C6

DREDGING AND DREDGE MOVEMENTS

OTHER CONSIDERATIONS

CONTENTS

6.1 Introduction 139

6.2 Non-Indigenous cultural heritage 139

6.2.1 Methodology and assumptions 139

6.2.1.1 Desktop assessment 139

6.2.1.2 Significance criteria 139

6.2.2 Policy context and legislative framework 141

6.2.3 Existing conditions and impact assessment 141

6.2.4 Mitigation measures 141

6.3 Indigenous cultural heritage 142

6.3.1 Methodology and assumptions 142

6.3.2 Policy context and legislative framework 142

6.3.2.1 Commonwealth legislation 142

6.3.2.2 State legislation 143

6.3.3 Existing conditions 144

6.3.3.1 Changing sea levels 144

6.3.3.2 Deposition of sediment 144

6.3.3.3 Register searches 145

6.3.3.4 Description of significance criteria 145

6.3.4 Summary of impacts 146

6.3.5 Suggested mitigation measures 146

6.4 Social impact assessment 146

6.4.1 Dredge site 147

6.4.2 Vessel transit 148

6.5 Visual assessment 148

6.5.1 Methodology and assumptions 148

6.5.1.1 Methodology 148

6.5.1.2 Assumptions and technical limitations. 148

6.5.2 Policy context and legislative framework 148

6.5.2.1 State planning and legislation 148

6.5.2.2 Local planning policies 150

6.5.3 Existing conditions 151

6.5.4 Impact assessment 152

6.5.4.1 Description of significance criteria 152

6.5.4.2 Assessment of potential impacts and mitigation measures 152

6.5.4.3 Mitigation 152

6.5.5 Summary and conclusions 152

FIGURES

6.1a: Location of the sand extraction area in Moreton Bay 140

6.2a: Shipwrecks along Sunshine Coast 141

6.2b: Proposed dredge vessel route between Spitfire Channel and Marcoola 142

6.3a: Changing sea levels in Moreton Bay 145

6.4a: Existing shipping channels and proposed Spitfire Realignment Channel near Spitfire Banks 147

6.5a: Viewpoints used to assess visual impacts of dredging 149

6.5b: Viewpoint 1 – Marcoola Beach 153

6.5c: Viewpoint 2 – Woorim Beach, Bribie Island 153

TABLES

6.5a: Tourism focus areas 151

6.5b: Regionally significant landscape features 151

6.5c: Definitions of impact significance criteria 152

6.5d: Summary of visual impacts 153

6.5e: Summary of viewpoints in relation to various aspects of the Project 154

6.1 INTRODUCTION

This chapter covers the following matters:

- Non-Indigenous and Indigenous cultural heritage
- Social impacts
- Visual impacts.

It discusses the potential impacts on these matters from dredge operations from the proposed sand extraction area and the proposed transit route for the dredge vessel to the pump-out site at Marcoola. Note that the potential implications of pump out activities offshore at Marcoola are assessed in Volume B.

Each section within this chapter identifies the methodology and assumptions and existing conditions, along with a summary of impacts and suggested mitigation measures.

The preferred sand extraction area for the Sunshine Coast Airport (SCA) Expansion Project (the Project) is Spitfire Realignment Channel, located in Moreton Bay approximately 7.5 km east of Woorim. **Figure 6.1a** shows the location of the sand extraction area.

The Spitfire Realignment Channel is an area of proposed dredging by the Port of Brisbane Pty Ltd (PBPL), which once complete, would remove a dogleg from the existing shipping channels, resulting in a channel that would ultimately be 500 m wide and to a depth of -16.5 m Chart Datum (CD). PBPL has a 15 M m^3 allocation to dredge the realignment channel for use as fill.

The triangular area enclosed by the existing Spitfire Channel and the Spitfire Realignment Channel is covered by an approved allocation for Riverside Sand Pty Ltd.

SCA has been in consultation with PBPL to identify opportunities for a combined sand extraction area at the Spitfire Realignment Channel for the Project and PBPL's current allocation. PBPL has indicated a preference for a shared dredging footprint that would be extended deeper than PBPL's current approved dredging footprint, rather than wider. As dredging for the Project is likely to occur before PBPL undertakes any major dredging of the realignment, PBPL have indicated that it would be preferable for the SCA dredging to form a shallow 300 m wide channel within the overall realignment channel footprint. This may then allow the realignment to be used for navigation by some vessels.

Based on bathymetry of the seabed surveyed in 2010, a 1.1 M m^3 allocation would provide a 300 m wide channel to an average depth of approximately -11.55 m CD. The final level would depend on any prior dredging undertaken by PBPL and the quality of sand within the footprint.

To develop a combined extraction area of 16.1 M m^3 (i.e. PBPL's 15 M m^3 allocation and 1.1 M m^3 for the Project) the base of the realignment would need to extend to approximately -17.05 m CD. Extraction within the combined area would involve dredging in Holocene deposits only.

6.2 NON-INDIGENOUS CULTURAL HERITAGE

This non-Indigenous cultural heritage (NICH) section considers the Project activities in the sand extraction area at the Spitfire Realignment Channel (see **Figure 6.1a**).

Recommendations for management of assessed sites are provided, as well as a process for the management of potential NICH within the sand extraction area.

This section includes:

- A review of NICH heritage databases and registers, existing studies, publications and reports with relevance to the Project area
- The nature of cultural heritage significance and sites noted during the course of the desk based review
- Specific management and mitigation recommendations for the identified NICH
- Specific management recommendations for additional NICH sites and places which potentially exist within the Project area and which have not, to date, been assessed and/or identified as requiring assessment.

6.2.1 Methodology and assumptions

The following methodology was employed to assess the potential impacts to NICH.

6.2.1.1 Desktop assessment

A desktop assessment was undertaken to determine the existence, extent and probable levels of significance of any places likely to be located within the sand extraction area. This assessment comprised searches of statutory and non-statutory registers and databases, and a review of existing published and unpublished reports, of the sand extraction area and its immediate surroundings.

