Initial and Concluding Analyses - Hay Point and Mackay

Priority Ports Master planning - Planning and Environment Analysis

Queensland Government Department of Transport and Main Roads

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Disclaimer

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PROJECT 311012-01182 - REP-002: Initial and Concluding Analyses - Hay Point and Mackay - Priority Ports Master planning - Planning and Environment Analysis

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Acknowledgement of country

Advisian acknowledges the Traditional Owners and Custodians of this country throughout Australia and their connections to land, sea and community. We pay our respect to their Elders past, present and emerging, and extend that respect to all Aboriginal and Torres Strait Islander people today. Advisian is committed to reconciliation among all Australians.

Executive summary

Initial analysis

The Queensland Government is advancing master planning for the Priority Port of Hay Point / Mackay in accordance with the *Sustainable Ports Development Act 2015* (Ports Act). The Department of Transport and Main Roads (TMR) is leading this work in collaboration with planning and development decision makers. The master plan will outline the long-term outlook for the future development of the Priority Port of Hay Point / Mackay consistent with the principles of ecologically sustainable development and in alignment with the Reef 2050 Plan. A port overlay will be the statutory instrument to ensure the master plan's outcomes are delivered across the master planned area.

The master plan process is founded on an evidence base which has been gathered to:

- Inform the preparation of the master plan by analysing the economic, environmental, cultural heritage and social values relevant to the priority port, including the Outstanding Universal Value (OUV) of the Great Barrier Reef World Heritage Area (GBRWHA)
- Identify long-term infrastructure, supply chain, and port development requirements
- Undertake an assessment of the regulatory framework to understand how impacts from development will be sustainably managed.

TMR developed a method to achieve consistency in what information on the environmental, social, cultural and economic values is relied upon, how regulatory gaps are identified and how port master planning tools' efficacy is verified. The method guides the process of identification, analysis and review of land use and environmental matters relevant to the master planning of priority ports, comprising three steps:

- Evidence gathering – collation of base information to be considered during master planning
- Initial analysis – preliminary analysis of the evidence base for risks, information gaps, and planning issues or risks to be managed
- Concluding analysis – analysis of the effectiveness of proposed master plan and port overlay measures developed in response to matters identified through the initial analysis.

Initial and concluding analyses are the focus of this report. Evidence gathering undertaken to support the master planning process, including the initial analysis, is presented in the Evidence Base Report prepared by TMR August 2022 for the Priority Port of Hay Point / Mackay (EBR). Concluding analysis was undertaken after the draft master plan and draft port overlay had been developed.

The initial analysis focused on the management of potential port-related development impacts (micro level impacts) by the existing regulatory frameworks operating in the study area. The analysis considered likely future development activities and associated potential impacts and was not centred on specific projects or development scenarios. It provided an assessment of whether potential impacts on identified values at or near the port are subject to the control of existing management measures i.e., existing legislative and planning instruments. Evidence with respect to infrastructure, port optimisation, forward planning and macro level impacts to port operations, such as external trade influences, was not considered in the initial analysis and is addressed separately in master plan and port overlay development (Figure E-1).

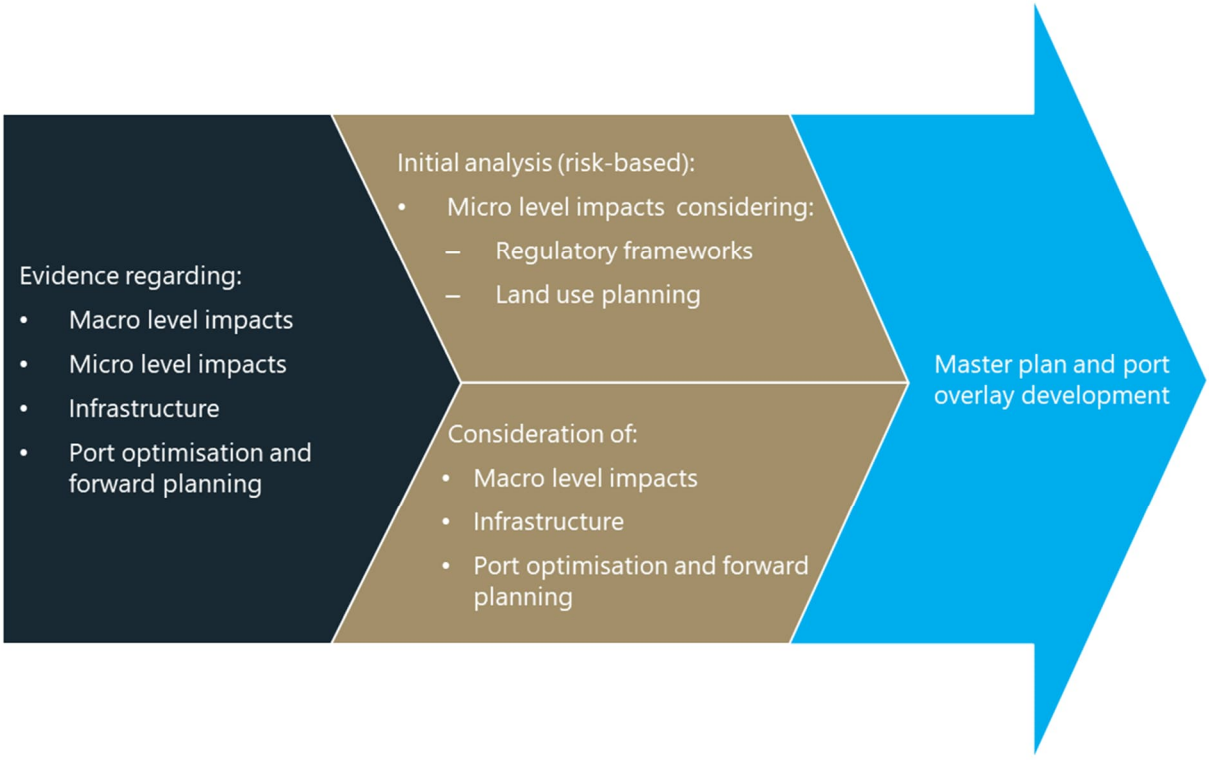

Figure E-1 Consideration of evidence base in initial analysis

The initial analysis applied a risk-based approach to identify matters that may need to be addressed in preparation of the master plan and port overlay (Figure E-2). The contribution of attributes to the OUV of the GBRWHA was flagged in the risk assessment table for each environmental value and was considered explicitly in the risk assessment.

The assessment of initial risk considered potential future development at the port including:

- Location of development with reference to values within the study area that may be impacted
- Types of development likely to be proposed in the study area and how these may impact values present.

Post-management risk analysis took account of existing management measures that may control risk associated with impacts to specific values.

Value	OUV	Potential impacts, threats or pressures	Development activities	Initial risk	Existing management measures	Post management risk	Matters for consideration	Summary conclusion

Figure E-2 Outline of risk assessment table considerations

There are several spatial planning instruments currently applied to land within the port area, including the Mackay Regional Council (MRC) Planning Scheme (MRC planning scheme) and the Land Use Plans (LUP) for the Port of Hay Point and the Port of Mackay.

The analysis assumed that development activities may occur on Strategic Port Land (SPL) at Hay Point or Mackay and surrounding areas, including land within the MRC planning scheme area. The analysis also contemplated potential impacts that may occur across the boundaries where relevant planning instruments interface e.g., development activities within the MRC planning scheme area with potential impact to future development within SPL, and vice versa.

Findings

There is a complex, comprehensive, and overlapping range of Commonwealth, Queensland and local government regulatory and policy instruments that are relevant to the Priority Port of Hay Point / Mackay. The application of this regulatory framework is of significant complexity due to:

- Jurisdictional overlap of instruments between the Commonwealth, Queensland and local governments
- Spatial overlap of instruments, including their application over both land and marine areas
- Need to balance management of economic, environmental, cultural and social values present.

Key management measures applicable to proposed development at the Port of Hay Point / Mackay are contingent on the development location, scope of activity and the values potentially impacted:

- Dependent on location and activity, new port development requires approval of land use under:
  - The LUP and associated port development guidelines for development within SPL
  - The MRC planning scheme for development within the MRC area
  - The GBRMP Act for development within the marine park.
- Dependent on activity and/or values potentially impacted, new port development will require:
  - Approval under the *Planning Act 2016*, with consideration of associated legislation and codes
  - Environmental Authority under the *Environmental Protection Act 1994*
  - Approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
  - Approval under the *Environment Protection (Sea Dumping) Act 1981*.

The Commonwealth, State, local government and port instruments regulate potential impacts from proposed development within their respective remit. They also complement each other to create a mesh able to regulate potential impacts from proposed development of various magnitude.

Application of existing management measures (i.e., the existing regulatory and planning framework) reduces the risk rating for all potential impacts to values present at the Priority Port of Hay Point / Mackay to 'low' except for:

- Potential impacts on environmental values at both ports due to climate change
- One post-management risk for the Port of Hay Point related to potential amenity impacts to neighbouring sensitive land uses.

Regulatory gaps – climate change

Impacts associated with climate change, such as elevation of ocean surface temperature, increasing ocean acidification, sea level rise and increased frequency and intensity of storm events and storm surge were identified as potentially impacting environmental values of marine and estuarine water

quality, coastal processes, marine plants and coral reefs. The post-management risk rating for potential impact to these environmental values was assessed as 'high' and 'medium' because:

- The contribution of new development to climate change-related threats is not addressed by any regulatory and planning instruments
- Several values at risk from climate change impacts are local attributes of the OUV of the GBRWHA, including diversity of seagrass, coral reefs, coral reef ecosystems, inshore fringing reefs, mid-shelf reefs, and exposed outer reefs, hard and soft corals, mangroves, and wetlands.

Relevant considerations for potential management of climate change-related impacts in master planning for the Priority Port of Hay Point / Mackay may include:

- The Commonwealth Government currently has a national commitment to net zero greenhouse gas emissions by 2050
- The Ports Act requires development of port master plans that establish a long-term vision for the future development of priority ports consistent with the principles of ecologically sustainable development, as defined in the EPBC Act.

Regulatory gaps – amenity at Port of Hay Point

The EBR identifies potential impacts to social values associated with the Port of Hay Point and surrounding areas. These include potential impacts associated with elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.

The post-management risk rating for potential impact to social values associated with amenity was assessed as 'medium' because there are some areas where sensitive land uses may be approved in future in the vicinity of SPL, thereby representing future amenity and reverse amenity impacts.

Gap analysis

With respect to the potential regulatory gap related to amenity at the Port of Hay Point additional analysis was undertaken focused on the specific areas potentially at risk and in consideration of:

- Location of the future port industry growth precincts
- Ownership of land parcels for land potentially at risk
- Application of existing management measures within the MRC planning scheme.

The gap analysis identified that the risk of new sensitive land uses being developed near the Port of Hay Point that may result in amenity or reverse amenity issues is likely to be very low due to the following:

- Land adjacent to the port is predominantly owned by North Queensland Bulk Ports Corporation (NQBP) as the relevant port authority, with NQBP continues to manage a voluntary property purchase program in the Louisa Creek area
- While current land use zoning may permit development of sensitive land uses, most land adjacent to the port is subject to MRC planning scheme overlays which provide a level of protection, with only a very small number of land parcels able to be developed for potentially sensitive land uses.

Geographical coverage

Through completion of the initial analysis, consideration was given to the geographical coverage of the master plan area. It was noted that no land use planning instruments relevant to the Priority Port of Hay Point address an area of mangroves and tidal flats on Sandringham Bay to the west of Dudgeon Point. This area receives surface water drainage from adjacent areas, most of which are regulated under the Port of Hay Point LUP.

Matters to be considered

Based on the assessment outlined here, the following matters should be given further consideration during development of the master plan and port overlay:

- The master plan will include a series of objectives and desired outcomes. The issue of climate change and its potential impacts could potentially be addressed through one or more of these statements
- Consideration may be given to inclusion of the Sandringham Bay mangroves and tidal flats located to the west of Dudgeon Point in the master planned area to support achievement of coherent and holistic port environmental management outcomes.

Concluding analysis

As outlined in the TMR Method, the concluding analysis involved:

- Assessment of matters identified as a high post management risk during the initial analysis
- Assessment of all areas within the master planned area to ensure no inadvertent increase to the post-management risk profile of identified values from implementation of the master plan
- Assessment of any remaining matters that may require further consideration or management but are outside of the scope of master planning.

One climate change-related risk is rated ‘high’ post-management. However, it was found to be beyond the land use management scope of the master plan and port overlay and must be addressed through higher level policies and legislation.

A single Priority Management Measure (PMM) was created to ensure potential port development impacts on sensitive land uses and environmental values are managed appropriately. It reinforces, and is consistent with, the requirements of existing management measures. Due to the comprehensiveness of existing management measures, the draft port overlay only seeks to guide plan-making under the *Planning Act 2016* and *Transport Infrastructure Act 1994* and does not establish controls for proposed development. Consequently, it was found that there is no risk of inadvertent increase to the post-management risk profile of identified values from the master plan implementation. Undertaking a detailed risk assessment as stipulated in the TMR Method was considered unwarranted.

Remaining matters outside of the scope of master planning implementation are the climate change-related risks. Government is beginning to addressed them through higher level policies and legislation.

Acronyms and abbreviations

Acronym/abbreviation	Definition
ASS	Acid sulfate soils
DEO	Desired Environmental Outcomes
EBR	Evidence Base Report prepared by TMR August 2022
EIS	Environmental Impact Statement
EP Act	*Environmental Protection Act 1994*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ERA	Environmentally Relevant Activity
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMP Act	*Great Barrier Reef Marine Park Act 1975*
GBRWHA	Great Barrier Reef World Heritage Area
IAR	Impact Assessment Report
KRA	Key Resource Area
LUP	Land Use Plan
Min	Minor contribution
MNES	Matter of National Environmental Significance
Mod	Moderate contribution
MRC	Mackay Regional Council
MRC planning scheme	Mackay Region Planning Scheme 2017
MSES	Matter of State Environmental Significance
NQBP	North Queensland Bulk Ports
OUV	Outstanding Universal Value
PASS	Potential acid sulfate soils
Planning Act	*Planning Act 2016*
Planning Regulation	*Planning Regulation 2017*
Ports Act	*Sustainable Ports Development Act 2015*
Reef 2050 Plan	Reef 2050 Long-Term Sustainability Plan 2021–2025
SDAP	State Development Assessment Provisions

Acronym/abbreviation	Definition
SDPWO Act	*State Development and Public Works Organisation Act 1971*
Sea Dumping Act	*Environment Protection (Sea Dumping) Act 1981*
SIA	Social Impact Assessment
Sig	Significant contribution
SPL	Strategic Port Land
SPP	State Planning Policy
TEC	Threatened Ecological Community
TIA	*Transport Infrastructure Act 1994*
TMR	Queensland Department of Transport and Main Roads
TMR Method	Methodology for planning and environmental analysis to inform priority port master planning, May 2021, Draft

1 Introduction

The Reef 2050 Long-Term Sustainability Plan 2021–2025 (Commonwealth of Australia 2021) (the 'Reef 2050 Plan') is a comprehensive plan developed by the Australian and Queensland governments in 2015 to secure the health and resilience of the Great Barrier Reef. Consistent with the Reef 2050 Plan, the protection of the Outstanding Universal Value (OUV) of the Great Barrier Reef World Heritage Area (GBRWHA) is an intrinsic consideration in port development.

In accordance with the *Sustainable Ports Development Act 2015* (Ports Act), the Queensland Government is advancing master planning for the Priority Port of Hay Point / Mackay. The port master planning process delivers master plans and port overlays for Queensland's four priority ports. On behalf of the Queensland Government, the Department of Transport and Main Roads (TMR) is leading this work in collaboration with planning and development decision makers.

Master plans are strategic documents that outline the long-term outlook for the future development of priority ports consistent with the principles of ecologically sustainable development. Port overlays are the statutory instruments that ensure a master plan's outcomes are delivered across the master planned area.

The master plan process is founded on an evidence base which has been gathered to:

- Inform the preparation of the master plan by analysing the economic, environmental, cultural heritage and social values relevant to the priority port, including the OUV of the GBRWHA
- Identify long-term infrastructure, supply chain, and port development requirements
- Undertake an assessment of the regulatory framework to understand how impacts from development will be sustainably managed.

Applying an evidence-based planning approach is in accordance with an action from the original Reef 2050 Plan to "*Ensure Great Barrier Reef ports planning incorporates evidence-based measures to support protection, restoration and management of coastal ecosystems that contribute to Reef health and resilience (EHA25)*".

The regulatory framework that exists in and around the Priority Port of Hay Point / Mackay is complex, and the extent of environmental, cultural heritage and social values present contributes a further challenge to planning and environment analysis. The master planning process seeks to define and analyse this complex setting to establish a long-term coordinated strategy to guide development outcomes at the priority port over the next 30 years.

1.1 Context

1.1.1 The Port of Hay Point / Mackay

The Priority Port of Hay Point / Mackay is on the Central Queensland coast and comprises two ports i.e., ports of Hay Point and Mackay. The port of Mackay is located 5 kilometres north of the city centre of Mackay, while the port of Hay Point is located 40km south of Mackay. Mackay has a population of approximately 120,000. Both ports are in the local government area of the Mackay Regional Council (MRC) and the port authority for both is North Queensland Bulk Ports Ltd (NQBP).

The port of Hay Point has two dedicated coal terminals, the Hay Point Coal Terminal and the Dalrymple Bay Terminal. The terminals have a combined capacity of 145 million tonnes per annum and service coal mines in Central Queensland's Bowen and Galilee Basins. The Great Barrier Reef Marine Park (GBRMP) covers over half of the designated port limits; however, key offshore port infrastructure, such as jetties and wharves, are located within the port limits but outside of the GBRMP. The Strategic Port Land (SPL) at the port of Hay Point covers two areas containing the Dalrymple Bay Terminal and Dudgeon Point. The port is serviced by rail via the Goonyella Rail Network and by road via Hay Point Road, accessed off the Bruce Highway.

The port of Mackay is a multi-commodity port primarily servicing Central Queensland's mining and agricultural industries. The port's four wharves cater primarily for the export of sugar and grain and the import of petroleum products and the import and export of break-bulk cargo. Offshore port infrastructure is within port limits and outside of the GBRMP, the boundary of which is approximately five kilometres offshore. The onshore port area is within SPL. There is rail access from the port to the North Coast Line through the Port Access Corridor, and road access is currently provided via Harbour Road.

1.1.2 Master planning process

A master plan is a strategic document providing policy direction that is implemented by a port overlay to guide future development in the master planned area.

Master plans and port overlays are intended to complement rather than duplicate current regulatory frameworks. They are developed on a regulation by exception basis, thereby allowing existing plan-making and approval processes to continue where they adequately regulate development to the extent needed to achieve the master plan outcomes. Analysis of the regulatory frameworks affecting future planning and development at the port supports the goal of regulation by exception and avoids unnecessary burden on proponents and decision makers.

The initial analysis considered the current regulatory context for land use planning and marine areas to establish whether regulatory gaps exist that may require additional controls to support the long-term vision in the master plan. The management measures considered include:

- Environmental assessment controls
- Planning and development processes
- Marine area management requirements.

The evidence base and initial analysis inform development of the draft master plan and port overlay for the Priority Port of Hay Point / Mackay.

Following preparation of the draft master plan and port overlay, the concluding analysis section of this report was prepared. The concluding analysis is based on the initial analysis of the existing regulatory framework combined with the management measures introduced by the draft master plan and draft port overlay.

1.2 Structure of report

This report provides the outputs of the initial analysis and is structured as follows:

- Section 1 (this section) provides an introduction and context to the initial analysis
- Section 2 describes the approach undertaken to analysis
- Section 3 provides an overview of areas of port development, development types and existing management measures
- Section 4 describes the risk assessment process applied
- Section 5 sets out the findings of analysis with a detailed risk assessment table provided in Appendix A (Hay Point) and Appendix B (Mackay)
- Section 6 describes additional analysis of matters which required further consideration as part of master plan and port overlay development
- Section 7 presents the concluding analysis (assuming implementation of the measures identified in the draft master plan/port overlay)
- Section 8 lists references used in the report.

2 Approach

2.1 Study area

Evidence gathering was undertaken to support the master planning process and is presented in the Evidence Base Report prepared by TMR August 2022 for the Priority Port of Hay Point / Mackay (EBR). The EBR addressed areas that covered approximately 450km^2 and 170km^2 of land and sea around the ports of Hay Point and Mackay respectively.

For the purposes of initial analysis, it was assumed that development activities may occur on land that is SPL at Hay Point or Mackay and surrounding areas, including land within the MRC planning scheme area. An initial analysis study area ('the study area') was identified to represent the extent of land within which port development activity may occur at Hay Point and Mackay. Figure 2-1 shows the study areas for Hay Point and Mackay and contrasts this with the EBR study area for each.

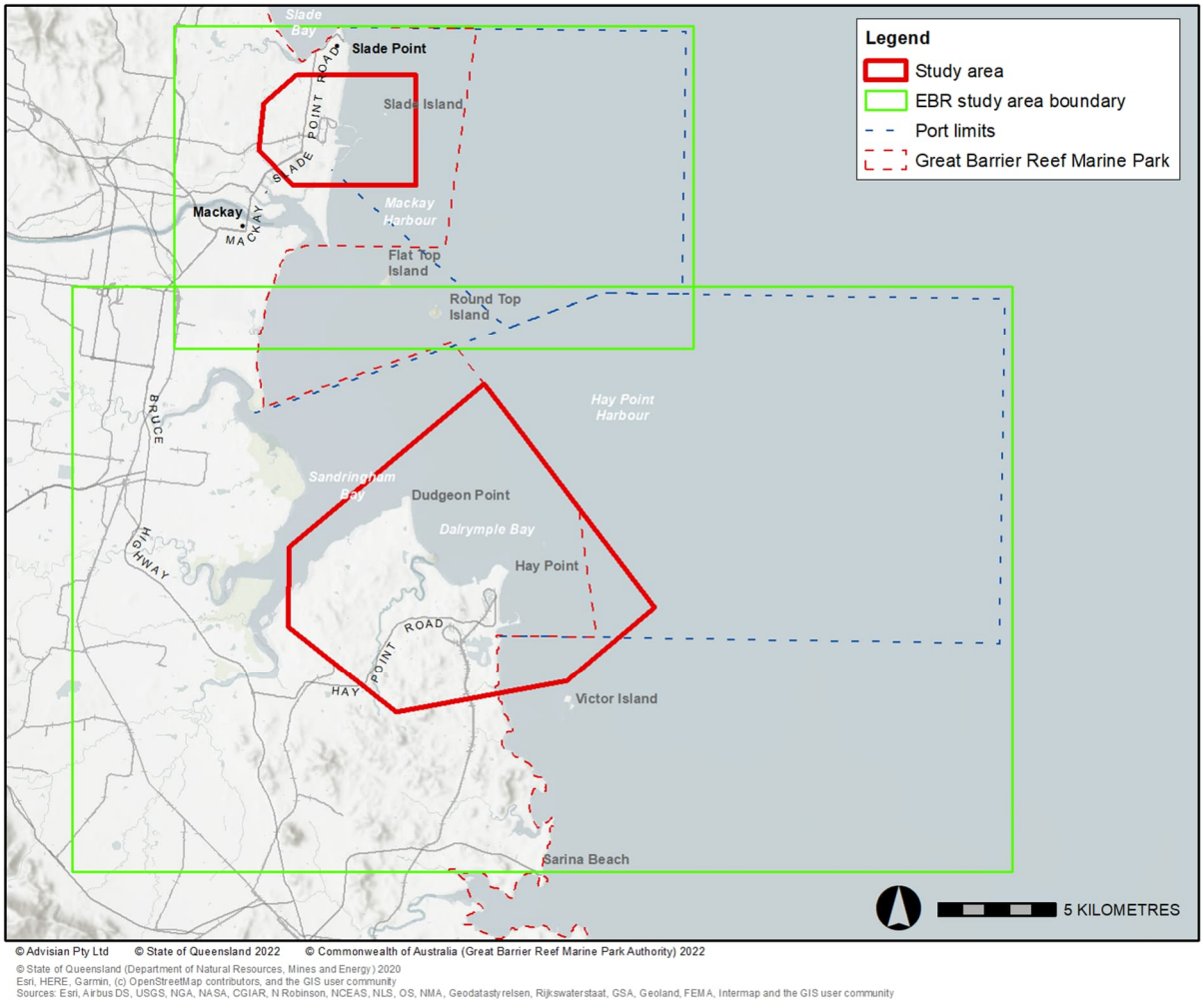

Figure 2-1 Study area

2.2 Background

Based on learnings gained through development of master plans for the priority ports of Townsville and Gladstone, TMR developed a method for planning and environmental analysis to inform priority port master planning (*Methodology for planning and environmental analysis to inform priority port master planning, May 2021, Draft*) (TMR Method). The TMR Method seeks to achieve consistency in what information on the environmental, social, cultural and economic values is relied upon, how regulatory gaps are identified and how port master planning tools' efficacy is verified. It applies an approach to identify, analyse, and review land use and environmental matters relevant to the master planning of priority ports, comprising:

- Evidence gathering – collation of base information to be considered during master planning
- Initial analysis – preliminary analysis of the evidence base for risks, information gaps, and planning issues or risks to be managed
- Concluding analysis – analysis of regulatory requirements along with master plan and port overlay measures developed in response to matters identified by evidence gathering and initial analysis.

2.2.1 Evidence gathering

Review of the evidence base was completed in May 2022 and is presented in the EBR for both Hay Point and Mackay. The EBRs identify:

- Economic, environmental, cultural and social factors relevant to the priority port including OUV of the GBRWHA
- Future development activities relevant to the port and surrounding areas
- Potential impacts from development and associated activities on the values identified
- Existing Commonwealth, Queensland and local government management measures (legislation, regulation, planning instruments, policies) that apply to matters relevant to the port and its surrounding area.

2.2.2 Initial analysis

The initial analysis process was initiated through a workshop held on 28 October 2021, with Advisian and TMR personnel in attendance. The primary objective of the workshop was to achieve alignment on the risk assessment approach to be applied for the planning and environment analysis.

As agreed at the workshop, the analysis approach must align with the TMR Method, which underpins the practical application of the principles of priority port master planning and ensures consistency in port master plan development and reviews. It is notable that priority port master plans for the ports of Townsville and Gladstone were developed prior to establishment of the TMR Method in 2021. Planning and environmental analysis for those ports (including risk assessment) differs from that undertaken for the Port of Hay Point / Mackay.

The scope of what can be implemented through master planning is limited to future development. The initial analysis focused on the management of potential port-related development impacts by the existing regulatory frameworks operating in the study areas. The initial analysis did not focus on specific projects or development scenarios, rather it considers likely development activities in the context of port growth and the management of their potential development impacts.

2.2.3 Concluding analysis

A concluding analysis has been undertaken to revisit the analysis with the assumed imposition of master plan and port overlay measures, developed in response to matters identified from evidence gathering and initial analysis. The concluding analysis is included in Section 7 of this document.

2.3 Overview of analysis

The initial analysis considered values (environmental, social, cultural heritage) present within the study areas, potential development impacts and existing management measures (i.e., regulatory and policy instruments) that apply.

The initial analysis applied a risk-based approach to identify matters that may need to be addressed in preparation of the master plan and port overlay. The analysis provides an assessment of whether potential impacts on identified values caused by development activity at the port are subject to the control of existing management measures, such as legislative and planning instruments noting:

- The analysis focused on existence of the management measures to manage impacts on the values
- The analysis did not address the implementation or administration of the measures by regulatory agencies, nor the effectiveness of existing measures
- The analysis is not an environmental impact assessment for future development.

Outputs of the initial analysis include identification of aspects that may require additional management through the master plan and port overlay.

2.3.1 Risk assessment

The analysis incorporates a risk assessment structured around the considerations shown in Figure 2-2.

Value	OUV	Potential impacts, threats or pressures	Development activities	Initial risk	Existing management measures	Post management risk	Matters for consideration	Summary conclusion

Figure 2-2 Outline of risk assessment table considerations

The matters which informed the risk-based approach (headings in Figure 2-2) are described below:

- Value refers to the environmental, social or cultural heritage values considered in the risk assessment
- OUV refers to the contribution of specific values to the OUV of the GBRWHA i.e., Minor, Moderate or Significant contribution (where relevant)
- Potential impacts, threats or pressures, refers to the potential impacts of future development on the identified values
- Development activities refers to the types of development activity that may occur, and cause potential impacts to identified values
- Initial risk refers to an assessment of risk assuming that the current suite of regulatory and policy instruments do not exist

- Existing management measure refers to the existing regulatory and policy instruments that apply to proposed development activities and manage potential impacts on identified values
- Post management risk refers to an assessment of risk with the application of existing management measures
- Matters for consideration refers to a description of how each existing management measure addresses the potential impacts of proposed development activities on identified values in support of the post management risk rating for each management measure
- Summary conclusion refers to identification of summary conclusions regarding the risk assessment of all potential impacts of proposed development activities on identified values, given the application of all existing management measures and in support of the overall post management risk rating.

2.4 Use of evidence

The EBR provides most of the inputs to the risk assessment table, including a description of the values and contributions to OUV, development activities, potential impacts and existing management measures. Potential impacts are described in the EBR at two different levels:

- Macro i.e., cumulative impact of port development and/or impact of external influences on port operations such as potential for future port trade enhancement from development in new industries, or influence of key Asian economies on Queensland's future coal demand and therefore Hay Point's future throughput
- Micro i.e., impact of new development at the port such as a new industrial development causing environmental impacts and/or nuisance impacts on nearby residential communities.

The EBR also sets out other matters, such as existing and planned infrastructure at the Port, along with providing an overview of evidence relevant to port optimisation and forward planning.

The initial analysis focused on a sub-set of information contained in the EBR i.e., the micro level impacts of new development on values as described in the EBR, in context of the regulatory and land use planning frameworks (as illustrated in Figure 2-3). Assessment of the application of existing management measures to potential impacts of new development on values was the primary focus of the initial analysis.

To maintain traceability between the EBR and the initial analysis, the values and potential impacts used for the risk assessment tables were generally as set out in the EBR, noting that some values were assessed as a group in the risk assessment given their overlap, potential impacts and their management.

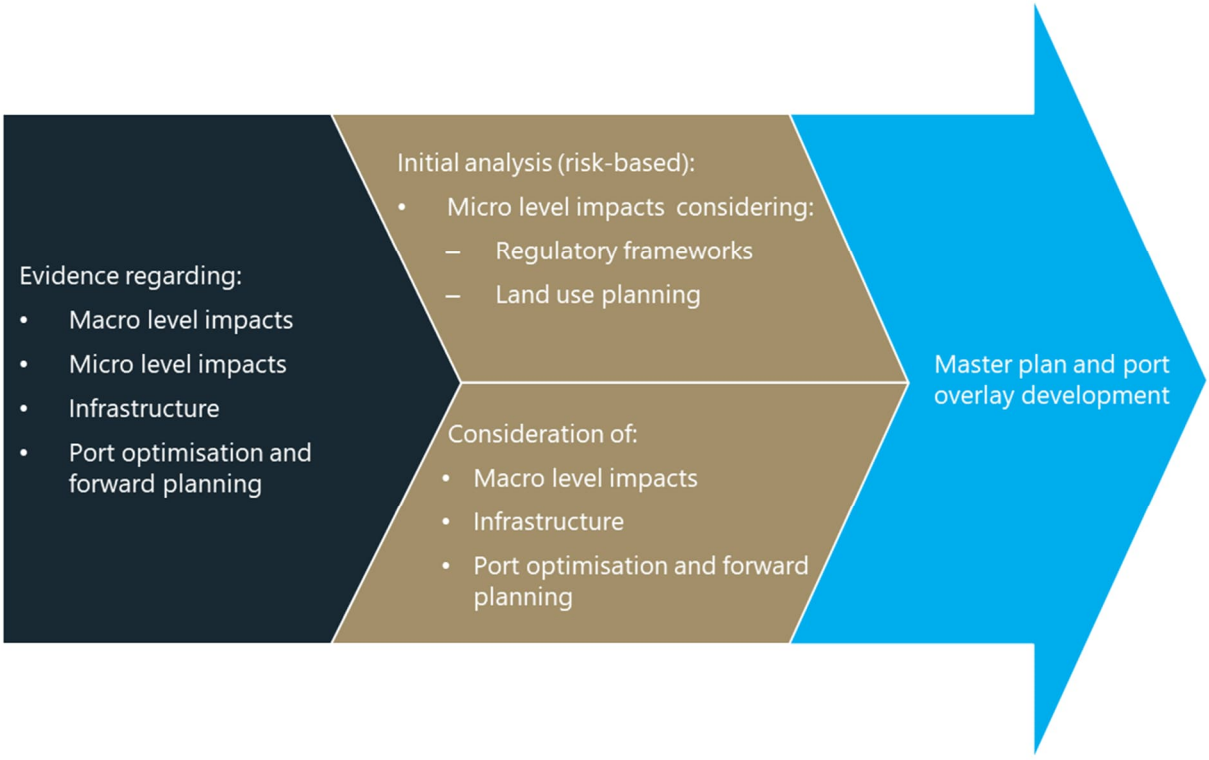

Figure 2-3 Consideration of the evidence base for master plan and port overlay development

Table 2-1 provides an overview of information provided in the EBR and how this was utilised in the initial analysis and/or may be used in the master planning process.

Table 2-1 Utilisation of EBR information

EBR information (Part A and Part B)	Utilisation in initial analysis and/or master planning
Chapter 1: Executive Summary	Not applicable.
Chapter 2: Introduction	Not applicable.
Chapter 3: Port of Hay Point / Port of Mackay Provides context to the Port including location and function	Provides broad context to the initial analysis and master planning.
Chapter 4: Regulatory frameworks Describes existing management measures relevant to the Port.	The identified existing management measures were used in risk assessment for the initial analysis.
Chapter 5: Land use planning Describes existing management measures relevant to the Port.	The identified existing management measures were used in risk assessment for the initial analysis.
Chapter 6: Social	Micro level impacts to social values of amenity of surrounding residential communities were addressed in risk assessment for the initial analysis.

EBR information (Part A and Part B)	Utilisation in initial analysis and/or master planning
Describes social values and potential impacts on these. Impacts set out in the discussion of social values include both macro and micro level impacts. The micro level impacts are associated with potential impacts to amenity of surrounding residential communities due to increased noise, dust, traffic and visual impacts from new development associated with the port. Macro level impacts to social values identified in the EBR include potential impacts associated with construction activity and ongoing operations at the Port relevant to: • Population and demography • Employment and training • Housing • Social infrastructure • Broad community values (beyond the micro-level amenity impacts described above)	Macro level impacts may be reflected and/or considered in master plan and port overlay development as relevant. Existing social policy and strategic context with respect to management of social values relevant to the port area is provided in the EBR, including discussion of the Mackay, Isaac, and Whitsunday Regional Plan 2012 and the Mackay Region Planning Scheme 2017 (MRC planning scheme). Furthermore, Social Impact Assessment (SIA), including development of social impact management measures, is required for all projects subject to an environmental impact statement (EIS) process under either the: • *State Development and Public Works Organisation Act 1971* (SDPWO Act), or • *Environmental Protection Act 1994* (EP Act).
Chapter 7: Cultural heritage Describes cultural heritage values along with potential micro level impacts to these.	Micro level impacts to cultural heritage values were addressed in risk assessment for the initial analysis.
Chapter 8: Environmental values Describes environmental values along with potential micro level impacts to these.	Micro level impacts to environmental values were addressed in risk assessment for the initial analysis.
Chapter 9: Outstanding Universal Values Describes OUV relevant to the Port.	Contribution to OUV was considered in risk assessment for the initial analysis.
Chapter 10: Climate change and natural hazards Describes natural hazards and climate change, along with relevant policies and strategies. Potential macro level impacts to infrastructure are set out in the discussion of climate change and natural hazard including: • Impact to port infrastructure and operation due to physical climate risk (and including supply chain and insurance risk) such as associated with warmer temperatures, less frequent but more intense rainfall, more frequent and longer droughts and sea level rise and associated hazards • Impact to port operations and business due to the transition to a low or zero carbon economy and potentially including legal and policy risk,	Potential micro level impacts of climate change to environmental values were identified in the EBR under Chapter 8 (Environmental values) and were addressed in risk assessment for the initial analysis. Existing and planned responses to potential macro level impacts to infrastructure associated with climate change and natural hazards were detailed in the EBR. Most of the responses focused on strategies/actions to avoid hazard prone areas or mitigate and adapt to the existing and potential hazards/risks. These may be reflected in the master plan and port overlay as relevant. Further detailed consideration of these matters is set out in the relevant planning instruments (MRC planning scheme, Hay Point Land Use Plan, Mackay Land Use Plan and port authority NQBP Sustainable

EBR information (Part A and Part B)	Utilisation in initial analysis and/or master planning
technological risk, market risk and reputational risk for port operations (transition climate risk).	Port Development Guidelines) along with relevant building and engineering standards.
Chapter 11: Infrastructure Describes existing infrastructure along with proposed projects and potential new industry.	Provides context to the description of development activities and potential impacts considered for the initial analysis. Existing and proposed infrastructure may be reflected and/or considered in the master plan and port overlay as relevant.
Chapter 12: Economic Potential macro level impacts set out in the discussion of economic value including economic impacts to the port (positive and negative) associated with Commonwealth and Queensland Government policy, strategy, and plans, long-term global demand for coal, global energy transition and outlook and port industry trends (such as for shipping).	Provides context to the description of development activities and potential impacts considered for the initial analysis. Economic development may be considered in the master plan and port overlay development.
Chapter 13: Port optimisation and forward planning Describes international, national, state and local policy documentation and sets out existing and planned port optimisation and forward planning.	Provides context to the description of development activities and potential impacts considered for the initial analysis. Port optimisation and forward planning may be considered in the master plan and port overlay development.
Chapter 14: References	Not applicable.

