E7

IMPACT SUMMARY & MANAGEMENT FRAMEWORK

SUMMARY OF BENEFITS, IMPACTS, MITIGATION AND COMMITMENTS

CONTENTS

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7.1 INTRODUCTION

The Terms of Reference (TOR) include an extract from the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Regulations 2000 which specifies the "Matters to be addressed by draft public environment report and Environmental Impact Statement (EIS)". Including the following requirement:

> *"Information given …… must include a consolidated list of mitigation measures proposed to be undertaken to prevent, minimise or compensate for the relevant impacts of the action, including mitigation measures proposed to be taken by State governments, local governments or the proponent".*

In addition, the TOR require the following:

> *"Provide a list of all commitments made by the proponent in the EIS, together with a reference to the relevant section in the report".*

This chapter seeks to draw together the residual impacts, benefits and commitments for the Project.

7.2 SUMMARY OF PROJECT BENEFITS AND IMPACTS

7.2.1 Project benefits

The Sunshine Coast Airport Expansion Project (the Project), including the proposed new runway, is vital for the growth and future development of the Sunshine Coast region. The Project will provide a range of benefits including:

Social

- Currently, 4,428 dwellings are impacted by five or more 70 dB(A) noise events a day, described as N70 events. The new runway (in 2020) would result in more than 3,500 fewer dwellings experiencing five or more 70 dB(A) noise events, benefitting homes and businesses in suburbs (including Buddina, Buderim, Maroochydore, Minyama, Mooloolaba, Mountain Creek, Mt Coolum, North Marcoola, Pacific Paradise, Sippy Downs, Twin Waters, Warana and Yaroomba)
- Areas to the north and south of the existing Runway (RWY) 18/36 would experience a decrease in N70 noise events
- The Project would reduce aircraft noise on identified noise-sensitive receivers located around the airport (including residences, education facilities, hospitals and health care facilities, libraries, nursing homes, churches and child care centres)
- Stimulation of diversification in employment opportunities on the Sunshine Coast, assisting in the retention of the 19 – 34 age population demographic
- In 2040 there is a 73 per cent reduction (5,285 fewer dwellings) in the number of dwellings affected by frequent noise events (five or more 70 dB(A) noise events on a summer weekday day)
- In 2040 there is a 27 per cent reduction (540 fewer dwellings) in the Australian Noise Exposure Forecast (ANEF)/Australian Noise Exposure Contour (ANEC) 20 or more contour
- No night flights (between 10pm and 7am) are forecast for 2020 or 2030 and two flights between 6am and 7am are forecast for 2040.

Economic

- A positive benefit cost ratio of 2.45:1
- Enhances connections between Sunshine Coast businesses and the global economy
- Contributes $4.1 billion to Gross Regional Product between 2020 and 2040
- Generates 2,231 new full time jobs by 2040
- Supports the ongoing development of the Sunshine Coast
- Facilitates uplift in the export freight direct from the Sunshine Coast
- Facilitates direct access to all national and international destinations in Australia, South East Asia and the Western Pacific
- Provides infrastructure to complement the development of the Maroochydore Principal Activity Centre, Sunshine Coast University Hospital and ongoing urban development
- Use of the Spitfire Realignment Channel has secondary benefits to maritime navigation into Port of Brisbane through channel deepening.

Environmental

- Designed to minimise impacts on the site, adjoining lands, flora and fauna
- Ecological offsets for impacts have been identified and secured to be placed in conservation tenure in perpetuity
- Extraction of sand within Spitfire Realignment Channel keeps dredging within an existing sand extraction area previously approved for dredging with limited environmental values
- Reduces the need for private vehicle travel to Brisbane Airport to access aviation services.

Operational/Regulatory

- Is fully compliant with international standards
- Is better aligned to prevailing winds enhancing aircraft performance and reducing potential diversions to other airports
- Most aircraft will be able to operate at full capacity
- Facilitate direct access to all national and international destinations in Australia, South East Asia and the Western Pacific.

7.2.2 Residual Impacts

The following section summarises the residual impact of the Project, details the mitigation measures identified and where appropriate, specifies monitoring requirements. The following summary is based on the individual impact assessment chapters in Volumes B, C and D. The risk matrix applied to all assessed issues, previously described in Volume A, is shown below to explain how the combination of likelihood of an impact occurring, combined with the significance of the impact, produces the resultant risk rating. Where the Project results in a beneficial impact, these are also identified.

The impacts, as identified in the individual chapters of Parts B, C and D, are summarised in **Table 7.2a**. The mitigation measures and any monitoring proposed to address the impacts are detailed further in the following sections.