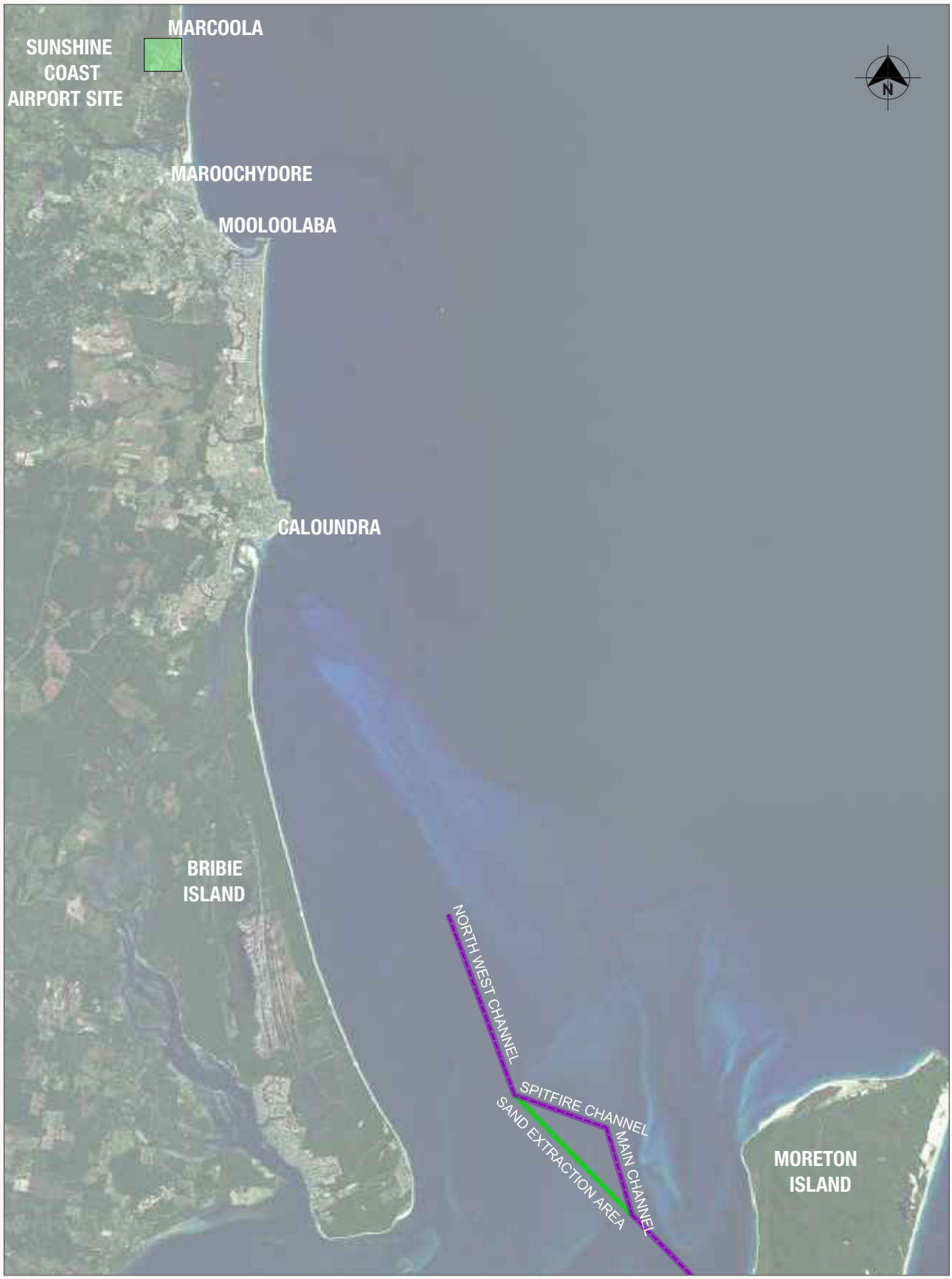
Consultation with relevant stakeholders was conducted as part of the research for the NICH assessment.

6.2.1.2 Significance criteria

Determining the significance of a heritage place, item or site requires research to enable an understanding of its value or level of importance. Assessments of heritage significance for this assessment were based on an understanding of the place's history together with the physical analysis (field survey) and an appreciation of the comparative level of rarity or representative that the site possesses. In Queensland, heritage practitioners rely on two key documents to undertake significance assessments: The Burra Charter of Australia International Council on Monuments and Sites (Australia ICOMOS) and the *Queensland Heritage Act 1992* (QH Act).

Chapter B11 in Volume B provides a discussion of the significance criteria for NICH.

Figure 6.1a: Location of the sand extraction area in Moreton Bay



6.2.2 Policy context and legislative framework

A detailed discussion of the policy context and legislative framework for NICH are provided in Chapter B12 in Volume B.

Legislation specifically relevant to the marine environment is the *Historic Shipwrecks Act 1996*. Other legislation generally related to NICH in the marine environment is described in Chapter B12.

Historic Shipwrecks Act

The Historic Shipwrecks Act 1996 (Cwth) (HSA) applies to all Australian waters from the low tide mark to the edge of the continental shelf. The Act is administered in collaboration with the States, Northern Territory and Norfolk Island. In Queensland, the Act is administered by the Department of Environment and Heritage Protection (DEHP). The provisions of the *Queensland Heritage Act,* in conjunction with the HSA, provide protection for all shipwrecks and associated artefacts which are at least 75 years old. It applies to all wrecks located along Queensland's open coast, bays, lakes and inland waterways.

The aim of the Acts is to maintain shipwrecks and associated artefacts for recreational, scientific and educational purposes through controlling actions which may result in damage, interference, removal or destruction of them or any associated relics. The Australian National Shipwreck Database (ANSDB) of historic shipwrecks and relics is maintained by the Australian Government.

Some of the sites on this register were entered prior to the 'advent of GPS and/or based on historic research. Not all reported sites' information and locations have been verified.

6.2.3 Existing conditions and impact assessment

The Spitfire Realignment Channel is not listed on any heritage register or database for NICH (historical heritage) significance.

As illustrated in **Figure 6.2a**, no shipwrecks are located in the route to be taken by the dredge vessel, which is shown on **Figure 6.2b**. The nature and level of impact on known NICH by the Project is negligible.

Two non-historical shipwrecks are known to occur in the area: the *Dana Marea* and *Just Cruisin'*. The *Dana Marea* was a wooden, two-masted ketch that ran aground offshore from Bribie Island in November 1965. *Just Cruisin'* was a cruiser that was reported lost in 2001, and the wreck was later found at Spitfire Banks.

The Historic Shipwrecks Act affords protection to wrecks older than 75 years. Neither the *Dana Marea* nor *Just Cruisin'* are historic shipwrecks, and therefore not protected under the Act. Moreover, neither the *Dana Marea* nor *Just Cruisin'* are within the sand extraction area of the proposed travel route to the pump-out site; consequently, neither wreck is expected to be affected by or affect the proposed sand extraction operations for the Project.

6.2.4 Mitigation measures

The NICH management recommendations have been incorporated into the Dredge Management Plan (DMP) to mitigate Project impacts on unidentified NICH material/sites that might be found during the dredging (see Chapter E4 – Dredge Management Plan).

Figure 6.2a: Shipwrecks along Sunshine Coast (ANSB 2013)