2.4.1 Values

Environmental, social and cultural heritage values of the Priority Port of Hay Point / Mackay and surrounding areas are described in detail in the EBR. For consistency and traceability, the description of values used in the EBR was generally adopted for the initial analysis:

- The description of environmental and cultural heritage values was extracted from Chapter 8 (Environmental values) and Chapter 7 (Cultural heritage) of the EBR for both Hay Point and Mackay respectively:
  - Several values were aggregated for the purposes of risk assessment given that potential impacts to these values are addressed concurrently by relevant management measures
  - Aspects of the environment such as climatic conditions and topography, soils and geology (including actual and potential acid sulfate soils (ASS / PASS) are not specifically categorised as values, but identified in the analysis within other values and / or with respect to potential impacts as relevant
  - Biosecurity is not identified as an environmental value, but weeds and pests are considered as part of potential impacts to the identified values

- The description of social values was derived from Chapter 6 (Social) and Chapter 8 (Environmental values - 8.2 Landscape and visual amenity, 8.10 Air quality, and 8.11 Noise emissions) of the EBR for both Hay Point and Mackay.

OUV is the central concept of the World Heritage Convention. The EBR provides detailed analysis of the attributes of the Port of Hay Point / Mackay and surrounding areas with respect to their contribution to the OUV of the GBRWHA. Key findings of that analysis indicate that several attributes provide either a minor (Min), moderate (Mod) or significant (Sig) contribution (set out in detail in Section 4.3).

2.4.2 Potential impacts, threats and pressures

Potential impacts of development to the environmental, social and cultural heritage values of the Ports of Hay Point, Mackay and surrounding areas are described in detail in the EBR. As described in Section 2.3, the initial analysis focused on the micro level impacts described in the EBR (i.e., impact of new development activity at the port) in context of the regulatory frameworks and land use planning. The EBR identifies direct and indirect impacts of port development activity and both are considered in the risk assessment.

In some instances, the impacts identified in the EBR were specific to the types of development that currently exist at the ports. Noting that regulatory and planning frameworks address the management of values and potential impacts on these for the full range of potential development activity, the initial analysis considered the potential impacts in a broad sense as described in Section 4.4. By way of example, the EBR identified potential impacts of coal terminal development at Hay Point, such as deposition of coal dust. The initial analysis addressed potential impacts associated with any potential development activity that could cause the emission and deposition of dust more generally.

In line with the approach for description of values and for consistency and traceability, the description of potential impacts used in the EBR has been generally adopted for the initial analysis:

- The description of potential impacts to environmental and cultural heritage values was extracted from Chapter 8 (Environmental values) and Chapter 7 (Cultural heritage) of the EBR for both Hay Point and Mackay respectively:
  - As noted in Section 2.4.1, several values were aggregated for the purposes of risk assessment given that potential impacts to these values are addressed concurrently by relevant management measures
  - Potential impacts associated with topography, soils and geology (including ASS/PASS) were considered with reference to several values including marine and estuarine water quality, marine plants, coral reefs, fish and fish habitat areas, terrestrial vegetation communities and ecosystems, listed threatened and migratory species and associated habitat, surface water resources, groundwater resources and wetlands
  - Potential impacts associated with climate change were considered under the relevant values, including marine and estuarine water quality, coastal processes, marine plants and coral reefs
  - Potential impacts associated with weeds and pests were considered with reference to the value of terrestrial vegetation communities and ecosystems.
- The description of potential impacts to social values was derived from Chapter 6 (Social) and Chapter 8 (Environmental values - 8.2 Landscape and visual amenity, 8.10 Air quality, and 8.11 Noise emissions) of the EBR for both Hay Point and Mackay.

2.5 Gap analysis

Following completion of the initial analysis in alignment with the TMR Method, additional analysis of identified gaps was undertaken to identify matters to be considered further in the preparation of the master plan and port overlay.

3 Port development

The assessment of initial risk considered potential future development at the port including:

- Location with reference to values within the study area that may be impacted
- Types of development likely to be proposed in the study area and how these may impact values present.

Post-management risk analysis took account of existing management measures that may control risk associated with potential impacts to particular values regardless of the scale of the development.

3.1 Areas of port development

Consideration was given to where development activities may occur within the study area and potential impacts on the values set out in the EBR.

3.1.1 Planning context

There are several different spatial planning instruments currently applied to land within the two study areas. These include the MRC planning scheme, the Port of Hay Point Land Use Plan (LUP) and the Port of Mackay LUP as summarised in Table 3-1. Figure 3-1 and Figure 3-2 show the study areas with reference to relevant spatial planning instruments.

Table 3-1 Summary of existing spatial planning instruments

Instrument	Summary
MRC planning scheme	The MRC planning scheme operates alongside a suite of policies developed by the MRC for land within the study area.
- Extractive resources and High impact use overlay	The Extractive resources and High impact use overlay applies to a significant portion of the study area. Overlays reflect state and local level interests, in this case those interests are a quarry site and the operational area of the port of Hay Point / Mackay.
- Regional infrastructure overlay	The Regional infrastructure overlay applies to land adjacent to significant infrastructure. In this case it applies to existing rail lines connecting to the port.
Port of Hay Point LUP and the Port of Mackay LUP	The LUP is a framework for the development of SPL held by NQBP. It establishes a vision for the port, identifies existing and proposed uses and operates in conjunction with a set of development guidelines.

Within the study area for Hay Point there are significant areas of land zoned for Rural, Rural Residential and Township purposes. Within the study area for Mackay a large number of different urban zonings are present surrounding the port including Low, Medium and High Density Residential, Mixed Use, Local Centre and Tourism, Sport and Recreation purposes.

At Hay Point, NQBP has an active program for the acquisition of land outside the port within the adjoining Louisa Creek area.

The Extractive resources and High impact use overlay provides a level of protection to ongoing port activities by placing additional requirements on the development of sensitive land uses taking into consideration potential impacts from noise and lighting.

The analysis assumed that development activities may occur on land that is SPL at Hay Point or Mackay and surrounding areas, including land within the MRC planning scheme area. The analysis also contemplated potential impacts that may occur across the boundaries where relevant planning instruments interface e.g., development activities within the MRC planning scheme area with potential impact to future development within SPL, and vice versa.

It is noted that within the Hay Point study area there is a parcel of land that is not currently zoned under one of the instruments identified in Table 3-1. This parcel of land is located to the west of Dudgeon Point and contains mangroves and tidal flats along the southern boundary of Sandringham Bay. Although not subject to the zoning/precincts identified in Table 3-1, development of this land is still subject to the *Planning Act 2016* (Planning Act).

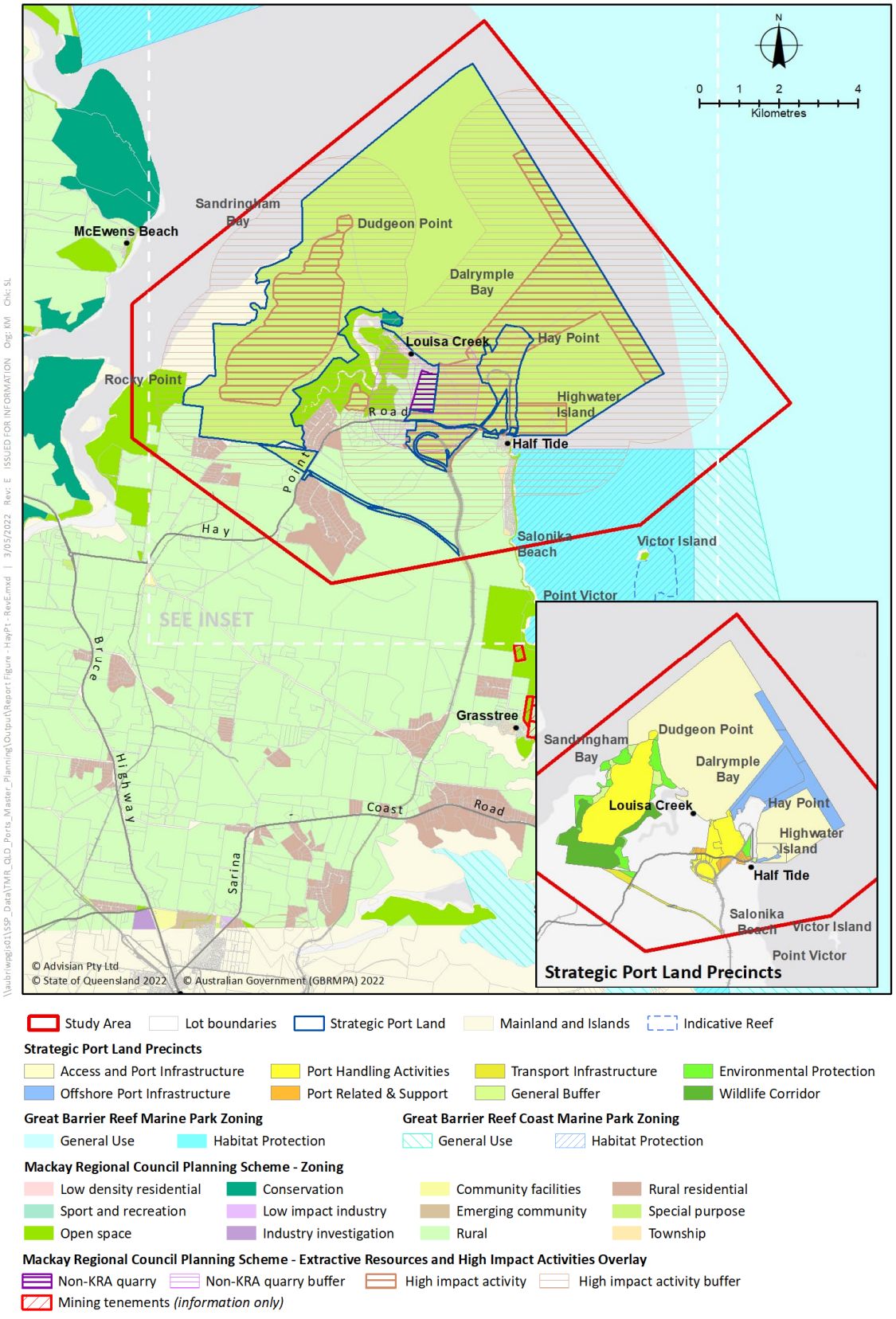

Figure 3-1 Port of Hay Point study area and spatial planning instruments

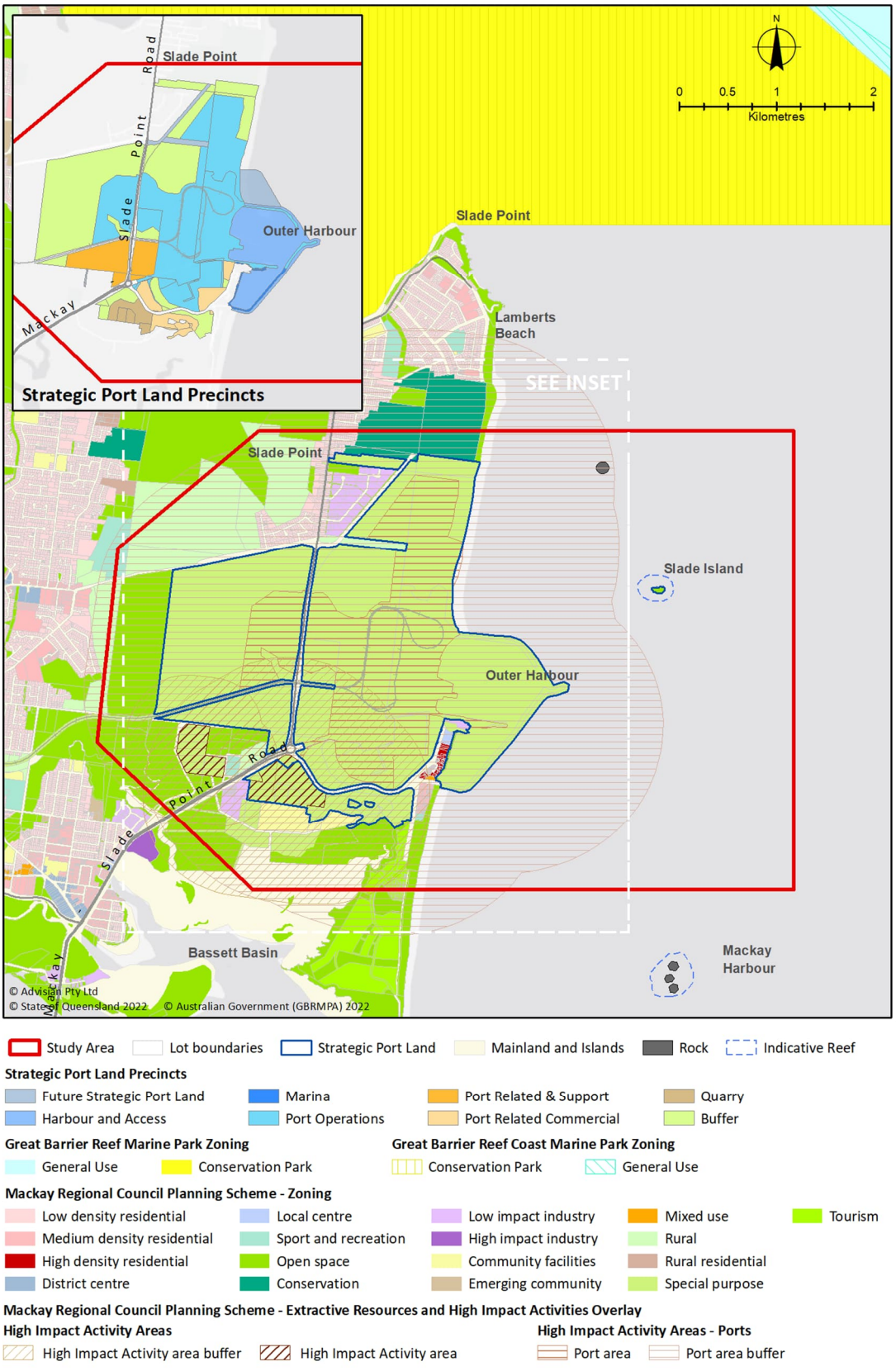

Figure 3-2 Port of Mackay study area and spatial planning instruments

3.1.2 Values

Land and marine areas in the study areas contain sensitive terrestrial and marine environments of national and state significance. These are recognised and protected through Commonwealth and Queensland Government legislation. Parts of the study areas are within the GBRWHA.

Wetlands provide important ecosystem services by capturing overland flow, recycling nutrients and sediment, providing feeding and breeding grounds for fish, prawns, birds, amphibians and habitat for flora species.

Several fringing reefs in waters off Mackay at Round Top Island, Flat Top Island, Slade Island, Dangerous Reef, St Bees Island, and Keswick Island and inshore coral reefs contribute to the diversity of inshore waters, fisheries and tourism.

Sandringham Bay and Ince Bay

The Sandringham Bay - Bakers Creek aggregation is a coastal plain with extensive shallow water and mudflats. These wetlands are home to internationally recognised roosting sites that provide habitat for shorebirds and migratory birds and are considered to make a moderate contribution to OUV.

Sarina Inlet - Ince Bay aggregation is located south of Hay Point and is a wetland supporting inshore coral reefs and mudflats. The nearby Lake Barfield is a freshwater wetland providing habitat for fauna and bird species.

The wetlands at Sandringham Bay and Sarina Inlet support over 30 migratory shore and sea bird wetland species and more than 20,000 birds during the annual migration.

Keeley Road Wetlands

Keeley Road Wetlands, west of the Port of Mackay, is a significant habitat for many migratory shorebird species. It forms part of the corridor linking Slade Point with the Pioneer River. The wetlands support critically endangered species, including the curlew sandpiper, great knot and eastern curlew as well as other endangered and vulnerable species.

3.1.2.1 *Environmental values that contribute to the local expression of Outstanding Universal Value*

Master planning ensures that the OUV of the GBRWHA is an intrinsic consideration in managing port-related development. The local expression of OUV in and around the Port of Hay Point / Mackay includes:

- Shorebirds and migratory birds are key environmental values that have international environmental significance. There are internationally recognised roosting sites at Sandringham Bay that supports up to 23,000 shorebirds each year during annual migration. Shorebirds and migratory birds are a significant contribution to the local expression of OUV
- Nesting turtles and marine turtle rookeries are identified as making a moderate contribution to the local expression of OUV. Flatback turtles are the dominant nesting species and Haliday Bay north of Mackay is considered the most important nesting beach in the Mackay Region while nesting also occurs at Hay Point Beach, Salonika Beach and Dudgeon Point. Green turtles are frequently observed at Bucasia Beach, Blacks Beach, North Harbour Beach and Salonika Beach

- Mangroves cover approximately 22 hectares within enclosed wetland areas which support 21 species of national importance. Vast mangrove forests can be found at Sandringham Bay, Hay Point peninsula, Sarina Inlet, Slade Point, McCready's Creek and the Basset Basin in the Pioneer River. Both mangrove diversity and vast forests make a moderate contribution to the OUV of the area
- Humpback whales migrate along this stretch of coast annually between June and October and are considered to make a moderate contribution to the local expression of OUV. Female whales with calves can be observed within the port limits of the Port of Hay Point. Core aggregation and calving areas are located approximately 80kms east of Mackay.

All attributes contribute to the structure and diversity of the local ecosystem.

3.1.2.2 Other environmental and heritage values

Separate to the OUV of the GBRWHA, there are important environmental values in and around the Port of Hay Point / Mackay, that are not identified as directly contributing to the OUV of the GBRWHA. These values are diverse and relate to terrestrial, aquatic and marine environmental values.

Indigenous cultural heritage: Land and Sea Country are significant for social and cultural practices for the Yuwibara people

The Traditional Owners of the Land and Sea Country are the Yuwibara people. In the Hay Point area there are several places of high cultural significance.

Fish Habitat Areas: breeding, feeding and nursery grounds for target species which are important for commercial and recreational fishing

The Basset Basin Fish Habitat Area provides a nursery and habitat for a number of species including barramundi, blue salmon, bream, estuary cod, flathead, grunter, mangrove jack, queenfish, whiting, mud crabs, tiger prawns and grey mackerel.

Freshwater marine and estuarine water quality: marine waters, fresh waters, and aquatic ecosystems values providing ecosystem services and protected under Queensland Government legislation

Several riverine and estuarine wetlands of high ecological significance contain a diverse range of mangrove forests, shrublands and samphire open forblands. There are high ecological value watercourses and wetlands located around Alligator Creek and Bakers Creek, and other wetlands along local rivers and streams containing melaleuca or eucalyptus dominated woodlands.

Heritage places: State and local heritage places protected under Queensland Government legislation

Mackay has numerous historical heritage places associated with settlement from the early colonisation of the area through to World War II.

Listed threatened and migratory species: identified under international agreements and protected under Commonwealth Government legislation

A number of species can be found in and around the Port of Hay Point / Mackay, including threatened ecological communities, endangered and vulnerable species.

Protected areas: a range of protected areas providing environmental conservation and recreational opportunities, including National Parks and Conservation Parks, listed under Commonwealth and Queensland Government legislation

The protected areas of vegetation are on two islands east of Mackay, listed as Yuwi Paree Toolkoon National Park or more commonly known as Flat Top and Round Top Islands.

Regional ecosystems: remnant vegetation and ecological communities identified and protected under Commonwealth and Queensland Government legislation

Terrestrial vegetation is critical to provide habitat for native fauna and flora and provides corridors for movement of wildlife between refuges, roosting, breeding and feeding areas. This includes mangroves, saltmarshes, saline grasslands and sedgelands, vegetated swamps and wetlands, coastal vine thickets and rainforests, tussock grasslands and a variety of eucalypt woodlands and forests.

Mangroves and marine plants: provide habitat and food sources for a range of invertebrates, birds and fish and protected under Queensland Government legislation

There are a diverse range of intertidal habitats, including sandy beaches, exposed mud or sand flats, small rocky headlands, and mangrove-lined estuaries present.

3.2 Development types

The initial analysis includes risk assessment of potential impacts from particular land uses that were considered most relevant to future port and port-related development.

The risk assessment used similar land use definitions as are applied in the MRC planning scheme, the Port of Hay Point LUP and Port of Mackay LUP. The definitions adopted are set out in Table 3-2. The development types apply to both marine and land development.

Table 3-2 Development types applied for initial analysis

Development type	Description	Examples
Special development	Development with one or several of the following attributes: • potential for extreme[1] impacts on sensitive land uses and values • potential for extreme offsite impacts in the event of fire, explosion or toxic release • the development may involve the storage and handling of large volumes of dangerous goods • the development requires significant separation from other uses	Marine Multi-berth or swing basin capital dredging, large-scale reclamation Land Producing, refining or processing gas or fuel gas, major hazard facility involving manufacturing of dangerous goods, rendering plants, oil refineries, waste incineration, manufacturing/ storing chemicals, explosives, fertilisers involving ammonia
High / medium impact development	Development with one or several of the following attributes:	Marine

Development type	Description	Examples
	• potential for significant[2] impacts on sensitive land uses and values • potential for significant offsite impacts in the event of fire, explosion or toxic release • the development may involve the storage and handling of moderate volumes of dangerous goods	Single berth capital dredging, medium/small reclamation, large jetty and loading platform on trestles, tug harbour Land Dredge material storage cells, transport infrastructure, pipeline (gas, liquids) concrete batching plant, boiler making, metal foundry, major hazard facility for the storage and distribution of dangerous goods not involving manufacturing processes, abrasive blasting, enamelling, galvanising, spray painting
Low impact development	Development with the following attributes: • limited impacts on sensitive land uses and values • potential minor offsite impacts from storage of dangerous goods are low level.	Marine Marine offloading facility, small jetty and loading platform on trestles, floating tug berth, maintenance dredging Land Storage sheds, offices, local roads, water pipeline

Definitions: 1= reaching a high or the highest degree, 2= sufficiently great or important to be worthy of attention; noteworthy.

3.3 Existing management measures

As set out in the EBR, there is a complex, comprehensive, and overlapping range of Commonwealth, Queensland and local government regulatory and policy instruments that are of relevance to the Priority Port of Hay Point/Mackay and surrounding areas.

The application of this regulatory framework is of significant complexity due to the:

- Jurisdictional overlap of instruments between the Commonwealth, Queensland and local governments
- Spatial overlap of instruments, including their application over both land and marine areas
- Need to balance management of economic, environmental, cultural and social values present.

Existing management measures are described in detail in the EBR:

- Chapter 4 (Regulatory frameworks) of the EBR for both Hay Point and Mackay provides an overview of the Commonwealth, Queensland and local government regulatory framework and summarises its application
- Chapter 5 (Land use planning) of the EBR for both Hay Point and Mackay describes land use planning and development assessment requirements that apply in the study areas, including how the existing management measures apply to development proposals within land and marine areas.

Table 3-3 sets out the relevant existing Commonwealth, Queensland and local government management measures identified in the EBR and considered in the initial analysis. It should be noted

that the regulatory framework identified is supported by additional instruments e.g., exploration or production activity for petroleum and gas in Queensland requires approval under the *Petroleum and Gas (Production and Safety) Act 2004*. These additional instruments were not considered in the initial analysis as they address potential impacts that are outside the scope of the master planning process including requirements or standards around operational matters such as governance, maintenance and welfare.

Table 3-3 Relevant Commonwealth, Queensland and Local Government management measures

Commonwealth Government	Queensland Government	Local Government
Key management measures (current) relevant to new development at the Port and surrounding areas		
Environment Protection and Biodiversity Conservation Act 1999 *Great Barrier Reef Marine Park Act 1975* and the *Great Barrier Reef Marine Park Zoning Plan 2003* *Environment Protection (Sea Dumping) Act 1981*	*Environmental Protection Act 1994* *Planning Act 2016* and associated State Development Assessment Provisions *State Development and Public Works Organisation Act 1971* *Transport Infrastructure Act 1994* and the Port of Hay Point LUP, Port of Mackay LUP and NQBP Sustainable Port Development Guidelines	Mackay Region Planning Scheme 2017
Other management measures relevant to new development at the Port and surrounding areas		
Aboriginal and Torres Strait Islander Heritage Protection Act 1984 *Biosecurity Act 2015* *Coastal Trading (Revitalising Australian Shipping) Act 2012* *Marine Safety (Domestic Commercial Vessel) National Law Act 2012* *Native Title Act 1993* *Navigation Act 2012* *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* *Sea Installations Act 1987* *Underwater Cultural Heritage Act 2018* *Work Health and Safety Act 2011* Reef 2050 Long-Term Sustainability Plan	*Aboriginal Cultural Heritage Act 2003* *Aboriginal Land Act 1991* *Biosecurity Act 2014* *Building Act 1975* *Coastal Protection and Management Act 1995* *Environmental Offsets Act 2014* *Fisheries Act 1994* *Forestry Act 1959* *Land Act 1994* *Marine Parks Act 2004* *Native Title (Queensland) Act 1993* *Nature Conservation Act 1992* *Queensland Heritage Act 1992* *Regional Planning Interests Act 2014* *Sustainable Ports Development Act 2015*	

Commonwealth Government	Queensland Government	Local Government
	Transport Operations (Marine Pollution) Act 1995 *Transport Operations (Marine Safety) Act 1994* *Transport Operations (Marine Safety–Domestic Commercial Vessel National Law Application) Act 2016* *Transport Operations (Road Use Management) Act 1995* *Vegetation Management Act 1999* *Water Act 2000* *Work Health and Safety Act 2011* Mackay, Isaac and Whitsunday Regional Plan 2012	

3.3.1 Key management measures

While each of the management measures is relevant within its remit for management of the impacts of development at the port and surrounding areas, the key measures identified in Table 3-3 that are currently relevant to the management of significant new development in the port area are discussed below.

3.3.1.1 Commonwealth Government

The EPBC Act is the principal environmental legislation in Australia. The EPBC Act provides a framework for the protection of environmental values of national and international significance through the regulation of activities that may impact on nine 'matters of national environmental significance' (MNES), including (among other things) listed threatened species and communities, listed migratory species, world and national heritage properties and the GBRMP.

The *Great Barrier Reef Marine Park Act 1975* (GBRMP Act) is the primary legislation providing for the protection and conservation of the environment, biodiversity and heritage values of the Great Barrier Reef (GBR) region. Among other things, the GBRMP Act provides for the designation of the GBRMP and establishes a management framework establishing zoning plans and a system of permissions to regulate the use of the Marine Park, including for dredging and placement of dredge material.

The *Environment Protection (Sea Dumping) Act 1981* (Sea Dumping Act) regulates (among other things) dredging and disposal of dredge material at sea, noting that for dredging and disposal within the GBRMP the legislation is administered by the Great Barrier Reef Marine Park Authority.

3.3.1.2 Queensland Government

The Planning Act is the head of power for planning and development in Queensland. The Planning Act establishes the Queensland planning framework, which includes (among other things):

- The plan-making system, which guides strategic planning and sets out the planning intent for land across Queensland. The Planning Act brings into effect the State Planning Policy (SPP)

- The development assessment system, which sets out the rules for how development is to occur. Through the Planning Act the State Development Assessment Provisions (SDAP) provide assessment benchmarks for the assessment of development applications in Queensland.

The Planning Act works in concert with the SDAP and related legislation to manage potential impact to values as relevant to the development activity, including the *Coastal Protection and Management Act 1995*, EP Act, *Fisheries Act 1994*, *Queensland Heritage Act 1992*, *Vegetation Management Act 1999* and *Water Act 2000*.

The EP Act is a key element of Queensland's environmental regulatory system. The EP Act and its subordinate legislation prescribes a range of Environmentally Relevant Activities (ERAs), which are activities identified by the Government to present environmental risks and require assessment and issuance of an Environmental Authority before these activities can be undertaken. The ERAs include (among other things) activities commonly undertaken at ports such as dredging and mineral and bulk material handling. Further, the EP Act implements a range of environmental protection policies that support the purpose of the act in relation to specific environmental aspects including air, noise, and water and wetland biodiversity. For these matters, the environmental protection policies prescribe environmental values to be enhanced or protected, establish objectives for enhancing or protecting these values, and provide a framework for decision-making.

Among other things, the SDPWO Act establishes a framework for coordinating and planning the delivery of large-scale projects and provides a process for the declaration of State Development Areas to promote economic development in Queensland. A large-scale project may be declared a 'coordinated project' under the SDPWO Act, in which case it is subject to a coordinated assessment by the Coordinator-General and relevant government agencies through the preparation of an EIS or Impact Assessment Report (IAR).

The *Transport Infrastructure Act 1994* (TIA) establishes a regulatory framework that provides for integrated planning and the efficient management of Queensland's ports. It establishes port authorities and port limits along with port LUPs as the principal regulatory mechanism for planning and development on SPL. The TIA also determines that port authorities are the assessment manager for all assessable development under the Planning Act for SPL. Proposed new development on SPL at Hay Point or Mackay is assessed against the Port of Hay Point LUP, or the Port of Mackay LUP along with NQBP's Sustainable Port Development Guidelines.

3.3.1.3 Local Government

The MRC planning scheme is the principal local planning instrument used by Mackay Regional Council (MRC) to regulate development within the local government area. The MRC planning scheme contains various components which work collectively to regulate planning and development including strategic framework, tables of assessment, zone codes, local plan codes, overlay codes, development codes, schedules and planning scheme policies. The MRC planning scheme does not apply to SPL.

3.3.2 Application of management measures

The EBR provides an overview of the application of all identified management measures, including in Chapter 4.4 (Management measures – overview, Tables 4.2, 4.3, 4.4) for both Hay Point and Mackay, describing the values managed for each instrument along with the application of the instrument.

The key management measures applicable to proposed development activity at the Ports of Hay Point and Mackay and surrounds (Table 3-3) are contingent on various factors including the geographic location of development, the scope of activity and/or the values potentially impacted by the development:

- Dependent on geographic location and activity, new port development will require approval of land use under:
  - The LUP and associated port development guidelines for development within SPL
  - The MRC planning scheme for development within the Mackay Regional Council area
  - The GBRMP Act for development within the marine park.
- Dependent on activity and/or values potentially impacted new port development will require:
  - Approval under the Planning Act, with consideration of associated legislation and SDAP
  - Environmental Authority under the EP Act
  - Approval under the EPBC Act
  - Approval under the Sea Dumping Act.
- Dependent on the significance of environmental effects and complexity of approval requirements (among other things) proposed port development activity may be categorised as a 'coordinated project' under the SDPWO Act, requiring impact assessment either by a comprehensive EIS or a targeted IAR.

By way of example, Table 3-4 shows the key management measures that would typically be applied to port-related development activities with the potential to result in impacts on environmental values within and surrounding the master planned area.

Table 3-4 Key management measures typically applied to port-related development activities

Port-related development activities identified by TMR	Key management measures
Capital dredging	Approval under the relevant local planning instrument i.e., LUP and associated port development guidelines and/or MRC planning scheme. Approval under the GBRMP Act for development within the marine park. Approval for activities such as coastal development, tidal works and removal or destruction of marine plants (approval under the Planning Act or under the *Coastal Protection and Management Act 1995* and *Fisheries Act 1994*). Environmental Authority under the EP Act for dredging. Approval under the EPBC Act for significant impacts on MNES.
New or expanded port and supply chain infrastructure	Approval under the relevant local planning instrument i.e., LUP and associated port development guidelines and/or MRC planning scheme. Approval for activities such as vegetation clearing, coastal development, tidal works and removal of marine plants (approval under the Planning Act or under the *Vegetation Management Act 1999*, *Coastal Protection and Management Act 1995* and *Fisheries Act 1994*). Approval under the EPBC Act for significant impacts on MNES.

Port-related development activities identified by TMR	Key management measures
Establishment of new port-related industries	Approval under the relevant local planning instrument i.e., LUP and associated port development guidelines and/or MRC planning scheme. Approval under the Planning Act for activities such as vegetation clearing, coastal development and tidal works and removal or destruction of marine plants. Environmental Authority under the EP Act for activities such as bulk material handling. Approval under the EPBC Act for significant impacts on MNES.

4 Risk assessment

4.1 Overview

The risk assessment applied the TMR Method. For each of the identified values, consideration was given to potential development activities and impacts, threats or pressures to those values. An assessment was undertaken of uncontrolled or 'initial risk' posed by the potential impacts to the values, followed by controlled or 'post-management risk' with matters for consideration identified.

A risk assessment table (refer to Appendix A and Appendix B) was used to capture the risk assessment, including the initial and post-management risk levels along with associated and supporting commentary. Commentary with respect to the post-management risk ratings was provided in the table as 'matters for consideration'. This includes further detail to explain the risk rating outcomes and rationale as to why/why not the matter may require further address during master plan and overlay preparation.

The risk assessment table addressed values identified in the EBR under the following groups:

- Marine values
- Land values
- Cultural heritage values
- Social values.

4.2 Risk assessment tools

The risk assessment approach followed the TMR Method for initial analysis. The risk assessment tools consisted of:

- A risk matrix (Table 4-1), noting that the target risk profile for TMR is 'Low' or a positive outcome for the value
- Likelihood and consequence definitions (Table 4-2 and Table 4-3 respectively), noting that as shown in Table 4-3, 'consequence' contemplates the presence or absence of important values at the port, along with the severity of potential impacts to values.

Table 4-1 TMR risk matrix

Consequence / Likelihood	Rare	Unlikely	Possible	Likely	Almost certain
Positive	Positive	Positive	Positive	Positive	Positive
Minor	Low	Low	Low	Low	Low
Moderate	Low	Medium	Medium	Medium	Medium
Major	Medium	Medium	High	High	High

Table 4-2 TMR likelihood definitions

Likelihood	Definition
Almost certain	Is expected to occur as a regular or unavoidable result of development
Likely	Will probably occur as a result of development within planning horizon of the master plan (2050)
Possible	Might occur as a result of development within planning horizon of the master plan
Unlikely	Unlikely to occur as a result of development within planning horizon of the master plan
Rare	Extremely unlikely to occur as a result of development within planning horizon of the master plan

Table 4-3 TMR consequence definitions

Definition	Environmental values	Social values	Cultural heritage values
Positive	Positive environmental outcomes	Positive social and community outcomes	Improved protection and opportunity to appreciate heritage values
Minor	Impact is present but not to the extent that it would impair the overall condition of the ecosystem, OUV, sensitive population or community in the long term	Disruption to social amenity or demand on services for 1-12 months	Minor or reversible disruption to access or appreciation of heritage values
Moderate	Impact is present at either a local level for a period of 0 - 10 years but would not affect local expression of a GBR OUV. If environmental values are high, recovery periods of 0 - 10 years anticipated	Impact to multiple community sectors or businesses for 1-5 years	Temporary loss of access to heritage values Loss of appreciation of heritage value
Major	Impact is significant at either a local or wider level or to a sensitive population or community Impacts of a temporary nature (0 – 10 years) to the local expression of a GBR OUV. OR If environmental values are high, recovery periods of greater than 10 years are likely	Prolonged negative impact to multiple community sectors or businesses with limited ability to adapt or recover (5 or more years) OR Permanent or long-term decline in social or community profile	Restricted access and/or reduction to condition or quality of heritage value and appreciation OR Permanent alteration or loss of heritage values

Definition	Environmental values	Social values	Cultural heritage values
	OR Condition of an affected part of the ecosystem/environmental value or local expression of a GBR OUV is irretrievably compromised		

The assessment of post management risk was supported by a rating of management measures application (Table 4-4) where management measures rated as '1*' provide greater confidence for application and therefore reduction of risk than management measures rated as '3*'.

Table 4-4 Application of relevant management measures

Rating	Application	Examples
1*	Values are identified and potential impacts from development are specifically managed through existing regulatory processes: • Values and potential impacts are transparently identified and addressed in assessment processes with rigorous and legally binding requirements applied to manage impacts.	This category includes legislation and land planning instruments with mandatory development controls targeting the protection of environmental values. Examples include: • EPBC Act: regulates impacts to specific environmental and cultural heritage matters listed under the Act (MNES) such as particular vegetation communities or migratory species • *Vegetation Management Act 1999*: protects Queensland native vegetation • MRC planning scheme: includes development controls targeting protection of values such as water quality, native vegetation and amenity.
2**	Values and potential impacts from development are generally managed through existing regulatory processes: • Values and potential impacts are generally identified and addressed in assessment processes with the potential for requirements to be applied to development or activities.	This category includes: • mandatory instruments (legislation, land planning instruments, policies with mandatory provisions) that either indirectly address impacts on a value or parts thereof (e.g., Sustainable Ports Act restricting capital dredging to priority ports, thereby indirectly limiting the magnitude of impacts from dredging) • instruments that require local planning schemes to integrate specific measures to regulate impacts on particular values (e.g., State Planning Policy).
3***	Values and potential impacts from development are somewhat managed through discretionary or non-regulatory processes: • Values and potential impacts are partially identified with assessment or management providing some guidance on implementation.	This category includes non-mandatory instruments such as policies. Examples include: Reef 2050 Long-Term Sustainability Plan and Mackay, Isaac and Whitsunday Regional Plan.