	Significance				
Likelihood	**Negligible**	**Minor**	**Moderate**	**High**	**Very High**
Highly Unlikely	Negligible	Negligible	Low	Medium	High
Unlikely	Negligible	Low	Low	Medium	High
Possible	Negligible	Low	Medium	Medium	High
Likely	Negligible	Medium	Medium	High	Extreme
Almost Certain	Negligible/Low	Medium	High	Extreme	Extreme

Table 7.2a: Summary of impacts

Chapter	Technical Disciplines	Residual Risk Rating
Volume A: Impact Assessment		
A2	Economic	Considerable economic benefits to the region
Volume B: Airport and Surrounds		
B2	Land Use and Tenure	No impacts identified
B3	Geology, Soils and Groundwater	Low to
		Medium
B4	Coastal Processes	Low
B5	Flooding	Negligible
B6	Surface Water and Hydrology	Negligible to
		Low
B7	Terrestrial Flora	Negligible to
		Medium
B8	Terrestrial Fauna	Low to
		High
B9	Aquatic Ecology	Negligible to
		Low
B10	Marine Ecology	Negligible to
		Medium
B11	Indigenous Cultural Heritage	No impacts identified – Cultural Heritage Management Plan (CHMP) pending

Chapter	Technical Disciplines	Residual Risk Rating
B12	Non- Indigenous Cultural Heritage	Negligible to
		Low
B13	Social Impact	Low
B14	Surface Transport	Low to
		Medium
B15	Terrestrial Noise and Vibration	Negligible to
		Low
B16	Air Quality and Greenhouse Gas Emissions	Negligible to
		Low
B17	Landscape and Visual – Construction	Medium to
		High
	Landscape and Visual – Operation	Negligible to
		Medium
B18	Climate Change	Low
Volume C: Dredging and Dredge Movements		
C3	Coastal Processes and Water Quality	Negligible to
		Low
C4	Marine Ecology	Negligible to
		Medium
C5	Shipping Traffic	Negligible to
		Low
C6	Other Considerations:	
	Cultural Heritage – Non-Indigenous Cultural Herigate (NICH)	No impacts identified
		No impacts identified – CHMP pending
	Landscape and Visual	Negligible to
		Moderate
	Social Impacts	Negligible
Volume D: Airspace and Aircraft Noise		
D4	Air Quality and GHG Emissions	Negligible to
		Low
D5	Social Impacts	Beneficial to
		Medium

7.2.3 Summary of impacts on Matters of National Environmental Significance (MNES)

The MNES directly impacted by the Project are:

- **Wallum Sedgefrog –** 1.67 ha of wallum Sedgefrog breeding habitat would be impacted
- **Mt Emu She-oak** – The Project will result in a loss of approximately 4.4 ha of Mt Emu She-oak habitat, with the majority of this habitat considered to be of lower quality, supporting a reduced density of plants. At the time of the population survey carried out as part of this study, this impact was quantified at approximately 550 plants, or 5 per cent of the Finland Road population (comprising 12,152 plants in total)
- **Grey-headed Flying-fox –** The Project would result in the loss of 41.8 ha of Grey-headed Flying-fox foraging/ feeding habitat. With extensive areas of suitable foraging habitat remaining in the region, the loss of 0.65 per cent of available foraging habitat is unlikely impact significantly on numbers of Grey-headed Flying-foxes within the Maroochy area.

7.2.4 Mitigation measures – Airport and Surrounds

The residual risk ratings provided in **Table 7.2a** rely on the following specific mitigation measures being implemented. Some of the measures are considered inherent in the design (as described in Chapter A5) whilst others are additional mitigation to better manage residual risks. This section relates to issues addressed in Volume B: Airport and Surrounds. The Environmental Management Plan in Chapter E3 and parts of the Dredge Management Plan (DMP) – E4 provide full detail of all mitigation measures proposed.

7.2.4.1 Land Use and Tenure

No impacts have been identified as a result of the Project and as such no mitigation is required.

7.2.4.2 Geology, Soils and Groundwater

The overall residual impact is rated as low to medium with the following mitigation measures proposed:

Groundwater

- A cut-off wall is proposed on the northern side of the northern perimeter drain to mitigate risks associated with drawdown of water and prevent the mobilisation of acidity (a feature inherent in the design)
- A high quality liner is included within the base of the reclamation area to minimise infiltration of seawater into the underlying groundwater (a feature inherent in the design)
- The polishing pond for tailwater discharge will be located on naturally low permeability clay (a feature inherent in the design).

Acid sulphate soils (ASS)

- Specific pads will be used for treatment of excavated ASS (a standard measure)
- A guard layer of lime will be placed within sections of the proposed drains to intercept and neutralise any acidity mobilised from normally unsaturated actual ASS that settles beneath the water table
- The Environmental Management Plan (Chapter E3) details the measures for ASS management that will be adopted during construction.