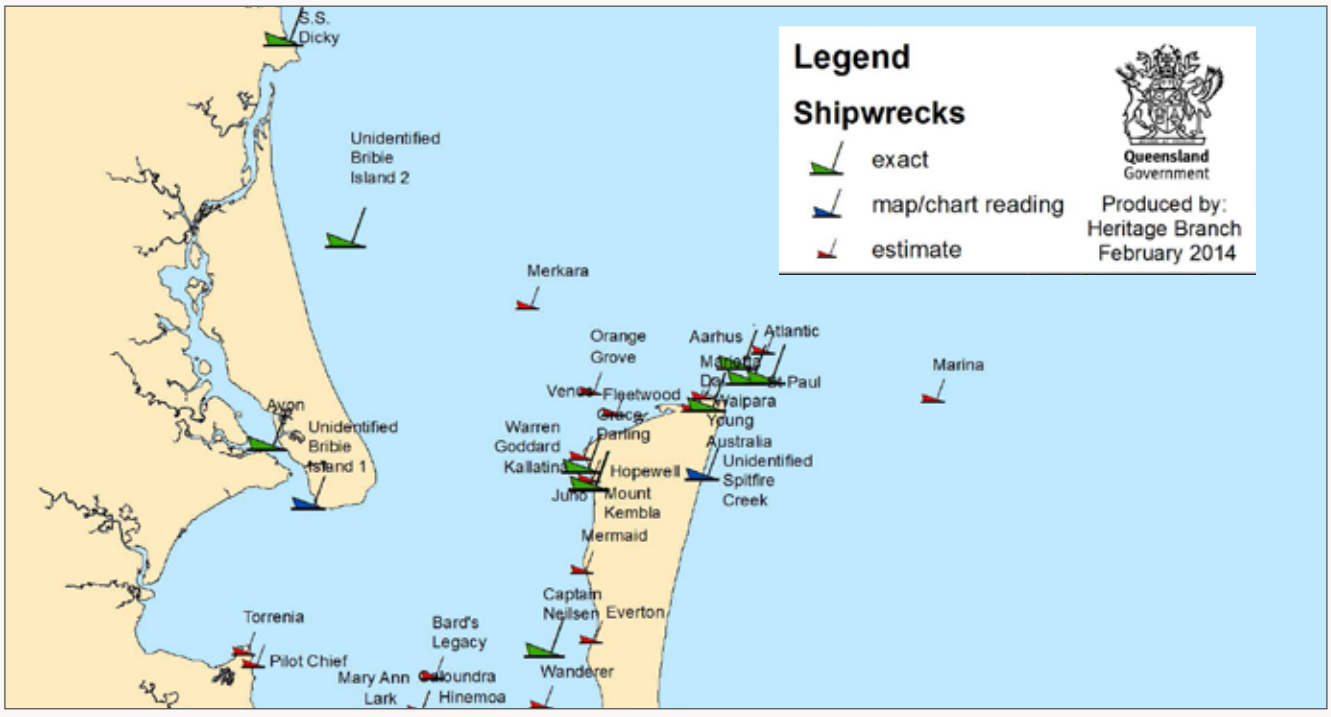
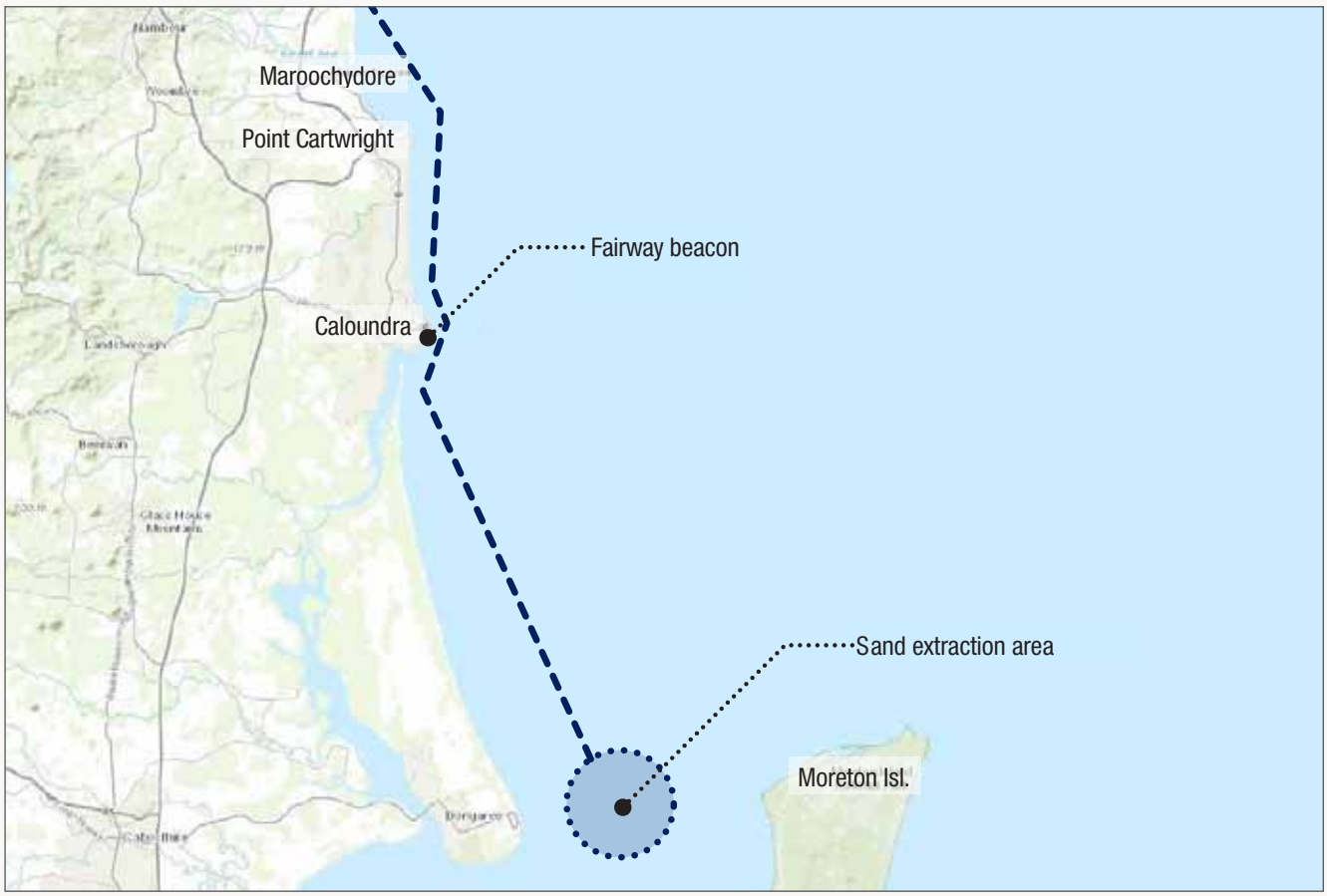


Figure 6.2b: Proposed dredge vessel route between Spitfire Channel and Marcoola



6.3 INDIGENOUS CULTURAL HERITAGE

Following an initial assessment of Indigenous Cultural Heritage (ICH) in the Project area, it was apparent that ICH issues could arise during the course of the Project. In addition, Part 7 of the *Aboriginal Cultural Heritage Act 2003* (ACH Act) requires the development and approval of a Cultural Heritage Management Plan (CHMP) with the relevant Aboriginal Party(ies) if a project is conducting an EIS process.

The development of CHMPs will continue after the finalisation of the EIS.

6.3.1 Methodology and assumptions

An understanding of the landscape, especially in the pre-contact period, is essential to a discussion of the context of ICH. To inform an understanding of the landscape and its relationship to ICH, it is necessary to understand what is currently known about this area. The methodology for this study was therefore founded on contextual research which consisted of searches of relevant State registers and databases, historical literature and other sources, such as previous cultural heritage reports of the area. The assessment provides an analysis of the landscape context in which cultural and social events have occurred in the past and assists in understanding whether ICH is likely and what form it might take, and includes a description of all ICH, any significant Aboriginal areas and significant Aboriginal objects, appropriate recommendations for management, and other aspects that the Party(ies) to the CHMP may regard as important.

6.3.2 Policy context and legislative framework

6.3.2.1 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act is the key national heritage legislation and is administered by the Commonwealth Department of Environment. The 2004 amendments to the EPBC Act established the Commonwealth and National Heritage Lists.

Following from the Burra Charter's ethics, Section 528 of the EPBC Act defines the 'heritage value' of a place as including the place's natural and cultural environment having aesthetic, historic, scientific or social significance, or other significance, for current and future generations of Australians. The EPBC Act covers both Indigenous and non-Indigenous cultural significance. Section 10.03A of the EPBC Regulation defines nine Commonwealth Heritage criteria for evaluating, identifying and assessing the Commonwealth Heritage values of a place.

The Burra Charter 1999

In 1999, Australian ICOMOS defined a Charter for Places of Cultural Significance, this became known as the Burra Charter. Although not codified in law, the Burra Charter is the foundation document upon which Australian cultural heritage management best practice is based.

Using the Burra Charter as a reference base, scientific significance of an area or object is assessed according to its research potential and representativeness. Archaeological research potential refers to a site's ability to provide information on past human activities, particularly everyday life, which more often than not is not available in documentary sources. Representativeness refers to the ability of one site or a sample of sites to represent as accurately as possible the range and frequency of site types in a particular area. The notion of representativeness is also related to the maintenance of site diversity: the rarer a site, the greater its significance.

Native Title Act 1993

The Native Title Act 1993 (NT Act) provides statutory protection for native title wherever it continues to exist over land or waters. It is a blanket protection created by rendering any activity affecting native title after 23 December 1996 invalid at law unless the activity is covered by one of provisions in Part 2, Division 3 of the NT Act. The NT Act also contains a statutory process to enable the formal recognition of native title rights wherever they exist. That process involves a traditional owner group filing a native title claim with the Federal Court of Australia. Hence the claim process is a legal proceeding of the Court, albeit with a range of special features specific to native title proceedings. At the end of what can be a long and complex statutory process (the "claim process"), the Court may finally determine the extent of native title rights by deciding whether native title in respect of the claimed area exists or not and the extent of rights associated with it.