4.3 Values

For the purposes of the initial analysis, the following overarching values identified in the EBR were used in the risk assessment for both Hay Point and Mackay:

- Marine-based environmental values
  - Marine and estuarine water quality that supports aquatic ecosystems
  - Coastal processes such as bathymetry, tides, currents, waves and sediment transport
  - Marine plants including mangroves, saltmarsh, seagrass, macroalgae
  - Coral reefs including near-shore and mid-shelf reefs
  - Fish and Fish Habitat Areas
  - Marine reptiles, marine mammals and migratory marine species
- Land-based environmental values
  - Terrestrial vegetation communities and ecosystems
  - Listed threatened and migratory species and associated habitat
  - Surface water resources, including water quality that supports aquatic ecosystems
  - Groundwater resources that support aquatic ecosystems
  - Wetlands such as the Sandringham Bay - Bakers Creek Aggregation near Hay Point and associated ecosystems
- Cultural heritage
  - Indigenous cultural heritage
  - Historical heritage
- Social values associated with health and amenity of surrounding communities including air and noise environment along with visual amenity and road safety
- Social values associated with health and safety of surrounding communities and as relevant to industrial safety.

The contribution of attributes to the OUV of the GBRWHA (Table 4-5) was flagged in the risk assessment table for each environmental value (as relevant) and was considered in the risk assessment for the initial analysis (refer to Section 4.2).

Table 4-5 Local attributes of the Outstanding Universal Value of the Great Barrier Reef World Heritage Area

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
Corals	Coral reefs (400 species of corals in 60 genera)				Min	Reefs present in the waters offshore waters include: Flat Top Island, Keswick Island and St Bees Island, Hay Reef, Victor Islet, Victor Island, Round Top Island and Dudgeon Point. Fringing reefs are present at Victor Island and Round Top Island. Inshore turbid coral reefs communities are present at Hay Reef, which is located between the existing jetties at the Hay Point terminal, Taroba Rocks, Slade Island/Slade Rock, Dangerous Reef and Downward patches. They are also present in shallow waters south of Dudgeon Point. Common corals in the turbid marine environment include *Montipora, Acropora, Pocillopora* and *Turbinaria*, as well as a diverse range of soft corals, sea fans, ascidians and hydroids. These coral reef areas are important habitat for locally important fish and other marine species. The nearest significant coral reef ecosystems to Hay Point are over 20 kilometres distance. The inshore reefs of the region are relatively small and limited in extent in comparison to other inshore reefs. They have relatively low diversity and low cover. They have persisted over time with fluctuations driven mainly by cyclonic disturbances. As the reefs are relatively isolated from other systems they tend to be regenerative. The size and density of inshore reefs does not result in the mass spawning events more commonly associated with mid shelf and outer reefs. Local spawning is important for ongoing presence of the reefs but it is not on a level of the mass phenomenon that if of importance for reef persistence across the wider World Heritage Area.
	Coral reef ecosystem		Min			
	Inshore fringing reefs, mid-shelf reefs, and exposed outer reefs		Min			
	Hard and soft corals	Min				
	Coral reefs, sand banks and coral cays			Min		
	Coral spawning	Min				

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
Mangroves	Diversity of mangroves				Mod	The Hay Point area has 22 hectares of mangroves within enclosed wetland areas. There are 21 species present in wetlands of national importance. Minor stands of mangroves can be found at Half Tide Beach and an extensive community at Louisa Creek. The most common species include the Red Mangrove (*Rhizophora stylosa*), Grey Mangrove (*Avicennia marina*) and Yellow Mangrove (*Ceriops australis*).
	Vast mangrove forests	Mod				Important areas of mangroves include: • The Sandringham Bay – Bakers Creek Aggregation, listed as a wetland of national importance due to its mangrove diversity • Hay Point Peninsula • Sarina Inlet – Ince Bay Aggregation (predominantly south of the study area) • Slade Point and McCready's Creek • Basset Basin, an estuary of the Pioneer River.
Seagrass and macroalgae	Beds of *Halimeda* algae			Min		Macroalgae communities in this region are considered to be variable in terms of density and frequency of occurrence with species observed including Sargassum, Udotea and Caulerpa. In the area surrounding Hay Point Port, macroalgae density is low (<1-5 per cent), while the seafloor offshore of both ports supports large areas of medium density algae (5-20 per cent).

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
	Diversity of seagrass				Min	Meadows provide foraging habitat for species of turtles and dolphins and nursery habitat for a diversity of fish species. There are seagrass habitats off Hay Point and Mackay in shallow water and in mid-shelf deeper water, containing four species of seagrass: • *Halpphila decipiens* • *Halophila ovalis* • *Halophila spinulosa* • *Halodule uninervis.* • *Halophila tricostata* (Mackay only) Deepwater seagrass meadows are also present at Hay Point but are low and medium densities. Other occasional visitors include the leatherback turtles (*Dermochelys coriacea*) and loggerhead turtles *(Caretta caretta)*.
Marine turtles	Marine turtles				Min	Species of marine turtles present include: • Green turtle • Loggerhead turtle (occasional sightings) • Leatherback turtle
	Green turtle breeding	Min			Min	
	Nesting turtles	Mod				

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
	Marine turtle rookeries				Mod	• Hawksbill turtle • Olive Ridley turtle • Flatback turtles. The inshore areas of the port support a population of resident Green turtles that forage on the algae covered reefs and deep-water seagrass. Green turtles (*Chelonia mydas*) are the most frequently observed marine turtle, with nesting recorded by Mackay Turtle watch on beaches in the Mackay region including Bucasia Beach, Blacks Beach, North Harbour Beach and Salonika Beach. Low density Flatback Turtle nesting has been observed within the Port on Hay Point Beach and Salonika Beach and at Dudgeon Point and Mt Hector Conservation Area between the months of November and April. Flatback turtles (*Natator depressus*) are the dominant nesting species in this region and nesting sites occur on the mainland beaches between November and April. Haliday Bay north of Mackay is recognised as one of the most important Flatback turtle nesting beaches in the Mackay Region. There are peripheral Flatback turtle rookeries at Hay Point Beach, Salonika Beach and Sarina Beach. Green turtles have been recorded at Bushy Islet (approximately 80 kilometres off the Mackay coast).
Marine mammals	Migrating whales	Mod				Humpback whales migrate through the project area annually between June and October (peak in August). Females with calves have been observed within the Hay Point port limits. Core aggregation and calving areas for migrating Humpback whales are located approximately 80 kilometres east of Mackay. The waters off Mackay (approximately 100 kilometres from the coast) have been identified as important wintering areas for Humpback whales, particularly in the inner reef lagoon.

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
	Species of whales				Mod	Humpback Whales *(Megaptera novaeangliae)* is the most prevalent in this area. The Sei Whale (*Balaenoptera musculus*) and Fin Whale (*Balaenoptera physalus*) are occasionally observed.
	Dugong				Min	There are low density seagrass meadows that dugongs may use for foraging while transiting between dugong protection areas north and south of the port.
	Species of dolphins				Mod	A number of species of dolphins occur in the waters off Hay Point. The most prevalent species is the Australia Humpback Dolphin (*Sousa sahulensis*) and others include the Spotted Dolphin (*Stenella attenuate*), Indian Ocean Bottlenose Dolphin (*Tursiops aduncus*), Australian Humpback Dolphin (*Sousa sahulensis*) and potentially the Irrawaddy Dolphin (*Orcaellabrevirostris*). The Australian Snubfin Dolphin (*Orcaella heinsohni*) may also occur in the riverine and estuarine areas of the bays and lagoons.
Landscapes and seascapes	Green vegetated islands	Min				Vegetated islands include Round Top Island and Flat Top Island (Yuwi Paree-Toolkoon National Park), Slade Island, Keswick Island, Victor Island and St Bees Island. These islands include varying degrees of vegetation, some with remnant areas.
	Continental islands		Min			Continental islands include Keswick Island, St Bees Island and Prudhoe Island.
	Vegetation of the cays and continental islands			Min		
	Unique and varied seascapes and landscapes		Min			There is a variety of seascapes and landscapes that are well represented across the GBRWHA including beaches, coastal dunes, river deltas, wetlands, mangroves,

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
	Significant diversity of reef and island morphologies that reflects ongoing geomorphic, oceanographic and environmental processes			Min		sand beaches, mudflats, open water, coastal islands and coral reefs.
	Superlative natural beauty	Mod				Large aggregations of shorebirds, seabirds and migratory birds at Sandringham Bay, Dudgeon Point and other estuarine wetlands areas. Ocean and island vistas.
Species diversity	Over 4000 species of molluscs and over 1500 species of fish, plus a great diversity of sponges, anemones, marine worms, crustaceans			Min		There are diverse marine and terrestrial habitats including coral reefs, mangroves, seagrass, macroalgae, wetlands, continental islands, intertidal areas and beaches. These support a range of invertebrate and macroinvertebrate species.
	Thousands of species of reef fish	Min				The inshore and fringing reefs support reef fish communities. The reef fish communities in this region are comprised of typical inshore fishes including wrasses, damselfishes, angelfishes, bufferfly fishes and snapper.

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
	Diversity supporting marine and terrestrial species (global conservation significance)				Mod	Nationally important wetlands in the study area include the Sandringham bay – Bakers Creek Aggregation and the Sarina Inlet – Ince Bay Aggregration (predominantly south of the study area). A total of 31 listed migratory wetland species are either known to inhabit or visit these wetlands, or have habitat or roosting sites suitable for their visitation within the project area There is the additional moderate presence of whales, dolphins and flatback turtle nesting. State significant wetlands within the study area include the Keeleys Road wetlands to the east of the Port of Mackay. Locally significant wetlands include those at the mouth of the Pioneer River.
	Plant species and diversity and endemism (species being unique to a defined geographic location)				Min	One Threatened Ecological Community (TEC), the critically endangered Littoral Rainforest and Coastal Vine Thickets of Eastern Australia is likely to be present within the study area. Listed flora species includes Bluegrass (*Dichanthium setosum*), Black Ironbox (*Eucalyptus raveretiana*), an evergreen vine thicket (*Omphalea celata*), Lesser Swamp Orchid (*Phaius australis*), Holly-Leaved Graptophyllum (*Graptophyllum ilicifolium*).
	Important role of birds, such as the pied imperial pigeon, in processes such as seed dispersal and plant colonisation			Min		The seed dispersal role played by birds is important in terrestrial environments and particularly to help maintain biological and genetic diversity between vegetated islands and the mainland. The Imperial pigeon for instance migrates daily as flocks from the islands to the mainland rainforests to eat fruit, returning to the islands at dusk. These environments are limited and sparse and as such the ecological role of birds in spreading seeds is minor.
	Breeding colonies of seabirds and marine turtles	Min				There is significant habitat for shorebird and migratory birds which vary from year to year. There are internationally recognised roosting

Category	Local attribute	Relevant OUV criteria and contribution classifications				Summary of the key environmental values
		vii	viii	ix	x	
	242 species of birds				Sig	sites at Sandringham Bay that supports up to 23,000 shorebirds each year during annual migration. Estuarine wetlands associated with the local rivers and bays which provide breeding habitat for resident shorebird species. The Mackay Region is recognised as the fifth most important site for shorebirds in Queensland. Eighteen different shorebird species utilise habitats in the Mackay regions for foraging and roosting. There are areas at Dudgeon Point where large emergent trees are present and provide suitable nesting sites for large raptors such as the White-bellied Sea Eagle (*Haliaeetus leucogaster*). Eshelby Island, 1200 kilometres north west of Mackay and Bushy Islet, 90 kilometres east of Mackay are recognised as regionally important breeding site for seabirds within the Whitsunday region.
	22 seabirds species breeding				Min	
Coastal processes	Cross-shelf, longshore and vertical connectivity			Min		Offshore areas form part of the larger longshore connections within the Great Barrier Reef lagoon. Intertidal and estuarine habitats connecting terrestrial and marine habitats

4.4 Potential impacts

For the purposes of the initial analysis, the following potential impacts of development activities to values were identified in the EBR and used in the risk assessment:

- Potential impacts to marine and estuarine water quality:
  - Maintenance and/or capital dredging causing increased sedimentation and turbidity
  - Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants
  - Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions
  - Disturbance of ASS during construction and operational activities

  - Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants.
- Potential impacts to coastal processes:
  - Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport
  - Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.
- Potential impacts to marine plants:
  - Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities
  - Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat
  - Elevation of sea surface temperature due to climate change resulting in degradation or loss of marine plant habitat
  - Sea level rise caused by climate change resulting in the degradation or loss of marine plant habitat in intertidal areas (additional to those identified in the EBR).
- Potential impacts to coral reefs:
  - Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat
  - Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.
- Potential impacts to fish and Fish Habitat Areas:
  - Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and

dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat

  - Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.

- Potential impacts to marine reptiles, marine mammals and marine migratory species:
  - Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat
  - Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.
- Potential impacts to terrestrial vegetation communities and ecosystems:
  - Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat
  - Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat
  - Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.
- Potential impacts to listed threatened and migratory species:
  - Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species
  - Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species

  - Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike)
  - Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality
  - Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.
- Potential impacts to surface water resources:
  - Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants
  - Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions
  - Disturbance of ASS during construction and operational activities
  - Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.
- Potential impacts to groundwater:
  - Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction.
- Potential impacts to wetlands:
  - Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems
  - Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat
  - Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat
  - Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species
  - Increased weed and pest pressure on wetland ecosystems due to construction and operational activities, including through increased availability of access.
- Potential impacts to Indigenous cultural heritage:
  - Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.

- Potential impacts to historical heritage:
  - Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites.
- Potential impacts to social values associated with amenity of surrounding communities:
  - Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities
  - Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.
- Potential impacts to social values associated with industrial safety:
  - Industrial incident causing harm or health impacts to surrounding communities.

4.5 Initial risk

The initial risk assessed the likelihood of each development type (i.e., Special, Medium/High, Low Impact development[1]) to cause the listed potential impacts, threats or pressures[2] and the consequence level on the environmental value[3] considered.

The assessment of initial risk assumed that there are no management measures (legislative and planning instruments) in place to control potential impacts, threats or pressures associated with development activities. This is the reason why some risks are ranked 'high', particularly for the Special Development category.

The risk scoring took into consideration any port-specific features (environmental or other). For instance, at the Port of Hay Point, the presence of the Sandringham Bay - Bakers Creek Aggregation wetlands near port areas leads the initial risk to be high for both Special Development and High/Medium impact Development.

4.6 Post-management risk

The assessment of post-management risk considered the existing management measures (legislative and planning instruments) that would be applied to prevent or mitigate the potential impact, thereby managing and reducing the risk. Consideration was given to Commonwealth, Queensland and local government regulatory and planning instruments.

The post-management risk assessment was primarily focussed on the application of regulatory and planning instruments to the listed potential impacts, their capacity to regulate them and reduce the initial risk level. It should be noted that the risk assessment considered whether regulatory and planning instruments apply to the listed threats. It did not assess the way the management measures are implemented/administered by regulators.

[1] Refer to Section 3.2 for a description of each development type.
[2] Potential impacts, threats or pressures were sourced from the EBR and are discussed in Section 4.4.
[3] Refer to Section 4.3 for a description of the values sourced from the EBR.

Acknowledging that regulatory and planning instruments work together in a framework to regulate development, multiple instruments may apply to each potential impact, depending on the type of impact, type of development and location of the development. This combined application of instruments is illustrated in Figure 4-1.

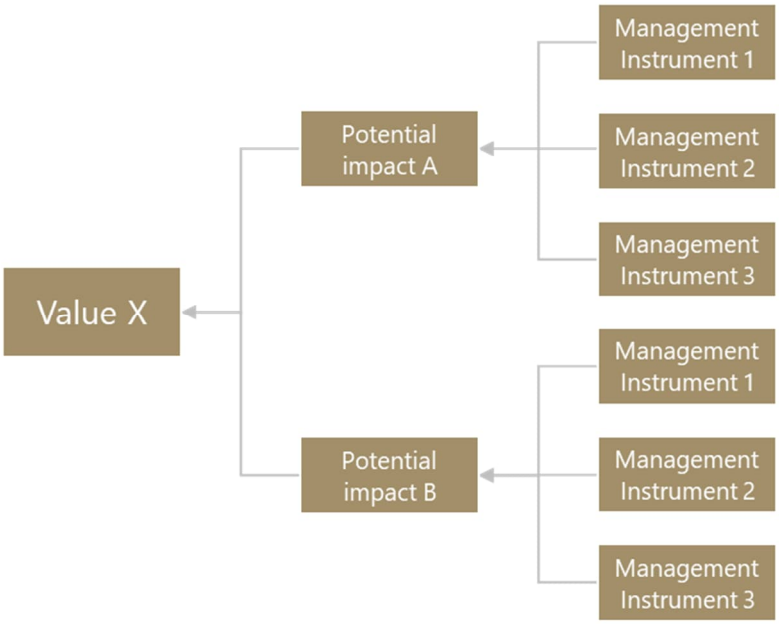

Figure 4-1 Combined application of regulatory and planning instruments to potential impacts on a value

The post-management risk assessment considered two aspects for each impact:

1. Firstly, the application of each of the individual instruments, i.e., the application of the individual instrument to regulating the potential impact, or part thereof, within the instrument's stated purpose
2. Secondly, the combined application of all instruments relevant to the identified potential impact.

As such, the post-management risk assessment identified if a potential impact is not, or is incompletely, addressed by the combined application of all instruments relevant to that potential impact.

4.6.1 Application of each regulatory and planning instrument

The rating of each regulatory and planning instrument (as per Table 4-4) was used in the risk assessment to alter the consequence and/or likelihood of the post-management risk. Table 4-6 describes how the rating of each instrument typically influenced the post-management risk rating.

Table 4-6 Effect of regulatory and planning instrument rating on post-management risk rating

1*/2**/3*** instrument rating	Effect of application of regulatory/planning instrument on risk rating
1*	With reference to the Initial Risk rating, Consequence rating was typically reduced to Minor. Likelihood rating may have been reduced subject to risk description and instrument.
2**	With reference to the Initial Risk rating, Consequence rating may have been reduced by one category (e.g., Major to Moderate or Moderate to Minor) pending risk description and instrument. Likelihood rating may have been reduced subject to risk description and instrument.
3***	With reference to the Initial Risk rating, Consequence may have been reduced by one category (e.g., Major to Moderate or Moderate to Minor) subject to risk description and instrument.

4.6.2 Combined application of all regulatory and planning instruments

The 'combined risk' is a rating of the combined application of all regulatory and planning instruments that address one or more threats listed for a given value. The combined post-management risk reflected the combined application of existing management measures in managing potential impacts of development on each value e.g., the presence of Commonwealth and Queensland Government regulatory and planning instruments combined with local government planning controls may be sufficient to reduce the post-management risk to low.

4.7 Matters for consideration

The description of matters for consideration summarised how the regulatory/planning instrument(s) apply to one or multiple threats listed for a particular environmental value.

The initial analysis identified potential impacts that may not be managed to be of low risk through application of existing management measures. The risk assessment table included a description of why a matter should or should not be further considered, for example, in relation to the interaction of instruments, locational differences, level of assessment, land use intent or local expression of OUV.

5 Findings

This section presents the findings of the initial analysis. It is important to note that the initial analysis is not intended to provide recommendations regarding how identified gaps should be addressed in the master plan and/or port overlay.

5.1 Summary risk assessment table

5.1.1 Hay Point

Table 5-1 presents a summary of the key outcomes of the Port of Hay Point risk assessment with full copy of the risk assessment attached at Appendix A. Table 5-1 also explains the rating of the post-management risk for each potential impact.

In Table 5-1 and in the risk assessment tables in Appendix A and Appendix B:

- The column on 'potential impacts, threats or pressures' describes the types of impacts that could affect each value, as identified in the EBR
- The risks levels are defined as follows:
  - Initial risk: risk level if none of the current management measures existed (refer to "Initial risk" tables in Appendix A and Appendix B)
  - Post-management risk: risk level when applying current management measures (i.e., excluding the master plan and port overlay) (refer to "Post-management risk" tables in Appendix A and Appendix B)
- The column on 'findings' provides the justification for the post-management risk ranking for each potential impact.

Values of key importance at the Port of Hay Point are those listed in Section 3.1.2. The risks to these values included in Table 5-1 are therefore of particular importance at Hay Point.

Table 5-1 Summary risk assessment table – Hay Point

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Marine			
1. Marine and estuarine water quality			
Maintenance and/or capital dredging causing increased sedimentation and turbidity. Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive. Within the rural zone, the following uses are accepted development under the WRC planning scheme: (non-intensive) animal husbandry, cropping (<5ha on previously uncropped land), sewage treatment plant <100 EP and small intensive industry (e.g., 20 cattle). These activities do not require development approval under the planning scheme and do not require State approval under the Planning Act or as Environmentally Relevant Activity under the Environmental Protection Act. This could lead to unregulated discharge of contaminants in waterways. However, the risk is considered low.
Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions.	Medium	Low	
Disturbance of ASS during construction and operational activities.	Medium	Low	
Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants.	Medium	Medium	The increase in intensity of storm surge and heavy rainfall events caused by climate change and threatening the health and quality of coastal waters is not addressed in any instrument considered in the initial analysis. Both initial and post-management risks are medium due to the current water quality within the Hay Point study area being already affected by elevated loads of sediment, nutrients and contaminants.
2. Coastal processes			
Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
(such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport.			impacts/threats/pressures from new development is comprehensive.
Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.	High	Medium	While some existing regulatory measures (e.g. coastal management district, erosion prone areas) will assist in indirectly mitigating impacts to coastal areas from sea level rise, no instrument considered in the initial analysis addresses climate change as the root cause.
3. Marine plants			
Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments.	High	Low	
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat.	High	Low	
Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat.	Medium	Medium	The threat of rising sea surface temperature above tolerance thresholds of seagrass resulting in impacts to seagrass is not addressed in any instrument considered in the initial analysis. Both initial and post-management risks are medium due to the relatively low density and quality of seagrass populations within the Hay Point study area.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Sea level rise caused by climate change resulting in the degradation or loss of marine plant habitat in intertidal areas.	High	High	The threat of sea level rise caused by climate change on intertidal areas is not addressed in any regulatory instrument considered in the initial analysis. The initial risk is high due to the important amount of mangrove areas within the Hay Point study area that have important value for fisheries, coastal water quality and coastal protection. The post-management risk remains high due to the absence of regulatory instrument addressing climate change as the root cause of sea level rise and absence of mitigation measures in existing regulatory instruments against sea level rise impacts on intertidal fauna and flora habitat.
4. Coral reefs			
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments is effective at regulating these potential impacts/threats/pressures from new development.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat.	Medium	Low	
Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.	Medium	Medium	The threats of increased ocean acidification from anthropogenic CO_2 emissions and increased water temperatures causing impacts to coral such as bleaching are not addressed under any instrument considered in the initial analysis. Both initial and post-management risks are medium due to the low quantity and relatively low importance of coral reefs within the Hay Point study area.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
5. Fish and Fish Habitat Areas			
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat.	Medium	Low	
Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.	Medium	Low	
6. Marine reptiles, marine mammals and marine migratory species			
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat.	Medium	Low	
Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	Medium	Low	

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Land			
7. Terrestrial vegetation communities and ecosystems			
Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat.	High	Low	
Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat.	High	Low	
Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.	High	Low	
8. Listed threatened and migratory species			
Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species.	High	Low	

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species.	High	Low	
Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike).	High	Low	
Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	High	Low	
Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.	High	Low	
9. Surface water resources			
Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions.	High	Low	
Disturbance of ASS during construction and operational activities.	High	Low	
Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.	High	Low	

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
10. Groundwater			
Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
11. Wetlands			
Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat.	High	Low	
Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat.	High	Low	
Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species.	High	Low	
Increased weed and pest pressure on wetland ecosystems due to construction and operational activities, including through increased availability of access.	High	Low	

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Cultural heritage			
12. Indigenous cultural heritage			
Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.	Low	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
13. Historical heritage			
Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites.	Low	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Social			
14. Amenity of surrounding communities			
Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.	High	Medium	The post-management combined risk rating for potential impact to social values associated with amenity was assessed as 'medium' because there are some areas where sensitive land uses may be approved in future in the vicinity of SPL, thereby presenting future amenity and reverse amenity impact risks.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
15. Industrial safety			
Industrial incident causing harm or health impacts to surrounding communities.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.

5.1.2 Mackay

Table 5-2 presents a summary of the key outcomes of the Port of Mackay risk assessment with full copy of the risk assessment attached at Appendix B. Table 5-2 also explains the rating of the post-management risk for each potential impact.

In Table 5-2 and in the risk assessment tables in Appendix A and Appendix B:

- The column on 'potential impacts, threats or pressures' describes the types of impacts that could affect each value, as identified in the EBR
- The risks levels are defined as follows:
  - Initial risk: risk level if none of the current management measures existed (refer to "Initial risk" tables in Appendix A and Appendix B)
  - Post-management risk: risk level when applying current management measures (i.e., excluding the master plan and port overlay) (refer to "Post-management risk" tables in Appendix A and Appendix B)
- The column on 'findings' provides the justification for the post-management risk ranking for each potential impact.

Values of key importance at the Port of Mackay are those listed in Section 3.1.2. The risks to these values included in Table 5-2 are therefore of particular importance at Mackay.

Table 5-2 Summary risk assessment table – Mackay

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Marine			
1. Marine and estuarine water quality			
Maintenance and/or capital dredging causing increased sedimentation and turbidity Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions	Medium	Low	
Disturbance of ASS during construction and operational activities	Medium	Low	
Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants	Medium	Medium	The increase in intensity of storm surge and heavy rainfall events caused by climate change and threatening the health and quality of coastal waters is not addressed in any instrument considered in the initial analysis. Both initial and post-management risks are medium due to the current water quality within the Mackay study area being already affected by elevated loads of sediment, nutrients and contaminants.
2. Coastal processes			
Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.	High	Medium	While some existing regulatory measures (e.g. coastal management district, erosion prone areas) will assist in indirectly mitigating impacts to coastal areas from sea level rise, no instrument considered in the initial analysis addresses climate change as the root cause.
3. Marine plants			
Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments	High	Low	
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat	High	Low	
Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat.	Medium	Medium	The threat of rising sea surface temperature above tolerance thresholds of seagrass resulting in impacts to seagrass is not addressed in any instrument considered in the initial analysis. Both initial and post-management risks are medium due to the relatively low density and quality of seagrass populations within the Mackay study area.
Sea level rise caused by climate change resulting in the degradation or loss of marine plant habitat in intertidal areas.	High	High	The threat of sea level rise caused by climate change on intertidal areas is not addressed in any regulatory instrument considered in the initial analysis. The initial risk is high due to the important amount of mangrove areas within the Mackay study area that have important

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
			value for fisheries, coastal water quality and coastal protection. The post-management risk remains high due to the absence of regulatory instrument addressing climate change as the root cause of sea level rise and absence of mitigation measures in existing regulatory instruments against sea level rise impacts on intertidal fauna and flora habitat.
4. Coral reefs			
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat.	Medium	Low	
Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.	Medium	Medium	The threats of increased ocean acidification from anthropogenic CO_2 emissions and increased water temperatures causing impacts to coral such as bleaching are not addressed under any instrument considered in the initial analysis. Both initial and post-management risks are medium due to the low quantity and relatively low importance of coral reefs within the Mackay study area.
5. Fish and Fish Habitat Areas			
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat.	Medium	Low	
Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.	Medium	Low	
6. Marine reptiles, marine mammals and marine migratory species			
Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport.	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat.	Medium	Low	
Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	Medium	Low	
Land			
7. Terrestrial vegetation communities and ecosystems			
Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge	High	Low	

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems.			The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat.	High	Low	
Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat.	High	Low	
Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.	High	Low	
8. Listed threatened and migratory species			
Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species	High	Low	
Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species	High	Low	

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike)	High	Low	
Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality	High	Low	
Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.	High	Low	
9. Surface water resources			
Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions	High	Low	
Disturbance of ASS during construction and operational activities	High	Low	
Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.	High	Low	
10. Groundwater			
Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction	Medium	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
11. Wetlands			
Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat.	High	Low	
Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat.	High	Low	
Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species.	High	Low	
Increased weed and pest pressure on wetland ecosystems due to construction and operational activities, including through increased availability of access.	High	Low	
Cultural heritage			
12. Indigenous cultural heritage			
Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.	Low	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.

Potential impacts, threats or pressures	Initial risk *(Based on worst-case risk level)*	Post-management risk	Findings
13. Historical heritage			
Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites.	Low	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Social			
14. Amenity of surrounding communities			
Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.	High	Low	
15. Industrial safety			
Industrial incident causing harm or health impacts to surrounding communities.	High	Low	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.

5.2 Overall findings

The Commonwealth, State, local government and port instruments regulate potential impacts from proposed development within their respective remit. They also complement each other to create a mesh able to regulate potential impacts from proposed development of various magnitude.

Post-management risks were rated (Table 5-1, Table 5-2, Appendix A and Appendix B) 'low' with the exception of:

- Post-management risks for both Port of Hay Point and Port of Mackay related to the potential impact of climate change which were rated as 'medium' and 'high'
- One post-management risk for the Port of Hay Point related to potential amenity impacts to neighbouring sensitive land uses which was also rated as 'medium'.

This confirms that the regulatory and planning framework applied to potential impacts identified in the EBR is comprehensive.

The remaining potential impacts not captured by the framework typically present a low risk that are, in many cases, expressly exempt from regulation such as via exemptions or 'accepted development' provisions. Some of these are referred to in Appendix A, and include the following:

- Operational work for waterway barrier works is accepted development under the Planning Act via the *Planning Regulation 2017* (Planning Regulation) subject to certain conditions being met
- Operational work for clearing of native vegetation is accepted development if the work complies with a vegetation clearing code
- Operational work for taking or interfering with water is accepted development under the Planning Regulation subject to certain conditions being met
- Clearing of native vegetation is exempt of approval under particular circumstances listed in the Planning Regulation.

5.3 Regulatory gaps identified

5.3.1 Climate change-related potential impacts, threats and pressures on environmental values

The EBR identifies climate change-related potential impacts to values associated with the Port of Hay Point, Port of Mackay and surrounding areas, as summarised below:

- Potential impacts to marine and estuarine water quality associated with increased intensity of storm events and storm surge due to climate change, causing elevated loads of sediment, nutrients and contaminants
- Vulnerability of coastal areas to sea level rise as the inland migration of wetlands is blocked by growing populations and developments
- Potential impacts to coastal processes associated with increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes
- Potential impacts to seagrass associated with elevation of sea surface temperature due to climate change resulting in degradation or loss of habitat

- Potential impacts to coral reefs associated with elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.

The post-management combined risk rating for the above-listed environmental values was assessed as 'medium' because:

- The contribution of new development to climate change-related threats is not addressed by any regulatory and planning instruments.
- Several values at risk from climate change impacts are local attributes of the OUV of the GBRWHA; however, they have only a minor to moderate contribution to the OUV. They are listed below (refer to Section 4.3, with further detail provided in the EBR):
  - Seagrass
  - Coral reefs, coral reefs ecosystem, inshore fringing reefs, mid-shelf reefs, and exposed outer reefs, and hard and soft corals
  - Wetlands including O'Connell and Pioneer wetlands.
- Values that are intrinsically associated with wetlands and marine shorelines at both ports, and have a significant contribution to the OUV, ares bird diversity as well as significant, nesting, feeding and breeding habitat for shorebird and migratory birds. It is unclear what negative or positive effects sea level rise will have on the wetlands or shorelines at both ports and how this will, in turn, affect associated bird life.

An additional risk identified is that of sea level rise caused by climate change resulting in the degradation or loss of marine plant habitat in intertidal areas. Its post-management risk rating was assessed as 'high' because:

- The contribution of new development to climate change-related threats is not addressed by any regulatory and planning instruments
- There are vast mangrove areas within the Hay Point and Mackay study areas that have important value for fisheries, coastal water quality and coastal protection
- Mangroves have a moderate contribution to the GBRWH OUV.

It is noted that the Hay Point LUP includes a Desired Environmental Outcome (DEO) on ecological processes (DEO ECOL. 5) stating that:

"Climate change assessment will form part of the design of projects on strategic port land as appropriate".

This DEO does not indicate that a climate change contribution assessment must consistently be undertaken for specific types or magnitude of development and does not specify whether the assessment must address the potential climate change-related impacts to environmental values as summarised above and detailed in the EBR.

Similarly, the NQBP Sustainable Port Development Guidelines, which support the LUP, address resilience of port infrastructure to climate change-related impacts but are silent on assessment of the contribution of port projects to climate change.

Climate change-related impacts have the potential to affect environmental matters protected at Commonwealth, Queensland and local government level, for example:

- The GBR is an MNES protected under the Commonwealth Government EPBC Act – coral reefs are at risk from climate change-induced ocean acidification, increased water temperatures and degrading water quality from increased runoff
- Marine plants are a Matter of State Environmental Significance (MSES) protected under the Queensland Government *Fisheries Act 1994* and Planning Act – seagrass and mangroves are at risk from climate change-induced rising sea surface temperature and sea level rise
- Urban development is regulated by local councils - the inland migration of wetlands caused by climate change-induced sea level rise is at risk of being blocked by urban development.

Additionally, it is widely recognised that concerted action at all levels of government and society is required to effectively reduce the threats posed by climate change.

As such, the regulatory gap cannot be attributed to a single regulatory or planning instrument as several instruments may address climate change-related impacts from new development.

5.3.2 Potential amenity impacts to neighbouring sensitive land uses – Hay Point

The EBR identifies potential impacts to social values associated with the Port of Hay Point and surrounding areas, including:

- Potential impacts associated with elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.

The post-management combined risk rating for the above-listed social values was assessed as 'medium' because there are some areas where sensitive land uses may still be approved in the vicinity of SPL, thereby representing future amenity risk.

The risk assessment identified the following:

- The MRC planning scheme addresses amenity and reverse amenity[4] in all zones by requiring sensitive land uses to be located, designed and operated to mitigate impacts from nearby uses generating amenity impacts (noting that provisions for the rural zone are less prescriptive)
- The MRC planning scheme addresses reverse amenity for sensitive land uses through the following overlays (refer to Figure 5-1):
  - Non-key resource area (KRA) quarry and associated buffer – under the overlay code, the performance outcome requires that sensitive land uses and reconfiguration of a lot that facilitate sensitive land uses are not located where they are adversely affected by impacts from non-KRA processing areas and transport routes (i.e., ground vibration, noise, odour, dust, visual, and vehicular access and safety) 1000 metres from rock quarries
  - High impact activity (including ports) and associated buffer - under the overlay code, the performance outcome requires that sensitive land uses, and reconfiguration of a lot that facilitate sensitive land uses, are not located where they are adversely affected by nuisance (noise, odour, emissions/dust, visual, lighting) from the High impact activity.

[4] Situation where a sensitive land use threatens to encroach into the 'buffer' or nuisance impact perimeter of industry premises.

The overlay code acceptable outcome AO2.2 leaves the possibility for a sensitive land use to locate within a High impact activity or High impact activity buffer if the sensitive land use is designed to ensure that the indoor noise objectives set out in the *Environmental Protection (Noise) Policy 2008* are met and the air quality objectives in the *Environmental Protection (Air) Policy 2008*, and any relevant national or international standard, are met.

The areas located outside SPL and within the High impact activity buffer (areas of purple shading in Figure 5-1) could be used for the establishment of a sensitive land use if the proponent can demonstrate the requirements from AO2.2 are met.

Some of these areas, particularly the area south of Dudgeon Point, currently adjoin undeveloped SPL. Assuming the nuisance assessment for proposed sensitive land uses in the High impact activities buffer area is based on land use at the time of the application, the absence of nuisance impact risks would currently be easy to demonstrate. Consequently, the approval of sensitive lands uses in these areas is theoretically possible. This could potentially lead to impacts on these sensitive land uses from future industrial development in the currently undeveloped areas of SPL. Equally, it could constrain future industrial development within SPL.

Similar outcomes may occur if a sensitive land use is approved because it is demonstrated that the current industrial activities will not cause nuisance impacts, yet these industrial activities may be replaced by more intense and potentially higher impacting activities as part of future development.

Additionally, development of sensitive land uses in some areas adjoining SPL (areas of orange shading in Figure 5-1, nominal one kilometre width from the SPL boundary) is not subject to the High impact activities overlay. Any sensitive land uses approved in these areas could be at risk of nuisance from future industrial development in adjoining SPL. Equally, it could also constrain future industrial development within SPL.

The following elements have been identified as relevant considerations for potential address of amenity and reverse amenity risks in master planning for the priority Port of Hay Point / Mackay:

- Location of the future port industry growth precincts to determine if the areas identified in Figure 5-1 may be at risk of amenity impacts from future industrial development within SPL
- Land ownership in the areas identified in Figure 5-1, to determine if ownership by the port authority (NQBP) adequately mitigates the risks described above
- MRC development plans in the areas identified in Figure 5-1.