Erosion and sediment control

- The potential for erosion will be significantly reduced by very shallow grades and the establishment of vegetation (grass) around the proposed runway
- The Environmental Management Plan (Chapter E3) details the measures for erosion and sediment control that will be adopted during construction.

Monitoring would include:

- A monitoring program for receiving waters and groundwater is proposed for the site including establishing a baseline which is currently being monitored.

7.2.4.3 Coastal Processes and Marine Water Quality

The overall residual impact is rated as low with the following mitigation measures proposed:

- Minimising the structure for the pump-out site to a temporary anchor and connecting buoy (a feature inherent in the design)
- Disturbance on the dune has been minimised during the design phase through proposing jacking or directional drilling to install the pipeline under David Low Way and the dune
- Dredging works are proposed to be completed during winter months when the coastal erosion and storm tide risk is lower
- Any disturbance to the beach below mean high water level as a result of the pipeline would be temporary with recovery under natural coastal processes
- The pipeline on the seabed and beach may create a minor barrier and could cause sand to accumulate. This is expected to be temporary and manual relocation of accumulated sand would be undertaken, if required
- During sand pumping some sand may be spilled at the off-shore dredge pump-out site, with a negligible impact on coastal processes. If a spill is excessive, it will be re-dredged and pumped to the Project site
- The 20 m wide section of the dune surface (including dune vegetation) and the beach impacted by the pipeline will be reinstated on completion of the dredge campaign
- All work would be managed under the Dredge Management Plan (DMP), refer Volume E of the Draft EIS.

7.2.4.4 Flooding

The overall residual flood impact risk is rated as negligible, mitigation measures proposed include:

- Major drainage infrastructure is proposed as part of the Project to effectively manage stormwater runoff and flood flows at the Project site. New infrastructure includes the northern perimeter drain, which directs overland flow from north of RWY 13/31 north into Marcoola drain. Additionally, in a major flood the proposed western perimeter drain will improve the flow of floodwaters around the end of RWY 13/31 into the southern perimeter drain
- The new runway has been designed to be immune from a 2100 climate change scenario consisting of a 100 year ARI flood event with a 20 per cent increase in rainfall intensity and a 0.8 m sea level rise
- Up to 15 dwellings on 14 properties within the affected area have existing floor levels that may be affected by the increase in depth of up to 18.5 mm in the 100-year ARI event. The owners of the affected properties will be contacted during the public notification for the EIS to conduct detailed surveys to confirm the potential impact and determine the need for property-scale mitigation measures
- A regional climate change mitigation strategy should be prepared in a timely manner and implemented by cooperation between appropriate government planning authorities at Federal, State and Local government levels.

7.2.4.5 Surface Water and Hydrology

The overall residual impact is rated as negligible to low.

Mitigation measures include:

- Provision of a settlement pond (underlain by naturally low permeability clay) to manage turbidity and total suspended solids during sand placement
- Using Marcoola Drain as a proposed mixing zone, prior to discharge of tailwater into the Maroochy River
- Provision of a 150 m wide grassed strip adjacent to RWY 13/31 to assist with stormwater management once the runway is operational.

Monitoring includes:

- A reactive water quality monitoring program will be implemented to ensure compliance with proposed turbidity trigger values and WQOs during construction. The DMP – Chapter E4 provides coordinates for monitoring locations.

7.2.4.6 Terrestrial Flora

The overall impact of the Project on terrestrial flora is rated as negligible to medium.

- It is proposed to offset via translocation (a proven tiling method), the 4.41 ha of the EPBC Act listed Mt Emu She-oak to a site 1.4 km to the north as mitigation for the impact by the Project on the affected population
- Collection of seed from the impacted Mount Emu She-oak plants for storage and ultimate propagation for use in replanting works
- The retained population of Mount Emu She-oak on the site will be protected during construction with appropriate vegetation protection procedures as outlined in the Environmental Management Plan (EMP) – Chapter E3
- Remnant vegetation clearing is exempt on the airport, however, this vegetation loss is proposed to be compensated for through the rehabilitation of 55 ha of a SCC-owned off-site property at Palmview
- Clearing of vegetation for the runway will reduce current levels of ecological connectivity between the northern and southern sections of Mt Coolum National Park, and this will be compensated for by the provision of a rehabilitated corridor from the northern portion of the National Park around the end of the proposed RWY13/31 inside the Sunshine Motorway for a width of approximately 100 m to the southern portion of the National Park
- Implementation of the EMP (see Chapter E3) which also addresses pre-clearing surveys and action for when additional threatened or near threatened plants are identified; appropriate fire regimes; weed management measures and the location of construction compounds, storage areas and stockpiles within in existing cleared areas and monitoring requirements
- An Offset Management Plan will be prepared as part of subsequent project phases which will outline all on-ground works required, management and monitoring required for offset, compensation and rehabilitation actions.