Where a traditional owner group makes a native title claim, the group is technically referred to as the "native title claim group". At the beginning of the claim process, at the 'authorisation meeting', the native title claim group authorises specific persons from its number to be listed as the applicants for the claim and who are to undertake the claim on group's behalf. For the purposes of the claim process, those persons are called the "applicant". Under the NT Act, it is the task of the National Native Title Tribunal (NNTT) to consider at an early stage in the claim process whether the claim is to be "registered" (i.e. entered on the NNTT's register of native title claims). Where a claim is registered, the claim is called a "registered native title claim" and the applicant, when referred to in the context of native title, is technically called the "registered native title claimant".

Until a native title claim is determined by the Court one way or another, it is generally assumed that native title could continue to exist (and hence could be affected by activities). Only in respect of a particular parcel of land where it can be shown that native title has previously been completely extinguished at law, can it be said with absolute legal certainty that native title does not exist. Hence activities that may affect native title in non-extinguished areas require assessment irrespective of whether the location is currently subject to a native title claim or not.

SCA may in future undertake activities with respect to land which may affect native title. Third parties (including the State of Queensland and other government authorities), may undertake activities at the request of, or for the benefit of, a proponent which also affect native title. These activities are termed 'future acts' under the NT Act. The NT Act creates certain statutory notice and/or procedural rights which the proponent of a future act may need to satisfy depending on which of the native title compliance options applies. Different procedural rights apply to different options.

In Queensland, the registration of a native title claim pursuant to the NT Act is used by the ACH Act to determine who the Aboriginal party is for an area of land. This is discussed below.

In addition to the above-mentioned legislation, the following national legislation is relevant to heritage:

The Australian Heritage Council Act 2003 (AHC Act) provides for the establishment of the Australian Heritage Council, which is the principal advisory group to the Australian Government on heritage matters. This Act also provides for registration of places, including those of Indigenous origin, considered of national significance on the Australian Heritage Places Inventory (AHPI), the National Heritage List (NHL) and the Commonwealth Heritage List (CHL).

6.3.2.2 State legislation

In Queensland, the assessment of significance for ICH is guided by the ACH Act and its gazetted guidelines. The ACH Act acknowledges in its fundamental principles that 'recognition, protection and conservation of Aboriginal cultural heritage should be based on respect for Aboriginal knowledge, culture and traditional practices' (Section 5(a)) and that 'Aboriginal people should be recognised as the primary guardians, keepers and knowledge holders of Aboriginal cultural heritage' (Section 5(b)). These principles are implied in the ACH Act's definition of Aboriginal cultural heritage, which is defined as anything that is 'a significant Aboriginal area in Queensland; or a significant Aboriginal object; or evidence, of archaeological or historic significance, of Aboriginal occupation of an area of Queensland' (Section 8). A significant Aboriginal area or object is defined as an area or object of 'particular significance to Aboriginal people' because of Aboriginal tradition or the history, including contemporary history, of any Aboriginal party in the area (Sections 9 and 10).

A registered native title claimant is given special legal status as the party to be dealt with in respect of ICH, known as Aboriginal cultural heritage under the ACH Act, and is deemed by law to be the "Aboriginal Party" in respect of all land and waters within the external boundaries of the registered native title claim.

The application of significance is ultimately the responsibility of the Aboriginal Party, who may have regard for 'authoritative anthropological, bio-geographical, historical and archaeological information' provided by a person with skills in that area. For this reason, the assessment of significance may be achieved by an amalgamation of both scientific and cultural approaches.

Under the ACH Act, Aboriginal cultural heritage includes areas and objects where there may be no physical manifestation of human use, but that are culturally significant to Indigenous people. It also includes places of archaeological or historical significance. Notably, under the ACH Act significant cultural places are not restricted to the period prior to contact with non-Indigenous people and may include places and events that date from contemporary history. In particular, if such events relate to a specific place in the landscape, then that place (i.e. a site in archaeological terms, or an area or object in accordance with the ACH Act) may become significant to the Indigenous communities connected to it.

Importantly, an assessment of the levels of scientific significance of a particular object or place is not always consistent with Indigenous people's cultural evaluations, and as such, under the ACH Act, Indigenous cultural values of an area or object override other forms of significance assessment.

6.3.3 Existing conditions

Moreton Bay, the area from where fill will be sourced, is a bay with early Holocene and Pleistocene deposits in the sea bed. The geology of the sand extraction area is predominantly sand, mainly Quaternary tidal delta deposits, brought up the coast from New South Wales. This sand is the same that forms the offshore sand islands such as North and South Stradbroke, Bribie, Moreton and Fraser Islands.

Indigenous cultural heritage in Moreton Bay is of relevance to this Project because of the proposed location of the sand extraction area. Archaeological studies have revealed that Indigenous people occupied the area that later became Moreton Bay during the Pleistocene, when sea levels were up to 180 m lower than today and the coastline was up to 40 km east of where it is today.

6.3.3.1 Changing sea levels

Hall (1999) discussed the archaeology and changing sea levels of Moreton Bay. **Figure 6.3a** shows the interpolated sea levels at different times since Last Glacial Maximum (LGM) at 18,000 before present (BP). The Spitfire Realignment Channel, between the southern end of Bribie Island and the northern end of Moreton Island, is located in what was coastal plain at LGM in **Figure 6.3a**. A paleo-river that formed at the confluence of Kedron Brook, the Brisbane and Pine Rivers can be seen running out to sea north of Moreton Island at around 12,000 BP. By 9,000 BP this paleo-river had widened, forming an estuarine environment.

The northern part of Moreton Bay was inundated fairly rapidly over the next thousand years. Inundation continued with a stillstand (period of geological time) at about 6,000 BP being 1 – 2 m higher than current sea level, after which the sea level dropped back to modern levels. This estimate has recently been revised to about 7,000 BP for stillstand (Lewis et al 2008).

Figure 6.3a demonstrates not only the changing nature of sea levels in Moreton Bay, but also demonstrates that by 8,000 BP, the proposed sand extraction area at Spitfire Realignment Channel had been inundated. In the 10,000 years preceding this, following LGM, the area had been in a widening riverine fringe. However, this scenario does not preclude the possibility of archaeological material being found in this area. It is well known from archaeological environments that the range of resources associated with the banks of rivers were attractive to hunter-gatherer groups, such as those who would have inhabited the Moreton Bay basin during this time period. With the temperatures rising after LGM, and the combination of riverine and marine resources at no great distance, it is likely that this would have been an attractive environment for people.

Excavation of a stratified site at Wallen Wallen Creek on Stradbroke Island in the 1980s revealed a continuous occupation sequence from the Pleistocene through to the Holocene (Neal and Stock 1986). Occupation intensified during the late Holocene, which matches occupation patterns at other sites throughout Queensland and Australia. Dates cover the range 20,000 to 1,000 BP, with no significant hiatus of occupation (Neal and Stock 1986:619).