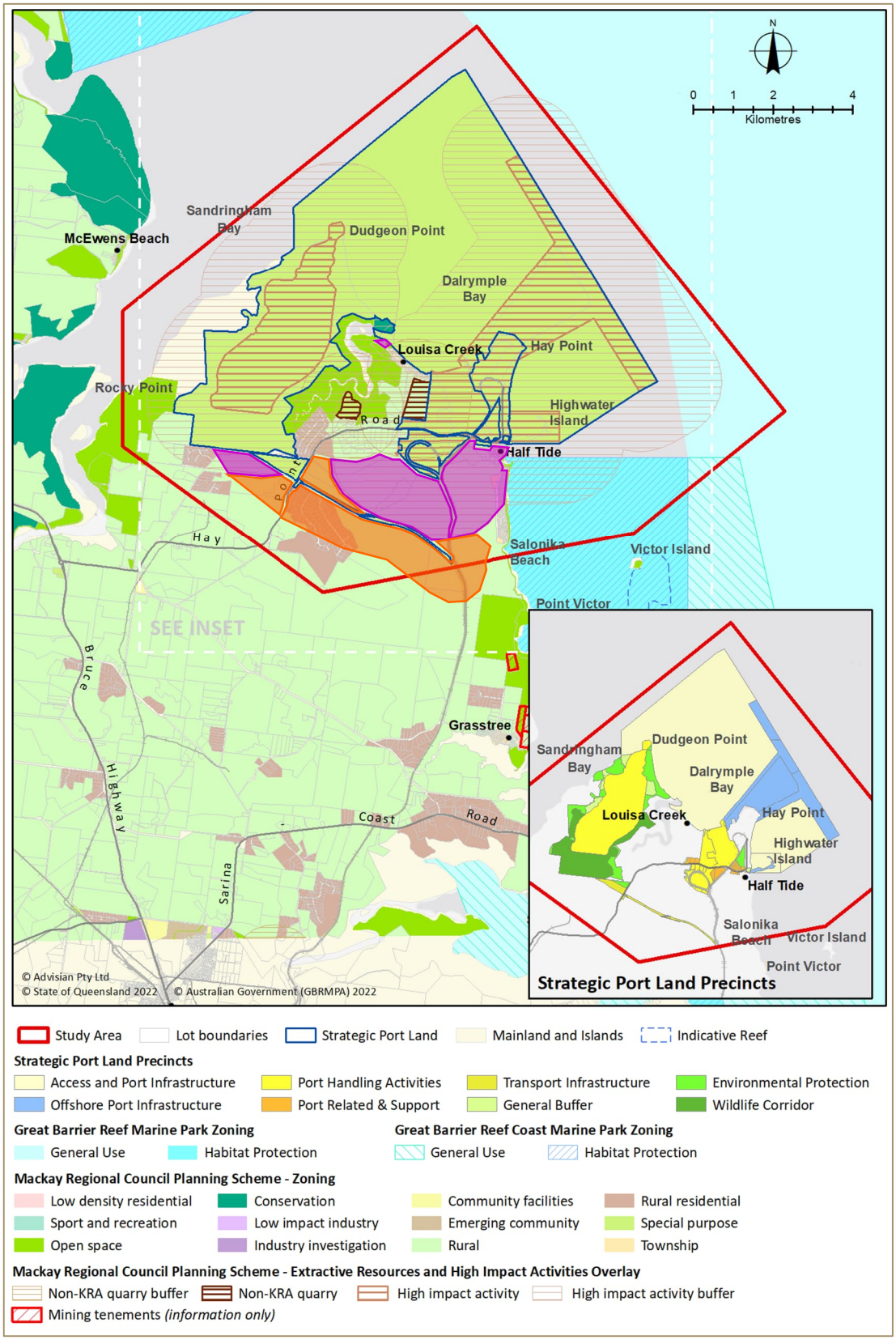

Figure 5-1 Areas of amenity risk – Hay Point

5.4 Consideration regarding geographical coverage of master planned area – Hay Point

As part of initial analysis, it was noted that the LUP precinct mapping does not include the area of mangroves and tidal flats of Sandringham Bay to the west of Dudgeon Point, as illustrated in Figure 5-2.

Currently, the Sandringham Bay mangrove and tidal flat areas appear to be an enclave of land not included in the scope of the Port of Hay Point land use planning and management.

Due to the topography of the Dudgeon Point area, the Sandringham Bay mangrove and tidal flat areas receive surface water drainage mostly from areas within SPL.

Therefore, it should be considered whether inclusion of the Sandringham Bay mangrove and tidal flat areas in the master planned area would achieve more coherent and holistic port environmental management outcomes.

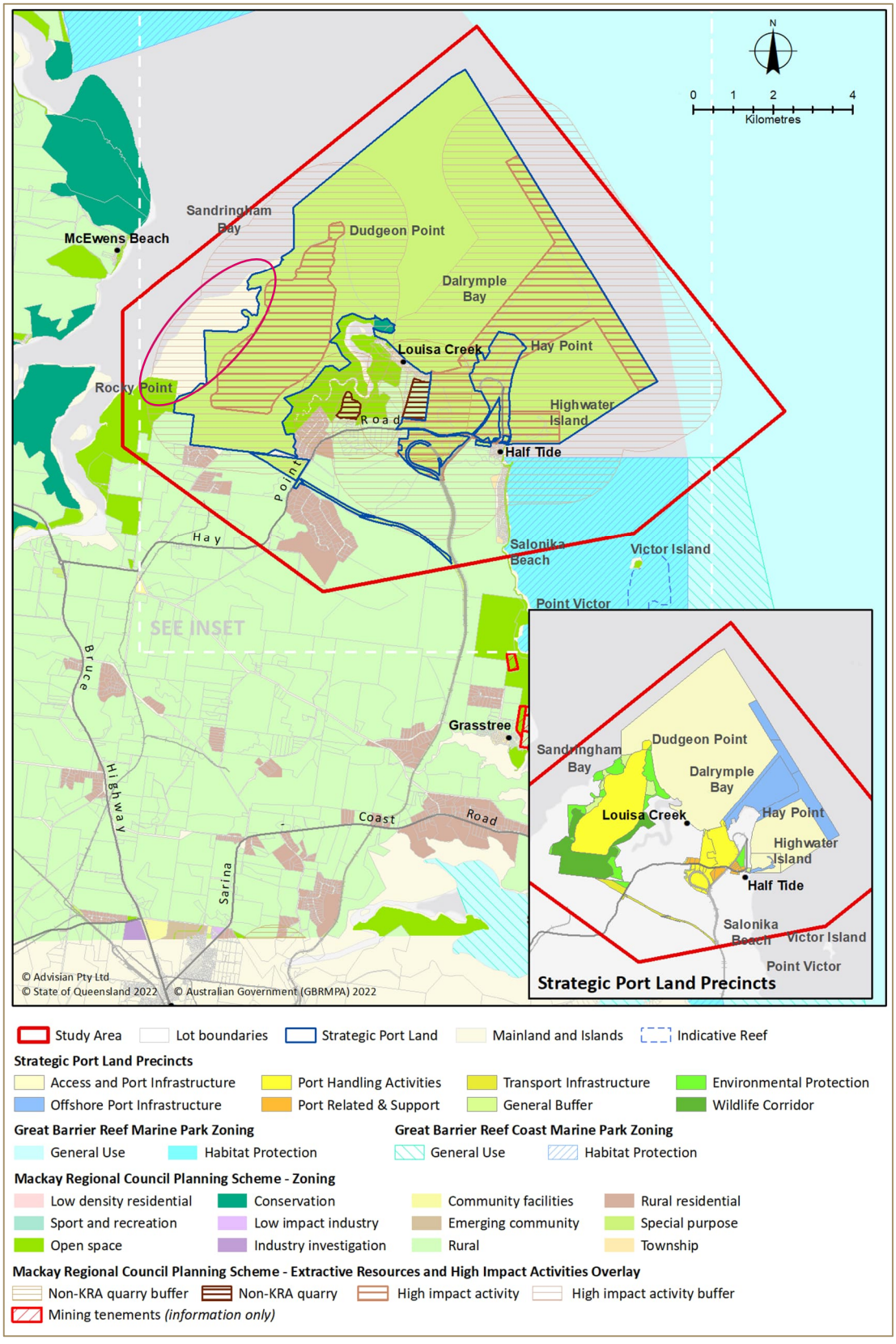

Figure 5-2 Consideration regarding geographical extent of master planned area

6 Gap analysis

6.1 Guiding principles

In completing the gap analysis, three principles (aligned with TMR's Priority Port Master Planning Guideline (TMR, 2020) were used to guide the identification of matters for further consideration. These included that matters for further consideration be:

1. Evidence based
2. Proportionate
3. Only regulate by exception.

6.2 Analysis of Findings

Table 5-1 and Table 5-2 provide a summary of the key outcomes of the risk assessment for Hay Point and Mackay respectively. Of the potential impacts, threats or pressures identified, five were assessed as having a post management risk greater than 'low', which would therefore require further consideration and potential mitigation through the master plan and/or port overlay.

6.2.1 Climate Change Impacts

Four risks related to the potential impacts of climate change were assessed to be of 'medium' risk level:

- Increased intensity of storm events and storm surge causing elevated loads of sediment, nutrients and contaminants
- Increased vulnerability of coastal areas due to climate change-induced sea level rise and associated changes to coastal processes
- Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat
- Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.

The risk of degradation or loss of marine plant habitat in intertidal areas from climate change-related sea level rise was assessed to be of 'high' risk level.

With regard to climate change, all levels of government are beginning to develop legislation and policy to help avoid and mitigate potential impacts. At a Commonwealth Government level, there has been a commitment to achieve net zero greenhouse gas emissions by 2050, although this is yet to be reflected in legislation.

The following elements have been identified as relevant considerations for potential management of climate change-related impacts in master planning for the Priority Port of Hay Point/Mackay:

- The Ports Act purpose includes development of port master plans that establish a long-term vision for the future development of priority ports consistent with the principles of ecologically sustainable development, as defined in the EPBC Act

- The principles of ecologically sustainable development include the following principles that are relevant to potential impacts to environmental values from climate change:
  - Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations
  - The principle of inter-generational equity - that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations
  - The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.

As noted in Section 5.3, the Hay Point LUP refers to climate change impacts and includes a DEO on ecological processes (DEO ECOL. 5) stating that:

"Climate change assessment will form part of the design of projects on strategic port land, as appropriate".

The LUP is supported by the NQBP Sustainable Port Development Guidelines, which requires consideration during project design of the effects of climate change on structures; however, neither the DEO nor the guidelines are required to consistently be applied based on the type or scale of development and both are focussed on the mitigation of impacts created by climate change rather than addressing the root cause.

Other instruments relating to the management of potential impacts from climate change exist, including bushfire management and coastal hazard considerations (coastal erosion, storm surge and flooding); however, the broader underlying causes of climate change are not specifically addressed through the instruments reviewed as part of the assessment.

While the master plan and port overlay are not able to address the root causes of climate change directly, it is acknowledged that development of land and infrastructure within the port master plan area must contribute positively to minimising climate change and mitigating potential impacts.

6.2.2 Amenity

A single risk relating to the amenity of surrounding communities was assessed to be of 'medium' risk level:

- Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.

The MRC planning scheme addresses amenity and reverse amenity in all zones by requiring sensitive land uses to be located, designed and operated to mitigate impacts from nearby uses generating amenity impacts (noting that provisions for the rural zone are less prescriptive). The MRC planning scheme also addresses amenity for sensitive land uses through a number of overlays. The Extractive resources and High impact activities overlay is applicable to both extractive resource activities (mining, quarries) and port operations. It is applicable to both Hay Point and Mackay. The Regional infrastructure overlay is applicable to land adjacent to designated infrastructure corridors.

Within the overlay, the acceptable outcome AO2.2 leaves the possibility for a sensitive land use to locate within a High impact activity or High impact activity buffer if the sensitive land use is designed

to ensure that the indoor noise objectives set out in the *Environmental Protection (Noise) Policy 2008* are met and the air quality objectives in the *Environmental Protection (Air) Policy 2008*, and any relevant national or international standard, are met.

The Regional infrastructure overlay is applicable primarily to railway, electrical infrastructure and irrigation infrastructure. Development of sensitive land uses within designated distances of infrastructure must be designed to maintain a high level of amenity through the mitigation of noise, visual and other impacts from the infrastructure. It also must not interfere with the operational efficiency of the infrastructure. This overlay may be applicable to land located in the southern portion of the study area where the existing land use plan identifies a transport infrastructure zone.

For land located outside SPL and within the High impact activity buffer, there is potential for the establishment of sensitive land uses if the proponent can demonstrate the requirements from AO2.2 are met. For locations shown with purple shading in Figure 5-1, the High impact activities overlay applies and therefore sensitive land uses could be developed in accordance with the requirements of the MRC Planning Scheme.

The following elements have been identified as relevant considerations to potentially address the issue of amenity and reverse amenity risks in master planning for the priority Port of Hay Point / Mackay:

- Location of the future port and industrial development precincts to determine if the areas identified in Figure 5-1 may be at risk of amenity impacts from future industrial development within SPL
- Land ownership in the areas identified in Figure 5-1, to determine if ownership by the port authority (NQBP) adequately mitigates this risk
- MRC planning in the areas identified in Figure 5-1.

6.2.2.1 Development of port and industrial land

Figure 6-1 illustrates the existing Port of Hay Point LUP, while Figure 6-2 illustrates the existing Port of Mackay LUP. It is assumed that there is a strong likelihood that precincts proposed through the master plan will broadly align with the existing port LUPs.

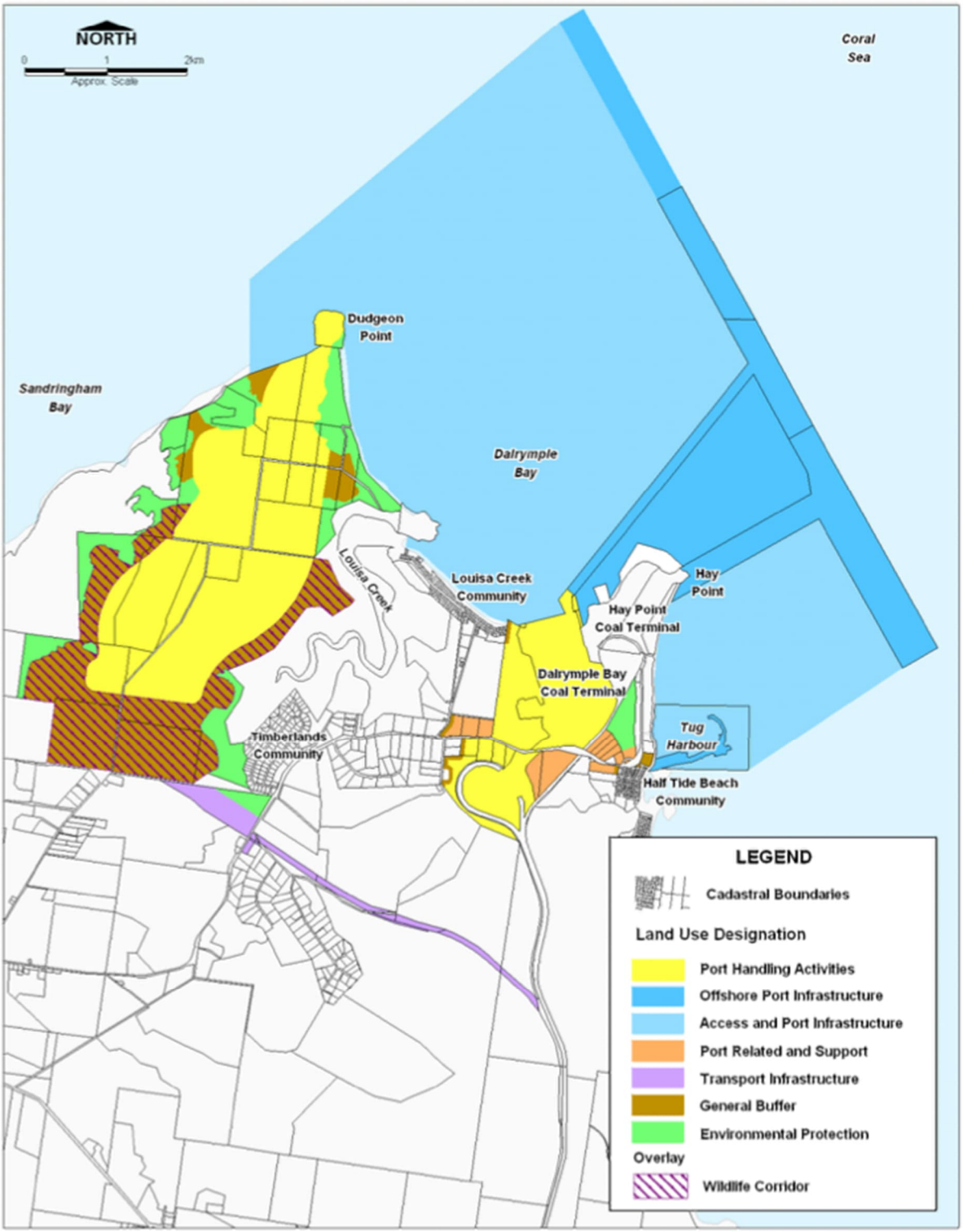

Figure 6-1 Existing Port of Hay Point LUP (NQBP, 2010)

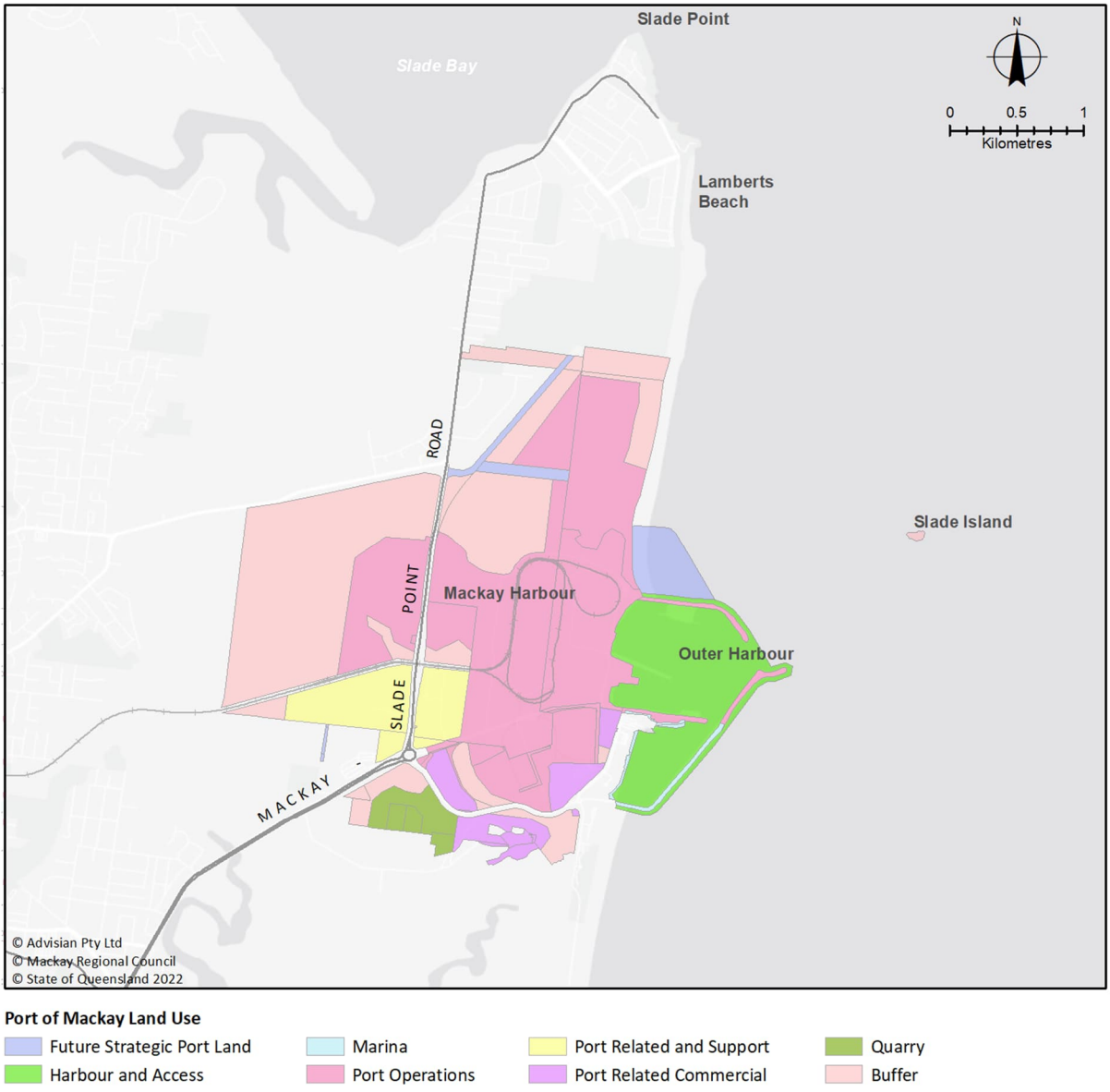

Figure 6-2 Existing Port of Mackay LUP (NQBP, 2009)

6.2.2.2 Land ownership and zoning - Hay Point

Land ownership was explored within the Hay Point study area focusing on the locations identified within Figure 5-1.

In the southern portion of the study area, land ownership is predominantly private except for land currently owned by NQBP for the purpose of constructing a new railway in the future. Figure 6-3 illustrates the existing zoning of land within this area under the MRC planning scheme.

Two existing MRC planning scheme overlays apply to land in this area:

- The northern portion of this land is covered by the Extractive resources and High impact uses overlay

- The eastern portion is covered by the Regional infrastructure overlay.

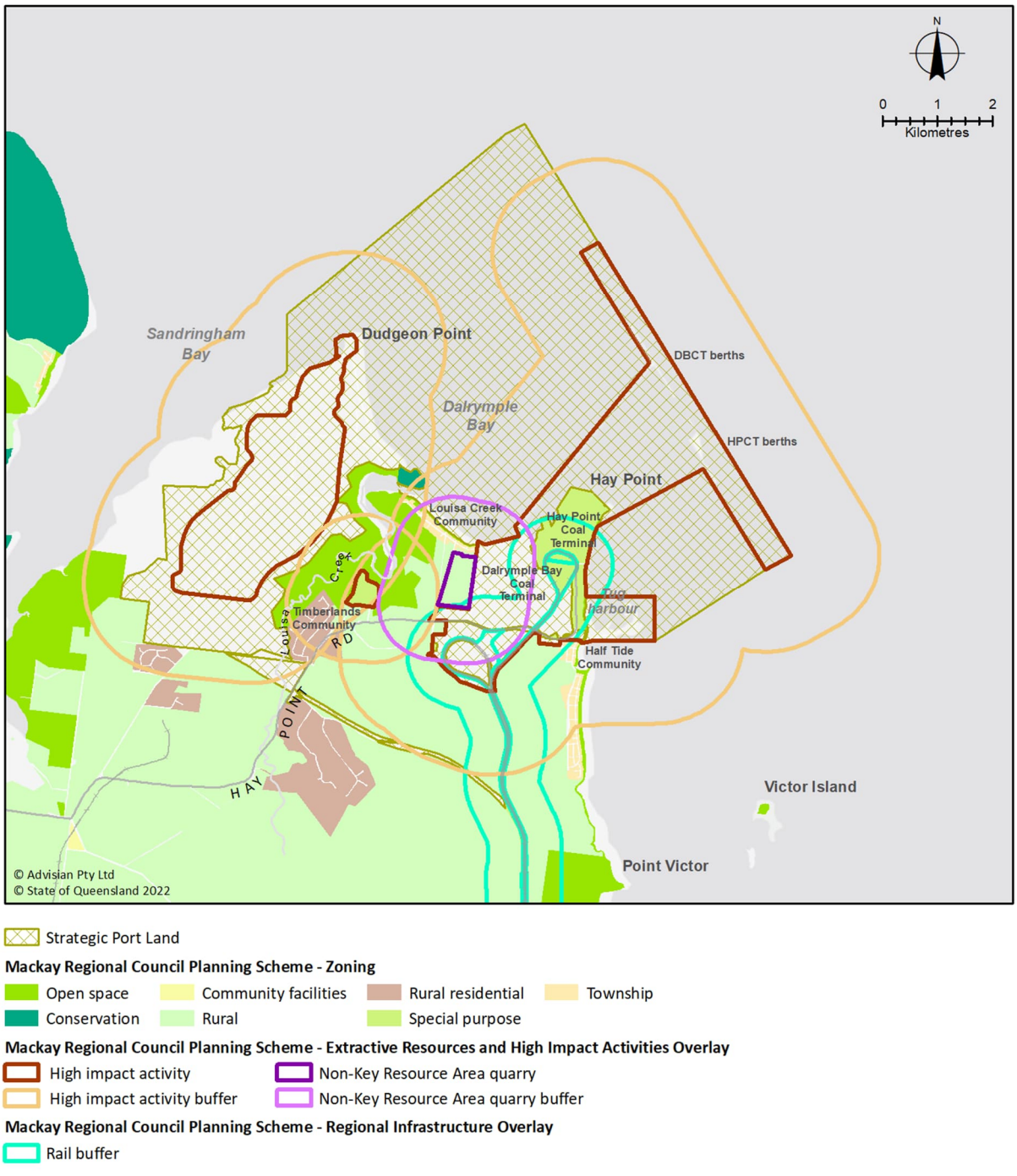

Figure 6-3 Existing MRC planning scheme overlays

The following lot types within the southern area are designated as Rural residential in the MRC planning scheme:

- Undeveloped - those where a new private dwelling/sensitive land use could potentially be developed

- Potential for further subdivision - those lots that may potentially be subdivided in the future (based on current planning scheme requirements including minimum lot sizes) and may therefore result in new private dwellings/sensitive land uses. The study team is not aware of any existing proposals to subdivide land in this location.

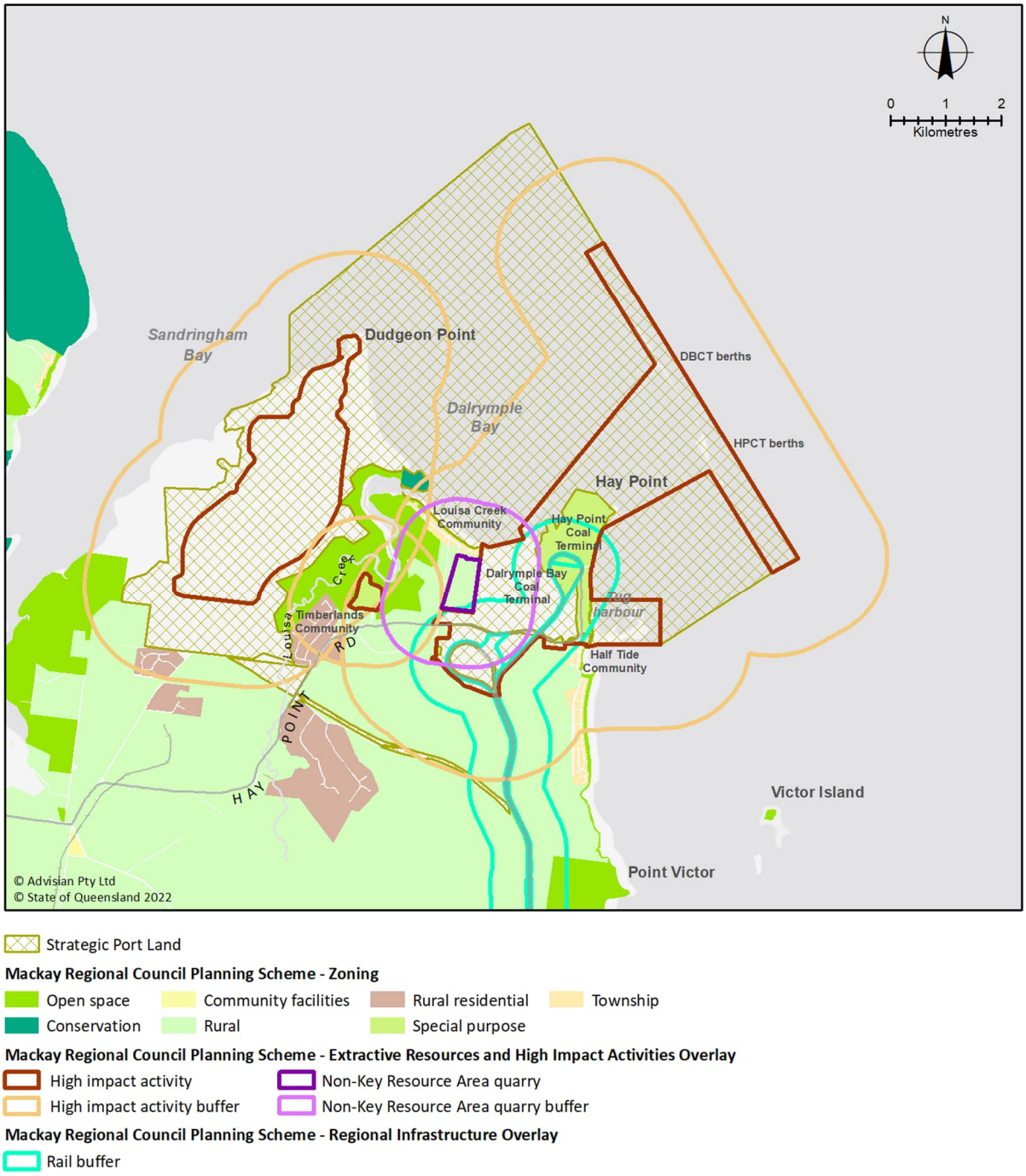

Figure 6-4 Land designated for Rural Residential development in the MRC planning scheme

It is possible that a small number of new dwellings could be constructed in close proximity (within 600m or less, this is the buffer zone created around other regional rail infrastructure through the

Regional Infrastructure Overlay) of the current Transport infrastructure zone identified within the Port of Hay Point LUP (refer to Figure 6-1). This may be achieved by:

- Development of currently vacant Rural residential lots for single dwellings (approximately 3 lots)
- Subdivision of existing large Rural residential lots (approximately 6 lots)
- Subdivision of surrounding Rural zoned land (approximately 7 lots).

It is noted that a significant proportion of the Rural zoned land is currently subject to the Extractive resources and High impact activities overlay.

Within the northern portion of the study area, Figure 5-1 identifies a potential risk relating to land within the Louisa Creek area. Figure 6-5 illustrates the current zoning of land in this area under the current MRC planning scheme.

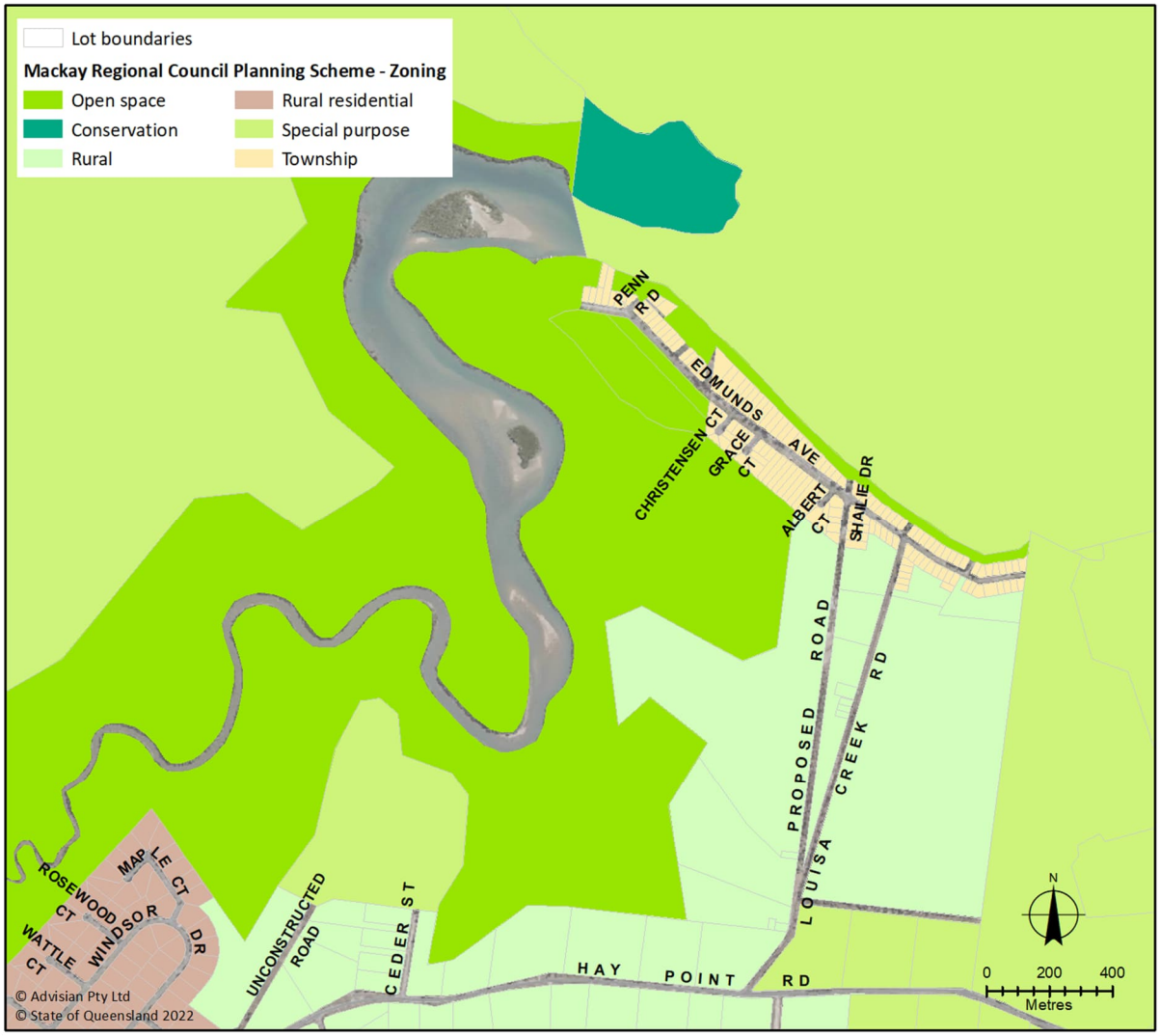

Figure 6-5 Existing MRC planning scheme land zoning

Most of the land in this area (with the exception of a small number of lots in the north-west corner) is subject to the Extractive resources and High impact use overlay (refer to Figure 6-6). Portions of the precinct fall under two different benchmarks set out in the overlay code:

- High impact activities
- Non-KRA quarries.

The Non-KRA quarries benchmark requires proposed development to achieve performance outcome PO4 regarding amenity.

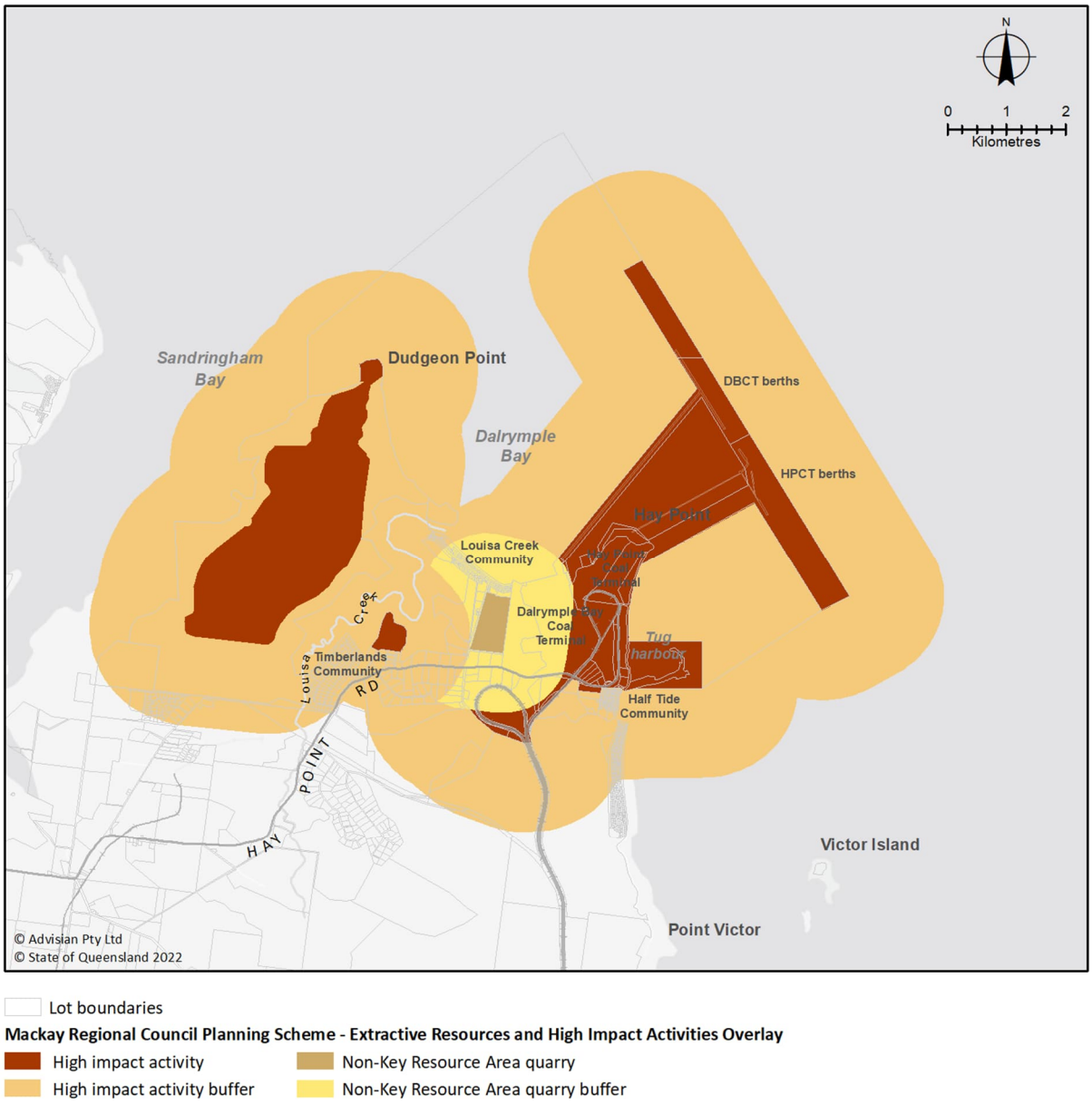

Figure 6-6 Extractive resources and High impact use overlay (MRC planning scheme)

Land ownership within this area is broken down as follows:

- 16 lots are privately held and targeted for acquisition by NQBP
- All remaining lots are owned by NQBP (some tenanted and others vacant).