7.2.4.7 Terrestrial Fauna

The impacts on terrestrial fauna are rated as ranging between low and high and the following mitigation measures are proposed:

- Augmentation of dry heath to create 2.22 ha of low-lying wet heath as an offset for the loss of 1.67 ha of EPBC Act listed Wallum Sedgefrog breeding habitat. The offset is to be located within the Wallum Heath Management Area in an area sited outside of existing Ground Parrot habitats
- State-listed acid frog habitat would be offset by the rehabilitation of a SCC-owned property at Palmview. This off-site compensatory habitat may also provide a co-benefit of providing habitat for Grey Goshawk and Lewin's Rail
- The airport provides suitable habitat for Ground Parrots due to SCA's management regime of trimming wallum heath, preventing the emergence of a tree canopy and maintenance of the perimeter fence restricting predator access. The Ground Parrot population at the airport site comprises approximately 14 to 16 birds. The Project would result in a loss of 7.78 ha of wallum heath. The area lost is not the area most regularly used by the birds

- To mitigate the loss of Ground Parrot habitat, it is proposed to manage 5.84 ha adjacent to the northern boundary of the site in a manner expected to encourage Ground Parrot use, that is to transition the area to dwarf heath to encourage its use by Ground Parrots
- For reasons of airport security, there will be no gaps been erection of new perimeter fencing and removal of existing fencing, which will also benefit Ground Parrot
- As an indirect offset it is proposed to contribute funding (for a specified period) to a Ground Parrot Recovery Plan (covering the airport and region) and also contribute funds (also for a defined period and amount) to Queensland Parks and Wildlife Service (QPWS) to maintain part of the northern section of the Mt Coolum National Park to assist in increasing the habitat area for the Ground Parrot population (this would also include discussion about fencing part of the National Park for the protection of the birds)
- Whilst no historic or active flying fox camps occur on the Project site, the Project will affect food sources for the EPBC Act listed Grey-headed Flying-fox, including eucalypts and melaleucas. It is proposed to compensate for the loss of foraging habitat through the rehabilitation of 55 ha of an SCC-owned property at Palmview. This site will also compensate for the loss of state listed acid frog habitat in the same location
- Clearing of vegetation for the runway will reduce current levels of ecological connectivity between the northern and southern sections of Mt Coolum National Park, and this will be compensated for by the provision of a rehabilitated corridor from the northern portion of the National Park around the end of the proposed RWY13/31 inside the Sunshine Motorway for a width of approximately 100 m to the southern portion of the National Park
- Implementation of the EMP (Chapter E3), which also addresses proposed management measures for the use and nature of lighting during construction and operation to reduce light spill on adjacent habitats. Development and implementation of a wallum heath management plan ensuring slashing occurs infrequently, at a height of 0.5 m or higher, and only during the dry season; research into call bout parameters pre-construction and confirm the appropriate slashing regime in the Wallum Heath Management Area and offset areas for Ground Parrot.

7.2.4.8 Aquatic Ecology

The overall impact of the Project on aquatic ecology is rated as negligible to low. The EMP in Chapter E3 contains a set of standard measures considered sufficient to maintain or improve the status of drains and waterways on site.

7.2.4.9 Marine Ecology

The impacts on marine ecology are rated as ranging between negligible and medium, with the following mitigation measures proposed:

- To minimise disturbance to marine habitats, in the ocean or in tidal waters on or near the Project site, the Project design incorporates:
  - Placement of the temporary pipeline on the surface of the seabed, rather than buried
  - A tailwater discharge outlet that minimises scouring of local tributaries
  - Selection of a dredge that minimises the potential for excessive sand spillage at the pump-out site
  - Minimising the length of time for beach works and the extent of beach area affected by pipeline assembly and operation
  - Protection of marine plants at Marcoola drain during the construction of the tailwater discharge outlet.
- To protect marine megafauna, such as turtles, strategies to avoid contact and minimise exposure to light and noise will be implemented including:
  - All dredge pipeline construction works on Marcoola Beach will be undertaken outside turtle nesting season (November to March)
  - Engagement with turtle nest monitoring groups to investigate past and likely future sites prior to commencing work.

7.2.4.10 Indigenous Cultural Heritage

Cultural Heritage Management Plans (CHMPs) are currently being developed which includes consultation with the appropriate Aboriginal Parties. Through this process the Aboriginal Party will identify Indigenous Cultural Heritage (ICH) significance within the Project area and assess the impact on the cultural heritage values. The CHMPs are expected to include mitigation measures to manage impacts and monitoring requirements.

