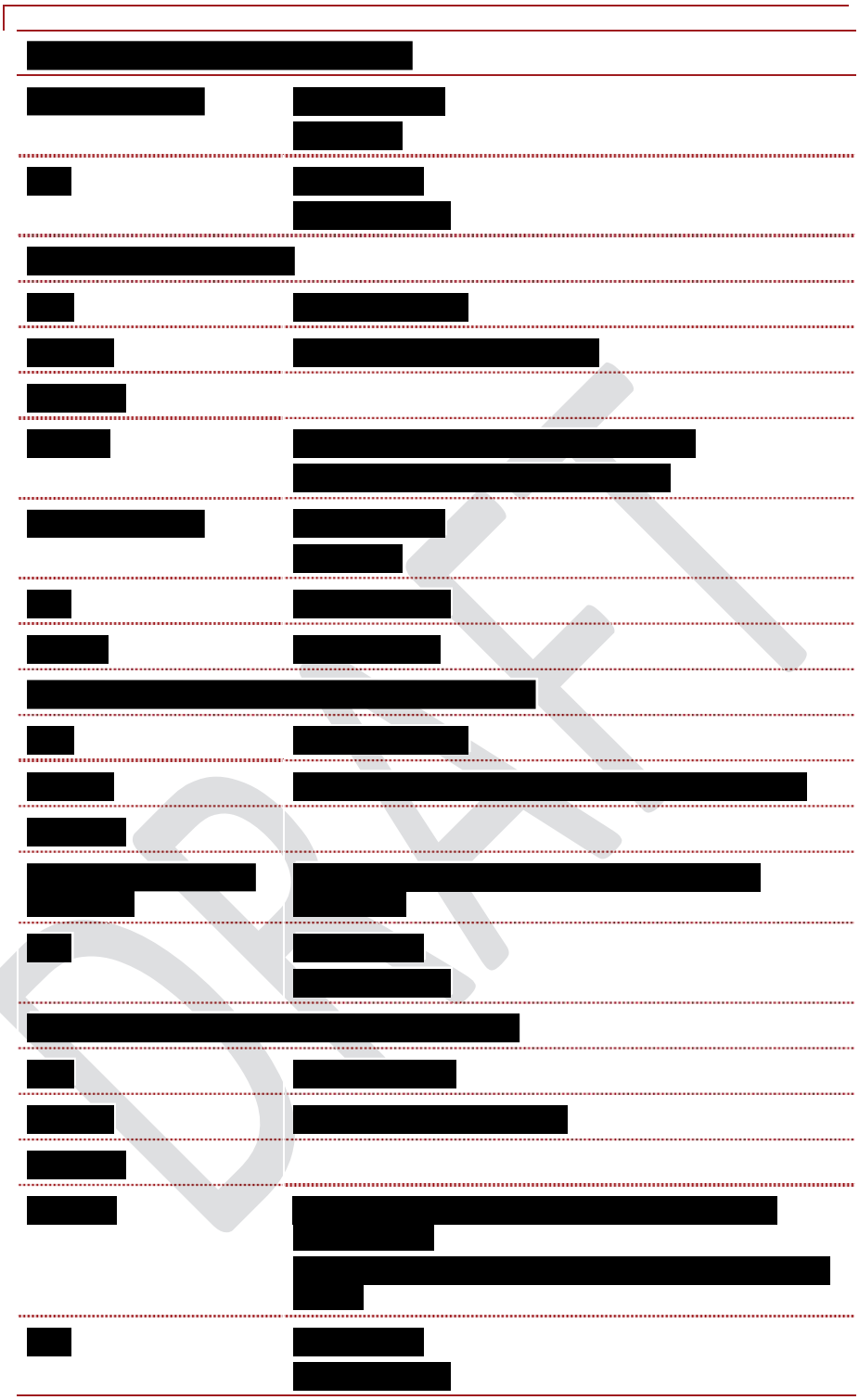
Future Market Sounding Activities



Future Market Sounding Activities



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Appendix G Port Charges

Port Charges

Charges and fees are payable to the operating terminal per ship per visit. The charge applied at Australian ports varies between ports with some facilities applying a fixed user charge while others use variable measure based on the ship's length, gross tonnage and passenger numbers.

The port charges applied in the financial analysis have been benchmarked based on publically available information. Different port and terminal operators are likely to have different objectives when setting their charges, as such the port charges that would apply to the Gold Coast CST are dependent on the final technical design and requirements of ships as well as the prevailing market dynamics at the time. Further work in determining appropriate port charges will be required as part of the pre-procurement activities.