Within the location identified as a 'amenity risk gap' in Figure 5-1 there are five lots in private ownership. Only one of these lots appears to be vacant and could therefore potentially have a dwelling constructed on it. It is noted that NQBP currently have a voluntary acquisition program for land within this precinct.

The risk of new sensitive land uses being developed within the Louisa Creek area that may result in amenity or reverse amenity issues is considered to be very low given the following:

- While current land use zoning would permit the development of sensitive land uses, the majority of this land is subject to the Extractive resources and High impact use overlay
- The number of lots in the Louisa Creek area is predominantly owned by NQBP. As the operator of the port it is highly unlikely that NQBP would seek to develop sensitive land uses
- Of the land subject to the Extractive resources and High impact use overlay, but not to the Non-KRA Extractive resources buffer, only five lots are privately held with only one of these appearing to be vacant. As such there is the potential that only a single new dwelling could be developed within this area.

6.2.2.3 Land ownership and zoning – Mackay

Although no risk relating to amenity was identified at the Port of Mackay, similar analysis was undertaken where sensitive land uses currently exist in the vicinity of the port. It is noted that no gap was identified through the initial analysis and this analysis is included only to confirm this conclusion.

Except for land held by government for various reserves (public open space etc.) the majority of land outside of the SPL is privately owned.

Land uses surrounding the Port of Mackay are well established with limited vacant land available for future development. Figure 6-7 and Figure 6-8 illustrate existing land uses surrounding the port.

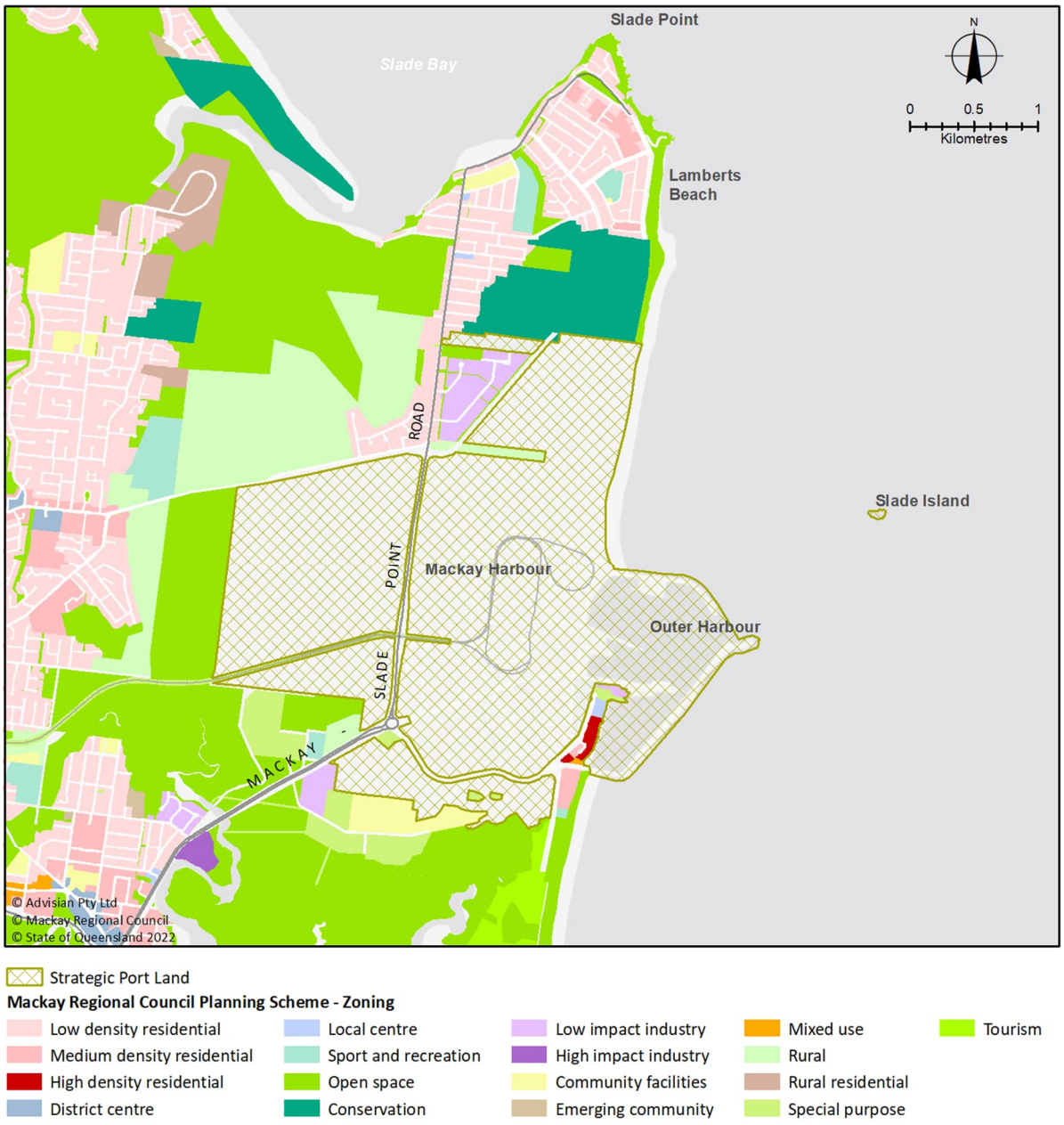

Figure 6-7 MRC planning scheme land use zones surrounding Port of Mackay

Land in closest proximity to the Port is illustrated in Figure 6-8. This land is part of the Mackay marina village.

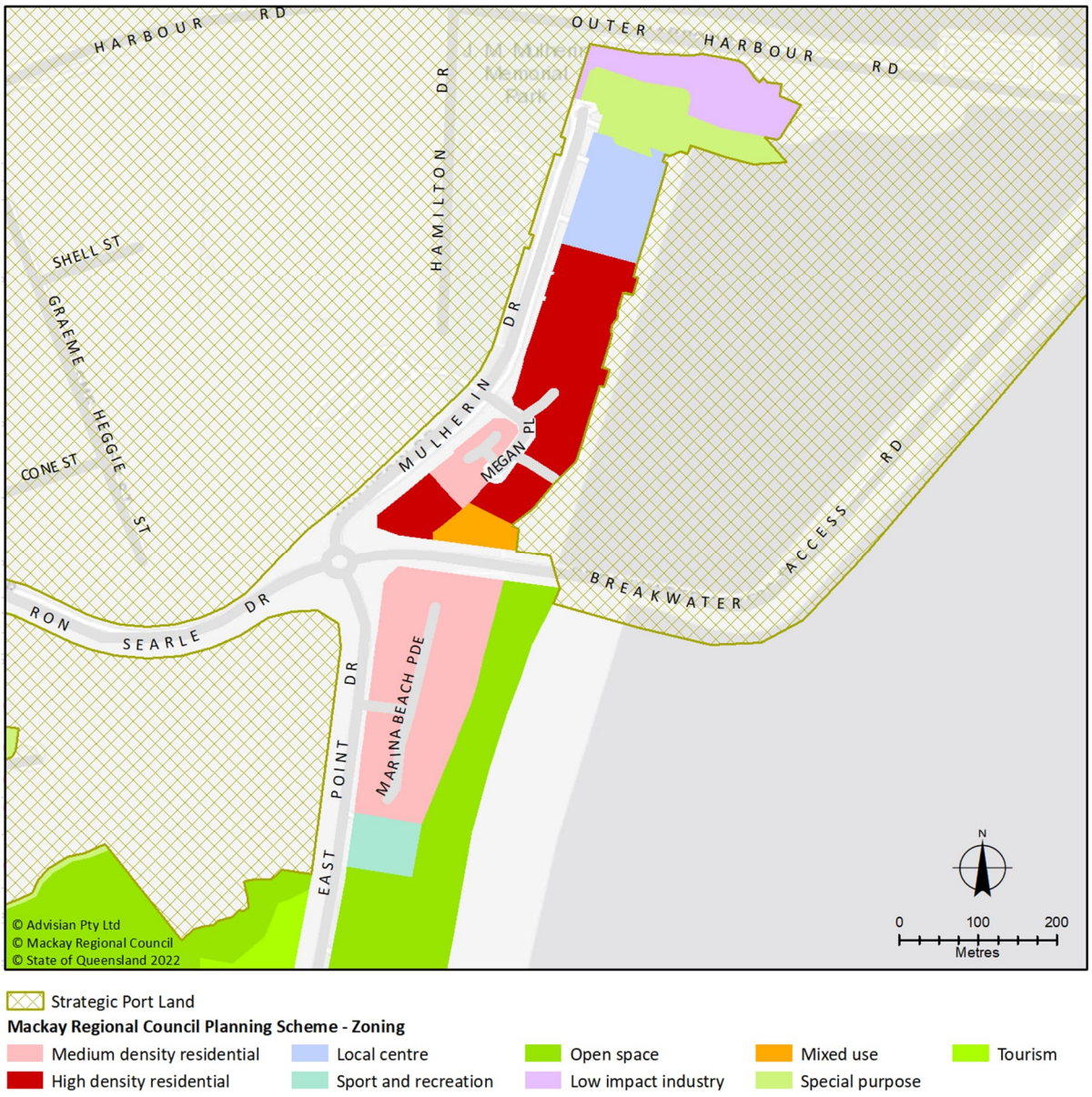

Figure 6-8 MRC planning scheme land use zones surrounding the Port of Mackay (Mackay marina village)

Figure 6-9 illustrates the extent of the Extractive resources and High impact use overlay at the Port of Mackay. The land surrounding the port falls under two different benchmarks:

- High impact activities
- Non-KRA quarries.

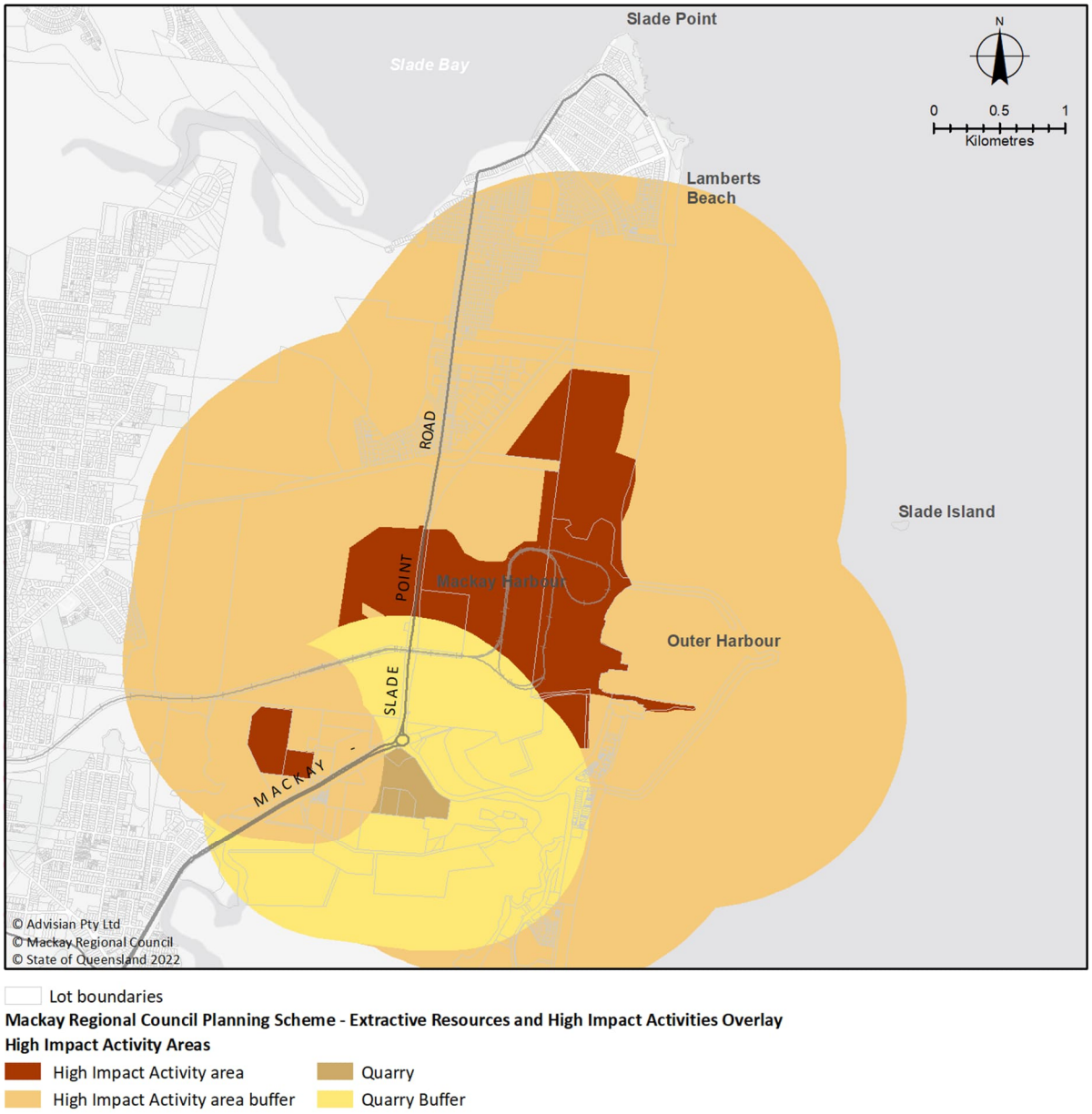

Figure 6-9 Extractive resources and High impact use overlay at the Port of Mackay (MRC planning scheme)

The risk of new sensitive land uses being developed in the vicinity of the Port of Mackay which may result in amenity or reverse amenity issues is considered to be very low given the following:

- While the current land use zoning would permit the development of sensitive land uses, the majority of this land is subject to the Extractive resources and High impact use overlay
- Most of the land in close proximity to the port is already developed and therefore the potential for new development is considered to be low given existing land availability.

6.2.3 Geographical coverage

It was noted that no land use planning instruments relevant to the Priority Port of Hay Point / Mackay address an area of mangroves and tidal flats of Sandringham Bay to the west of Dudgeon Point. This area receives surface water drainage from areas of SPL at Dudgeon Point which is regulated under the Port of Hay Point LUP.

Inclusion of this location within the master plan area through application of a suitable planning precinct may help manage potential impacts on this land in the future.

6.3 Matters to be considered

Based on the assessment outlined here the following matters should be given further consideration during development of the master plan and port overlay:

- The master plan will include a series of objectives and desired outcomes. The issue of climate change and its potential impacts could potentially be addressed through one or more of these statements
- Inclusion of land to the west of Dudgeon Point along Sandringham Bay within the master plan area and application of a suitable planning precinct to this land.

7 Concluding analysis

7.1 Purpose and methodology

The TMR Method seeks for the concluding analysis to review the management measures proposed for inclusion in the draft master plan and draft port overlay, with the aim to verify that proposed management measures in the draft master plan and draft port overlay do not inadvertently create a regulatory gap or unintended consequence to, or within pre-existing regulatory requirements. For example, the port overlay overrides local and state planning requirements to the extent that there is any inconsistency, which could create a regulatory gap if existing processes are not appropriately considered.

Under the TMR Method, the concluding analysis is to be undertaken as a risk assessment similar to that of the Initial Analysis but accounting for application of the draft master plan and draft port overlay management measures in addition to pre-existing management measures.

7.2 Draft master plan and draft port overlay measures

This section presents a summary of the management measures contained in the draft master plan and draft port overlay.

7.2.1 Port precincts

The role of precincts is to identify the long-term purpose and intent for specific areas within the master planned area. The precincts provide for the spatial implementation of the master plan.

The following precincts are included within the master planned area and are illustrated in Figure 7-1:

- Environmental management precinct
- Infrastructure and supply chain corridors precinct
- Interface precinct
- Marine infrastructure precinct
- Marine services and recreation precinct
- Port, industry and commerce precinct.

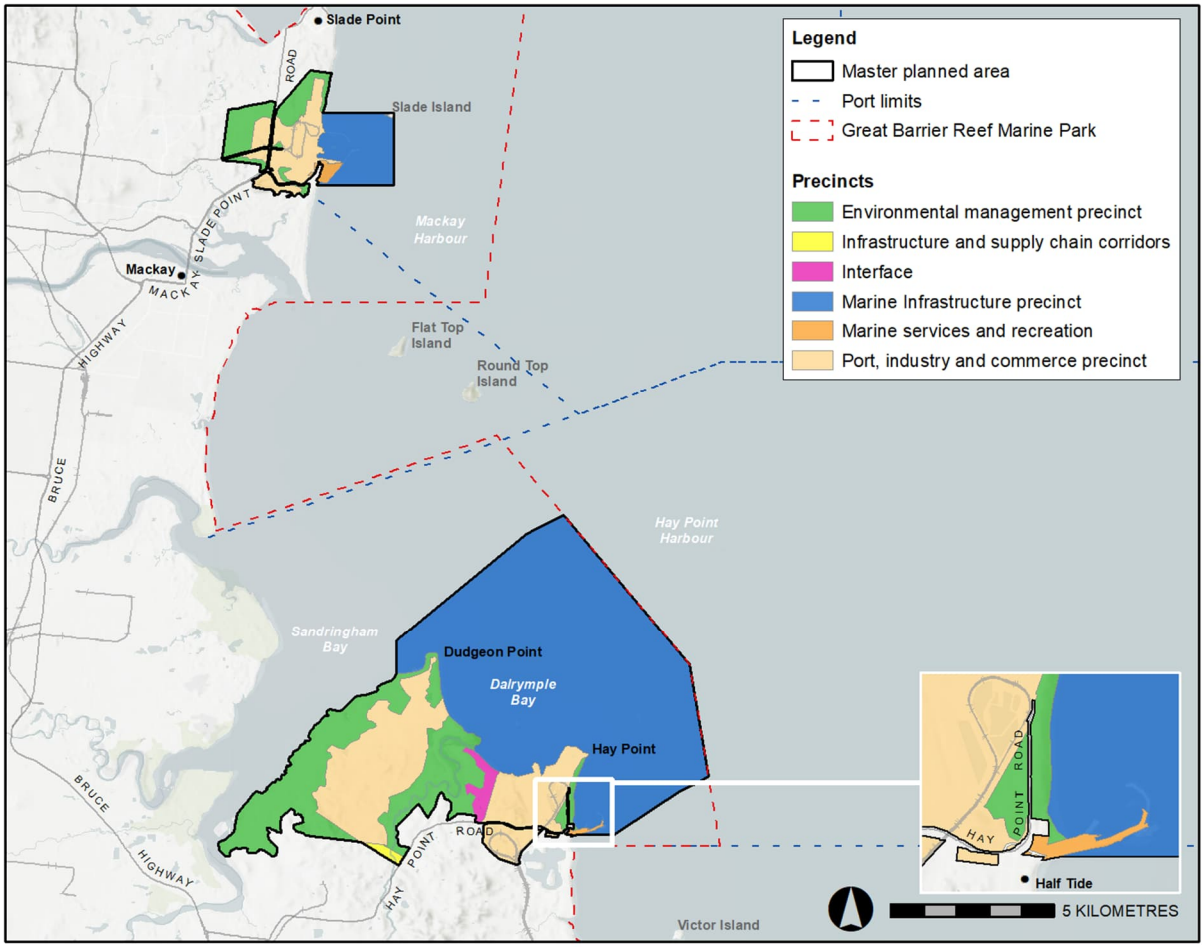

Figure 7-1 Hay Point/Mackay master planned area precincts

The draft master plan assigns to each precinct a purpose, a description, outcomes to be achieved and environmental management framework objectives to be considered through future planning.

7.2.2 Strategic vision, objectives, state interests and desired outcomes

The following sections have been prepared based on the wording contained in the draft master plan and draft port overlay 2022.

The Long-term strategic vision for the master planned area to 2050 is as follows:

The priority Port of Hay Point/Mackay will maximise opportunities to connect diverse regional industries with global markets, supporting resilient and prosperous communities. Sustainable development across the ports of Hay Point and Mackay will optimise economic opportunities while also protecting the Outstanding Universal Value of the Great Barrier Reef World Heritage Area within and surrounding the master planned area by managing potential impacts on cultural, social and environmental values.

State interests and their associated objectives and desired outcomes are as follows:

- Management of port-related development:
  - Objectives:
    - Sustainable development – enable ongoing sustainable trade growth through the priority Port of Hay Point/Mackay
    - Efficient land use – use, adapt and develop land and marine infrastructure efficiently to minimise impacts on surrounding areas
    - Port optimisation – maintain and enhance the effective and efficient operation of the port.
  - Desired outcomes:
    - Port optimisation – land and marine areas are optimised for port operations and associated industries
    - Capital dredging – capital dredging is undertaken, where necessary, to support the ongoing operation and development of the priority Port of Hay Point/Mackay.
    - Safe navigation – safe and efficient access for all vessels is provided
    - Maintenance dredging – maintenance dredging is undertaken to ensure safe and efficient navigation of waterways in accordance with the relevant legislative requirements
    - Built environment – encroachment from incompatible uses and activities is avoided to safeguard port operations and development.
- Economic
  - Objectives:
    - Economic prosperity – facilitate economic growth, supporting prosperous and resilient regional communities
    - Sustainable trade – ensure the priority port is positioned to support emerging industry and trade diversification.
  - Desired outcomes:
    - Trade gateway – diverse regional industries are connected with global markets by the priority Port of Hay Point/ Mackay
    - Regional prosperity – economic benefit and employment opportunities are provided to regional communities
    - Extractive resources – the economic value of extractive resources and other minerals is recognised
    - Emerging industry – the establishment and growth of emerging industries is enabled.
- Environment
  - Objectives:
    - Protecting the GBRWHA – port-related development contributes to the protection of the OUV of the GBRWHA
    - Environmental values – avoid, minimise and offset impacts from development on environmental values within and surrounding the master planned area.
  - Desired outcomes:

        - Beneficial re-use – material generated from capital dredging is beneficially reused
        - Sustainable port development – environmental values and ecological processes are protected, including values that contribute to the OUV of the GBRWHA
        - Leading environmental practice – existing Commonwealth and state legislation, planning processes and policies are addressed to achieve leading practice in a GBR context.
- Infrastructure:
    - Objectives:
        - Supply chain efficiency – maximise the effective operation of supply chain infrastructure and the transport network servicing the port
        - Efficient logistics – improve freight efficiency and support the operation of supply chain infrastructure
        - Industrial opportunities – promote port, freight and logistics infrastructure to support existing trade and emerging industries.
    - Desired outcomes:
        - Supply chain infrastructure – supply chain infrastructure is protected including connectivity between land and marine areas
        - Responsive infrastructure – port and supply chain infrastructure is developed and managed to accommodate changing technology, market demands and shared use
        - Optimised infrastructure – the capacity of port and supply chain infrastructure is optimised to encourage efficient use of land.
- Community:
    - Objectives:
        - Safety and security – provide for the safety and security of people, shipping, and property
        - Community access – provide for recreational use of waterways and public open space
        - Connection to country – recognise the ongoing cultural and spiritual connection the Yuwibara people have with Land and Sea Country.
    - Desired outcomes:
        - Sensitive uses – adverse impacts from port-related development on sensitive uses are minimised
        - Health and safety – industrial activities including hazardous chemical facilities are designed, located and managed to minimise risks to human health and safety and the built environment
        - Waterfront access – public access to the waterfront is provided, having regard to port operational needs, safety and security
        - Cultural significance – development and activities are managed to avoid harm to cultural heritage and connections with Land and Sea Country.

7.2.3 Environmental management framework

The EMF describes the interaction of port-related development with environmental values.

The role of the EMF in the master plan includes:

- Identifying environmental values: identifying and mapping environmental values within and surrounding values within and surrounding the master planned area, including those that contribute to the OUV of the GBRWHA
- Identifying potential impacts: identifying any potential impacts that development in the master planned area may have on environmental values
- Managing impacts: stating the EMF objectives and measures (priority management measures) for managing impacts that have been identified.

With regards to the management of impacts, EMF objectives have been assigned to each of the master planned area precincts. Due to the comprehensive nature of Commonwealth and State requirements, approvals and operational environmental management measures that apply to development within the master planned area, only one PMM was developed. This PMM is intended to ensure potential development impacts on sensitive land uses and environmental values are managed appropriately:

Port interface management - Manage development involving sensitive land uses and port operations to minimise potential light, noise, odour, emissions, dust and visual impacts.

This PMM applies to the following master planned area precincts:

- Interface
- Marine services and recreation
- Port, industry and commerce.

7.3 Assessment of risk

The TMR Method requires the concluding analysis to:

- Undertake an assessment of matters identified as a high post management risk during the initial analysis to determine the risk to identified values if the proposed management measures developed for the master plan and port overlay are applied (refer to section 7.3.1)
- Undertake an assessment of all areas within the master planned area to ensure no inadvertent increase to the post-management risk profile of identified values occurs as part of master plan implementation (refer to section 7.3.2)
- Undertake an assessment of any remaining matters that may require further consideration or management intervention but are outside of the scope of master planning implementation under the Ports Act (refer to section 7.3.3).

The following sections apply the above assessments to the draft master plan and draft port overlay.

7.3.1 Assessment of matters identified as a high post management risk

The Initial Analysis identified one climate change-related risk having a “high” post-management risk and the others being of “medium” post-management risk (refer to Table 5-1 and Table 5-2). Climate

change-related impacts are beyond the land use management scope of the master plan and port overlay, and are also beginning to be addressed at State, National (and port industry) levels (refer to section 7.3.3). As such, it would be counterproductive for the master plan and port overlay to risk interfering with such initiatives[5]. Consequently, no formal risk assessment was required to determine the risk to identified values from the proposed management measures developed for the draft master Plan and draft port overlay.

7.3.2 Assessment of master planned areas to ensure no inadvertent increase to the post-management risk profile

Within a master plan and port overlay, the following provisions have the potential to contradict the application of existing regulations pertaining to port development:

- The PMM (refer to section 7.2.3)
- Any port overlay provision that would override local and state planning requirements (e.g., development controls).

Other port master plan and port overlay measures such as the port precincts, strategic vision, objectives, state interests, desired outcomes and EMF do not directly impact on the assessment of port development and therefore are not at risk of contradicting existing regulation.

The following sections discuss the PMM and port overlay development controls.

7.3.2.1 Priority Management Measure

The PMM established under the EMF by the draft port overlay manages impacts from development on environmental values. Due to the comprehensive nature of Commonwealth and State regulations, approvals and operational environmental management measures that apply to development within the master planned area, a single PMM has been established. It seeks to ensure potential development impacts on sensitive land uses and environmental values are managed appropriately. Applicable to the Interface, Marine Services and Recreation and Port, Industry and Commerce precincts, the PMM requires the following:

Manage development involving sensitive land uses and port operations to minimise potential light, noise, odour, emissions, dust and visual impacts.

The PMM is consistent with the requirements of existing management measures (refer to section 3.3) as it seeks to achieve the same amenity outcomes for sensitive land uses.

The draft port overlay establishes requirements on plan-making for the following regulatory instruments:

- Planning Act: matters MRC must consider in making or amending the Mackay Region Planning Scheme or other local planning instruments

[5] It should be noted that port master planning indirectly contributes to limiting greenhouse gas emissions from port activities by fostering efficient port land use, thereby preventing or limiting the need for development of additional ports along the Queensland Coast.

- Transport Infrastructure Act: matters NQBP must consider in making or amending the Port of Hay Point Land Use Plan or Port of Mackay Land Use Plan.

7.3.2.2 Port Overlay development controls

Due to the comprehensiveness of existing management measures, the draft port overlay only seeks to guide plan-making by MRC and NQBP. It does not establish development controls with which proposed development at the port must comply.

As the PMM seeks to achieve the same outcomes as existing management measures and the draft port overlay does not establish controls for proposed development, there is no risk of inadvertent increase to the post-management risk profile of identified values from the master plan implementation. Therefore, undertaking a detailed risk assessment as stipulated in the TMR Method is considered unwarranted as there would be no change to the port management risk profile.

7.3.3 Assessment of remaining matters outside of the scope of master planning implementation

Climate change-related risks identified in the EBR and assessed in the Initial Analysis are caused by global greenhouse gas emissions, including Australia's, which are beyond the scope and purpose of the master plan and the Ports Act in its aim to manage port development. However, the draft master plan acknowledges that climate change is the single biggest threat to coral reefs and exacerbates localised impacts on the Great Barrier Reef and other ecological processes. It recognises that the long-term outlook for the GBRWHA is critically dependent on limiting global temperature rise to the maximum extent possible, as quickly as possible.

With the effort to curb Australia's greenhouse gas emissions and bolster its resilience to climate change impacts being led at State and National levels, it is expected that the climate change-related risks identified by the EBR, and assessed in the Initial Analysis, will be accounted for in the future development of State and Commonwealth policies/regulations that address climate change.

7.4 Conclusion

The concluding analysis has found that the draft master plan is consistent with existing regulations and that its provisions are unlikely to weaken the existing regulatory framework applying to development. The proposed PMM strengthens existing development controls within the port land use plan and the Mackay Region Planning Scheme planning instruments while seeking to achieve the same amenity outcomes as existing development controls from these instruments. The Port Overlay only seeks to guide plan-making by MRC and NQBP. It does not establish development controls with which proposed development at the port must comply.

Consequently, the concluding analysis did not identify any need for the draft master plan and draft port overlay provisions to be amended.

8 References

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Appendix A
Initial analysis risk assessment tables – Port of Hay Point

1 Marine values

1.1 Marine and estuarine water quality

Table 1 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Maintenance and/or capital dredging causing increased sedimentation and turbidity Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Moderate	Possible	Medium
		Low impact development	Minor	Possible	Low

Table 2 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Maintenance and/or capital dredging causing increased sedimentation and turbidity Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants.	Sea Dumping Act	1*	Minor	Possible	Low	Medium	The Act regulates the offshore disposal of dredge material, one of the aims being the preservation of water quality.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, the increase in intensity of storm surge and heavy rainfall events caused by climate change and threatening the health and quality of coastal waters is not addressed in any instrument considered in the initial analysis. The post-management risk is medium due to the current water quality within the Hay Point study area being already affected by elevated loads of sediment, nutrients and contaminants. Within the rural zone, the following uses are accepted development under the WRC planning scheme: (non-intensive) animal husbandry, cropping (<5ha on previously uncropped land), sewage treatment plant <100 EP and small intensive industry (e.g., 20 cattle). These activities do not require development approval under the planning scheme and do not require State approval under the Planning Act or as Environmentally Relevant Activity under the Environmental Protection Act. This could lead to unregulated discharge of contaminants in waterways. However, the risk is considered low.
		EPBC Act	1*	Minor	Unlikely	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as a threatened marine species that relies on water quality to support habitat (e.g., seagrass, algae).	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works. The permit can impose conditions aiming to preserve water quality from these activities.	
		Coastal Protection and Management Act, Environmental Protection Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Tidal works proponents are required to demonstrate how contamination of marine waters will be prevented. SDAP State code 8: Coastal development and tidal works includes performance outcomes focused on prevention of erosion and water quality and the management of dredging activities in accordance with the National Assessment Guidelines for Dredging. SDAP State code 9: Great Barrier Reef wetland protection areas includes performance outcomes on avoidance of impacts on wetland protection areas, including water quality.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The Act prohibits disposal of listed contaminants in waters. Environmental Authorities for dredging ERA impose water quality criteria for project proponents to meet. Environmental Authorities for ERA covering coal stockpiling can place limits on coal dust deposition rates.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Fisheries Act / Planning Act / SDAP	2**	Minor	Possible	Low		Assessment under the Act would only address water quality if it was a factor at risk of affecting marine plants. The Act requires water quality degradation to be assessed as part of development proposals to predict the impacts on marine plants and requires mitigation measures to be implemented. SDAP State code 11: Removal, destruction or damage of marine plants includes performance outcomes on avoidance and mitigations of impacts on marine plants, including aspects influencing water quality.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Possible	Low		The Act requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality from these activities.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Possible	Low		The Act requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality from these activities.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including marine water quality, do not occur.	
		Sustainable Ports Act	2**	Minor	Unlikely	Low		The Act indirectly protects water quality by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits offshore disposal of capital dredge material. This assists in safeguarding water quality. The Act also prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. It mandates the master planning of priority ports adjacent to the GBR coast, which may regulate impacts on water quality not already regulated by existing legislative/planning instruments.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 16 includes the following performance outcomes: - Clearing maintains natural wetland and watercourse/drainage feature vegetation to protect bank stability by protecting against bank erosion, water quality by filtering sediments, nutrients and other pollutants. - Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application. - Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater, surface water or soil. - Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either aeration of horizons containing iron sulphides or mobilisation of acid or metals. - The duration of clearing for a vegetation retention purpose occurs only for a period that will not contribute to land degradation.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Act's Riverine Protection Permit for works within the banks of watercourses seeks to prevent bank destabilisation that would lead to erosion and water sedimentation.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed. It also commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil. Refer to Sustainable Ports Act.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State Interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								construction phases. The SPP's State interest - emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities as well as the mobilisation of ASS. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's DRO Environment includes a focus on water quality, waterway health and wetlands, which includes the following policies: - Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater, wetlands and their associated buffers and coastal waters. - Strategies to protect, manage and rehabilitate riparian areas and wetlands are incorporated into land use planning to maintain and enhance their water quality, scenic, biodiversity, ecological, recreational and corridor values. Supporting programs consist of the following: - Support land management practices that protect waterway health through the voluntary uptake of industry-led programs and incentives. - Develop and monitor regional targets for water quality and waterway health.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		All works (excluding minor works) on strategic port land and in port waters require a Port Development Approval. For developments triggering assessment under the Planning Act, the Planning Regulation determines when the LUP (and SPDG) is applicable. Development not requiring approval under the Planning Act is assessed against the LUP/SPDG under the port development consent process. The LUP requires development of port land to comply with EPP Water. The LUP DEOs apply across all SPL as general measures to ensure ecological and environmental considerations are adopted as part of development approvals under the Land Use Plan. The SPDG include objectives on discharge to water management, protection of environmental values. They include requirements for	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								environmental assessment of discharges as well as specific requirements on stormwater quality and groundwater quality.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands. The following uses are accepted development: (non-intensive) animal husbandry, cropping (<5ha on previously uncropped land), sewage treatment plant <100 EP and small intensive industry (e.g., 20 cattle). These	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								activities do not require development approval under the planning scheme and do not require State approval under the Planning Act or as Environmentally Relevant Activity under the Environmental Protection Act. This could lead to unregulated discharge of contaminants in waterways.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: earthworks do not result in the contamination of land or water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids its disturbance or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development avoids land degradation within, and in close proximity to, waterways and wetlands through mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion or scaling.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: the manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.2 Coastal processes (bathymetry, tides, currents, waves, sediment transport)

Table 3 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cix - Min	Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport. Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.	Special development (highest level of impact)	Major	Possible	High
		High/medium impact development	Moderate	Possible	Medium
		Low impact development	Minor	Unlikely	Low

Table 4 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cix - Min	Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport. Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.	Sea Dumping Act	1*	Minor	Possible	Low	Medium	The Act regulates the offshore disposal of dredge material and includes the aim to avoid the creation of underwater sediment mounds.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, sea level rise caused by climate change and impacting on wetlands is not addressed in any instrument considered in the initial analysis. While some existing regulatory measures (e.g. coastal management district, erosion prone areas) will assist in
		EPBC Act	1*	Minor	Unlikely	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for changes in seafloor topography or hydrology to cause significant impact on a matter of national environmental significance (e.g., via impacts on food sources like marine plants).	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The application assessment considers impacts to seafloor topography and changes in hydrology.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The application assessment considers impacts to seafloor topography and changes in hydrology.	indirectly mitigating impacts to coastal areas from sea level rise, no instrument considered in the initial analysis addresses climate change as the root cause.
		Coastal Protection and Management Act, Environmental Protection Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Tidal works proponents are required to demonstrate how structures in the tidal area do not, or have minimal, impact on coastal processes. SDAP State code 8: Coastal development and tidal works includes performance outcomes focused on protection of coastal processes from interference and the management of dredging activities in accordance with the National Assessment Guidelines for Dredging. Operational work for tidal works or work within a coastal management district by State or Local Government is accepted development only if the works comply with accepted development requirements, which require avoidance of impacts to natural features of tidal waters.	
		Fisheries Act / Planning Act / SDAP	2**	Moderate	Unlikely	Medium		Assessment under the Act would only address changes to seafloor topography and hydrology if they were factors at risk of affecting marine plants. The approval process requires assessment where there is a potential for changes in seafloor topography or hydrology to cause significant impact on a matter of state environmental significance (e.g. marine plants).	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The assessment considers impacts to seafloor topography and changes in hydrology.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The assessment considers impacts to seafloor topography and changes in hydrology.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including coastal processes, do not occur.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects against changes in seafloor topography and hydrology by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits the offshore disposal of port-related capital dredge material, which prevents interference with coastal processes. It prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. It also mandates master planning of priority ports adjacent to the GBR coast, which may regulate impacts on coastal processes not already regulated by existing legislative/planning instruments.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to limiting port-related capital dredging in priority ports and to the beneficial reuse of dredge spoil instead of offshore disposal. Refer to Sustainable Ports Act.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes ensuring that coastal development avoids adverse impacts on coastal processes.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		All works (excluding minor works) on strategic port land and in port waters require a Port Development Approval. For development not requiring approval under the Planning Act, the SPDG require proponents of marine structures to discuss the basis of design with NQBP in situations where consideration of metocean conditions will form a significant part of the design.	
		Mackay Region Planning Scheme - Flood and Coastal Hazard overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following overall outcomes: development in coastal hazard areas: - Is avoided due to the nature of the use or the severity of the hazard; and - Is designed to protect communities, infrastructure and coastal ecosystems from adverse coastal hazard impacts.	