7.2.4.11 Non-Indigenous Cultural Heritage

The overall impact of the Project on NICH is rated as negligible with mitigation proposed in the form of a procedure for managing unexpected cultural heritage material or sites that may be encountered as detailed in the EMP (Chapter E3).

7.2.4.12 Social Impact

The residual impact of the non-aircraft related social impacts are rated as low and the following mitigation is proposed:

- The Marcoola beachfront and Coastal Pathway would be temporarily impacted by construction activities related to the dredge pipeline, however a short detour is to be provided during this brief period
- SCC will not continue to augment facilities offered at Keith Royal Park.

7.2.4.13 Surface Transport

The overall residual traffic impact risk during the construction phase is rated as ranging between low and medium. Mitigation measures proposed during the construction phase will include:

- Improvements are proposed at the intersection of David Low Way and Finland Road to address safety deficiencies
- Finland Road will be upgraded
- An initial Road User Management Plan (RUMP) is included in the EIS which sets out strategies for informing the community about any road related changes that may occur during the construction of the Project.

7.2.4.14 Terrestrial Noise and Vibration

The overall terrestrial noise and vibration impacts of the Project during both the construction and operation stages are rated as negligible to low. Mitigation measures during the construction phase would include:

- Houses surrounding and closest to the airport were identified as the sensitive receptors to noise impacts. The other sensitive receptor identified on site was the Ground Parrot population within the airport. To assess impacts on residential sensitive receptors, noise goals were developed from best practice Queensland guidance. Mitigation for construction noise impacts inherent in design include significant acoustic attenuation around the booster pump (which would operate for around 14 weeks depending on the size of dredge) and temporary noise barriers in place for the same duration
- Preliminary noise predictions identified the need to attenuate the dredge booster pump, the specific measures will need to be developed by the contractor but may be achieved by a combination of the following:
  - Enclosing the engine with an acoustically robust enclosure including internal acoustic absorption
  - Fitting residential class mufflers
  - Selection of the quietest available plant or perhaps over specified equipment (allowing lower operating speeds for the same throughput)
  - Enclosing the pump.
- Predicted increases in traffic noise along Finland Road (currently a quiet rural road with 14 residences) will be expected as this will be the main construction access to the Project site. Regular communication ahead of some construction activities would be provided to noise affected residents in Finland Road and on Keith Royal Drive. An effective community relations programme would be put in place to keep the community that has been identified as being potentially affected appraised of progress of the works, and to forewarn potentially affected groups (e.g. by letterbox drop, meetings with community groups, etc.) of any anticipated changes in noise emissions prior to critical stages of the works, and to explain complaint procedures and response mechanisms
- Equipment selection – All plant at the work sites should be appropriately selected, and where necessary, fitted with silencers, acoustical enclosures and other noise attenuation measures in order to ensure that the total noise emission from each work site is minimised
- Site noise planning – Where practical, the layout and positioning of noise-producing plant and activities on each work site should be optimised to minimise noise emission levels
- Permissible times of work – Where engineering, safety, access or programming constraints permit, the hours of use of noisy equipment may be limited at the work sites where residential areas could otherwise be adversely affected. However, the implications of this in terms of possible extension of the period of noise exposure should be considered
- Where practical, construction traffic outside of standard hours would be avoided
- Mitigation and management measures for noise during construction and operation, including proposed working hours are provided in Chapter E3, the Project EMP.

Monitoring includes:

- Noise monitoring programme – A well-planned noise monitoring programme will assist in identifying the site-specific potential for disturbance at particularly sensitive localities as the works progress. Reasonable and feasible mitigation measures, such as time restrictions, changes in work sequences or selection of smaller items of equipment can then be put in place before significant disturbance occurs. The programme would include the ongoing monitoring of emissions from work sites and would assist in planning of ongoing works
- Plant noise audit – Noise emission levels of all critical items of mobile plant and equipment should be checked for compliance with noise limits appropriate to those items prior to the equipment going into regular service. Periodic noise monitoring should be conducted to ensure that items of plant continue to be well maintained in compliance with the noise emission limits for that class of equipment. To this end, a regular equipment testing programme should be established with the contractor.

7.2.4.15 Air Quality and Greenhouse Gas Emissions

The overall impact of the Project during both the construction and operation stages on Air Quality and GHGs is rated as negligible to low. Mitigation measures during the construction phase would include:

- Regular watering of haul roads and stockpiles to minimise dust
- Minimise the exposed surface of stockpiles including partial enclosure where practical

- Additional watering during adverse weather conditions such as during very high winds
- Avoid dust generating activities near residences during periods of high winds, particularly early morning or evening
- Scheduling and organisation of construction activities will seek to minimise fuel consumption of site vehicles
- Where biodiesel is readily available it will be substituted for regular diesel
- Fuel storage will be located to minimise travel distance.