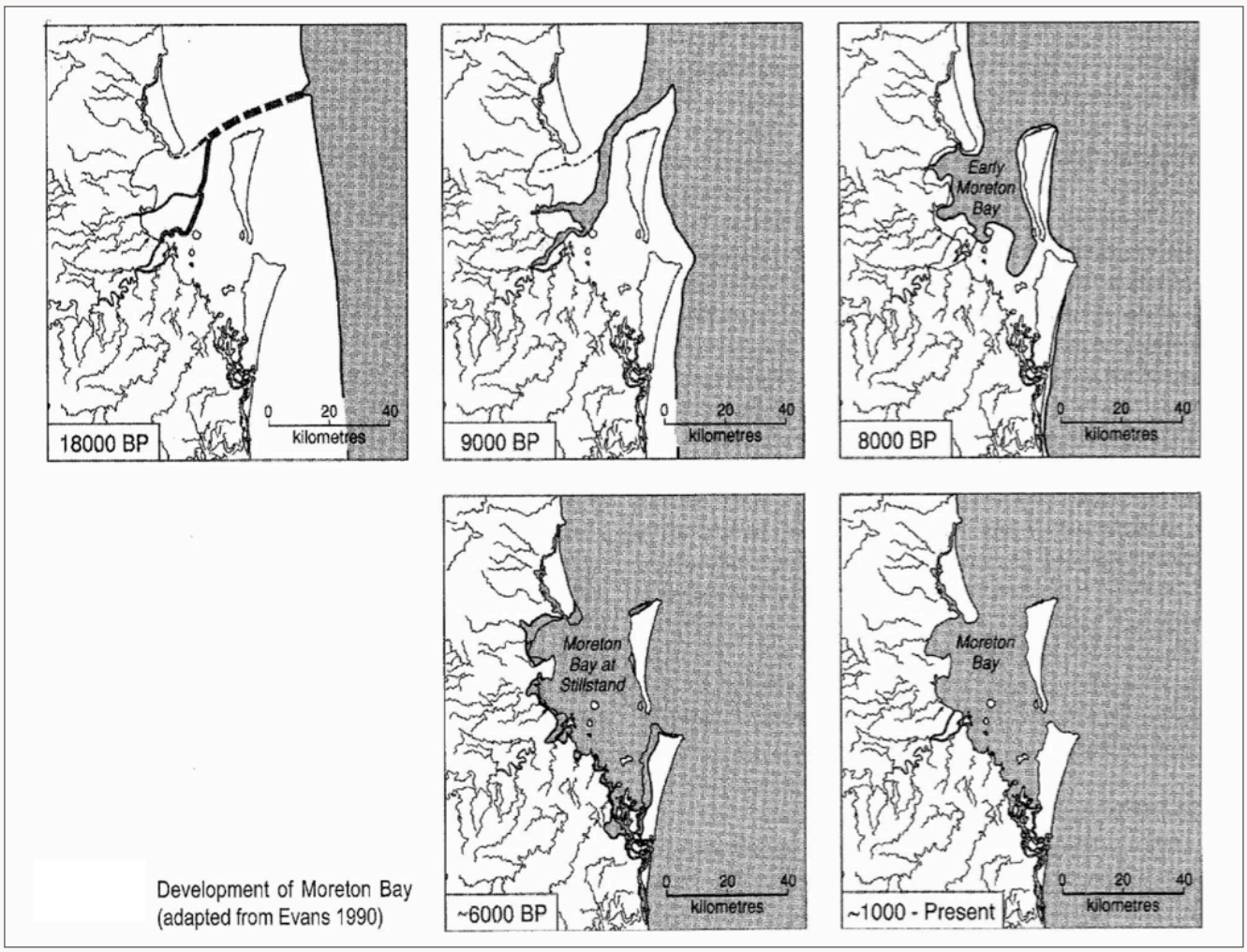
High quality raw material for stone tools occurs only within the Pleistocene deposits and is absent from the Holocene deposits, suggesting that by this time the high quality stone resources were no longer accessible, perhaps through inundation (Neal and Stock 1986). Occupation at Wallen Wallen Creek suggests that the range of resources available in this area attracted human settlement.

6..3.3.2 Deposition of sediment

Another factor influencing the likelihood of encountering archaeological material during dredging is the deposition of sediment. As stated above, paleo-rivers ran across what is now Moreton Bay during the Pleistocene and early Holocene. These paleo-rivers filled and widened throughout the early to mid-Holocene, forming the bay. The rivers are also responsible for transporting sediments, which are deposited in the bay. The Brisbane River in particular deposits significant amounts of sediment into Moreton Bay. Estimates range from 300,000 to 450,000 tonnes of sediment per year being carried by the Brisbane River (Marston 2000, Hancock 2001). Events such as the January 2011 floods are estimated to have increased this figure to around 10,000,000 tonnes.

Most of the river-borne sediment is deposited in the western parts of Moreton Bay (Hancock 2001). This sediment does not have a large effect on the Spitfire Realignment Channel. The eastern parts of Moreton Bay, particularly between Bribie and Moreton Islands, are affected by tidal delta sand, which is brought in from the sea, having been carried up the coast from New South Wales (Jones 2005). It is this sand which has a large impact on the southern coast of Queensland and which is responsible for the formation of the sand islands, including North and South Stradbroke, Moreton and Fraser Islands (Jones 2005).

Figure 6.3a: Changing sea levels in Moreton Bay (Hall 1999:171)



Willmott and Stevens (2005) demonstrated that the tidal delta sand in the north-eastern section of Moreton Bay and, most importantly, in the Spitfire Realingment Channel, originates in the river sand deposited along the northern New South Wales coast and carried northwards by the ocean currents. Large amounts of sand are deposited at the Spitfire Banks. This area has been dredged for other projects, such as extensions to Brisbane Airport (Archaeo 1998). It has been found that sand is redeposited quickly in areas that have been dredged.

The deposition of sediments over the former land areas under Moreton Bay means that dredging, which will be restricted to deposited sand, is unlikely to disturb cultural heritage material, even though such material may remain on the original land surface below deposited sand.

An assessment of sand depths at the sand extraction area (refer Chapter C2) indicates that the ultimate dredge footprint would be above the sediments deposited during the Pleistocene.

6.3.3.3 Register searches

Searches were conducted of the World Heritage List (WHL), National Heritage Register and State Register of ICH.

No ICH was listed for the sand extraction area. However, the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (DATSIMA) cautioned in their response that the lack of listed heritage did not necessarily mean that no heritage was present.

Further consultation with the Aboriginal Party will be undertaken during the CHMP program to confirm the existence of sites in the vicinity, should this be relevant.

6.3.3.4 Description of significance criteria

The ultimate determination of ICH significance lies with the Aboriginal Party. While ICH may be determined by scientific (archaeological) significance or by the assigning of tangible or intangible heritage values by the Aboriginal Party, ultimately the Aboriginal Party's evaluations take precedence.

Preliminary conclusions may be drawn from the desktop study reported here. However, the final assessment will require both consultation with the Aboriginal Party and a field survey and report conducted by the Aboriginal Party.

Protection, management and mitigation measures will be discussed and incorporated into the cultural heritage survey report, following completion of the survey.

The CHMP will give directions on agreed and appropriate protection, management and mitigation measures for ICH.

Scientific criteria of significance include the nature of the site, using measures such as extent, time, depth and activities present. In all cases the criteria defined by the Burra Charter are the starting point for assigning scientific significance.

6.3.4 Summary of impacts

Following assessment of ICH in the Project area, it was apparent that ICH issues could arise during the course of dredging for the Project. In addition, Part 7 of the ACH Act requires the development of a CHMP with the relevant Aboriginal Party(ies) if a project is conducting an EIS process.

For the purposes of developing a CHMP, registration of the Kabi Kabi First Nation Claim provides certainty as to the Aboriginal party for those lands and waters falling within the registered claim area and are therefore deemed to be the Aboriginal Party for this area in accordance with Section 34 of the ACH Act. The Kabi Kabi First Nation Claim area does not include areas below the low water mark that fall within the sand extraction area (see Chapter B11). Consequently, for offshore areas it was necessary to publically notify SCA's intention to develop a CHMP in order to determine who should be endorsed for the purpose of developing the CHMP (in relation to offshore areas, only).

Given this scenario, the most appropriate course of action was to initiate consultation with the Kabi Kabi First Nation with a view to negotiating a CHMP in its schedules for the mainland section of the Project, and a separate CHMP for the sand extraction area which is outside the Kabi Kabi First Nation Claim. This process is now underway.

A cultural heritage survey may be undertaken by the Aboriginal Party if considered necessary. This survey would be used to inform the development of each CHMP. It would be the responsibility of the Aboriginal Party to identify ICH significance within the Project area and to assess the impact on the cultural heritage values that the Project would produce.