The benchmark charges sourced from the Port of Brisbane charges as at 1 July 2016 have been used to form the basis of our estimates for the lower bound revenue assumption. These charges along with the following port charges of other Australian cruise ship terminals are presented in Table 90.

- Port Authority of New South Wales Schedule of Port Charges Sydney effective 1 July 2016 (hereafter, Sydney)
- Port of Newcastle Schedule of Port Pricing effective from 1 January 2017 (hereafter, Newcastle)
- Victorian Ports Corporation (Melbourne) Pty Ltd Reference Tariff Schedule effective 1 July 2016 (hereafter, Melbourne).

Table 90: Port charges of other Australian cruise ship terminals

Item	Charge	Description	Source/Benchmark Equivalent
A	Berth hire charges	Time-based fee for providing berths for the purpose of loading or discharging passengers (and cargo). It is assumed that this includes the cost of mooring and use of buoys as well as gangway hire.	• Brisbane: $40,617.68 • Melbourne: $15,599.52 berth charge • Sydney: Price split into mooring fee ($36.52 per hour) and wharfage fee (price on arrival) • Newcastle: Depends on berth, averaging $0.90 per GRT.
B	Site occupation charge	Levy for incoming passengers.	• Sydney: $30 per passenger • Newcastle: $232.05 per hour.
C	Harbour dues / environmental fees	Levy for environmental services	• Brisbane: $0.24 per GRT • Melbourne: $0.2097 per GRT.
D	Navigation service charge	Levy for the safe navigation of vessels.	• Sydney: $0.60 per GRT per ship • Newcastle: $0.4721 per GRT for the first 50,000 GRT, plus $1.0622 per GRT thereafter.

Item	Charge	Description	Source/Benchmark Equivalent
E	Pilotage charge	Levy for the pilotage for vessels, charged for each inbound and outbound movement.	• Sydney: Standard Boarding Fee is $1,051.98 and extra $0.007 charge per GRT over 55,000.
F	Utility charge	A levy for the facilities and services to supply water and electricity to vessels. This includes the cost of hose connection and disconnection.	• Newcastle: $197.51 fixed fee • Sydney: $2.00 per kilolitre; $541.72 connection fee • Brisbane: $4.33 per kilolitre; $144.3 connection fee • Melbourne: $4.30 per kilolitre; $978 connection fee, which also includes waste removal connection.
G	Security charge	A levy for the terminal to recover costs in adhering to legislation requiring the security of maritime transport and offshore facilities.	• Newcastle: $510.14 • Sydney: Recoverable for passenger vessels through Port Authority contract • Melbourne: Hourly rate for security guards at an average of $112 per hour.

Additional information has been sourced from the ACA EIA. This study documents the number of ships visiting a particular port and the direct operational expenditure the cruise ship operator paid for through port charges, which has informed the upper bound revenue assumption. The port charges included in the ACA EIA include:

- Pilotage
- Towage
- Storage
- Utilities
- Security charges, and
- Baggage handling.

These actual operations expenditure paid by cruise ship operators in 2015-16 are presented in Table 91. Proportionate to the number of ships visits observed, we are able to deduce the assumed revenue generated by each cruise ship visit (assuming an average charge across various ship sizes).

Table 91: Actual operations expenditure of cruise ship operators 2015-16

Port	Cruise ship visits in 2015-16	Total operations expenditure ($M)	$ per ship visit
Sydney	308	$68.4	$220,078
Brisbane	148	$23.6	$159,459

For the purpose of the financial analysis it is assumed that all ships visiting the Gold Coast CST will be moored to the berth for passengers to embark and disembark the vessel. Tendering facilities will not be used and so it is assumed that cruise vessels will not require anchorage. Anchorage may be required if a cruise ship is waiting on another vessel to depart the terminal before it can access the port. Such situations however, cannot be determined.