During operation key measures include the continued engagement with the ACI Airport Carbon Accreditation Scheme and resultant management measures including the choice of energy efficient options for lighting and air-conditioning on airport.

7.2.4.16 Landscape and Visual

During construction, the visual impacts will range from medium to high (for a short, temporary period during dredging). During the operation of the airport, the impact, with RWY 13/31 commissioned, is rated as ranging from negligible to medium. Mitigation measures include:

- Corridor planting inside the Sunshine Motorway for ecological purposes, has the co-benefit of filtering views towards the airport infrastructure from the motorway
- The 20 m wide section of dune would be rehabilitated back to existing following completion of the dredge campaign.

7.2.4.17 Climate Change

The overall residual climate change risk is rated as low.

Mitigation measures include:

- A regional climate change mitigation strategy should be prepared and implemented by cooperation between appropriate government planning authorities at Federal, State and Local government levels
- Monitoring the performance of the local drainage system over time to identify of remedial works is required
- Inclusion of climate change risk in ongoing risk reviews for the airport in case adaptation to climate change is required in the future.

7.2.5 Mitigation Measures – Dredge and Dredge Movements

The residual risk ratings provided in **Table 7.2a** rely on the following specific mitigation measures being implemented. Some of the measures are considered inherent in the design (as described in Chapter A5) whilst others are additional mitigation to better manage residual risks. This section relates to issues addressed in Volume C: Dredging and Dredge Movements. The Dredge Management Plan in Chapter E4 provides full detail of all mitigation measures proposed.

7.2.5.1 Coastal Processes and Water Quality

The overall impact of the Project on coastal processes and water quality is negligible to low. Mitigation measures include:

- Mitigation measures are not proposed in terms of coastal processes based on the low risk of impact
- To mitigate the temporary water quality impacts from the Spitfire Channel Realignment dredging, the following mitigation measures are proposed and summarised in the Dredge Management Plan (Chapter E4):
  - Incorporation of a short-term model validation water quality monitoring program following commencement of dredging and similar to that undertaken for previous dredge campaigns undertaken by the Volvox Asia (BMT WBM 2008) to validate the model findings outlined in the EIS
  - Implementation a reactive monitoring program to ensure compliance with proposed trigger values and Water Quality Objectives (WQOs) set for the dredging works. Monitoring data would be downloaded remotely assessed against threshold trigger values during the dredging, with appropriate corrective actions implemented if those trigger values are exceeded. These corrective actions could include:
    - Dredging, during flood tides when migration of the plume would likely be to the south over the area defined by M3B and WBA location (i.e. slightly to moderately disturbed area E2A and away from the High Ecological Value (HEV) area to the north of the Spitfire Realignment Channel)
    - Not dredging during certain neap tidal periods to avoid prolonged exposure of the plume to benthic communities.
- Dredge vessel to be fitted with green valves to further reduce surface water turbidity impacts.

7.2.5.2 Marine Ecology

The overall impact of the Project on marine ecology is negligible to medium. Mitigation measures include:

- While the dredge footprint area is not known to contain large numbers of marine megafauna, management strategies will be implemented throughout the course of the proposed dredging works in Moreton Bay to minimise the risk of interactions with the dredger. These management strategies are set out in the Dredge Management Plan (Chapter C4) and include:
- A fauna management plan which seeks megafauna exclusion zones (i.e. maintaining a given buffer distance between the dredger and megafauna) and associated reactive megafauna monitoring program (e.g. regular visual inspections of dredge footprint area and dredge path)

- If visual monitoring for megafauna from the dredge vessel detects megafauna within or headed towards exclusion zones, execute strategies to avoid interactions as required (e.g. stopping work if megafauna, especially whales, are within or near exclusion zones; halt dredge vessel transit if potential to encroach on observed whales or their anticipated path)
- Operational procedures to minimise the risk of capture of turtles lying on the seabed, especially utilising tickler chains on the dredge head as a fauna exclusion device to reduce fauna entrainment and prevent fauna injury and mortality
- Ensure dredge suction is ceased prior to lifting the dredge head from the seabed
- Where it does not conflict with security and safety requirements, lighting on the dredge vessel will aim for low wattage and/or directional light fixtures.

Together, these mitigation strategies will reduce the likelihood of interactions between the dredge vessel and marine megafauna, such that the overall residual risk of potential impacts to marine megafauna is low for all related mechanisms (ie vessel strike, noise, entrainment and light).