The CHMP(s) would contain the following, in accordance with Part 7 of the ACH Act:

- A process for including Indigenous people associated with the development areas in protection and management of Indigenous cultural heritage
- Approaches to avoid of harm to Aboriginal cultural heritage, or if harm cannot reasonable be avoided, to minimise harm
- The reasonable requirements and methodologies for carrying out cultural heritage surveys and preparing cultural heritage survey reports
- Processes to achieve acceptable protection, management or mitigation of potential harm to Aboriginal cultural heritage during both the construction and operational phases of the development
- Arrangements to ensure workplace health and safety requirements are observed during cultural heritage surveys and management or mitigation work programmes
- Arrangements for notification about Project activities and work programmes, including Project area access
- A conflict resolution process
- A new finds process, incorporating a clear recording process, to cover procedures for managing accidental discoveries of ICH
- A cultural heritage induction for Project staff
- A process for developing a cultural heritage awareness program, to be incorporated into the contractor/employee manual and induction manual. This would be in the form of a plain language, short document that is easy for contractors and staff 'on the ground' to understand.

DATSIMA's EIS Coordinator would be informed of the CHMP at its commencement, and the Chief Executive would be requested to approve it upon completion and execution. If the CHMP has not been approved when the EIS is submitted to the Coordinator-General, an outline of the draft CHMP that addresses management and protection strategies for cultural heritage, subject to confidentiality provisions, outlining the position of the relevant parties, as well as details of the proposed steps and timeframes for finalising each CHMP may be provided.

6.3.5 Suggested mitigation measures

The CHMP would seek to manage all aspects of ICH matters for the Project, including any appropriate mitigation measures. The development of mitigation measures would be informed by the context of the work (i.e. in this case dredging in Spitfire Realignment Channel) and the Aboriginal Party. These may range from avoidance of particularly sensitive ICH through to monitoring of Project works with recording, collection and removal of ICH, where appropriate.

Avoidance of harm to ICH would always be the first option to be examined, and would be practised where practicable. Where avoidance is not practicable, other mitigation measures would be implemented. In parts of the Project area identified as having a low risk of harm to ICH, such as Spitfire Realignment Channel, a new finds process would be implemented to prevent harm in the event of unexpected finds of ICH. It is also possible that the Aboriginal Party may wish Project staff to undergo cultural heritage awareness inductions.

6.4 SOCIAL IMPACT ASSESSMENT

This section addresses the social impact associated with dredging activities and the transport of dredged material to Marcoola via dredge vessel from the Spitfire Realignment Channel.

Spitfire Realignment Channel is listed by the Queensland Government as a major extractive industry site (Department of Natural Resources and Mines, 2012). The Moreton Bay Sand Extraction Study (MBSES) was undertaken between 2002 and 2005 to determine the amount of extractive resource that should be made available from the bay.

This report also commented on a number of social factors involved in marine based sand extraction. These included:

- Sand extraction activities may be visible from selected locations on Moreton and Bribie Islands; however the distances involved lessen the likelihood of visual impact
- Noise impacts from the dredging activities are not anticipated to be audible from the closest residential locations
- The existing shipping channel already accommodates a number of daily ship movements. Whilst the proposed activities will not introduce any new visual elements into the area, the frequency of trips (3 per day by one new dredge vessel) and duration of activities will be slightly different to those already occurring in the area
- There will be additional vessel movements during dredging
- There may be conflicts between sand extraction activities and the movement of commercial shipping. This will be managed through scheduling (see Chapter C5 – Shipping Traffic)
- Impacts to water based sports and swimming are expected to be negligible, as these activities are generally focused closer to land than the potential locations for sand extraction. (WBM Oceanics, 2002).

6.4.1 Dredge site

The sand extraction area is located within the General Use Zone of the Moreton Bay Marine Park, approximately 7.5 km from both the Bribie and Moreton Island coastlines. The suburbs of Woorim on Bribie Island and Bulwer and Cowan Cowan on Moreton Island are the closest inhabited land areas to the sand extraction area. Bulwer and Cowan Cowan have a population of close to 300 people each and Woorim has a population of close to 1,800 people (Australian Bureau of Statistics, 2013).

The existing shipping channel runs between Bribie and Moreton Islands as shown in **Figure 6.4a**. Ships currently travel along the shipping channel on a daily basis and previous dredging activity has already been undertaken by PBPL in the proposed Spitfire Realignment Channel. As outlined in the MBSES, activity in this area is a normal occurrence and the increase in activity during the nominal 14 week dredge campaign is not expected to have any significant social impacts for residents on Moreton or Bribie Islands.

Figure 6.4a: Existing shipping channels and proposed Spitifre Realignment Channel near Spitfire Banks

The MBSES highlighted that additional vessel traffic in the bay (created by the dredge vessel) may have some impact on other vessel movements. Dredging will take place within the realignment channel which is outside the current defined shipping channel. As discussed in Chapter C5, the expected inpacts to shipping traffic are negligible.

There is some evidence that this area is used for commercial and recreational fishing activity but it does not appear to be a key fishing area for anglers. Maritime Safety Queensland has recommended small craft routes within the port limits. These routes generally avoid the shipping channels and do not cross the proposed sand extraction area.

6.4.2 Vessel transit

The dredge vessel would follow the existing shipping channels in port-controlled waters from the Spitfire Realignment Channel until it reaches the Fairway Beacon off Caloundra. From Caloundra the vessel would leave the shipping channel and follow a safe navigation route to Marcoola Beach (**Figure 6.2b**), which is to be agreed in consultation with Maritime Safety Queensland.

The dredge vessel would add an additional vessel to the shipping channel for the duration of the dredge campaign, but shipping traffic passing alongside Bribie Island up to Caloundra is a daily occurrence and therefore, it is not expected to have a significant social impact.

Once the vessel leaves the shipping channel it would be operating in waters not generally used by large vessels for regular journeys. While the exact route the dredge vessel would take from this point has not yet been determined, the route will be required to have sufficient under keel clearance for safe passage and would avoid key areas of commercial or recreational activity.

6.5 VISUAL ASSESSMENT

The sand to be dredged from the Spitfire Realignment Channel would be transported by a dredge vessel to a pump-out site off Marcoola Beach and piped to the new runway site.

This section considers the visual assessment of the journey of the dredge vessel from the pump-out site to Spitfire Realignment Channel. The discharge of sand while the dredge is moored at the pump-out site off Marcoola is addressed in Volume B.

The dredge vessel transit route and sand extraction area are described in **Sections 6.4.2** and **6.4.1** respectively.

West of the sand extraction area, Bribie Island includes popular small beach communities and surf beaches. Moreton Island to the east is also a popular holiday destination, although less accessible and populated than Bribie Island.

The potential visual impacts of the dredging are associated with operations during the day and at night, and will include a moving dredge vessel, and turbidity plumes in the water (the water quality and ecological impacts of the dredge plume are addressed in Chapters C3, and C4 respectively).

6.5.1 Methodology and assumptions

6.5.1.1 Methodology

The methodology for the assessment of visual impact is outlined in Chapter B17 – Landscape & Visual Impact Assessment and is not repeated here.

To assess visual impacts, two viewpoints were selected as representative views towards the dredging activities. These representative viewpoints are locations where a reduction in visual amenity may have some visual impact either because of the duration of the view (such as views from lookouts), the importance of visual amenity to the experience of the location (such as recreational areas) or where there are large numbers of potential viewers (such as busy roads). The location of these representative viewpoints is shown in **Figure 6.5a**.

Photographs have been taken from all locations during daylight hours. The visual impact from each representative viewpoint is evaluated in **Table 6.5e**.

6.5.1.2 Assumptions and technical limitations

The dredging will include:

- The dredge vessel will hydraulically extract sand mixed with water from the seabed in the Spitfire Realignment Channel and load it into the dredging vessel hopper
- The dredge vessel will travel the designated shipping channel to the extent of the port limits off Caloundra at Point Cartwright and then travel to the pump-out site
- The dredge vessel will be assisted by a tug at the pump-out site to position and couple to a floating pipeline
- The dredging works will nominally take 14 weeks, but could be up to 33 weeks, depending on the chosen dredge vessel predominately during the winter period where possible
- The dredging will occur for 24 hours a day
- It is anticipated the dredge vessel will be at the pump-out site for 2-3 hours before transiting back to the Spitfire Realignment Channel to recommence dredging
- It is anticipated that the dredge vessel will be approximately 120-180 m in length.