1.3 Marine plants (mangroves/saltmarshes, seagrass/macroalgae)

Table 5 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cx – Mod Cix, Cx - Min	Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities. Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat. Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat. Sea level rise resulting in the degradation or loss of marine plant habitat in intertidal areas.	Special development (highest level of impact)	Major	Likely	High
		High/medium impact development	Major	Possible	Medium
		Low impact development	Minor	Unlikely	Low

Table 6 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cx – Mod Cix, Cx - Min	Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities. Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat. Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat. Sea level rise resulting in the degradation or loss of marine plant habitat in intertidal areas.	Sea Dumping Act	1*	Minor	Unlikely	Low	High	Regulates the offshore disposal of dredge material, one of the aims being to limit turbidity.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, the threat of rising sea surface temperature above tolerance thresholds of seagrass resulting in impacts to seagrass is not addressed in any instrument considered in the initial analysis. Similarly, the threat of sea level rise caused by climate change on intertidal areas is not addressed in any regulatory instrument considered in the initial analysis. The post-management risk is high due to: • the important amount of mangrove areas within the Hay Point study area that have important value for fisheries, coastal water quality and coastal protection • absence of regulatory instrument addressing climate change as the root cause of sea level rise and absence of mitigation measures in existing regulatory instruments against sea level rise impacts on intertidal fauna and flora habitat.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as a threatened marine species, that relies on marine plants as food source.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Tidal works proponents are required to assess the proposed development impact on marine plants. The Planning Act establishes the approval triggers and SDAP Code 8 Coastal development and tidal works sets out the performance outcomes to be met. SDAP Code 8 also requires the management of dredging activities to be in accordance with the National Assessment Guidelines for Dredging.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		EAs for dredging ERA impose water quality criteria for project proponents to meet. EAs for ERAs addressing coal stockpiling/handling can place limits on coal dust deposition rates.	
		Environmental Offsets Act	2**	Minor	Unlikely	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires the offsetting of lost marine plants when a significant residual impact is demonstrated. Non-offset impacts may still occur for small development where this threshold is not reached.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Fisheries Act / Planning Act / SDAP	1*	Minor	Possible	Low		Direct and indirect impacts to marine plants must be assessed as part of development proposals and require implementation of mitigation measures The Planning Act establishes the approval triggers and SDAP State code 11 Removal, destruction or damage of marine plants sets out the performance outcomes to be met. Operational work impacting on marine plants is accepted development under the Planning Regulation only if activities can comply with accepted development requirements.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including marine plants, do not occur.	
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects marine plants by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits the offshore disposal of port-related capital dredge material, which assists in safeguarding marine plants. It prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. This contributes to preventing impacts on marine plants.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. The approval process ensures preventive and mitigation measures are implemented. SDAP State code 16: Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts, including soil erosion and watercourse sedimentation.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed. It commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil. Refer to Sustainable Ports Act.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest - Biodiversity requires local planning schemes to integrate the avoidance and mitigation of impacts on MSES, which include marine plants. The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. It also seeks to avoid reclamation of land under tidal water, which may contribute in preserving marine plant habitat. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP's State interest - emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's sustainability, climate change and natural hazards DRO includes the following principle on climate change: the generation of greenhouse gases is reduced through land use planning and development design, and long-term climate change impacts are considered in planning decisions.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Relevant supporting policies seek to: - Reduce greenhouse gas emissions from vehicle usage - Improve energy efficiency and reduction of greenhouse gases from electricity usage - Increase access to renewable energy options and low-emission technology - Facilitate opportunities for carbon forestry.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Moderate	Unlikely	Medium		Both the LUP and SPDG require compliance with Commonwealth and State legislation, which is triggered if impacts to marine plants can be expected from a proposed development. The LUP requires development of port land to comply with EPP Water. The LUP DEOs apply across all SPL as general measures to manage ecological and environmental considerations. The SPDG include objectives on discharge to water management, protection of environmental values. They include requirements for environmental assessment of discharges as well as specific requirements on stormwater quality and groundwater quality.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality/quantity control measures as part of landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site,	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Residential zone code						specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		Mangrove areas are zoned as Open Space at Hay Point. Overall outcomes of the zone code include: - Predominant form of development in the zone is park, access and stormwater infrastructure and environmental facilities; or undeveloped open space - Development is designed to incorporate sustainable land management practices such as retention and enhancement of native vegetation Performance outcomes include maximisation of existing remnant vegetation retention. With regard to water quality, the zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General development	1*	Minor	Possible	Low		The code includes the following performance outcome: earthworks do not result in the contamination of land or water.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		requirements code							
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids their disturbance or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: the manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.4 Coral reefs

Table 7 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cviii, Cix, Cx - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat. Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Minor	Unlikely	Low
		Low impact development	Minor	Rare	Low

Table 8 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cviii, Cix, Cx - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat. Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.	Sea Dumping Act	1*	Minor	Unlikely	Low	Medium	The Act regulates the offshore disposal of dredge material, one of the aims being to avoid disposal in sensitive areas (e.g., coral reefs) and limit turbidity, including via resuspension during cyclones.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, the threats of increased ocean acidification from anthropogenic CO_2 emissions and increased water temperatures causing impacts to coral such as bleaching are not addressed under any instrument considered in the initial analysis. The post-management risk is medium due to the low quantity and relatively low importance of coral reefs within the Hay Point study area.
		EPBC Act	2**	Minor	Possible	Low		Assessment under the Act would only address coral reefs if it was part of an assessment of impacts to a matter of national environmental significance. The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as a threatened marine species that relies on coral reefs as food source and/or habitat.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Possible	Low		SDAP Code 8 requires that the management of dredging activities be in accordance with the National Assessment Guidelines for Dredging.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low		The application process for EAs for (maintenance) dredging and mineral/bulk material handling ERAs typically requires an impact assessment that considers coral reefs. EAs for agricultural ERAs (aquaculture, intensive animal feedlotting, pig keeping, poultry farming, commercial cropping and horticulture) located in GBR catchments can impose discharge water quality criteria.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including coral reefs, do not occur.	
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects coral reefs by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits the offshore disposal of port-related capital dredge material, which assists in safeguarding coral reefs. It prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. It also mandates the master planning of priority ports adjacent to the GBR coast, which may regulate impacts on coral reefs not already regulated by existing legislative/planning instruments.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. SDAP State code 16 Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts, including soil erosion and watercourse sedimentation.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed. It commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil, which contributes to limiting turbidity.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Refer to Sustainable Ports Act. The associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. The SPP's State interest - emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's Environment DRO includes water quality of waterways. Sustainability, climate change and natural hazards DRO includes the following principle on climate change: the generation of greenhouse gases is reduced through land use planning and development design, and long-term climate change impacts are considered in planning decisions.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Relevant supporting policies seeks to: - Reduce greenhouse gas emissions from vehicle usage - Improve energy efficiency and reduction of greenhouse gases from electricity usage - Increase access to renewable energy options and low-emission technology - Facilitate opportunities for carbon forestry.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		The LUP DEO ECOL. 4 states that development of port land will comply with the EPP Water. The SPDG requires compliance with State legislation, which includes the EPP Water. It requires the impact assessment to identify potential discharges to water, with estimates of both flow rates and contaminant loads for larger projects, where possible. It prohibits the discharge pollutants into surrounding waters and the release of sediments into the surrounding environment. It requires implementation of erosion and sediment control measures. For larger projects or sites, it requires a Stormwater Management Plan as part of a Port Development Application.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Earthworks do not result in the contamination of land or water.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		development requirements code							
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids their disturbance or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: the manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.5 Fish, Fish Habitat Areas

Table 9 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cix - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat. Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Minor	Possible	Low
		Low impact development	Minor	Unlikely	Low

Table 10 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cix - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat. Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.	Sea Dumping Act	1*	Minor	Unlikely	Low	Low	The Act regulates the offshore disposal of dredge material, one of the aims being to turbidity.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as a threatened fish species.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works and reclamation. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Protection of the Sea (prevention of Pollution from Ships) Act	1*	Minor	Unlikely	Low		The Act prohibits the discharge of oil, noxious substances, packaged harmful substances, sewage and garbage from vessels in Australian waters, thereby safeguarding water quality.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Possible	Low		Tidal works proponents are required to assess the proposed development impact on marine plants. The Planning Act establishes the approval triggers and SDAP State Code 8 Coastal development and tidal works sets out the performance outcomes to be met. SDAP Code 8 also requires the management of dredging activities in accordance with the National Assessment Guidelines for Dredging.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low		EAs for dredging ERA impose water quality criteria for project proponents to meet. EAs for ERAs addressing coal stockpiling/handling can place limits on coal dust deposition rates.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires offsetting of lost marine plants and threatened fish species (MNES) when a significant residual impact is demonstrated.	
		Fisheries Act / Planning Act / SDAP	1*	Minor	Rare	Low		The Acts require direct and indirect impacts to marine plants to be assessed as part of development proposals and requires mitigation measures to be implemented. The Planning Act establishes the approval triggers and SDAP State code 11 Removal, destruction or damage of marine plants sets out the performance outcomes to be met. The Acts establish a permitting system for works that may constitute waterway barrier works hindering fish passage in waterways. Operational work for waterway barrier works is accepted development under the Planning Regulation subject to conditions that regulate the activity.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works and reclamation. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including fish and their habitat, do not occur. For instance it can require the development of management measures to prevent entrapment of marine fauna in reclamation areas and their salvage from within the bund wall.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects fish and fish habitat areas by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits the disposal of port-related capital dredge material within the GBRWHA, which assists in limiting turbidity. The Act prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits, which limits the risk of marine plant removal. It also mandates the master planning of priority ports adjacent to the GBR coast, which may regulate impacts on fish or their habitat not already regulated by existing legislative/planning instruments.	
		Transport Operations (Marine Pollution) Act	1*	Minor	Unlikely	Low		The Act prohibits the discharge of ship-sourced pollutants including oils, chemicals, sewage and garbage into coastal waters.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. SDAP State code 16 Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts, including soil erosion and watercourse sedimentation.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Act's Riverine Protection Permit for works within the banks of watercourses seeks to prevent bank destabilisation that would lead to erosion and water sedimentation.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed. It commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil, which contributes to limiting turbidity. Refer to Sustainable Ports Act. The associated Reef 2050 Water Quality Improvement	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP's State interest - emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's environment DRO includes water quality of waterways.	
		Transport Infrastructure Act / Land use plan / Sustainable Port	1*	Minor	Unlikely	Low		The LUP DEO ECOL. 4 states that development of port land will comply with the EPP Water. The SPDG require compliance with State legislation, which includes the EPP Water. It requires the impact assessment to identify	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Development Guidelines						potential discharges to water, with estimates of both flow rates and contaminant loads for larger projects, where possible. It prohibits the discharge pollutants into surrounding waters and the release of sediments into the surrounding environment. It requires implementation of erosion and sediment control measures. For larger projects or sites, it requires a Stormwater Management Plan as part of a Port Development Application.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Unlikely	Low		The zone code includes the following performance outcome: - Earthworks do not result in the contamination of land or water.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids their disturbance or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Bushfire Hazard overlay code	1*	Moderate	Rare	Low		The overlay code includes the following performance outcome: the environment is not adversely affected by potential impacts of a bushfire over land containing hazardous materials manufactured or stored in bulk.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: the manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.6 Marine reptiles, marine mammals and migratory marine species

Table 11 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cx - Mod	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat. Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	Special development (highest level of impact)	Moderate	Likely	Medium
		High/medium impact development	Minor	Possible	Low
		Low impact development	Minor	Unlikely	Low

Table 12 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cx - Mod	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat. Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	Sea Dumping Act	1*	Minor	Possible	Low	Low	Sea dumping permits regulate dredge material disposal activities, including sources of disturbances to marine megafauna.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as a threatened marine species, including turtles.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from these activities.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Possible	Low		Under SDAP State Code 8 Coastal development and tidal works: - Development in erosion-prone areas is restricted, which indirectly limits edge effects and impacts on beaches where turtles may be nesting - Development is required to be as far landward as possible, which indirectly limits edge effects and impacts on beaches where turtles may be nesting - Development must avoid, minimise and offset impacts on matters of state environmental significance (includes marine reptiles, mammals and migratory species).	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		EAs for dredging ERA impose noise management measures to prevent impact on marine megafauna. SDAP Code 22 Environmentally Relevant Activities includes performance outcome requiring development to avoid, minimise and mitigate impacts on matters of state environmental significance, which includes marine megafauna.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								The Act requires the offsetting of lost marine megafauna species when a significant residual impact is demonstrated.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from activities.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from activities.	
		Nature Conservation Act	1*	Minor	Possible	Low		The Act lists marine megafauna species as threatened wildlife, which leads to their protection as MSES.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including marine megafauna, do not occur. For instance, it can require the development of management measures to prevent impacts to marine megafauna.	
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects marine reptiles, mammals and migratory species by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point), which prevents the multiplication of sites where marine megafauna could be impacted.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan sets objectives and targets aiming for populations increase. Actions include: - Implementation of the associated Queensland turtle strategy - Development of a guideline specific to the GBR on assessing and managing impacts of underwater noise on species.	
		Transport Infrastructure Act / Land use plan / Sustainable Port	1*	Minor	Possible	Low		The SPDG include the objective for works to be undertaken to minimise potential environmental impacts and protect environmental values of the marine environment. Specific requirements include: - Development on land adjoining an area of high ecological value shall include appropriate measures to protect the area	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Development Guidelines						- Addressing marine environmental values as documented in NQBP's Port Environmental Management Plan as a minimum and achieve the outcomes sought in the document through appropriate environmental controls. - CEMP focus areas listed include pile driving (for noise and vibration impacts) and OEMP focus areas listed include noise and light. - Both CEMP and OEMP must include an environmental monitoring and reporting program. The SPDG requires cumulative impacts to be evaluated, which is relevant to noise/vibration/lighting a proposed development will emit in addition to pre-existing emissions.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Unlikely	Low		At Louisa Creek, Half Tide and Salonika Beach townships, an open space zone separates the township zone from the beach. The zone code relevant performance outcome is as follows: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to the ecological integrity of other habitat areas and corridors and the ecological integrity of other natural features and elements of high environmental value.	

2 Land Values

2.1 Terrestrial vegetation communities and ecosystems

Table 13 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cx - Min	Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat. Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.	Special development (highest level of impact)	Major	Likely	High
		High/medium impact development	Moderate	Likely	Medium
		Low impact development	Minor	Possible	Low

Table 14 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cx - Min	Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat. Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.	Biosecurity Act (Cwth)	1*	Minor	Possible	Low	Low	The Act aims to prevent the introduction of weeds and pests that may cause harm to native flora. The Act has a broader focus than the listed threat.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as listed threatened flora species and TECs. Significant residual impacts are required to be offset.	
		Biosecurity Act (Qld)	1*	Minor	Possible	Low		The Act establishes a 'general biosecurity obligation' that requires all persons to take all reasonable and practical steps to prevent or minimise biosecurity risks. The *Biosecurity Regulation 2016* identifies prohibited matter that should not be present in Queensland, restricted matter for which movement control is prescribed and restricted places that pose biosecurity risks.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low		The approval process of EAs for land-based ERAs involves an assessment of impacts to remnant vegetation (categorised as Environmental Sensitive Areas - ESAs). Remnant vegetation clearing can be prohibited or subject to approval in particular ESA categories depending on their sensitivity. Approved clearing that is a significant residual impact must be offset under the Environmental Offsets Act. SDAP Code 22 Environmentally Relevant Activities includes performance outcome requiring development to avoid, minimise and mitigate impacts on MSES, which includes endangered and of concern regional ecosystems.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires the offsetting of significant residual impact to MSES (includes endangered and of concern regional ecosystem) is demonstrated.	
		Nature Conservation Act	1*	Minor	Possible	Low		The Act lists specific EVNT species for which clearing is subject to a protected plant clearing permit. Clearing requires to be offset under the Environmental Offsets Act.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation, do not occur. Vegetation clearing approvals under the relevant legislation are still required post-EIS.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Act's approval process for development involving interference with remnant vegetation involves an assessment of impacts to regional ecosystems. Clearing of all regional ecosystems (except least concern) requires approval. Approved clearing that constitutes a significant residual impact must be offset under the Environmental Offsets Act. SDAP Code 16 Native vegetation clearing specifies detailed performance and acceptable outcomes for various clearing types and locations. Sediment runoff is addressed as part of the clearing approval process: SDAP includes requirements for erosion prevention generally as well as in wetlands, watercourse and drainage features. Approval conditions typically include requirements to prevent erosion and waterway sedimentation. Operational work for clearing of native vegetation is accepted development only if the work complies with a vegetation clearing code.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Water Act's Riverine Protection Permit for works within the banks of watercourses seeks to prevent bank destabilisation that would lead to erosion and water sedimentation.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan's associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – biodiversity requires local planning schemes to integrate development outcomes seeking to avoid or minimise impacts to MNES, MSES and MLES, which includes vegetation. The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as native vegetation conservation in the coastal management district. The SPP's State interest - water quality require local planning schemes to integrate development outcomes seeking to: - Locate zones for urban purposes so as to avoid disturbance of high risk soils and natural drainage lines - Plan development to avoid or minimise adverse impacts on environmental values of receiving waters arising from altered stormwater hydrology. Appendix 2 sets out stormwater management design objectives for construction and post construction phases, which addresses drainage and erosion.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Minor	Likely	Low		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's DRO Environment includes a policy for development in non-urban areas to maintain the integrity of areas with significant biodiversity values. Supporting programs include: - Identification, rehabilitation and management of local and regional biodiversity networks through coordination mechanisms. - Pest and disease control programs to protect areas with significant biodiversity values. - Preventing and monitoring exposure to exotic and introduced pests, weeds and diseases in the region, through the combined efforts of government, industry and landholders.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		Development in areas mapped as Environmental Protection under the LUP that conflict with the conservation of environmental values are stated as inappropriate. For all other precincts, the LUP requires environmental best practice to be applied. The SPDG include the following specific requirements: - Proponents' impact assessment must detail any proposed flora removal required and address the environmental values of this flora and impacts of the proposed disturbance, - Approvals under State legislation (i.e., Vegetation Management Act, Nature Conservation Act) must be obtained where relevant.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - The zone primarily accommodates undeveloped natural habitat areas including extensive areas containing remnant vegetation. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximized.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Low Impact	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to:	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Industry zone code						(a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximized. - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Buildings and infrastructure are located in areas that are already cleared or degraded.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to:	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								(a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcomes: - Development is located, designed and operated to maintain ecological integrity and functionality within, adjoining and near the site by retaining high value vegetation and habitat areas, waterways and wetlands; and maintaining stormwater and hydrologic characteristics. - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion,	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								tunnel erosion, stream bank erosion, wind erosion, or scaling; and (b) loss or modification of chemical, physical or biological properties or functions of soils.	

2.2 Listed threatened and migratory species

Table 15 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii - Mod Cix - Min Cx - Sig	Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species. Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike). Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality. Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.	Special development (highest level of impact)	Major	Possible	High
		High/medium impact development	Major	Possible	High
		Low impact development	Moderate	Unlikely	Medium

Table 16 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii - Mod, Cix - Min, Cx - Sig	Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species. Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike). Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality. Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.	EPBC Act	1*	Minor	Possible	Low	Low	The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a MNES, such as listed threatened flora species and TECs. Significant residual impacts are required to be offset. Ecological impact assessments are typically required to consider effects of human activity on flora and fauna such as dust, light, noise and access to habitat. Approval is required only when a significant impact is likely.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to vegetation clearing. The EP Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation and native fauna, do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria. The approval process of EAs for land-based ERAs involves an assessment of impacts to remnant vegetation (categorised as Environmental Sensitive Areas - ESAs) and to fauna. Ecological impact assessments are required to consider effects of human activity on flora and fauna such as dust, light and noise. Approved clearing that is a significant residual impact must be offset under the Environmental Offsets Act. SDAP Code 22 Environmentally Relevant Activities includes performance outcome requiring development to avoid, minimise and mitigate impacts on MSES, which include regional ecosystems (except Least Concern) as well as threatened wildlife and special least concern animals.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires offsetting of significant residual impact to MSES (includes regional ecosystems, threatened wildlife and special least concern animals) is demonstrated.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Nature Conservation Act	1*	Minor	Possible	Low		The Act lists specific EVNT species for which clearing is subject to a protected plant clearing permit. Clearing requires to be offset under the Environmental Offsets Act.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation and native fauna, do not occur. The ecological assessment is typically required to consider noise, lighting and risks of increased access by people to fauna habitat. Vegetation/fauna habitat clearing approvals under the relevant legislation are still required post-EIS.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. SDAP State code 16 Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Water Act's Riverine Protection Permit process for works within the banks of watercourses covers the clearing of vegetation.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's DRO Environment includes the following policies: - Development in non-urban areas to maintain the integrity of areas with significant biodiversity values - In urban areas, impacts from development on areas with	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								significant biodiversity values are offset when they cannot be avoided.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		Development in areas mapped as Environmental Protection under the LUP that conflict with the conservation of environmental values are stated as inappropriate. For all other precincts, the LUP requires environmental best practice to be applied. The SPDG include the following specific requirements: - Impact assessment must detail any proposed flora removal required, and address the environmental values of this flora and impacts of the proposed disturbance. - Approvals under State legislation (i.e. Vegetation Management Act, Nature Conservation Act) must be obtained where relevant. - Development on land adjoining an area of high ecological value (e.g. areas zoned as Environmental Protection) shall include appropriate measures to protect the area to minimise adverse impacts. - OEMP focus areas listed include noise, light and stormwater management. Should fauna strike risks be high for a particular development, the OEMP may be required to include management measures such as speed limits or signage. - Cumulative impacts must be evaluated, which is relevant to noise, lighting and stormwater flows a proposed development will emit in addition to pre-existing emissions.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - The zone primarily accommodates undeveloped natural habitat areas including extensive areas containing remnant vegetation - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								(b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximised - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								- Buildings and infrastructure are located in areas that are already cleared or degraded.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcomes: - Development is located, designed and operated to maintain ecological integrity and functionality within, adjoining and near the site by retaining high value vegetation and habitat areas, waterways and wetlands; and maintaining stormwater and hydrologic characteristics. - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling; and (b) loss or modification of chemical, physical or biological properties or functions of soils.	

2.3 Surface water resources

Table 17 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cx - Mod	Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.	Special development (highest level of impact)	Major	Almost Certain	High
		High/medium impact development	Moderate	Almost Certain	Medium
		Low impact development	Minor	Almost Certain	Low

Table 18 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cx - Mod	Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.	EPBC Act	1*	Minor	Possible	Low	Medium	The Act's referral and controlled action assessment process provides for rigorous assessment, including impacts on freshwater quality, where there is a potential for significant impact on a matter of national environmental significance, such as listed threatened flora/fauna species and TECs. Significant residual impacts are required to be offset.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to water contamination. The Act's approval process of EAs for land-based ERAs involves an assessment of impacts to water quality (e.g., agricultural and quarrying activities). The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including water quality, do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria. SDAP Code 22 includes performance outcomes requiring development to: - Be suitably located and designed to avoid or mitigate environmental harm to the receiving waters environment. - To include elements which contain and treat hazardous contaminants on site rather than releasing them into the environment and provide secondary containment to prevent the accidental release of hazardous contaminants - Store hazardous materials to avoid or minimise their release into the environment during flood events.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including water quality, do not occur.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 16 includes the following performance outcomes: - Clearing maintains natural wetland and watercourse/drainage feature vegetation to protect bank stability by protecting against bank erosion, water quality by filtering sediments, nutrients and other pollutants. - Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application. - Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater, surface water or	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								soil. - Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either aeration of horizons containing iron sulphides or mobilisation of acid or metals. - The duration of clearing for a vegetation retention purpose occurs only for a period that will not contribute to land degradation.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Riverine Protection Permit process for works within the banks of watercourses includes erosion and water quality considerations. Taking or interfering with surface or ground water is subject to development approval.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. A large extent of the plan is focused on improving water quality in the GBR catchments to reduce pressures on the reef from sediment, nutrient and chemical runoff. It sets targets for 2025 on reduction of inorganic nitrogen, fine sediment and particulate nutrient and pesticide loads. Associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, facilitating restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The State interest – 'water quality' requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The State interest - emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater, as well as the mobilisation of ASS. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Environment has a focus on water quality, waterway health and wetlands, which includes the following policies: - Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater, wetlands and their associated buffers and coastal waters. - Strategies to protect, manage and rehabilitate riparian areas and wetlands are incorporated into land-use planning to maintain and enhance their water quality, scenic, biodiversity, ecological, recreational and corridor values. Supporting programs consist of the following: - Support land management practices that protect waterway health through the voluntary uptake of industry-led programs and incentives. - Develop and monitor regional targets for water quality and waterway health.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP requires development of port land to comply with EPP Water. The SPDG include objectives on discharge to water management and protection of environmental values. They include requirements for environmental assessment of discharges as well as specific requirements on stormwater quality and groundwater quality.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The conservation zone overlay code includes the following performance outcomes: - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological processes of waterways, wetlands and coastal areas - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximized.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The local centre zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The low impact industry zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The medium density residential zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The open space zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and a voids environmental impacts outside the subject site, specifically with regards to water quality and the ecological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximized. - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design.	
		Mackay Region Planning Scheme - Rural zone code	1*	Moderate	Possible	Medium		The rural zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.. The following uses are accepted development: (non-intensive) animal husbandry, cropping (<5ha on previously uncropped land), sewage treatment plant <100 EP and small intensive industry (e.g., 20 cattle). These activities do not require development approval under the planning scheme and do not require State approval under the Planning Act or as Environmentally Relevant Activity under the Environmental Protection Act. This could lead to unregulated discharge of contaminants in waterways.	
		Mackay Region Planning Scheme -	1*	Minor	Possible	Low		The rural residential zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Rural residential zone code						avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The township zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Healthy waters code	1*	Minor	Possible	Low		The purpose of the healthy waters overlay code is to ensure that development is planned, designed, constructed and operated to manage stormwater and wastewater in ways that help protect the water environmental values specified in the Environmental Protection (Water) Policy. Performance outcomes seek to achieve this objective.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Possible	Low		The general development requirements overlay code includes the following performance outcomes: - Drainage works are planned and designed to ensure that adjoining land and existing upstream and downstream drainage systems are not adversely affected by development, taking into account water sensitive urban design principles such as: (i) protection of natural systems (viii) protection of water related environmental values. - Earthworks do not result in the contamination of water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the ASS overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants through stormwater runoff. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The biodiversity overlay code includes the following performance outcomes: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The landslide hazard overlay code includes the following performance outcome: - Reconfigured lots in the rural zone provide a building envelope that is large enough to accommodate an onsite wastewater treatment system (where not connected to Council's reticulated sewerage network).	

2.4 Groundwater

Table 19 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Moderate	Possible	Medium
		Low impact development	Minor	Rare	Low

Table 20 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction.	EPBC Act	1*	Minor	Unlikely	Low	Low	The referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, including from impacts to groundwater. Significant residual impacts are required to be offset.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to groundwater impacts. The approval process of EAs for land-based ERAs involves an assessment of impacts to groundwater, where relevant. Only applies to development reaching ERA thresholds. The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including groundwater, do not occur. The EIS process only applies if	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including groundwater, do not occur.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 16 includes the following performance outcomes: - Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater. - Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either aeration of horizons containing iron sulphides or mobilisation of acid or metals.	
		Water Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The water licensing framework established under the Act aims for the sustainable use of groundwater resources. SDAP Code 10's purpose includes maintaining and reversing degradation of underground water systems and minimising adverse impacts on the connectivity between underground water and water in a watercourse, lake or spring. Performance outcomes support these two objectives. Operational work for taking or interfering with water is accepted development under the Planning Regulation subject to conditions that regulate the activity.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The State interest – 'water quality' requires local planning schemes to integrate development outcomes focused on avoiding/minimising disturbance to groundwater-dependent ecosystems and avoid impacts on groundwater in drinking water supply catchments.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Environment has a focus on water quality, waterway health and wetlands, which includes the following policies: - Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		The SPDG include the objective to prevent groundwater contamination. This is supported by specific requirements on: - The scope of the impact assessment. - Controls that must be implemented during construction and operation activities to prevent contamination of groundwater. - Where required, groundwater monitoring program to demonstrate minimal impact.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The conservation zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The local centre zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The low impact industry zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The medium density residential zoen overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The open space zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and a voids environmental impacts outside the subject site, specifically with regards to water quality. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The rural zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The rural residential zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The township zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Possible	Low		The general development requirements code includes the following performance outcome: - Earthworks do not result in the contamination of water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the ASS overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants, including to groundwater.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The landslide hazard overlay code includes the following performance outcome: - Reconfigured lots in the rural zone provide a building envelope that is large enough to accommodate an onsite wastewater treatment system (where not connected to Council's reticulated sewerage network).	

2.5 Wetlands

Table 21 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Ciiv – Mod Cx - Mod	Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat. Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species. Increased weed and pest pressure on wetland ecosystems due to construction and operational activities, including through increased availability of access.	Special development (highest level of impact)	Major	Almost Certain	High
		High/medium impact development	Major	Likely	High
		Low impact development	Moderate	Possible	Medium

Table 22 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Ciiv – Mod Cx - Mod	Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat. Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species. Increased weed and pest pressure on wetland ecosystems due to construction	EPBC Act	1*	Minor	Possible	Low	Low	The referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as listed threatened flora, TECs, Ramsar wetlands (none at Hay Point), listed threatened species and migratory bird species. Significant residual impacts are required to be offset. Approval is required only when a significant impact is likely.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 8 requires the following: - Development of artificial waterways, canals and dry-land marinas minimises impacts on coastal resources by maintaining the tidal prism volume of the natural waterway to which it is connected - Development avoids or minimises impacts on category C areas of vegetation and category R areas of vegetation. - Development avoids/minimises/offsets impacts on MSES. - Development does not involve reclamation of land below tidal water, other than for the purposes of specific development types, including strategic ports, priority ports and boat harbours.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to vegetation clearing and displacement of birds. Wetlands at Dudgeon Point are mapped as wetlands of high ecological significance subject to wetland protection areas. SDAP State Code 9 seeks to protect these wetlands from impacts of high impact earthworks. Operational work in wetland protection areas for electricity operating works or government supported transport infrastructure are accepted development only if the works comply with accepted development requirements. The approval process of EAs for land-based ERAs involves an assessment of impacts to vegetation, hydrology, bird habitat and operational impacts on birds, where relevant. Only applies to development reaching ERA thresholds. The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation, hydrology, bird habitat, do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
	and operational activities, including through increased availability of access.	Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. Requires the offsetting of significant residual impact to MSES (includes bird species, native vegetation) is demonstrated. Non-offset impacts may still occur for small development where this threshold is not reached.	
		Fisheries Act / Planning Act / SDAP	2**	Moderate	Possible	Medium		Establishes a permitting system for works that may constitute waterway barrier works hindering fish passage in waterways. Ensuring adequate flow to allow fish passage would indirectly allow environmental flows to reach wetlands.	
		Nature Conservation Act	1*	Minor	Unlikely	Low		The Act lists specific EVNT flora, the clearing of which is subject to a protected plant clearing permit. Clearing requires to be offset under the Environmental Offsets Act. Limited to listed EVNT species. Lists threatened bird species, leading to their protection as MSES.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation, hydrology and bird habitat do not occur. Approvals for impacts to MSES and environmental values under the relevant legislation are still required post-EIS.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Requires native vegetation clearing to be assessed for impacts and approved. The approval process ensures preventive and mitigation measures are implemented. SDAP State code 16 includes performance outcomes on avoidance and mitigations of impacts. SDAP Code 16 includes the following performance outcome: - Clearing maintains natural wetland and watercourse/drainage feature vegetation to protect bank stability by protecting against bank erosion, water quality by filtering sediments, nutrients and other pollutants.	
		Water Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The water licensing framework established under the Act aims for the sustainable use of surface water resources. SDAP Code 10's purpose includes maintaining natural ecosystem processes, the riverine environment and physical integrity of watercourses. Performance outcomes support these objectives. Operational work for taking or interfering with water is accepted development under the Planning Regulation subject to conditions that regulate the activity.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Operational work that is the construction or modification of a levee is accepted development if the works comply with the self-assessable code for the construction or modification of levees, which requires no change in the hydraulic effects beyond the boundaries of the property.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. Actions for 2018-20 include the identification, protection and management of key seabird nesting islands, and key habitats that support foreshore and pelagic foraging. Associated Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–2021 provides a whole-of-system framework for catchment management and the protection, maintenance and restoration of wetland systems. Associated Reef 2050 WQIP addresses water quality challenges by restoring catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes ensuring coastal processes and coastal resources are protected by: - Concentrating future development in existing urban areas through infill and redevelopment. - Conserving the natural state of landforms, wetlands and native vegetation in the coastal management district. - Avoiding reclamation of land under tidal water other than for the purpose of specific types of development, including strategic ports, priority ports and boat harbours.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Environment has a focus on water quality, waterway health and wetlands, which includes the following principle and policies: - Principle: The ecological health, environmental values and water quality of coastal, surface, ground waters and wetlands are protected. - Relevant policies: Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater, wetlands and their associated buffers and coastal	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								waters. Strategies to protect, manage and rehabilitate riparian areas and wetlands are incorporated into land-use planning to maintain and enhance their water quality, scenic, biodiversity, ecological, recreational and corridor values.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP requires environmental best practice to be incorporated in all activities and development. The SPDG includes the following objectives: - The amenity of local sensitive areas, such as air and noise quality, is to be protected through appropriate controls and management techniques. - The proposed development must not adversely impact on surrounding ecological system features, including air quality, water quality, soil quality and habitat values. Specific requirements include: - An impact assessment addressing construction and operational impacts, including details of any proposed flora and fauna removal required, assessment of the environmental values of this flora and fauna and the impacts of the proposed disturbance. - Specific measures required to maintain air quality and manage noise and vibration - Specific measures on flora and fauna management, including a buffer zone from areas of high conservation value. The SPDG requires cumulative impacts to be evaluated, which is relevant to noise/vibration/lighting a proposed development will emit in addition to pre-existing emissions.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Unlikely	Low		The conservation zone overlay code includes the following performance outcomes: - The zone primarily accommodates undeveloped natural habitat areas including extensive areas containing remnant vegetation - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to the ecological and hydrological processes of wetlands - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that retention of existing remnant vegetation is maximised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The local centre zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to:	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								(a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The low impact industry zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The medium density residential zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The open space zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to the ecological and hydrological processes of wetlands - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that retention of existing remnant vegetation is maximized. - Buildings and infrastructure are located in areas that are already cleared or degraded.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The rural zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The rural residential zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to:	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								(a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Unlikely	Low		The township zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Possible	Low		The biodiversity overlay code includes the following performance outcomes: - Development is located, designed and operated to maintain ecological integrity and functionality within, adjoining and near the site by retaining high value vegetation and habitat areas, waterways and wetlands; and maintaining stormwater and hydrologic characteristics. - Development avoids land degradation within, and in close proximity to wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling; and (b) loss or modification of chemical, physical or biological properties or functions of soils.	