7.2.5.3 Shipping Traffic

The overall impact of the Project on shipping traffic is rated as negligible to low. Mitigation measures include:

- The dredge vessel will comply with Port Procedures and directions from Port Control
- Maritime Safety Queensland will initiate Notices to Mariners as deemed necessary.

7.2.5.4 Other Considerations

The overall impact of the Project on other considerations which includes ICH, NICH, social and visual matters, is negligible to moderate. Mitigation measures include:

- SCA would be required to develop a CHMP with relevant Aboriginal Party(ies) for dredging activities at the Spitfire Realignment Channel and this process would continue after the finalisation of the EIS. All potential NICH impacts would be assessed and mitigation measures developed as part of the CHMP
- The dredge would travel on a route agreed with the Regional Harbour master between the Spitfire Realignment Channel and the pump-out site, taking into account the importance of reducing any impact on commercial and recreational activities
- Consultation will be undertaken with local recreational boating clubs to notify members of restricted areas during pipeline installation and pumping operations.

7.2.6 Mitigation measures – Airspace and Aircraft Noise

The residual risk ratings provided in **Table 7.2a** rely on the following specific mitigation measures being implemented. Some of the measures are considered inherent in the airspace design (as described in Chapter D2), whilst others are additional mitigation to better manage residual risks. This section relates to issues addressed in Volume D: Airspace and Aircraft Noise. The Airspace Management Plan in Chapter E5 provides detail of mitigation measures proposed.

With respect to the change to airspace, mitigation includes notifying airspace users of the changes and effective dates through publication in the Australian AIP in accordance with the normal Aeronautical Information Regulation and Control (AIRAC) cycle. Airspace users will be notified in a preliminary sense of the likely changes to airspace during the public notification period of the EIS.

7.2.6.1 Air Quality and Greenhouse Gas Emissions

The overall impact of the Project on air quality and GHG emissions is low to negligible. Mitigation measures associated with air quality and GHG emissions due to aircraft during the operational phase are predominantly outside of the direct control of SCA. The main mitigation measure SCA is able to implement is Continuous Descent Approaches (CDA). SCA has implemented 'Required Navigation Performance' procedures to allow shorter approach paths which would reduce flight miles and hence air emissions.

7.2.6.2 Social Impacts of Aircraft Noise

The residual social impact risk of the aircraft related impacts of this project include considerable benefits associated with the new runway orientation reducing the number of overall dwellings located in the ANEF and experiencing N70 events with some adverse impacts for affected residents also occurring and ranging from low to medium.

Mitigation measures include:

- RWY 13/31 – The orientation of the new runway and associated flight paths have been designed to reduce impacts of overflights on urban and particularly residential areas
- Airspace Management Plan – The Airspace Management Plan contained in this EIS (see Chapter E5) outlines SCA's approach to managing the airspace in the vicinity of SCA including the preferred modes of operation
- ANEF/C – Amendments to the SCC Planning Scheme to include up to date planning controls for new runway layout and associated flight paths (see Chapter B2 – Land Use and Tenure)
- Community engagement – SCA will maintain a dialogue with its neighbours in the lead up to and post new runway opening. The aim of this engagement is to discuss potential changes prior to the opening of the runway and to address any issues that may arise from the new operational modes.

7.3 CUMULATIVE IMPACTS

7.3.1 Other regional projects

Chapter A9 provides a list of key projects that have been proposed or are currently being undertaken within the region. The impact of these projects, combined with the impacts of the Project, have the potential to cause cumulative impacts. This has addressed and is detailed in **Table 7.3a**.

7.3.2 Cumulative sand assessment in Moreton Bay

To address any scientific uncertainty surrounding the extraction of 1.1 M m^3 of sand from the Spitfire Realignment Channel in Moreton Bay, the TOR required that SCC undertake a cumulative sand assessment which assesses the potential implications of the additional extraction over and above that allowed as part of the Moreton Bay Sand Extraction Study, 2000 – 2004. The results of this assessment identified that the additional allocation of sand associated with the Project is not determined to present any unacceptable cumulative impacts (this is described in detail in Chapter A3 – Options and Alternatives.

7.3.3 Cumulative Interactions within the Project

Cumulative interactions within the Project have been considered in the impact assessment chapters in Volumes B, C and D where appropriate. For example, Chapter B8 – Terrestrial Fauna, assesses the cumulative interactions of noise, lighting, construction methodology and groundwater impacts on fauna and its habitat.

7.4 KEY COMMITMENTS

7.4.1 Management plans and approvals

- The EMP, DMP, AMP will be implemented and complied with
- All necessary permits and approvals will be sought and complied with
- CHMP's will be completed in a timely manner and complied with
- The WHMA will continue to be managed by SCA.