All field work was undertaken during the day. It is assumed that many locations are not accessed regularly at night such as beaches, parks and walking trails.

6.5.2 Policy context and legislative framework

A range of existing state, regional and local plans and policies provide the planning framework that applies to the use of land and development in the study area.

6.5.2.1 State planning and legislation

State Planning Policies establish the Queensland Government's position in regard to planning matters of State significance. They are applicable to development assessment, designation of community infrastructure and the making and amending of planning schemes across the State.

Figure 6.5a: Viewpoints used to assess visual impacts of dredging

South East Queensland Regional Plan 2009-2031

The South East Queensland (SEQ) Regional Plan guides regional growth and change within SEQ with the goal to protect and enhance quality of life. The regional plan is now managed by the Department of State Development, Infrastructure and Planning (DSDIP) and has been prepared in accordance with the *Integrated Planning Act 1997*.

Through the SEQ Regional Plan, Implementation Guideline 8: Scenic Amenity, (2007) the visual experience of using major transport routes is afforded additional priority. In this guidance, the protection of coastal landscapes, particularly ocean views, are identified as particularly important. Views to vegetated areas, particularly hillsides, are also highly valued. The visual exposure of roadside landscapes is also considered important to the image of SEQ and requires the protection of their scenic amenity and management within defined limits.

National Parks

The Mt Coolum National Park is centred on the visually prominent Mt Coolum which has a distinctive form and is a visual landmark on the Coast. It is located only a few kilometres to the north of the airport site.

The National Parks and Wildlife Services Plan of Management for the Park includes the following description …

> *"Mt Coolum, bounded on all sides by either precipitous cliffs or very steep slopes, is an Imposing local landmark. Rising 208m above the flat coastal plains, the mountain is a drawcard for visitors. The summit provides panoramic views of the area, extending from Moreton Island to the south-east. Buderim and the Glass House Mountains to the south, the Blackall Ranges to the west, the Cooloola sand mass to the north and the Pacific Ocean to the east". (http://www.derm.qld.gov.au/parks/mount-coolum/index.html)*

On their website, the Department of Environment, Resources and Mining indicates that this place has landscape significance to the indigenous people of the Coast, *"…Mount Coolum is significant to the Gubbi Gubbi people and features in stories about the way the landscape was formed."*

Mt Coolum National Park is designated under the *Nature Conservation Act, 1992* as a national park and will be managed in accordance with s17.1 of the Act which sets out principles for management. *"…to present the area's cultural and natural resources and their values"*.

6.5.2.2 Local planning policies

Sunshine Coast Planning Scheme 2014

The Sunshine Coast Planning Scheme 2014 has been prepared in accordance with the *Sustainable Planning Act 2009* as a framework for managing development in a way that advances the purpose of the Act. In seeking to achieve this purpose, the planning scheme sets out the Sunshine Coast Council's intention for the future development in the planning scheme area over the next seventeen years to 2031. The planning scheme seeks to advance state and regional strategies, including the State Planning Policy, and the South East Queensland Regional Plan 2009-2031 through more detailed local responses taking into account the local context.

The strategic framework sets the policy direction for the planning scheme area and forms the bases for ensuring appropriate development occurs for the life of the planning scheme. The strategic framework defines a series of themes that respond to the strategic intent of the framework. These themes include:

- Settlement pattern
- Economic development
- Transport
- Infrastructure and services
- Natural environment
- Community identity, character and social inclusion
- Natural resources
- Natural hazards.

The themes of particular relevance to this Project and the associated 'Special Outcomes' have been captured in the following sections.

Settlement pattern – *Character, lifestyle and environment attributes – specific outcomes*

"…(a) The character, lifestyle and environment attributes of the Sunshine Coast are recognised as essential contributors to the region's natural (competitive) advantage by:

(i) protecting and enhancing the natural environment and undeveloped rural and coastal landscapes that create large, uninterrupted and diverse areas of open space which weave throughout the region and define the boundaries of urban and rural residential areas;…"

Economic Development – Tourism and tourism focus areas – specific outcomes

"… To support the preferred pattern of settlement, development provides for tourist oriented activities and services to be concentrated within the tourism focus areas (as shown in **Table 6.5a***) ."*

Community identity, character and social inclusion – *Landscape elements and features – specific outcomes*

"…(d) Scenic routes are protected and enhanced as major transport routes providing a high level of scenic and visual amenity to travellers.

(e) The prominent landscape features identified (captured in **Table 6.5b***) Regionally significant landscape features) and important views to these features are protected from intrusion from buildings and other aspects of urban development.*

(f) The landscape features contained within National Parks, Conservation Parks, State Forest Reserves and other areas of conservation estate are protected.

(g) Other views and vistas, including those identified in local plans or which are important in a local context are also protected, particularly from development which exceeds specified building heights.

(h) Development maintains and where possible and appropriate, enhances public access to landscape features…."

6.5.3 Existing conditions

The character of the landscape north of the airport is dominated by the broad plains of the South Maroochy River that meanders inland to the west, connecting the Maroochy Wetland Sanctuary and Mt Coolum National Park to the sea. The river plains have historically been used for sugar cane farming due to their rich fertile soils and flat topography. These plains, like many others, are prone to flooding and have seen considerable change over the past few decades due to rapid population growth, development and activities unrelated to sugar cane farming.

Encircling the South Maroochy River plains are a number of mountains which are scattered across the plains. These visually iconic features are distinctively characteristic of the Sunshine Coast region and are volcanic land formations. Rising prominently to the north is the iconic Mt Coolum, which includes recreational trails terminating in panoramic regional views. Rising abruptly to 208 m, Mt Coolum has a dome shape that covers approximately 1 km square at its base. One of the most notable features of the mountain

Table 6.5a: Tourism focus areas

Tourism focus areas	Location
Coastal tourism focus areas Areas within the coastal urban area accommodating a concentration of visitor accommodation and related tourism services.	(i) Alexandra Headland (ii) Bokarina Beach (iii) Bulcock Beach and Kings Beach ***(iv) Coolum Beach*** (v) Cotton Tree and Maroochydore (vi) Golden Beach ***(vii) Marcoola/Mudjimba*** (viii) Mooloolaba (ix) Twin Waters (x) Yaroomba (Palmer Coolum Resort and Sekisui House Beachside).

Table 6.5b: Regionally significant landscape features

Tourism focus areas	Location
Mountains, ridgelines, escarpments and foothills	• Blackall Range • Conondale Range • Mooloolah Range • Glass House Mountains • Mount Coolum • Mount Eerwah • Mount Emu • Mount Mellum • Mount Ninderry • Mount Peregian • Peachester escarpment • Maleny escarpment • Buderim escarpment
Waterways	• Mary River • Maroochy River • Mooloolah River • Pumicestone Passage • Stanley River

Tourism focus areas	Location
Water bodies	• Cooloolabin Dam • Ewen Maddock Dam • Lake Baroon • Wappa Dam • Lake Weyba
Other landscape elements	• Beaches • Parabolic high dunes • Coastal headlands • Islands, particularly Mudjimba Island and Bribie Island • Ocean

geology is the striking columnar / crystal jointing patterns clearly visible both on the main cliffs and the faces of what is a former quarry. The visual setting of this mountain is sensitive as a regionally important iconic landscape and National Park.

Further south, bands of dunal vegetation, residential apartments and resorts line the coastline with extensive panoramic views from the coastal beaches, including Marcoola, Mudjimba and Alexandra Headlands to the north, extending down to Moffat, Shelly and King's Beach to the south.