3 Cultural Heritage Values

3.1 Aboriginal cultural heritage

Table 23 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.	Special development (highest level of impact)	Minor	Possible	Low
		High/medium impact development	Minor	Possible	Low
		Low impact development	Minor	Unlikely	Low

Table 24 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.	Aboriginal and Torres Strait Islander Heritage Protection Act	1*	Minor	Possible	Low	Low	Enables the Commonwealth to protect an area or object of particular Indigenous significance from threats of injury or desecration. Typically used when State Government has elected not to apply state protection measures.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Native Title Act (Cwth) / Native Title Act (Qld)	1*	Minor	Possible	Low		The ILUA mechanism allows for Native Title holders to negotiate and agree on the land use/impact boundaries of a project, thereby giving the opportunity to avoid areas of cultural heritage significance.	
		Aboriginal Cultural Heritage Act	1*	Minor	Possible	Low		Protects Aboriginal cultural heritage, establishes the cultural heritage duty of care, which is supported by the duty of care guidelines and the CHMP process.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Environmental Protection Act / Planning Act - SDAP	2**	Minor	Possible	Low		The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria. The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on Aboriginal Cultural Heritage do not occur.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Possible	Low		GBRMPA requires an impact assessment on Traditional Owner heritage values to be undertaken as part of marine park permit applications.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Possible	Low		As above	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on Aboriginal Cultural Heritage values do not occur. Consent under agreed management measures for impacts to Aboriginal cultural heritage under the relevant legislation is still required post-EIS.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The relevant target for 2020 is "Indigenous and non-Indigenous heritage values are identified, documented and protected in decision-making and planning processes". The objective for 2035 is "Traditional Owners' cultural heritage rights and responsibilities are incorporated in all facets of management." Actions for 2018-20 include: - The facilitation of robust consideration of heritage values in planning processes including port development and associated activities - Updating and completing conservation management plans for key historic shipwrecks. - Implementing the Great Barrier Reef Marine Park Commonwealth Heritage Listed Places and Properties Heritage Strategy 2018–2021. - Finalising and implementing the Great Barrier Reef Marine Park Authority's Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park. - Further identify, map, monitor and report on key Reef heritage values and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								sites, including comprehensive maritime surveys in priority sections of the Reef.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – cultural heritage requires local planning schemes to integrate development outcomes ensuring the protection of Aboriginal cultural heritage to support the requirements of the Aboriginal Cultural Heritage Act 2003.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Strong Communities includes a focus on Aboriginal and Torres Strait Islander people, which includes the following policies and program: Policies: - Develop and implement mechanisms to sensitively identify, record, protect and preserve Aboriginal cultural heritage sites and interests. - Support Traditional Owners to engage with government early in planning and decision-making processes in a genuine and respectful manner. Program: - Identify, record and protect Aboriginal cultural heritage sites and interests.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		The Desired Environmental Outcome on ecological processes requires that measures to manage ecological (such as cultural heritage) considerations are developed and adopted as part of development approvals. The SPDG set out the objective that new development must not adversely affect areas of historical significance or indigenous cultural heritage. The SPDG require proponents to do a search of the Cultural Heritage Register for previously identified sites, to manage known or suspected indigenous cultural heritage values in accordance with the Aboriginal Cultural Heritage Act 2003, document impact mitigation measures before start of construction and, for a major development on previously undisturbed land, to undertake a cultural heritage survey using an archaeologist assisted by the local Traditional Owners and prepare a Cultural Heritage Management Plan.	

3.2 Historical heritage

Table 25 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites	Special development (highest level of impact)	Minor	Rare	Low
		High/medium impact development	Minor	Rare	Low
		Low impact development	Minor	Rare	Low

Table 26 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites	Underwater Cultural Heritage Act	1*	Minor	Unlikely	Low	Low	The shipwreck Barrier Princess is offshore from Dudgeon Point. The Act protects shipwrecks from interference and damage via a permitting system for entering into a protected zone, impacting underwater cultural heritage and possessing or transferring custody of legally held underwater cultural heritage artefacts.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on community values do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Queensland Heritage Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Queensland Heritage listed on the State register is protected. The Planning Act includes an approval trigger for development proposed in the vicinity of listed heritage places or buildings. SDAP Code 14 includes performance objectives for such development to meet.	
		State Development and Public Works Organisation Act	1*	Moderate	Possible	Medium		The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including heritage places, do not occur.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The relevant target for 2020 is "(Indigenous and) non-Indigenous heritage values are identified, documented and protected in decision-making and planning processes". The relevant objective for 2035 is "(Indigenous and) non-Indigenous heritage including natural, aesthetic, historic, scientific, and social values are identified, conserved and managed in partnership with the community." Actions for 2018-20 include: - The facilitation of robust consideration of heritage values in planning processes including port development and associated activities. - Updating and completing conservation management plans for key historic shipwrecks. - Implementing the Great Barrier Reef Marine Park Commonwealth Heritage Listed Places and Properties Heritage Strategy 2018–2021.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest - cultural heritage requires local planning schemes to integrate development outcomes ensuring the protection of world, national, state and local cultural heritage by: - Avoiding impacts to world, national and state cultural heritage. - Mitigating impacts to local cultural heritage.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Heritage, arts and cultural development includes the following principle: - The region's unique heritage places and experiences are identified, protected and valued, with further opportunities for arts and cultural development provided. The supporting policy is as follows: - Heritage places, including Aboriginal and Torres Strait Islander heritage (such as archaeological sites, landscapes, places or objects) are appropriately recognised and protected.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The Desired Environmental Outcome on ecological processes requires that measures to manage ecological (such as cultural heritage) considerations are developed and adopted as part of development approvals. The SPDG set out the objective that new development must not adversely affect areas of historical significance or indigenous cultural heritage. The SPDG require proponents to do a search of the Cultural Heritage Register for previously identified sites, document impact mitigation measures before start of construction and, for a major development on previously undisturbed land, to undertake a cultural heritage survey using an archaeologist.	

4 Social Values

4.1 Amenity of surrounding communities

Table 27 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.	Special development (highest level of impact)	Major	Almost Certain	High
		High/medium impact development	Moderate	Likely	Medium
		Low impact development	Minor	Possible	Low

Table 28 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.	Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low	Medium	The EP Act establishes the offence of causing environmental nuisance, which is relevant to noise and atmospheric emissions from industrial activities and traffic. The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on community values do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	The post-management combined risk rating for potential impact to social values associated with amenity was assessed as 'medium' because there are some areas where sensitive land uses may be approved in future in the vicinity of Strategic Port Land (SPL), thereby presenting future amenity and reverse amenity impact risks.
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The environmental and social impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on community values, do not occur.	
		Work Health and Safety Act	2**	Major	Unlikely	Medium		The Act focuses on workplace amenity but may indirectly benefit local communities. Workplace Health and Safety Queensland has developed a Code of Practice on traffic management for construction or maintenance work under the Act. The purpose of this code is to assist persons to manage workplace health and safety risks posed by traffic to workers and other persons while construction or maintenance work is occurring on, or adjacent to, roads.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – liveable communities requires local planning schemes to integrate development outcomes seeking for development to maintain or enhance important cultural landscapes and areas of high scenic amenity.. The SPP's State interest – emissions and hazardous activities requires local planning schemes to integrate development outcomes aiming to protect industrial development and major infrastructure from encroachment by development that would compromise the ability of the land use to function safely and effectively. This includes medium-impact, high-impact and special industries.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Regional landscape values has a focus on scenic amenity, which is supported by the following policy: plan, design and manage development, infrastructure and other activities to manage and enhance regional landscape values. DRO Environment includes a focus on air quality and noise which is supported by the following principle and policies: - Principle: The environment is protected to maintain the health and wellbeing of the community and the natural environment through effective management of air quality and noise. - Policies: Development minimises air, odour and noise emissions and potential impacts of any minor residual emissions on sensitive land uses through its location, design, construction or operation. Adequate separation distances, amelioration measures or appropriate design ensure more intensive land uses (such as those involving activities that may potentially generate air, odour and noise emissions) have limited impact on sensitive receivers. The programs supporting the policies are as follows: - Identify and protect lands suitable for accommodating significant air quality-impacting and noise-emitting activities from incompatible development. - Plan and manage the interface between land zoned for industry and land used for sensitive land use to support and protect industrial land uses in appropriate locations. DRO Transport includes a focus on efficient, accessible and safe transport. The relevant supporting policy is for the safety and wellbeing of road users to be prioritised throughout the region.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		The LUP precinct mapping includes buffer precincts and/or less intensive activity precincts between operational port precincts and neighbouring land. The LUP Desired Environmental Outcome on community wellbeing includes the objective for land use planning undertaken on Strategic Port Land will not exacerbate noise and other impacts on residents and the community. It also states that NQBP will continue to work with the Mackay Regional Council to ensure land use planning at the interface of Strategic and Non-Strategic Port Land is compatible and does not result in adverse amenity issues and impacts on Strategic Port Lands. It is unclear whether this would translate into DA-related assessment decisions by NQBP or MRC. The SPDG require buffer zones around sites where higher risk activities could impact on neighbouring land users or if environmental emissions (dust, odours, noise etc.) could occur from the site. The SPDG include the objective for the amenity of neighbouring sites and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								local sensitive areas, such as air and noise quality, to be protected through appropriate controls and management techniques. It requires the project environmental assessment to consider impacts to air quality and noise amenity. It also requires Construction and Operational EMPs to include measures to manage amenity impacts and details specific requirements regarding mitigation of dust and noise/vibration emissions from projects and operations.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The conservation zone overlay code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The local centre zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The low impact industry zone overlay code includes the following performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The medium density residential zone overlay code includes the following performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The open space zone overlay code includes the following performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The rural zone overlay code includes the following performance outcome on amenity: - Development is located to avoid conflicts between land uses. This could be applied to prevent rural development being located too close to industrial activities at the port.	
		Mackay Region Planning Scheme - Rural residential zone code	1*	Minor	Possible	Low		The rural residential zone overlay code includes the following performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby sites containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Township zone code	1*	Minor	Possible	Low		The township zone overlay code includes the following performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby sites containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Extractive Resources and High Impact Industries overlay code	1*	Minor	Unlikely	Low		The purpose of the extractive resources and high impact industries overlay code is to minimise potential conflicts between existing and future significant extractive resource areas and high impact activities and sensitive land uses. Overall outcomes are as follows: - Realisation of the full productive capacity of potential extractive resource areas is not compromised by the location of sensitive land uses. - The operation of existing and future high impact activities is not compromised by the nearby location of sensitive land uses -adverse impacts from extractive industries and high impact activities on sensitive land uses are avoided. Supporting performance objectives include: - Sensitive land uses, and reconfiguration of a lot that facilitates sensitive land uses, are not located where they are adversely affected by noise, odour, emissions, visual and lighting impacts from high impact activity and Key Resource Area (KRA) processing areas and transport routes. - The community and economic benefits associated with the operation of winning resources infrastructure or high impact industrial activities are not compromised or curtailed by sensitive land uses. - Sensitive land uses and reconfiguration of a lot that facilitates sensitive land uses, are not located where winning resources of non-KRA quarries may be curtailed or restricted, located where they are adversely affected by the following impacts generated by non-KRA processing areas and transport routes. Acceptable outcome for non-KRA quarries is as follows: sensitive land uses and reconfiguration of a lot that facilitates sensitive land uses are not located within 1000m from a non-KRA rock quarry. Yet, acceptable outcomes allow a sensitive land use to be established within high impact activities mapped buffer areas if it can be demonstrated that design measures suitably mitigate nuisance impacts. Sensitive land uses in areas in the high impact activity buffer and not covered by the non-KRA quarry 1000m buffer could potentially be developed. Assuming the nuisance assessment for proposed sensitive land uses in the high impact activities buffer area is based on existing industrial/port facilities, there is potential for sensitive land uses to be approved in such areas as they would potentially be able to demonstrate absence of nuisance from current activities. However, establishment of sensitive land uses could constrain future industrial development.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Landscape Character overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to maintain and enhance the visual amenity of the region provided by landscape character areas and experienced from image corridors. Overall outcomes are: - Development in landscape character areas is sensitively located and designed so that landscape character attributes are maintained. - Development adjacent to image corridors enhances the region's visual amenity by providing high quality built form and landscaping outcomes.	
		Mackay Region Planning Scheme - Regional Infrastructure overlay code	1*	Minor	Unlikely	Low		The purpose of the regional infrastructure overlay code is to maintain the operational efficiency and reliability of infrastructure, public safety and a high level of amenity for adjoining and nearby sensitive land uses. Overall outcomes include: - Development within, adjoining and near regional infrastructure elements and corridors maintains public safety. - Adjoining and nearby sensitive land uses are located, orientated and designed to achieve high levels and visual and general amenity.	

4.2 Industrial safety

Table 29 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Industrial incident causing harm or health impacts to surrounding communities.	Special development (highest level of impact)	Major	Likely	High
		High/medium impact development	Major	Possible	High
		Low impact development	Minor	Possible	Low

Table 30 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Industrial incident causing harm or health impacts to surrounding communities.	Environmental Protection Act	2**	Moderate	Unlikely	Medium	Low	The Act establishes a permitting system for ERAs, which are activities with the potential to cause environmental harm. This includes chemical manufacturing (ERA 7), chemical storage (ERA 8), hydrocarbon gas refining (ERA 9), gas production (ERA 10) and oil refining and processing (ERA 11). While ERAs focus on risks of environmental harm, the controls required under EAs indirectly act to protect human safety (e.g., air quality).	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		Planning Act	1*	Moderate	Rare	Low		The Planning Regulation makes a material change of use on land registered as contaminated or potentially contaminated assessable development. SDAP Code 13 addresses the case where a site is identified as having substantial unexploded ordinance (UXO) potential and requires remediation of the site or management of the risk. The Planning Regulation makes a material change of use for a hazardous chemical facility assessable development. SDAP Code 21 sets out performance objectives. The purpose of the code is to protect human health and safety, and the built environment from off-site risks resulting from physical or chemical hazards and to protect hazardous chemical facilities	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								from off-site hazard scenarios at existing hazardous chemical facilities or natural hazards.	
		Work Health and Safety Act	1*	Minor	Rare	Low		The Act and associated regulation regulate industrial facilities that store quantities of chemicals above set thresholds through the Major Hazard Facility MHF) licencing process. Operators of MHFs are granted licences of up to five years if the regulator is satisfied that the facility is able to operate safely, and that the safety management system can control risks identified. Risks considered include impact to neighbouring premises from explosions or accidental toxic emission releases. For explosion risks, management measures include requirements for buffer zones.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – 'emissions and hazardous activities' requires local planning schemes to integrate development outcomes seeking to protect sensitive land uses from emissions and hazardous industrial activities.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Moderate	Rare	Low		The LUP Desired Environmental Outcome on community wellbeing includes the objective for port operations to prioritise the safety and security of all visitors and employees accessing port land. The SPDG include the objectives to minimise the hazards and risks of new developments to port users and local communities and locate hazardous industries or infrastructure away from other industries and any sensitive receptors. A series of specific requirements support these objectives (e.g. fire safety, materials storage, risk assessments).	
		Mackay Region Planning Scheme - Special Purpose zone code	1*	Moderate	Possible	Medium		Note: SPL overlies, and takes precedent over, the Special Purpose Zone in almost its entirety except small areas. The code addresses the need to protect amenity of adjacent areas and uses but does not address the risk of impact from industrial accidents.	
		Mackay Region Planning Scheme - Extractive Resources and High Impact Industries overlay code	1*	Moderate	Possible	Medium		Note: In areas where SPL overlies the overlay the port LUP takes precedence over the overlay code. The code addresses the need to protect amenity of adjacent areas and uses but does not address the risk of impact from industrial accidents.	

Appendix B
Initial analysis risk assessment tables – Port of Mackay

1 Marine values

1.1 Marine and estuarine water quality

Table 1 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Maintenance and/or capital dredging causing increased sedimentation and turbidity Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Moderate	Possible	Medium
		Low impact development	Minor	Possible	Low

Table 2 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Maintenance and/or capital dredging causing increased sedimentation and turbidity Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including reclamation, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Increased intensity of storm events and storm surge due to climate change causing elevated loads of sediment, nutrients and contaminants.	Sea Dumping Act	1*	Minor	Possible	Low	Medium	The Act regulates the offshore disposal of dredge material, one of the aims being the preservation of water quality.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, the increase in intensity of storm surge and heavy rainfall events caused by climate change and threatening the health and quality of coastal waters is not addressed in any instrument considered in the initial analysis. The post-management risk is medium due to the current water quality within the Mackay study area being already affected by elevated loads of sediment, nutrients and contaminants.
		EPBC Act	1*	Minor	Unlikely	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, such as a threatened marine species that relies on water quality to support habitat (e.g., seagrass, algae).	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality from these activities.	
		Coastal Protection and Management Act, Environmental Protection Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Tidal works proponents are required to demonstrate how contamination of marine waters will be prevented. SDAP State code 8: Coastal development and tidal works includes performance outcomes focused on the prevention of erosion, maintaining water quality and the management of dredging activities in accordance with the National Assessment Guidelines for Dredging. SDAP State code 9: Great Barrier Reef wetland protection areas includes performance outcomes on avoidance of impacts on wetland protection areas, including water quality.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The Act prohibits the disposal of listed contaminants in waters. Environmental Authorities for dredging ERA impose water quality criteria for project proponents to meet. Environmental Authorities for ERA covering coal stockpiling can place limits on coal dust deposition rates.	
		Fisheries Act / Planning Act / SDAP	2**	Minor	Possible	Low		Assessment under the Act would only address water quality if it was a factor at risk of affecting marine plants. The Act requires water quality degradation to be assessed as part of development proposals to predict the impacts on marine plants and requires mitigation measures to be implemented. SDAP State code 11: Removal,	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								destruction or damage of marine plants includes performance outcomes on avoidance and mitigation of impacts on marine plants, including aspects influencing water quality.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Possible	Low		The Act requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality impacted by these activities.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Possible	Low		The Act requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to preserve water quality impacted by these activities.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values (including marine water quality) do not occur.	
		Sustainable Ports Act	2**	Minor	Unlikely	Low		The Act indirectly protects water quality by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Mackay) and prohibits the disposal of port-related capital dredge material within a restricted area (i.e., within the Great Barrier Reef World Heritage Area but outside the Commonwealth GBR marine park), which assists in safeguarding water quality. The Act prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. It mandates the master planning for priority ports adjacent to the GBR coast, which may regulate impacts on water quality not already regulated by existing legislative/planning instruments.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 16 includes the following performance outcomes: - Clearing maintains natural wetland and watercourse/drainage feature vegetation to protect bank stability by protecting against bank erosion, water quality by filtering sediments, nutrients and other pollutants. - Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application. - Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater, surface water or soil. - Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either aeration of horizons containing iron sulphides or mobilisation of acid or metals.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								- The duration of clearing for a vegetation retention purpose occurs only for a period that will not contribute to land degradation.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Act's Riverine Protection Permit for works within the banks of watercourses seeks to prevent bank destabilisation that would lead to erosion and water sedimentation. Exemptions apply.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed. It also commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil. Refer to Sustainable Ports Act.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve the quality of stormwater. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP's State interest – emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater, as well as the mobilisation of ASS. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's DRO Environment includes a focus on water quality, waterway health and wetlands, which includes the following policies: - Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater, wetlands and their associated buffers and coastal waters. - Strategies to protect, manage and rehabilitate riparian areas and wetlands	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								are incorporated into land-use planning to maintain and enhance their water quality, scenic, biodiversity, ecological, recreational and corridor values. Supporting programs consist of the following: - Support land management practices that protect waterway health through the voluntary uptake of industry-led programs and incentives. - Develop and monitor regional targets for water quality and waterway health.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		All works (excluding minor works) on strategic port land and in port waters require a Port Development Approval. For developments triggering assessment under the Planning Act, the Planning Regulation determines when the LUP (and SPDG) is applicable. Development not requiring approval under the Planning Act is assessed against the LUP/SPDG under the port development consent process. Development assessable under the Planning Act located within SPL requires approval from NQBP and assessment against the LUP and SPDG. The LUP requires development of port land to comply with EPP Water. The LUP DEOs apply across all SPL as general measures to ensure ecological and environmental considerations are adopted as part of development approvals under the Land Use Plan. The SPDG include objectives on discharge to water management and protection of environmental values. They include requirements for environmental assessment of discharges as well as specific requirements on stormwater quality and groundwater quality.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - low density residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Possible	Low		The code includes the following performance outcome: - Earthworks do not result in the contamination of land or water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: The manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.2 Coastal processes (bathymetry, tides, currents, waves, sediment transport)

Table 3 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cix - Min	Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport. Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.	Special development (highest level of impact)	Major	Possible	High
		High/medium impact development	Moderate	Possible	Medium
		Low impact development	Minor	Unlikely	Low

Table 4 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cix - Min	Alteration of topography and hydrology through development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) causing changes to currents, waves and sediment transport. Increased vulnerability of coastal areas to climate change-induced sea level rise and associated changes to coastal processes.	Sea Dumping Act	1*	Minor	Possible	Low	Medium	The Act regulates the offshore disposal of dredge material, including the aim to avoid the creation of underwater sediment mounds.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, sea level rise caused by climate change and impacting on wetlands is not addressed in any instrument considered in the initial analysis. While some existing regulatory measures (e.g. coastal management district,
		EPBC Act	2**	Moderate	Possible	Medium		Assessment under the Act would only address coastal processes if it was part of an assessment of impacts to a matter of national environmental significance. The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for changes in seafloor topography or hydrology to cause significant impact on a matter of national environmental significance (e.g., via impacts on food sources like marine plants).	
		Great Barrier Reef Marine Park Act /	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The application	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		GBRMP zoning plan (general use zone)						assessment considers impacts to seafloor topography and changes in hydrology.	erosion prone areas) will assist in indirectly mitigating impacts to coastal areas from sea level rise, no instrument considered in the initial analysis addresses climate change as the root cause.
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The application assessment considers impacts to seafloor topography and changes in hydrology.	
		Coastal Protection and Management Act, Environmental Protection Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Tidal works proponents are required to demonstrate how structures in the tidal area do not, or have minimal, impact on coastal processes. SDAP State code 8: Coastal development and tidal works includes performance outcomes focused on the protection of coastal processes from interference and the management of dredging activities in accordance with the National Assessment Guidelines for Dredging. Operational work for tidal works or work within a coastal management district by State or Local Government is accepted development only if the works comply with accepted development requirements, which require avoidance of impacts to natural features of tidal water.	
		Fisheries Act / Planning Act / SDAP	2**	Moderate	Unlikely	Medium		Assessment under the Act would only address changes to seafloor topography and hydrology if they were factors at risk of affecting marine plants. The approval process requires assessment where there is a potential for changes in seafloor topography or hydrology to cause significant impact on a matter of state environmental significance (e.g. marine plants).	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The application assessment considers impacts to seafloor topography and changes in hydrology.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dumping of spoil, harbour works, building a facility or constructing mooring facilities. The application assessment considers impacts to seafloor topography and changes in hydrology.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including coastal processes, do not occur.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects against changes in seafloor topography and hydrology by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Mackay) and prohibits the disposal of port-related capital dredge material within a restricted area (i.e., within the Great Barrier Reef World Heritage Area but outside the Commonwealth GBR marine park), which prevents interference with coastal processes. The Act prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. It also mandates the master planning for priority ports adjacent to the GBR coast, which may regulate impacts on coastal processes not already regulated by existing legislative/planning instruments.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to limiting port-related capital dredging in priority ports and the beneficial reuse of dredge spoil instead of offshore disposal. Refer to Sustainable Ports Act.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes ensuring that coastal development avoids adverse impacts on coastal processes.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		All works (excluding minor works) on strategic port land and in port waters require a Port Development Approval. For development not requiring approval under the Planning Act: the SPDG require proponents of marine structures to discuss the basis of design with NQBP in situations where consideration of metocean conditions will form a significant part of the design.	
		Mackay Region Planning Scheme - Flood and Coastal Hazard overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following overall outcomes: development in coastal hazard areas: - Is avoided due to the nature of the use or the severity of the hazard; and - Is designed to protect communities, infrastructure and coastal ecosystems from adverse coastal hazard impacts.	

1.3 Marine plants (mangroves/saltmarshes, seagrass/macroalgae)

Table 5 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cx - Mod Cix, Cx - Min	Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities. Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat. Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat. Sea level rise resulting in the degradation or loss of marine plant habitat in intertidal areas.	Special development (highest level of impact)	Major	Likely	High
		High/medium impact development	Major	Possible	High
		Low impact development	Minor	Possible	Low

Table 6 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cx - Mod Cix, Cx - Min	Vegetation clearing resulting in direct loss of marine plants and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of mangrove and intertidal flora communities. Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of marine plants and associated habitat and reduction of habitat quality in adjacent areas due to altered coastal processes and including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions and discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of marine plant habitat. Elevation of sea surface temperature due to climate change resulting in degradation or loss of seagrass habitat.	Sea Dumping Act	1*	Minor	Unlikely	Low	High	The Act regulates the offshore disposal of dredge material, one of the aims being to limit turbidity.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, the threat of rising sea surface temperature above tolerance thresholds of seagrass resulting in impacts to seagrass is not addressed in any instrument considered in the initial analysis. The post-management risks is medium due to the relatively low density and quality of seagrass populations within the Mackay study area. Similarly, the threat of sea level rise caused by climate change on intertidal areas is not addressed in any regulatory instrument considered in the initial analysis. The post-management risk is high due to: • the important amount of mangrove areas within the Mackay study area that have important value for fisheries, coastal water quality and coastal protection • absence of regulatory instrument addressing climate change as the root cause of sea level rise and absence of mitigation measures in existing regulatory instruments against sea level rise impacts on intertidal fauna and flora habitat.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, such as a threatened marine species that relies on marine plants as a food source.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Conservation park zone)	1*	Minor	Unlikely	Low		The Zoning Plan does not list dredging or dumping of spoil as permissible activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Marine national park zone)	1*	Minor	Unlikely	Low		The Zoning Plan does not list dredging or dumping of spoil as permissible activities.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Tidal works proponents are required to assess the proposed development impact on marine plants. The Planning Act establishes the approval triggers and SDAP State Code 8 sets out the performance outcomes to be met. SDAP Code 8 also requires the management of dredging activities to be in accordance with the National Assessment Guidelines for Dredging.	
		Environmental Protection Act /	1*	Minor	Unlikely	Low		EAs for dredging ERA impose water quality criteria for project proponents to meet. Environmental Authorities for ERAs addressing coal	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
	Sea level rise resulting in the degradation or loss of marine plant habitat in intertidal areas.	Planning Act - SDAP						stockpiling/handling can place limits on coal dust deposition rates. Activities not meeting the ERA thresholds are not regulated via EAs.	
		Environmental Offsets Act	2**	Minor	Unlikely	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires the offsetting of lost marine plants when a significant residual impact is demonstrated. Non-offset impacts may still occur for small development where this threshold is not reached.	
		Fisheries Act / Planning Act / SDAP	1*	Minor	Possible	Low		Direct and indirect impacts to marine plants must be assessed as part of development proposals and requires mitigation measures to be implemented. The Planning Act establishes the approval triggers and SDAP State code 11: Removal, destruction or damage of marine plants sets out the performance outcomes to be met. Operational work impacting on marine plants is accepted development under the Planning Regulation only if activities can comply with accepted development requirements.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including marine plants, do not occur.	
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects marine plants by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including blot Point) and prohibits the disposal of port-related capital dredge material within a restricted area (i.e., within the Great Barrier Reef World Heritage Area but outside the Commonwealth GBR marine park), which assists in safeguarding marine plants. The Act prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. Mandates the master planning for priority ports adjacent to the GBR coast, which may regulate impacts on water quality not already regulated by existing	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								legislative/planning instruments; this may include potential impacts on marine plants.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts requires native vegetation clearing to be assessed for impacts and approved. The approval process ensures preventive and mitigation measures are implemented. SDAP State code 16: Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts, including soil erosion and watercourse sedimentation.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed; commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil. Refer to Sustainable Ports Act.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – biodiversity requires local planning schemes to integrate the avoidance and mitigation of impacts on MSES, which include marine plants. The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. It also seeks to avoid reclamation of land under tidal water, which may contribute to preserving marine plant habitat. The SPP's State interest – 'water quality' requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP's State interest – 'emissions and hazardous activities' requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								The Plan's sustainability, climate change and natural hazards DRO includes the following principle on climate change: the generation of greenhouse gases is reduced through land-use planning and development design, and long-term climate change impacts are considered in planning decisions. Relevant supporting policies seek to: - Reduce greenhouse gas emissions from vehicle usage. - Improve energy efficiency and reduction of greenhouse gases from electricity usage. - Increase access to renewable energy options and low-emission technologies. - Facilitate opportunities for carbon forestry.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Moderate	Unlikely	Medium		Both the LUP and SPDG require compliance with Commonwealth and State legislation, which is triggered if impacts to marine plants can be expected from a proposed development.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The conservation zone overlay code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density	1*	Minor	Possible	Low		The medium density residential zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Residential zone code						avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		Under the zone code, mangrove areas are zoned as Open Space. Open space zone overlay code overall outcomes include: - Predominant form of development in the zone is park, access and stormwater infrastructure and environmental facilities; or undeveloped open space. - Development is designed to incorporate sustainable land management practices such as retention and enhancement of native vegetation Performance outcomes include maximisation of existing remnant vegetation retention .With regard to water quality, the zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - low density residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Possible	Low		The code includes the following performance outcome: earthworks do not result in the contamination of land or water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: the manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.4 Coral reefs

Table 7 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cviii, Cix, Cx - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat. Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Minor	Unlikely	Low
		Low impact development	Minor	Rare	Low

Table 8 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cviii, Cix, Cx - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in direct loss of coral reefs and coral habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes and including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of coral reef and coral habitat. Elevation of sea surface temperature and increasing ocean acidification due to climate change resulting in degradation or loss of coral reef and coral habitat.	Sea Dumping Act	1*	Minor	Unlikely	Low	Medium	The Act regulates the offshore disposal of dredge material, one of the aims being to avoid disposal in sensitive areas (e.g., coral reefs) and limit turbidity, including via resuspension during cyclones.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive. However, the threats of increased ocean acidification from anthropogenic CO_2 emissions and increased water temperatures causing impacts to coral such as bleaching are not addressed under any instrument considered in the initial analysis. The post-management risk is medium due to the low quantity and relatively low importance of coral reefs within the Mackay study area.
		EPBC Act	2**	Minor	Possible	Low		Assessment under the Act would only address coral reefs if it was part of an assessment of impacts to a matter of national environmental significance. The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, such as a threatened marine species that relies on coral reefs as a food source and/or habitat.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Possible	Low		SDAP Code 8 requires that the management of dredging activities be in accordance with the National Assessment Guidelines for Dredging.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low		The application process for EAs for (maintenance) dredging and mineral/bulk material handling ERAs typically requires an impact assessment that considers coral reefs. EAs for agricultural ERAs (aquaculture, intensive animal feedlotting, pig keeping, poultry farming, commercial cropping and horticulture in Great Barrier Reef catchment) located in GBR catchments can impose discharge water quality criteria.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging and dumping of spoil. The permit can impose conditions aiming to avoid direct impact to coral reefs.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including coral reefs, do not occur.	
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects coral reefs by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits the disposal of port-related capital dredge material within a restricted area (i.e., within the Great Barrier Reef World Heritage Area but outside the Commonwealth GBR marine park), which assists in safeguarding coral reefs. The Act prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits. It also mandates the master planning for priority ports adjacent to the GBR coast, which may regulate impacts on coral reefs not already regulated by existing legislative/planning instruments.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. SDAP State code 16: Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts, including soil erosion and watercourse sedimentation.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed. It commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil, which contributes to limiting turbidity. Refer to Sustainable Ports Act. The associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. The SPP's State interest – emissions and hazardous activities requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's Environment DRO includes water quality of waterways. Sustainability, climate change and natural hazards DRO includes the following principle on climate change: the generation of greenhouse gases is reduced through land-use planning and development design, and long-term climate change impacts are considered in planning decisions. Relevant supporting policies seeks to: - Reduce greenhouse gas emissions from vehicle usage - Improve energy efficiency and reduction of greenhouse gases from electricity usage - Increase access to renewable energy options and low-emission technologies - Facilitate opportunities for carbon forestry.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP DEO ECOL. 4 states that development of port land will comply with the EPP Water. The SPDG requires compliance with State legislation, which includes the EPP Water. It requires the impact assessment to identify potential discharges to water, with estimates of both flow rates and contaminant loads for larger projects, where possible. It prohibits the discharge of pollutants into surrounding waters and the release of sediments into the surrounding environment. It requires implementation of erosion and sediment control	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								measures. For larger projects or sites, it requires a Stormwater Management Plan as part of a Port Development Application.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme -	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		low densityresidential Rural zone code						avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Unlikely	Low		The zone code includes the following performance outcome: - Earthworks do not result in the contamination of land or water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: - The manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.5 Fish, Fish Habitat Areas

Table 9 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cix - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat. Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Minor	Possible	Low
		Low impact development	Minor	Unlikely	Low

Table 10 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cix - Min	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fish, direct loss of fish habitat and reduction of habitat quality in adjacent areas due to altered coastal processes, including erosion and accretion of sediments. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of fish habitat, including breeding and feeding habitat. Onshore development activities within and across watercourses, including for linear infrastructure, resulting in direct loss of habitat and obstruction or diminishment of fish passage.	Sea Dumping Act	1*	Minor	Unlikely	Low	Low	The Act regulates the offshore disposal of dredge material, one of the aims being to limit turbidity.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, such as a threatened fish species.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works and reclamation. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Protection of the Sea (prevention of Pollution from Ships) Act	1*	Minor	Unlikely	Low		The Act prohibits the discharge of oil, noxious substances, packaged harmful substances, sewage and garbage from vessels in Australian waters, thereby safeguarding water quality.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Possible	Low		Tidal works proponents are required to assess the proposed development impact on marine plants. The Planning Act establishes the approval triggers and SDAP State Code 8 sets out the performance outcomes to be met. SDAP Code 8 also requires the management of dredging activities in accordance with the National Assessment Guidelines for Dredging.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low		EAs for dredging ERA impose water quality criteria for project proponents to meet. Environmental Authorities for ERAs addressing coal stockpiling/handling can place limits on coal dust deposition rates.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires offsetting of lost marine plants and threatened fish species (MNES) when a significant residual impact is demonstrated.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Fisheries Act / Planning Act / SDAP	1*	Minor	Rare	Low		The Act requires direct and indirect impacts to marine plants to be assessed as part of development proposals and requires mitigation measures to be implemented. The Planning Act establishes the approval triggers and SDAP State code 11: Removal, destruction or damage of marine plants sets out the performance outcomes to be met. The Act establishes a permitting system for works that may constitute waterway barrier works hindering fish passage in waterways. Operational work for waterway barrier works is accepted development under the Planning Regulation subject to conditions that regulate the activity.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil, harbour works and reclamation. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit turbidity from these activities and to salvage fish trapped within reclamation area bund walls.	
		Protection of the Sea (prevention of Pollution from Ships) Act	1*	Minor	Unlikely	Low		The Zoning Plan prohibits the discharge of oil, noxious substances, packaged harmful substances, sewage and garbage from vessels in Australian waters, thereby safeguarding water quality.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including fish and their habitat, do not occur. For instance it can require the development of management measures to prevent entrapment of marine fauna in reclamation areas and their salvage from within the bund wall.	
		Sustainable Ports Act	2**	Minor	Rare	Low		The Act indirectly protects fish and fish habitat areas by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point) and prohibits the disposal of port-related capital dredge material within the Great Barrier Reef World Heritage Area, which assists in limiting turbidity. The Act prohibits development relating to a port facility within the State GBR marine park and within a restricted area that is outside a port's existing port limits, which limits the risk of marine plant removal. It also mandates the master planning for priority ports adjacent to the GBR coast, which may	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								regulate impacts on fish or their habitat not already regulated by existing legislative/planning instruments.	
		Transport Operations (Marine Pollution) Act	1*	Minor	Unlikely	Low		The Act prohibits the discharge of ship-sourced pollutants including oils, chemicals, sewage and garbage into coastal waters.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. SDAP State code 16: Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts, including soil erosion and watercourse sedimentation.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Act's Riverine Protection Permit for works within the banks of watercourses seeks to prevent bank destabilisation that would lead to erosion and water sedimentation. Exemptions apply.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan commits Queensland to advancing the preparation of master plans for priority ports to ensure the environmental values of the GBRWHA are managed; commits to limiting port-related capital dredging in priority ports and beneficial reuse of dredge spoil, which contributes to limiting turbidity. Refer to Sustainable Ports Act. The Plan's associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as wetland and native vegetation conservation in the coastal management district, which are known to improve quality of stormwater. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP's State interest – emissions and hazardous activities requires local	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's environment DRO includes water quality of waterways.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP DEO ECOL. 4 states that development of port land will comply with the EPP Water. The SPDG requires compliance with State legislation, which includes the EPP Water. It requires the impact assessment to identify potential discharges to water, with estimates of both flow rates and contaminant loads for larger projects, where possible. It prohibits the discharge of pollutants into surrounding waters and the release of sediments into the surrounding environment. It requires implementation of erosion and sediment control measures. For larger projects or sites, it requires a Stormwater Management Plan as part of a Port Development Application.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructure is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Residential zone code						regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - low density residential rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Unlikely	Low		The code includes the following performance outcome: - Earthworks do not result in the contamination of land or water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme - Bushfire Hazard overlay code	1*	Moderate	Rare	Low		The overlay code includes the following performance outcome: the environment is not adversely affected by potential impacts of a bushfire over land containing hazardous materials manufactured or stored in bulk.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcome: the manufacture or storage of hazardous material in bulk is not located on land, or in the immediate surrounds of land, with a slope in excess of 15%. This aims to prevent the accidental discharge of pollutants to stormwater.	