7.4.2 Ecology

- Offsetting 4.41 ha of Mt Emu she-oak on airport land
- Compensating for loss of 55 ha of broadleaved paperbark forest, heathland Regional Ecosystem and state listed acid frogs through rehabilitation of a site at Palmview
- Offsetting 1.67 ha within the WHMA
- On-site compensation of 5.84 ha for Ground Parrot on airport land
- Indirect offsets will involve contribution to ground parrot research
- Construction of the airside perimeter fence will be staged to ensure the ground parrot habitat (existing and proposed) is maintained at all times.

7.4.3 Flooding and groundwater

- Groundwater mitigation including a high quality liner and cut off wall will be provided to mitigate saline tailwater
- Site specific mitigation will be negotiated with individual property owners if warranted following additional detailed survey
- Work with Council, State and Commonwealth agencies to make sure that the impacts of the runway are recognised in a regional climate change strategy.

7.4.4 Construction

- During dredging the booster pump will be mitigated for noise including a temporary barrier
- Finland Road will be upgraded, the intersection signalised with David Low Way and used by construction traffic during daylight hours as much as possible
- Safe, convenient pedestrian and emergency vehicle access will be maintained during pipeline construction and sand delivery
- The dune will be rehabilitated once the sand delivery works are complete.

7.4.5 Aircraft noise

- All RPT jet traffic would be on RWY 13/31 not 18/36
- The Community Aviation Forum will be expanded include representatives from newly noise affected areas.

7.4.6 Community engagement

- Commit to ongoing community engagement throughout the construction phase and into the operational phase of the new runway.

Table 7.3a: Cumulative impacts on other regional projects

Project	Cumulative Impact with SCA Project
Brisbane Airport New Parallel Runway (NPR)	It is understood that a review of the Brisbane airspace will be undertaken by Airservices Australia before the NPR and SCA Project are operational (depending on the timing of SCA Project). This does not change the assessment of this Project but may affect aircraft management and procedures prior to opening. Any approvals for proposed changes to these procedures would be addressed at the appropriate time.
Caboolture to Maroochydore Corridor Study (CAMCOS)	The proposed CAMCOS railway line is a proposed single track rail line extending from the existing North Coast Line to service the Sunshine Coast. There is currently no date for its implementation but it would not be affected by the Project footprint and if constructed, would support the growth of the airport.
Sunshine Coast Light Rail	These transport projects if committed to, would not be affected by the Project, but if constructed, would support the growth of the airport.
North Coast Line to Nambour Station Upgrade	
Sunshine Motorway Upgrades, including Sunshine Coast Transport Project	
Bruce Highway Upgrades	Bruce Highway Upgrade Planning Study (Caloundra Road to Sunshine Motorway) project is dependent on Federal funding and is likely to be constructed in a number of stages. This project will not be affected by the Project footprint and if constructed, would support the growth of the airport.
Port of Brisbane – dredging works	SCA is proposing a co-located and deepened dredge footprint to that approved for Port of Brisbane within the same channel. This revised footprint is assessed in this EIS and implications for further approvals and permits are assessed in Chapter A6 – Planning and Legislation. A cumulative sand assessment is detailed in Chapter 3 – Options and Alternatives, which determines that the additional allocation of sand associated with the Project will not present any unacceptable cumulative impacts.
Desalination Plant	There have been recent changes to the water authority. The project still appears to be at concept stage with a number of sites being considered, one of which is located at Marcoola on a site north of the proposed new runway. Any development in this location would require a detailed study to assess its impacts (including flooding, impacts on airport operations etc).
Maroochydore Principal Regional Activity Centre	In July 2013, the state government announced that the Maroochydore City Centre would be a Priority Development Area (PDA). The intention is that declaration of a PDA at Maroochydore would renew the region by: • Supporting economic development • Providing much needed infrastructure • Creating a new central business district for the Sunshine Coast. The Masterplan for the City Centre Priority Development Area (approx. 60 ha of the PAC) was on public exhibition between January and March 2014. The Master Plan supports the growth of the airport and both projects complement each other.
Sunshine Coast Hospital (Kawana)	The development of a new public hospital at the Sunshine Coast University, has commenced. It is collocated with the new private hospital which opened in late 2013. The development of the hospital would not be effected by the Project footprint and would support the growth of the airport.
Parklands Quarry	It is noted that this quarry is proposed and is currently subject to an appeal. If approved, the possible imposition of conditions are as yet unknown and so it is not possible to undertake an assessment at this time.
Sunshine Coast Solar Farm	The Sunshine Coast Solar Farm is planned to be located at Valdora, west of the Project. The Solar farm will be a utility-scale facility, which is planned to meet 50 per cent of the coast's electricity needs. The Solar Farm is not expected to affect the performance of the Project, and conversely, the Project is not expected to affect the Solar Farm.

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