Appendix H Conservation Significant Fauna

Table 92: Conservation significant fauna

Species scientific name	Species common name	EPBC Act status	NC Act status
Birds			
Anthochaera phrygia	Regent honeyeater	CE	E
Botaurus poiciloptilus	Australasian bittern	E	-
Calidris canutus	Red knot	E/M	-
Calidris ferruginea	Curlew sandpiper	CE/M	-
Calidris tenuirostris	Great knot	CE/M	-
Calyptorhynchuc lathami	Glossy black-cockatoo (eastern)	-	V
Charadrius leschenaultii	Greater sand plover	V/M	-
Charadrius mongolus	Lesser sand plover	E/M	-
Dasyrnmis brachypterus	Eastern bristlebird	E	E
Diomedea antipodensis	Antipodean albatross	V/Mi/M	-
Diomedea antipodensis gibsoni	Gibson's albatross	V/Mi/M	V
Diomedea epomophora (sensu stricto)	Southern royal albatross	V/Mi/M	-
Diomedea exulans (sensu lato)	Wandering albatross	V/Mi/M	V
Erythrotriorchis radiatus	Red goshawk	V	E
Fregetta grallaria	White-bellied storm petrel	V	-
Geophaps scripta	Squatter pigeon	V	V
Lathamus discolor	Swift parrot	CE	E
Limosa lapponica baueri	Bar-tailed godwit	V/M	-
Limosa lapponica menzbieri	Northern Siberian bar-tailed godwit	CE	-
Macronectes giganteus	Southern giant petrel	E/Mi/M	E
Macronectes halli	Northern giant petrel	V/Mi/M	V
Numenius madagascariensis	Eastern curlew	CE/M	V
Pachyptila turtur subantarctica	Fairy prion	V/M	-

Species scientific name	Species common name	EPBC Act status	NC Act status
Phoebetria fusca	Sooty albatross	V/Mi/M	V
Poephila cincta	Southern black-throated finch	E	E
Pterodroma neglecta	Kermadec petrel	V	-
Rostratula australis	Australian painted snipe	E	V
Thalassarche cauta	Shy albatross	V/Mi/M	-
Thalassarche cauta steadi	White-capped albatross	V/Mi/M	V
Thalassarche eremita	Chatham albatross	E/Mi/M	-
Thalassarche impavida	Campbell albatross	V/Mi/M	-
Thalassarche melanophris	Black-browed albatross	V/Mi/M	-
Thalassarche salvini	Salvin's albatross	V/Mi/M	-
Turnix melanogaster	Black-breasted button-quail	V	V
Fish/Sharks			
Carcharias taurus	Grey nurse shark	CE	E
Carcharodon carcharias	Great white shark	V	-
Epinephelus daemelii	Black rockcod	V	-
Pristis zijsron	Green sawfish	V/Mi/M	-
Rhincodon typus	Whale shark	V/Mi/M	-
Mammals			
Balaenoptera musculus	Blue whale	E/Mi/M	-
Chalinolobus dwyeri	Large-eared pied bat	V	V
Dasyurus maculatus	Spot-tailed quoll	E	V
Eubalaena australis	Southern right whale	E/Mi/M	-
Megaptera novaeangliae	Humpback whale	V/Mi/M	V
Petauroides volans	Greater glider	V	-
Petrogale penicillata	Brush-tailed rock wallaby	V	V
Phascolarctos cinereus	Koala	V	V
Potorous tridactylus	Long-nosed potoroo	V	V
Pseudomys novaehollandiae	New Holland mouse	V	-
Pteropus poliocephalus	Grey-headed flying fox.	V	-
Xeromys myoides	Water mouse	V	V
Reptiles			
Adelotus brevis	Tusked frog	-	V
Caretta	Loggerhead turtle	E	E

Species scientific name	Species common name	EPBC Act status	NC Act status
Chelonia mydas	Green turtle	V	V
Delma torquata	Collared delma	V	V
Dermochelys coriacea	Leatherback turtle	E	E
Eretmochelys imbricata	Hawksbill turtle	V/Mi/M	-
Lepidochelys olivacea	Olive Ridley turtle	E	-
Natator depressus	Flatback turtle	V/Mi/M	-
Saiphos reticulatus	Three-toed snake-tooth skink	V	-

[1] EPBC Act: CE – Critically endangered, E – Endangered, V – Vulnerable, Mi – Migratory, M – Marine
[2] NC Act: E – Endangered, V – Vulnerable, NT – Near threatened