Bribie Island, a major sand island separated from the mainland, is situated west of the sand extraction area. The island is dominated by Bribie Island national park, offering tidal wetlands and extensive recreational activities. The residential areas of Banksia Beach, Bellara and Bongaree are located on the south-west boundary of the island with access to Bribie Island Road, providing a connection to the mainland. The residential and tourist area of Woorim, located on the south-east point of Bribie Island, offers extensive unobstructed coastal views to the ocean from the coastal beaches.

6.5.4 Impact assessment

6.5.4.1 Description of significance criteria

The significance criteria were used to assign a level of impact listed in **Table 6.5c**.

6.5.4.2 Assessment of potential impacts and mitigation measures

The dredging operations that may be visible are as follows:

- Dredging in Spitfire Realignment Channel and the associated turbidity plume
- Dredge vessel travelling between Spitfire Realignment Channel and the pump-out site off Marcoola Beach.

Note that the visual implications of dredge operations at the pump-out site (as sand is discharged from the vessel) are assessed in Volume B, Chapter B17.

The following assessment identifies visual impacts from two representative viewpoints (**Figure 6.5b** and **6.5c**). Mitigating measures and the residual environmental impacts are discussed at the end of this section.

6.5.4.3 Mitigation

Apart from views from Marcoola Beach, the identified impacts are generally negligible for this portion of the Project. The impacts to Marcoola Beach are primarily a result of the sensitivity of the view combined with the proximity of the dredging activity to the viewer. As the process of dredging has minimal opportunity for flexibility in the process and its design, there have been no mitigation measures identified for Marcoola Beach or Woorim Beach.

6.5.5 Summary and conclusions

Table 6.5d summarises the visual impacts identified for the Project and **Table 6.5e** summarises aspects of each view in relation to the Project.

From most viewpoints towards the ocean near Marcoola, large vessels are seen on the horizon using the shipping lanes. The introduction of the dredge vessel will be generally consistent with the character of this existing activity. The most notable visual impact caused by the dredging activity will be experienced from views at Marcoola Beach. From this location the dredge vessel will be seen at a much closer location to the beach than existing shipping activity.

The scale and proximity of this activity will therefore result in a noticeable reduction in the amenity of views across the ocean from Marcoola Beach and result in a moderate adverse visual impact. However, the construction works are considered to be of a transient nature and as such, the moderate impact would be intermittent during the dredging, specifically whilst the dredging vessel is stationary at the pump-out site and whilst navigating towards and away from the viewpoint.

Table 6.5c: Definitions of impact significance criteria

Very high	These impacts are considered critical to the decision making process. They tend to be permanent, or irreversible, or otherwise long term, and can occur over large scale areas. Environmental receptors are extremely sensitive, and/or the impacts are of national significance.
High	These impacts are likely to be of importance in the decision making process. They tend to be permanent, or otherwise long to medium term, and can occur over large or medium scale areas. Environmental receptors are high to moderately sensitive, and/or the impacts are of State significance.
Moderate	These impacts are relevant to decision making, particularly for determination of environmental management requirements. These impacts tend to range from long to short term, and occur over medium scale areas or focused within a localised area. Environmental receptors are moderately sensitive, and/or the impacts are of regional or local significance.
Minor	These impacts are recognisable, but acceptable within the decision making process. They are still important in the determination of environmental management requirements. These impacts tend to be short term, or temporary and at the local scale.
Negligible	Minimal change to the existing situation. This could include for example impacts which are beneath levels of detection, impacts that are within the normal bounds of variation or impacts that are within the margin of forecasting error.

Table 6.5d: Summary of visual impacts

View Point	Location	Visual Sensitivity	Construction		Operation	
			Day	Night	Day	Night
1	Marcoola Beach	Regional	Moderate	Negligible	N/A	N/A
2	Woorim Beach, Bribie Island	Local	Negligible	Negligible	N/A	N/A

Views to the sand extraction area, such as views from the eastern beaches of Bribie Island, will include views to the dredging. Again, distance and a precedent of existing vessels using the shipping channel mitigates this impact somewhat, resulting in no perceived change in the amenity of these views.

Similarly, views from Moreton Island will have no perceived change in the amenity of views due to distance and the visual precedent of the shipping channel.

There would be limited lighting associated with night time dredging activity, and therefore the night time visual impacts are generally considered to be negligible.

Figure 6.5b: Viewpoint 1: Marcoola Beach

Figure 6.5c: Viewpoint 2: Woorim Beach, Bribie Island

Table 6.5e: Summary of viewpoints in relation to various aspects of the Project

VIEWPOINT 1: Marcoola Beach

LOCATION: View east from Marcoola beach.

Existing Visual Conditions

This viewpoint is representative of residents and tourists using the beach.

Unobstructed views to the ocean from Marcoola Beach. Mudjimba Island is visible to the south of the view, approximately 3 km off the coast.

Large ships are currently seen intermittently using the shipping lanes. Aircraft movement associated with the 12/30 and 18/36 runways are also visible overhead.

At night the view out to sea would only include lights associated with ships using the shipping lanes, seen on the horizon. Nearby, brightly lit coastal development to the south and residential areas to the north may create some sky glow.

Visual Sensitivity

Regional sensitivity

Marcoola Beach is considered to be of regional sensitivity and importance as a valued landscape feature and tourist attraction. The quality of the view is an essential part of this experience and highly valued by users. This viewpoint includes the attractive coastal feature of Mudjimba Island, a regionally significant landscape feature. SEQ Regional Plan, Implementation Guideline 8: Scenic Amenity, identifies the protection of the coastal landscape, particularly ocean views, as particularly important.

Visual Modification

Dredging

The dredge pump-out site would be seen located 0.5 - 1.0 km out to sea, and would be located in the background of the view. Three times in a 24 hour cycle a dredge vessel would be stationed at this point. From this location, the dredge vessel will be seen at a much closer location to the beach than existing shipping activity.

Lighting from the dredging vessel will be visible at night.

Operation

During operation, dredging activity would have ceased and any infrastructure associated with pump-out would have been removed.

ASSESSMENT

Dredging

During dredging activites there would be a noticeable reduction in the amenity of this view, resulting in a moderate adverse visual impact during the day. The construction works are considered to be of a transient nature and as such, the moderate impact would be intermittent during the dredging, specifically whilst the dredge vessel is stationary at the pump-out site and whilst navigating towards and away from the view point. This would produce no perceived change in amenity and a negligible visual impact during the night.

Operation

There will be no visible activity in the ocean during operation.

VIEWPOINT 2: Woorim Beach, Bribie Island

LOCATION: At a distance of approximately 7.5 km from Spitfire Realignment Channel. View east from the patrolled swimming beach.

Existing Visual Conditions

Unobstructed views to the ocean from the beach, with Moreton Island visible on the horizon. Vessels are visible using the shipping channel, traveling across the view at a distance of approximately 7.5 km.

At night the view out to sea would include lights associated with ships on the horizon, and any activity on Moreton Island's north-western beaches. Nearby, brightly lit coastal development behind the viewer may create some visible sky glow.

Visual Sensitivity

Regional sensitivity

Woorim Beach is considered to be of regional importance as a valued landscape feature and tourist attraction. The quality of the view is an essential part of this experience and highly valued by users. This viewpoint includes the Stradbroke Island in the background. SEQ Regional Plan, Implementation Guideline 8: Scenic Amenity, identifies the protection of the coastal landscape, particularly ocean views, as particularly important.

Visual Modification

Dredging

The dredge vessel may be visible in the vicinity of Spitfire Realignment Channel, with Moreton Island visible beyond.

At night there may be additional lights associated with the dredge vessel.

Currently there is a considerable amount of large vessel movement along the shipping channel, crossing this view. It is considered that the additional vessel movement would not change the visual character of this view.

Operation

There will be no visible activity in the ocean during operation.

ASSESSMENT

Construction

Although the dredging would be visible, there would be no perceived change in the amenity of this view, resulting in a negligible visual impact during the day and night.

Operation

There will be no visible activity during operation of the airport.