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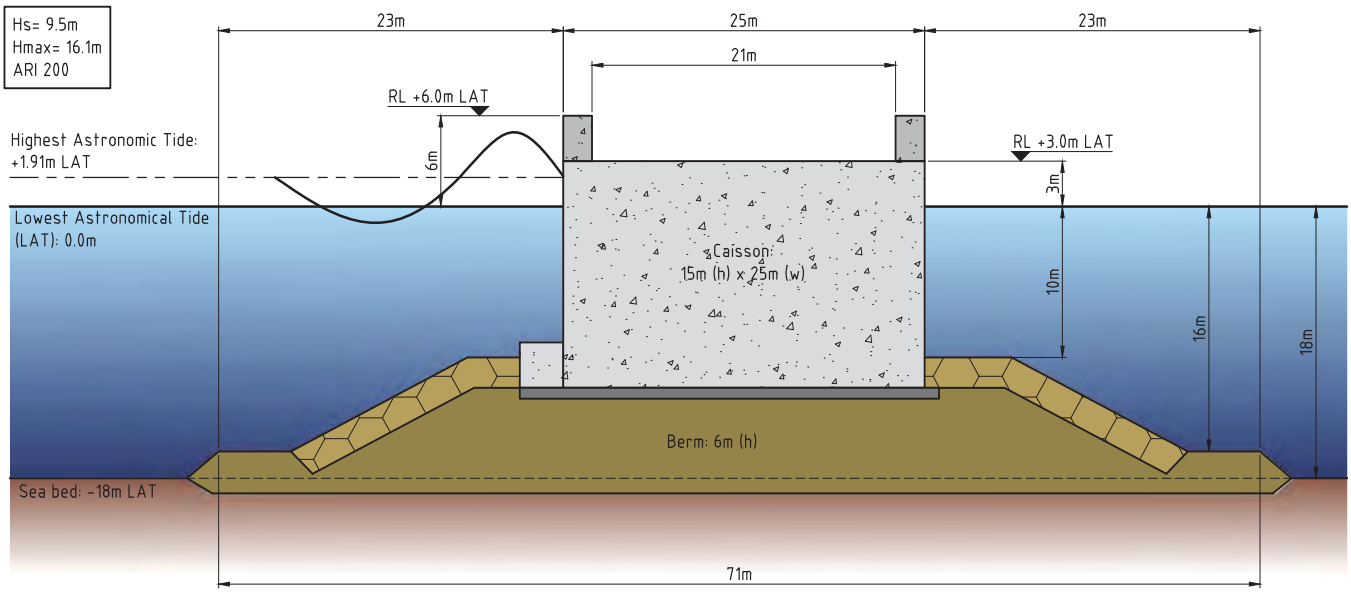
Caisson Breakwater

Caissons are usually large vertical pre-cast reinforced concrete units, typically used were water depths exceed 15m and a comparatively smaller rubble base pad is sought. A Caisson breakwater offers a reduced environmental impact due to significantly lower quarried rock and transport requirements, as well as reduced construction risk. Constructed on land and floated into place, the caisson can then be filled with material (eg. sand).



Detached Breakwater - Caisson with Double Crown Wall
Prepared by AECOM for ocean-side CST, Gold Coast

Energía Costa Azul, Mexico

Energía Costa Azul is the first liquefied natural gas receipt terminal on North America's west coast, in the Pacific Ocean.

Close to a World Surfing Reserve 23kms north of Ensenada, Baja California, Mexico, it is located in a wave environment similar to the Gold Coast. The project adopted innovative approaches to manage a difficult marine wave environment and protect sensitive flora and fauna, including the conservation of marine fauna migration paths.

The 250 metre long berthing pier had no natural protection, necessitating the design of a 652 metre long caisson breakwater.

The caisson breakwater was constructed by a joint venture between Costain (United Kingdom) and China Harbour Engineering Company (CHEC) and delivered between 2005 - 2008 at a reported cost of $170million (USD).

Designed to resist a 1-in-1000 year wave event (Hsig = 9.2m, Hmax = 17m), the breakwater consists of 12 caissons of two sizes (each 25 metres tall, 38 meters wide and either 46.25 metres or 68 metres long) and founded on a rubble mound situated at a water depth of 25 metres.

Construction of the giant caissons (each likened to an 8-storey building) was undertaken in a purpose-built casting basin located 22km south of the terminal. The basin (105m wide x 155m long x 12m deep) produced caissons over an 18 month period. Under controlled conditions, the basin was flooded and the caissons floated to their final destination.

The casting basin cost approximately $30million (USD) to construct.


http://www.energy.ca.gov/lng/documents/c 1


http://www.chec.bj.cn/zg/tabid/896/Infol 1


http://www.energy.ca.gov/lng/documents/c 4

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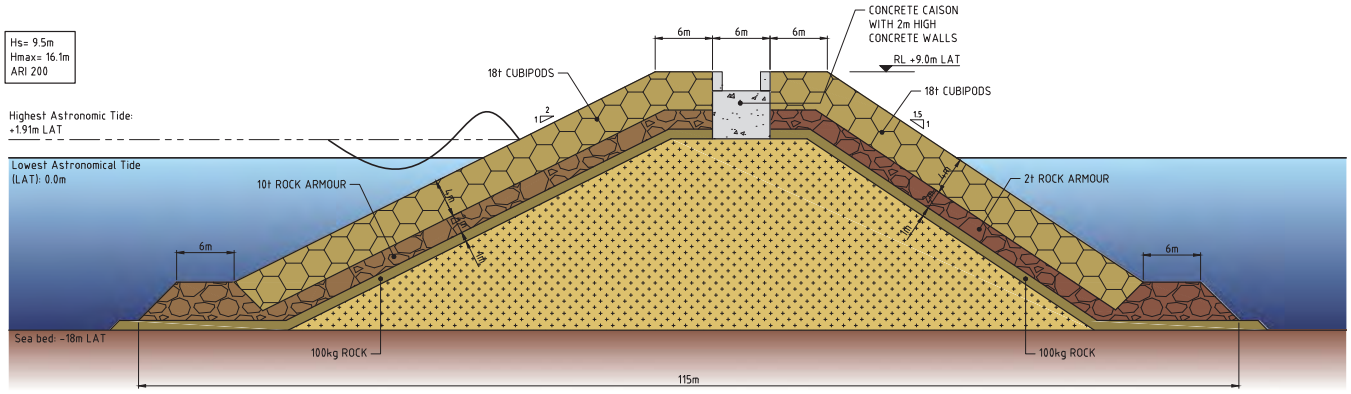
Rubble Mound Breakwater

Rubble mound breakwaters consist of a core of relatively small-sized material covered by filter layers of rock, protected on the exposed extremities by primary armour consisting of larger armour rock or concrete armour units. The base of the breakwater widens as the water depth increases in order to protect the layers of self-supporting rock.



Detached Breakwater - Rubble Mound Breakwater
Prepared by AECOM for ocean-side CST, Gold Coast

Pampa Melchorita LNG Project, Peru

Pampa Melchorita is the first liquefied natural gas receipt terminal in South America, located on the central coast of Peru. The marine terminal was built by the CDB consortium (Saipem, Jan De Nul, and Odebrecht) for an estimated cost of $300Million (USD). The LNG facility was delivered between August 2006 and June 2010.

The main wharf or trestle is 1,350m long, 9 to 11m above MLWS, and consists of a 2-lane road and LNG pipework. Although in a relatively benign wave environment, the area is a source of seismic activity in which the impact of tsunamis with a wave height from 6 – 9 metres was considered. The trestle is anchored into the seabed rock substratum by 550 steel piles. The LNG pipes are supported on top of the structure.

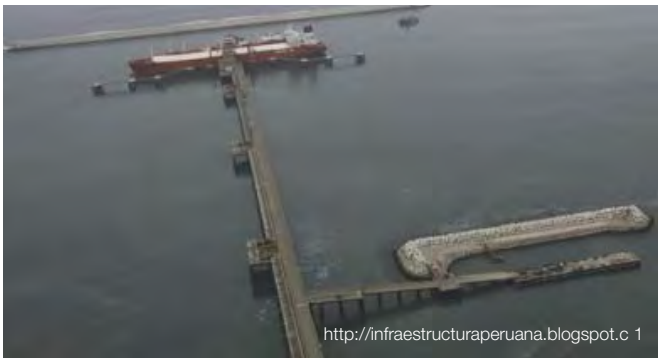
Ships berthing on the main trestle are facilitated by 4 breasting dolphins and 6 mooring dolphins which required an additional 50 deep support piles.

Construction of the breakwater was started in 2007 and completed in 2010. The main breakwater is 800m long and located 1,600m from shore, sitting in a water depth of 15m or greater. The structure stands at 8.5m above MLWS, or a 100-year wave height, in order to guarantee protection to the docked ships against the incoming ocean waves.

A temporary bridge or gantry system, although expensive, allowed vehicle access to the breakwater. The isolated location of the terminal supported the significant truck traffic required to move the 2 million tons of local quarry rock which formed the core of the breakwater.

The primary armour, consisting of 10,000 specially design concrete armour blocks, were transported by barge to the work face, and then lifted and placed by crane.

A 230m auxiliary wharf facilitated rock load-out and now acts as a permanent service port. The auxiliary breakwater is 205m long.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