1.6 Marine reptiles, marine mammals and migratory marine species

Table 11 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cx - Mod	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat. Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	Special development (highest level of impact)	Moderate	Likely	Medium
		High/medium impact development	Minor	Possible	Low
		Low impact development	Minor	Unlikely	Low

Table 12 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cx - Mod	Development of port infrastructure and removal or placement of material in the marine environment (such as through reclamation, dredging and dredge material placement) resulting in mortality or injury of fauna (such as through vessel strike), direct loss of habitat, and reduction of habitat quality in adjacent areas due to altered coastal processes including altered sediment transport. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including reclamation and dredging) causing a decline in quality or loss of habitat. Elevated levels of noise, vibration and lighting associated with construction and operational activities resulting in a reduction of habitat quality affecting fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality.	Sea Dumping Act	1*	Minor	Possible	Low	Low	The Act's sea dumping permits regulate dredge material disposal activities, including sources of disturbances to marine megafauna.	The combined application of Commonwealth, State, Local Government and port-specific instruments (as detailed in column 'Matter for consideration') to the potential impacts/threats/pressures from new development is comprehensive.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, such as a threatened marine species, including turtles.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from these activities.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from these activities.	
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Possible	Low		Under SDAP State Code 8: - Development in erosion-prone areas is restricted, which indirectly limits edge effects and impacts on beaches where turtles may be nesting. - Development is required to be as far landward as possible, which indirectly limits edge effects and impacts on beaches where turtles may be nesting. - Development must avoid, minimise and offset impacts on matters of state environmental significance (includes marine reptiles, mammals and migratory species).	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		EAs for dredging ERA impose noise management measures to prevent impact on marine megafauna. SDAP Code 22 includes performance outcome requiring development to avoid, minimise and mitigate impacts on matters of state environmental significance, which includes marine megafauna. Only applies to development reaching ERA thresholds.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires the offsetting of lost marine megafauna species when a significant residual impact is demonstrated.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from these activities.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Unlikely	Low		The Zoning Plan requires a permit for dredging, dumping of spoil and harbour works. The permit can impose conditions aiming to limit noise/vibration/lighting impacts on marine megafauna from these activities.	
		Nature Conservation Act	1*	Minor	Possible	Low		The Act lists marine megafauna species as threatened wildlife, which leads to their protection as MSES	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including marine megafauna, do not occur. For instance, it can require the development of management measures to prevent impacts to marine megafauna.	
		Sustainable Ports Act	2**	Minor	are	Low		The Act indirectly protects marine reptiles, mammals and migratory species by restricting port development along the GBR coast. The Act restricts capital dredging to four priority ports along the Great Barrier Reef coast (including Hay Point), which prevents the multiplication of sites where marine megafauna could be impacted.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan sets objectives and targets aiming for populations increase. Actions include: - Implementation of the associated Queensland turtle strategy. - Development of a guideline specific to the GBR on assessing and managing impacts of underwater noise on species.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		The SPDG includes the objective for works to be undertaken to minimise potential environmental impacts and protect environmental values of the marine environment. Specific requirements include: - Development on land adjoining an area of high ecological value shall include appropriate measures to protect the area, such as setbacks, landscaped buffers, stormwater quality, light spill and noise management to minimise adverse impacts on these areas. - Addressing marine environmental values as documented in NQBP's Port Environmental Management Plan as a minimum and achieve the outcomes sought in the document through appropriate environmental controls. - CEMP and OEMP - CEMP focus areas listed include pile driving (for noise	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
-								and vibration impacts) and OEMP focus areas listed include noise and light. - Both CEMP and OEMP must include an environmental monitoring and reporting program. The SPDG requires cumulative impacts to be evaluated, which is relevant to noise/vibration/lighting a proposed development will emit in addition to pre-existing emissions.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following overall outcomes: - Uses: the predominant form of development in the zone is park, access and stormwater infrastructure and environmental facilities; or undeveloped open space. - Amenity: development does not adversely affect the amenity of the open space and adjacent areas and uses, particularly sensitive land uses. Still allows for low intensity and small scale development.	

2 Land Values

2.1 Terrestrial vegetation communities and ecosystems

Table 13 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii, Cx - Min	Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat. Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.	Special development (highest level of impact)	Major	Likely	High
		High/medium impact development	Moderate	Likely	Medium
		Low impact development	Minor	Possible	Low

Table 14 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii, Cx - Min	Vegetation clearing resulting in direct loss of vegetation communities and ecosystems and reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat. Increased weed and pest pressure on terrestrial vegetation communities and ecosystems due to construction and operational activities, including through increased availability of access.	Biosecurity Act (Cwth)	1*	Minor	Possible	Low	Low	The Act aims to prevent the introduction of weeds and pests that may cause harm to native flora. The Act has a broader focus than the listed threat.	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		EPBC Act	1*	Minor	Possible	Low		The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as listed threatened flora species and TECs. Significant residual impacts are required to be offset.	
		Biosecurity Act (Qld)	1*	Minor	Possible	Low		The Act establishes a 'general biosecurity obligation' that requires all persons to take all reasonable and practical steps to prevent or minimise biosecurity risks. The Biosecurity Regulation 2016 identifies prohibited matter that should not be present in Queensland, restricted matter for which movement control is prescribed and restricted places that pose biosecurity risks.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		The approval process of EAs for land-based ERAs involves an assessment of impacts to remnant vegetation (categorised as Environmental Sensitive Areas - ESAs). Remnant vegetation clearing can be prohibited or subject to approval in particular ESA categories depending on their sensitivity. Approved clearing that is a significant residual impact must be offset under the Environmental Offset Act. SDAP Code 22 includes performance outcome requiring development to avoid, minimise and mitigate impacts on matters of state environmental significance, which includes endangered and of concern regional ecosystems. Only applies to development reaching ERA thresholds.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires the offsetting of significant residual impact to MSES (includes endangered and of concern regional ecosystem) is demonstrated.	
		Nature Conservation Act	1*	Minor	Unlikely	Low		The Act lists specific EVNT species for which clearing is subject to a protected plant clearing permit. Clearing requires to be offset under the Environmental Offset Act.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation,	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								do not occur. Vegetation clearing approvals under the relevant legislation are still required post-EIS.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Act outlines that approval processes for development involving interference with remnant vegetation involves an assessment of impacts to regional ecosystems. Clearing of all regional ecosystems (except least concern) requires approval. Approved clearing that constitutes a significant residual impact must be offset under the Environmental Offset Act. SDAP Code 16 specifies detailed performance outcomes and acceptable outcomes for various clearing types and locations. Sediment runoff is addressed as part of the clearing approval process: SDAP includes requirements for erosion prevention generally as well as in wetlands, watercourse and drainage features. Approval conditions typically include requirements to prevent erosion and waterway sedimentation. Operational work for clearing of native vegetation is accepted development only if the work complies with a vegetation clearing code.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Water Act's Riverine Protection Permit for works within the banks of watercourses seeks to prevent bank destabilisation that would lead to erosion and water sedimentation. Exemptions apply if the proponent is subject to other approvals that address impacts to waterways.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan's associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – biodiversity requires local planning schemes to integrate development outcomes seeking to avoid or minimise impacts to MNES, MSES and MLES, which includes vegetation. The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes such as native vegetation conservation in the coastal management district. The SPP's State interest – water quality requires local planning schemes to integrate development outcomes seeking to:	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								- Locate zones for urban purposes so as to avoid disturbance of high risk soils and natural drainage lines. - Plan development to avoid or minimise adverse impacts on environmental values of receiving waters arising from altered stormwater hydrology. Appendix 2 sets out stormwater management design objectives for construction and post construction phases, which addresses drainage and erosion.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Minor	Likely	Low		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. The Plan's DRO Environment includes a policy for development in non-urban areas to maintain the integrity of areas with significant biodiversity values. Supporting programs include: - Identification, rehabilitation and management of local and regional biodiversity networks through coordination mechanisms, in partnership with private and public landholders. - Pest and disease control programs to protect areas with significant biodiversity values. - Prevent and monitor exposure to exotic and introduced pests, weeds and diseases in the region, through the combined efforts of government, industry and landholders.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		Development in areas mapped as Environmental Protection under the LUP that conflict with the conservation of environmental values are stated as inappropriate. For all other precincts, the LUP requires environmental best practice to be applied. The SPDG includes the following specific requirements: - Proponents' impact assessment must detail any proposed flora removal required, and address the environmental values of this flora and impacts of the proposed disturbance. - Approvals under State legislation (i.e. Vegetation Management Act, Nature Conservation Act) must be obtained where relevant.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - The zone primarily accommodates undeveloped natural habitat areas including extensive areas containing remnant vegetation - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								and retention of existing remnant vegetation is maximised	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								and retention of existing remnant vegetation is maximised - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design - Buildings and infrastructure are located in areas that are already cleared or degraded.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - low density residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme -	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		community facilities zone code						regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses direct or indirect impacts to remnant vegetation.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcomes: - Development is located, designed and operated to maintain ecological integrity and functionality within, adjoining and near the site by retaining high value vegetation and habitat areas, waterways and wetlands; and maintaining stormwater and hydrologic characteristics - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling; and (b) loss or modification of chemical, physical or biological properties or functions of soils.	

2.2 Listed threatened and migratory species

Table 15 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cvii – Mod Cix – Min Cx - Sig	Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species. Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike). Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity) and leading to elevated stress or mortality. Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.	Special development (highest level of impact)	Major	Possible	High
		High/medium impact development	Major	Possible	High
		Low impact development	Moderate	Unlikely	Medium

Table 16 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cvii - Mod Cix - Min Cx - Sig	Vegetation clearing resulting in direct loss of threatened and migratory species and/or their habitat along with reduction of habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of habitat. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of habitat for listed threatened and migratory species. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of habitat for listed threatened and migratory species. Injury or mortality of listed threatened and migratory species due to direct interaction with construction and operational activities (such as vehicle strike). Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of habitat quality, affecting species habitat and fauna behaviour (such as migratory routes, breeding and feeding activity)	EPBC Act	1*	Minor	Possible	Low	Low	The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, such as listed threatened flora species and TECs. Significant residual impacts are required to be offset. Ecological impact assessments are typically required to consider effects of human activity on flora and fauna such as dust, light, noise and access to habitat.	Listed impacts, threats or pressures are suitably addressed by the regulatory and planning instruments considered.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to vegetation clearing. The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation and native fauna, do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria. The approval process of EAs for land-based ERAs involves an assessment of impacts to remnant vegetation (categorised as Environmental Sensitive Areas - ESAs) and to fauna. Ecological impact assessments are required to consider effects of human activity on flora and fauna such as dust, light and noise. Approved clearing that is a significant residual impact must be offset under the Environmental Offset Act. SDAP Code 22 includes performance outcome requiring development to avoid, minimise and mitigate impacts on matters of state environmental significance, which include regional ecosystems (except Least Concern) as well as threatened wildlife and special least concern animals.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets. The Act requires the offsetting of significant residual impact to MSES (includes regional ecosystems, threatened wildlife and special least concern animals) is demonstrated.	
		Nature Conservation Act	1*	Minor	Unlikely	Low		The Act lists specific EVNT species for which clearing is subject to a protected plant clearing permit. Clearing requires to be offset under the Environmental Offset Act.	
		State Development	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
	and leading to elevated stress or mortality. Increased weed and pest pressure on habitat for listed threatened and migratory species due to construction and operational activities, including through increased availability of access.	and Public Works Organisation Act						manner and unacceptable impacts on values, including remnant vegetation and native fauna, do not occur. The ecological assessment is typically required to consider noise, lighting and risks of increased access by people to fauna habitat. Vegetation/fauna habitat clearing approvals under the relevant legislation are still required post-EIS.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Act requires native vegetation clearing to be assessed for impacts and approved. SDAP State code 16: Native vegetation clearing includes performance outcomes on avoidance and mitigations of impacts.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Act's Riverine Protection Permit process for works within the banks of watercourses covers the clearing of vegetation.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Environment includes the following policies: - Development in non-urban areas to maintain the integrity of areas with significant biodiversity values. - In urban areas, impacts from development on areas with significant biodiversity values are offset when they cannot be avoided.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		Development in areas mapped as Environmental Protection under the LUP that conflict with the conservation of environmental values are stated as inappropriate. For all other precincts, the LUP requires environmental best practice to be applied. The SPDG includes the following specific requirements: - Impact assessment must detail any proposed flora removal required and address the environmental values of this flora and impacts of the proposed disturbance. - Approvals under State legislation (i.e. Vegetation Management Act, Nature	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Conservation Act) must be obtained where relevant. - Development on land adjoining an area of high ecological value (e.g. areas zoned as Environmental Protection) shall include appropriate measures to protect the area (setbacks, buffers, stormwater quality, light spill and noise) to minimise adverse impacts. - CEMP and OEMP: OEMP focus areas listed include noise, light and stormwater management. Should fauna strike risks be high for a particular development, the OEMP may be required to include management measures such as speed limits or signage. The SPDG requires cumulative impacts to be evaluated, which is relevant to noise, lighting and stormwater flows a proposed development will emit in addition to pre-existing emissions.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - The zone primarily accommodates undeveloped natural habitat areas including extensive areas containing remnant vegetation. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								(c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximised. - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Buildings and infrastructure are located in areas that are already cleared or degraded.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This seeks to encompass direct or indirect impacts to remnant vegetation and fauna habitat.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - low density residential Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses all listed threats.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses all listed threats.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses all listed threats.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses all listed threats.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands; and (b) the ecological integrity of other habitat areas and corridors; and (c) the ecological integrity of other natural features and elements of high environmental value. This encompasses all listed threats.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcomes: - Development is located, designed and operated to maintain ecological integrity and functionality within, adjoining and near the site by retaining high value vegetation and habitat areas, waterways and wetlands; and maintaining stormwater and hydrologic characteristics. - Development avoids land degradation within, and in close proximity to, waterways and wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling; and (b) loss or modification of chemical, physical or biological properties or functions of soils.	

2.3 Surface water resources

Table 17 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Cx - Mod	Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.	Special development (highest level of impact)	Major	Almost Certain	High
		High/medium impact development	Moderate	Almost Certain	Medium
		Low impact development	Minor	Almost Certain	Low

Table 18 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Cx - Mod	Stormwater runoff from development areas, including vegetation clearing, earthworks and operational activities causing elevated loads of sediment, nutrients and contaminants. Elevated sediment, nutrient and contaminant loads through construction and operational activities including onshore dredge material placement, wastewater discharge and dust emissions. Disturbance of ASS during construction and operational activities. Modification to surface water resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks.	EPBC Act	1*	Minor	Possible	Low	Low	The Act's referral and controlled action assessment process provides for rigorous assessment, including impacts on freshwater quality, where there is a potential for significant impact on a matter of national environmental significance, such as listed threatened flora/fauna species and TECs. Significant residual impacts are required to be offset.	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to water contamination. The approval process of EAs for land-based ERAs involves an assessment of impacts to water quality (e.g., agricultural and quarrying activities). The environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including water quality, do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria. SDAP Code 22 includes performance outcome requiring development to: - Be suitably located and designed to avoid or mitigate environmental harm to the receiving waters environment - To include elements which contain and treat hazardous contaminants on-site rather than releasing them into the environment and provide secondary containment to prevent the accidental release of hazardous contaminants - Store hazardous materials to avoid or minimise their release into the environment during flood events.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including water quality, do not occur.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 16 includes the following performance outcomes: - Clearing maintains natural wetland and watercourse/drainage feature vegetation to protect bank stability by protecting against bank erosion, water quality by filtering sediments, nutrients and other pollutants. - Clearing does not result in accelerated soil erosion within or outside the land the subject of the development application. - Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater, surface water or soil.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								- Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either aeration of horizons containing iron sulphides or mobilisation of acid or metals. - The duration of clearing for a vegetation retention purpose occurs only for a period that will not contribute to land degradation.	
		Water Act / Planning Act - SDAP	1*	Minor	Possible	Low		The Water Act's Riverine Protection Permit process for works within the banks of watercourses includes erosion and water quality considerations. Taking or interfering with surface or ground water is subject to development approval.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. A large extent of the plan is focused on improving water quality in the GBR catchments to reduce pressures on the reef from sediment, nutrient and chemical runoff. It sets targets for 2025 on reduction of inorganic nitrogen, fine sediment and particulate nutrient and pesticide loads. Associated Reef 2050 Water Quality Improvement Plan 2017-2022 establishes minimum practice standards across all industries and land uses, support to industries and communities to build a culture of innovation and stewardship that takes them beyond minimum standards, restoration of catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	1*	Minor	Unlikely	Low		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on improving the quality of stormwater. Appendix 2 sets out stormwater management design objectives for construction and post construction phases. The SPP's State interest – emissions and hazardous activitie' requires local planning schemes to integrate development outcomes focused on avoiding and limiting emissions from hazardous activities, including to stormwater, as well as the mobilisation of ASS. The SPP establishes assessment benchmarks for water quality to apply when local planning schemes do not integrate the listed policies. These apply to MCU, RoL and operational work applications.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								DRO Environment has a focus on water quality, waterway health and wetlands, which includes the following policies: - Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater, wetlands and their associated buffers and coastal waters. - Strategies to protect, manage and rehabilitate riparian areas and wetlands are incorporated into land-use planning to maintain and enhance their water quality, scenic, biodiversity, ecological, recreational and corridor values. Supporting programs consist of the following: - Support land management practices that protect waterway health through the voluntary uptake of industry-led programs and incentives. - Develop and monitor regional targets for water quality and waterway health.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP requires development of port land to comply with EPP Water. The SPDG include objectives on discharge to water management and protection of environmental values. They include requirements for environmental assessment of discharges as well as specific requirements on stormwater quality and groundwater quality.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design. - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								regards to: water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological processes of waterways, wetlands and coastal areas. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised, retention of natural drainage lines is maximised and retention of existing remnant vegetation is maximised. - Stormwater infrastructures is designed to minimise environmental impacts by utilising natural overland flow and water quality and quantity control measures as part of the landscape design.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - low density residential Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards towater quality and the ecological and hydrological processes of waterways and wetlands.	
		Mackay Region Planning Scheme - Healthy waters code	1*	Minor	Unlikely	Low		The purpose of the code is to ensure that development is planned, designed, constructed and operated to manage stormwater and wastewater in ways that help protect the water environmental values specified in the Environmental Protection (Water). Performance outcomes seek to achieve this objective.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Unlikely	Low		The code includes the following performance outcomes: - Drainage works are planned and designed to ensure that adjoining land and existing upstream and downstream drainage systems are not adversely affected by development, taking into account water sensitive urban design principles such as: (i) protect natural systems (viii) protection of water related environmental values. - Earthworks do not result in the contamination of water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants through stormwater runoff. Performance outcomes aim to achieve this objective.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Unlikely	Low		The overlay code includes the following performance outcomes: - Development avoids land degradation within, and in close proximity to, waterways and wetlands through mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling.	
		Mackay Region Planning Scheme -	1*	Minor	Possible	Low		The landslide hazard overlay code includes the following performance outcome: - Reconfigured lots in the rural zone provide a building envelope that is	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Landslide Hazard overlay code						large enough to accommodate an onsite wastewater treatment system (where not connected to Council's reticulated sewerage network).	

2.4 Groundwater

Table 19 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction.	Special development (highest level of impact)	Moderate	Possible	Medium
		High/medium impact development	Moderate	Possible	Medium
		Low impact development	Minor	Rare	Low

Table 20 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Altered groundwater availability and connectivity with surface water resources, along with diminished groundwater quality due to construction and operational activities including earthworks and groundwater extraction.	EPBC Act	1*	Minor	Unlikely	Low	Low	The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential for significant impact on a matter of national environmental significance, including from impacts to groundwater. Significant residual impacts are required to be offset.	The combined application of Commonwealth, State, local government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to groundwater impacts. The approval process of EAs for land-based ERAs involves an assessment of impacts to groundwater, where relevant. The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including groundwater, do not occur. The EIS process only applies if	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including groundwater, do not occur.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 16 includes the following performance outcomes: - Clearing does not contribute to or accelerate land degradation through waterlogging, or through the salinisation of groundwater. - Clearing does not result in, or accelerate, disturbance of acid sulfate soils or changes to the hydrology of the location that will result in either aeration of horizons containing iron sulphides or mobilisation of acid or metals.	
		Water Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The water licensing framework established under the Act aims for the sustainable use of groundwater resources. SDAP Code 10's purpose includes maintaining and reversing degradation of underground water systems and minimising adverse impacts on the connectivity between underground water and water in a watercourse, lake or spring. Performance outcomes support these two objectives. Operational work for taking or interfering with water is accepted development under the Planning Regulation subject to conditions that regulate the activity.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – water quality requires local planning schemes to integrate development outcomes focused on avoiding/minimising disturbance to groundwater-dependent ecosystems and avoid impacts on groundwater in drinking water supply catchments.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Environment has a focus on water quality, waterway health and wetlands, which includes the following policies: - Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater.	
		Transport Infrastructure Act / Land use plan /	1*	Minor	Unlikely	Low		The SPDG include the objective to prevent groundwater contamination. This is supported by specific requirements on: - The scope of the impact assessment.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Sustainable Port Development Guidelines						- Controls that must be implemented during construction and operation activities to prevent contamination of groundwater. - Where required, groundwater monitoring program to demonstrate minimal impact.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The conservation zone overlay code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality. - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that earthworks are minimised.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay Region Planning Scheme - low density residential Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to water quality.	
		Mackay Region Planning Scheme - General development requirements code	1*	Minor	Unlikely	Low		The code includes the following performance outcome: - Earthworks do not result in the contamination of water.	
		Mackay Region Planning Scheme - ASS overlay code	1*	Minor	Unlikely	Low		The overlay code is to ensure that development in areas known to contain, or potentially containing ASS, avoids the disturbance of acid sulfate soils or minimises the release of acid and metal contaminants, including to groundwater.	
		Mackay Region Planning Scheme - Landslide Hazard overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcome: - Reconfigured lots in the rural zone provide a building envelope that is large enough to accommodate an onsite wastewater treatment system (where not connected to Council's reticulated sewerage network).	

2.5 Wetlands

Table 21 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
Y Ciiv – Mod Cx - Mod	Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat. Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species. Increased weed and pest pressure on wetland ecosystems due to construction and operational activities, including through increased availability of access.	Special development (highest level of impact)	Major	Almost Certain	High
		High/medium impact development	Major	Likely	High
		Low impact development	Moderate	Possible	Medium

Table 22 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
Y Ciiv - Mod Cx - Mod	Direct loss of wetlands due to construction and operational activities within the wetland (including earthworks) and reduction of wetland habitat quality in remaining areas due to edge effects (including through increased availability of access) that reduce extent, condition and quality of communities and ecosystems. Elevated sediment, nutrient and contaminant loads in water due to stormwater runoff and emissions/discharges from construction and operational activities (including onshore dredge material placement) causing a decline in quality or loss of wetland habitat. Modification to surface water and groundwater resources (including altered flow paths and water availability) due to construction and operational activities such as earthworks causing a decline in quality or loss of wetland habitat. Elevated levels of air, noise, vibration and lighting emissions associated with construction and operational activities resulting in a reduction of wetland habitat quality, affecting wetland species habitat and the behaviour of species reliant on the wetland (such as migratory, breeding and feeding activity), and leading to elevated stress or mortality in those wetland species.	EPBC Act	1*	Minor	Possible	Low	Low	The Act's referral and controlled action assessment process provides for rigorous assessment where there is a potential significant impact on a matter of national environmental significance, such as listed threatened flora, TECs, Ramsar wetlands (none present at Hay Point), listed threatened and migratory bird species. Significant residual impacts are required to be offset.	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		Coastal Protection and Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		SDAP Code 8 requires the following: - Development of artificial waterways, canals and dry-land marinas minimises impacts on coastal resources by maintaining the tidal prism volume of the natural waterway to which it is connected - Development avoids or minimises impacts on category C areas of vegetation and category R areas of vegetation - Development avoids/minimises/offsets impacts on MSES - Development does not involve reclamation of land below tidal water, other than for the purposes of specific development types, including strategic ports, priority ports and boat harbours.	
		Environmental Protection Act / Planning Act - SDAP	1*	Minor	Rare	Low		The EP Act establishes the general environmental duty and the offence of causing serious or material environmental harm, which are relevant to vegetation clearing and displacement of birds. The wetlands from the O'Connell River Basin are mapped as wetlands of high ecological significance subject to a wetland protection area. SDAP State Code 9 seeks to protect these wetlands from impacts of high impact earthworks. Operational work in wetland protection areas for electricity operating works or government supported transport infrastructure are accepted development only if the works comply with accepted development requirements. The approval process of EAs for land-based ERAs involves an assessment of impacts to vegetation, hydrology, bird habitat and operational impacts on birds, where relevant. The EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation, hydrology, bird habitat, do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	
		Environmental Offsets Act	2**	Minor	Possible	Low		The Act does not prevent environmental impacts from development but rather mitigates such impacts through offsets.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
	Increased weed and pest pressure on wetland ecosystems due to construction and operational activities, including through increased availability of access.							The Act requires the offsetting of significant residual impact to MSES (includes bird species, native vegetation) is demonstrated.	
		Fisheries Act / Planning Act / SDAP	2**	Moderate	Possible	Medium		The Act establishes a permitting system for works that may constitute waterway barrier works hindering fish passage in waterways. Ensuring adequate flow to allow fish passage would indirectly allow environmental flows to reach wetlands.	
		Nature Conservation Act	1*	Minor	Unlikely	Low		The Act lists specific EVNT flora, the clearing of which is subject to a protected plant clearing permit. Clearing requires to be offset under the Environmental Offset Act. Lists threatened bird species, leading to their protection as MSES.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on values, including remnant vegetation, hydrology and bird habitat, do not occur. Approvals for impacts to MSES and environmental values under the relevant legislation are still required post-EIS.	
		Vegetation Management Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		The Acts require native vegetation clearing to be assessed for impacts and approved. The approval process ensures preventive and mitigation measures are implemented. SDAP State code 16 includes performance outcomes on avoidance and mitigations of impacts. SDAP Code 16 includes the following performance outcome: - Clearing maintains natural wetland and watercourse/drainage feature vegetation to protect bank stability by protecting against bank erosion, water quality by filtering sediments, nutrients and other pollutants.	
		Water Act / Planning Act - SDAP	1*	Minor	Unlikely	Low		The water licensing framework established under the Act aims for the sustainable use of surface water resources. SDAP Code 10's purpose includes maintaining natural ecosystem processes, the riverine environment and physical integrity of watercourses. Performance outcomes support these objectives. Operational work for taking or interfering with water is accepted development under the Planning Regulation subject to conditions that regulate the activity. Operational work that is the construction or modification of a levee is accepted development if the works comply with the self-assessable code for the construction or modification of levees, which requires no change in the hydraulic effects beyond the boundaries of the property.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. Actions for 2018-20 include the identification, protection and management of key seabird nesting islands, and key habitats that support foreshore and pelagic foraging. Associated Wetlands in the Great Barrier Reef Catchments Management Strategy 2016–2021 provides a whole-of-system framework for catchment management and the protection, maintenance and restoration of wetland systems. Associated Reef 2050 WQIP addresses water quality challenges by restoring catchments through works to improve or repair riparian vegetation, streambanks, gullies, waterways and wetlands.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – coastal environment requires local planning schemes to integrate development outcomes ensuring coastal processes and coastal resources are protected by: - Concentrating future development in existing urban areas through infill and redevelopment. - Conserving the natural state of landforms, wetlands and native vegetation in the coastal management district. - Reclamation of land under tidal water is avoided other than for the purpose of specific types of development, including strategic ports, priority ports and boat harbours.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Environment has a focus on water quality, waterway health and wetlands, which includes the following principle and policies: - Principle: The ecological health, environmental values and water quality of coastal, surface, ground waters and wetlands are protected. - Relevant policies: Development is located, designed and managed to protect the environmental values and water quality of surface water and groundwater, wetlands and their associated buffers and coastal waters. Strategies to protect, manage and rehabilitate riparian areas and wetlands are incorporated into land-use planning to maintain and enhance their water quality, scenic, biodiversity, ecological, recreational and corridor values.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP requires environmental best practice to be incorporated in all activities and development. The SPDG includes the following objectives: - The amenity of local sensitive areas, such as air and noise quality, is to be protected through appropriate controls and management techniques. - The proposed development must not adversely impact on surrounding ecological system features, including air quality, water quality, soil quality and habitat values. Specific requirements include: - An impact assessment addressing construction and operational impacts, including details of any proposed flora and fauna removal required, assessment of the environmental values of this flora and fauna and the impacts of the proposed disturbance. - Specific measures required to maintain air quality and manage noise and vibration. - Specific measures on flora and fauna management, including a buffer zone from areas of high conservation value. The SPDG requires cumulative impacts to be evaluated, which is relevant to noise/vibration/lighting a proposed development will emit in addition to pre-existing emissions.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - The zone primarily accommodates undeveloped natural habitat areas including extensive areas containing remnant vegetation - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to the ecological and hydrological processes of wetlands - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that retention of existing remnant vegetation is maximised.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to:	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								(a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Open Space zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to the ecological and hydrological processes of wetlands - The site layout responds sensitively to on-site and surrounding topography, drainage patterns, vegetation and utility services, such that retention of existing remnant vegetation is maximised - Buildings and infrastructure are located in areas that are already cleared or degraded.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - low density residential Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme -	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		community facilities zone code						regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcomes: - Development minimises environmental impacts within the subject site and avoids environmental impacts outside the subject site, specifically with regards to: (a) the ecological and hydrological processes of wetlands; and (b) the ecological integrity of other habitat areas and corridors.	
		Mackay Region Planning Scheme - Biodiversity overlay code	1*	Minor	Possible	Low		The overlay code includes the following performance outcomes: - Development is located, designed and operated to maintain ecological integrity and functionality within, adjoining and near the site by retaining high value vegetation and habitat areas, waterways and wetlands; and maintaining stormwater and hydrologic characteristics. - Development avoids land degradation within, and in close proximity to wetlands through: (a) mass movement, gully erosion, rill erosion, sheet erosion, tunnel erosion, stream bank erosion, wind erosion, or scaling; and (b) loss or modification of chemical, physical or biological properties or functions of soils.	

3 Cultural Heritage Values

3.1 Aboriginal cultural heritage

Table 23 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.	Special development (highest level of impact)	Minor	Possible	Low
		High/medium impact development	Minor	Possible	Low
		Low impact development	Minor	Unlikely	Low

Table 24 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Direct loss or degradation of cultural heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to cultural heritage sites.	Aboriginal and Torres Strait Islander Heritage Protection Act	1*	Minor	Possible	Low	Low	The Act enables the Commonwealth to protect an area or object of particular Indigenous significance from threats of injury or desecration. Typically used when State Government has elected not to apply state protection measures.	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		Great Barrier Reef Marine Park Act / GBRMP zoning plan (general use zone)	1*	Minor	Possible	Low		GBRMPA requires an impact assessment on Traditional Owner heritage values to be undertaken as part of marine park permit applications.	
		Great Barrier Reef Marine Park Act / GBRMP zoning plan	1*	Minor	Possible	Low		As above.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		(Habitat protection zone)							
		Native Title Act (Cwth) / Native Title Act (Qld)	1*	Minor	Possible	Low		The ILUA mechanism allows for Native Title holders to negotiate and agree on the land use/impact boundaries of a project, thereby giving the opportunity to avoid areas of cultural heritage significance.	
		Aboriginal Cultural Heritage Act	1*	Minor	Possible	Low		The Act's protects Aboriginal cultural heritage, establishes the cultural heritage duty of care, which is supported by the duty of care guidelines and the CHMP process.	
		Marine Parks Act / GBRCMP zoning plan (general use zone)	1*	Minor	Possible	Low		GBRMPA requires an impact assessment on Traditional Owner heritage values to be undertaken as part of marine park permit applications.	
		Marine Parks Act / GBRCMP zoning plan (Habitat protection zone)	1*	Minor	Possible	Low		As above.	
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on Aboriginal Cultural Heritage values do not occur. Consent under agreed management measures for impacts to aboriginal cultural heritage under the relevant legislation is still required post-EIS.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan's relevant target for 2020 is "Indigenous and non-Indigenous heritage values are identified, documented and protected in decision-making and planning processes". The objective for 2035 is "Traditional Owners' cultural heritage rights and responsibilities are incorporated in all facets of management." Actions for 2018-20 include: - The facilitation of robust consideration of heritage values in planning processes including port development and associated activities. - Updating and completing conservation management plans for key historic shipwrecks. - Implementing the Great Barrier Reef Marine Park Commonwealth Heritage Listed Places and Properties Heritage Strategy 2018–2021. - Finalising and implementing the Great Barrier Reef Marine Park Authority's Aboriginal and Torres Strait Islander Heritage Strategy for the Great Barrier Reef Marine Park.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								- Further identify, map, monitor and report on key Reef heritage values and sites, including comprehensive maritime surveys in priority sections of the Reef.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – cultural heritage requires local planning schemes to integrate development outcomes ensuring the protection of Aboriginal cultural heritage to support the requirements of the Aboriginal Cultural Heritage Act 2003.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Almost Certain	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Strong Communities includes a focus on Aboriginal and Torres Strait Islander people, which includes the following policies and program: Policies: - Develop and implement mechanisms to sensitively identify, record, protect and preserve Aboriginal cultural heritage sites and interests. - Support Traditional Owners to engage with government early in planning and decision-making processes in a genuine and respectful manner. Program: - Identify, record and protect Aboriginal cultural heritage sites and interests.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Possible	Low		The Act's Desired Environmental Outcome on ecological processes requires that measures to manage ecological (such as cultural heritage) considerations are developed and adopted as part of development approvals. The SPDG sets out the objective that new development must not adversely affect areas of historical significance or indigenous cultural heritage. The SPDG require proponents to do a search of the Cultural Heritage Register for previously identified sites, to manage known or suspected indigenous cultural heritage values in accordance with the *Aboriginal Cultural Heritage Act 2003*, document impact mitigation measures before start of construction and, for a major development on previously undisturbed land, to undertake a cultural heritage survey using an archaeologist assisted by the local Traditional Owners and prepare a Cultural Heritage Management Plan.	

3.2 Historical heritage

Table 25 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites	Special development (highest level of impact)	Minor	Rare	Low
		High/medium impact development	Minor	Rare	Low
		Low impact development	Minor	Rare	Low

Table 26 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Direct loss or degradation of historical heritage sites during land or marine area disturbance for construction and operational activities and through increased availability of access to historical heritage sites	Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low	Low	The Acts EIS processes provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on community values do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		Queensland Heritage Act / Planning Act / SDAP	1*	Minor	Unlikely	Low		Queensland Heritage places listed on the State register is protected. The Planning Act includes an approval trigger for development proposed in the vicinity of listed heritage places or buildings. SDAP Code 14 includes performance objectives for such development to meet.	
		State Development and Public Works Organisation Act	1*	Minor	Unlikely	Low		The Act's environmental impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								manner and unacceptable impacts on values, including heritage places, do not occur.	
		Reef 2050 Long-Term Sustainability Plan	3***	Moderate	Likely	Medium		The Plan is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable. The Plan's relevant target for 2020 is "(Indigenous and) non-Indigenous heritage values are identified, documented and protected in decision-making and planning processes". The Plan's relevant objective for 2035 is "(Indigenous and) non-Indigenous heritage including natural, aesthetic, historic, scientific, and social values are identified, conserved and managed in partnership with the community." Actions for 2018-20 include: - The facilitation of robust consideration of heritage values in planning processes including port development and associated activities. - Updating and completing conservation management plans for key historic shipwrecks. - Implementing the Great Barrier Reef Marine Park Commonwealth Heritage Listed Places and Properties Heritage Strategy 2018–2021.	
		Underwater Cultural Heritage Act	1*	Minor	Unlikely	Low		There is no known underwater cultural heritage in the study area, however the shipwreck "Fairy" is located nearby. It is possible there is unidentified underwater historical heritage from military activity during World War II. The Act protects shipwrecks from interference and damage via a permitting system for entering into a protected zone, impacting underwater cultural heritage and possessing or transferring custody of legally held underwater cultural heritage artefacts.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State Interest – cultural heritage requires local planning schemes to integrate development outcomes ensuring the protection of world, national, state and local cultural heritage by: - Avoiding impacts to world, national and state cultural heritage. - Mitigating impacts to local cultural heritage.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Almost certain	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable. DRO Heritage, arts and cultural development includes the following principle: The region's unique heritage places and experiences are identified, protected and valued, with further opportunities for arts and cultural development provided. The supporting policy is as follows: - Heritage places, including Aboriginal and Torres Strait Islander heritage (such as archaeological sites, landscapes, places or objects) are appropriately recognised and protected.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The Act's Desired Environmental Outcome on ecological processes requires that measures to manage ecological (such as cultural heritage) considerations are developed and adopted as part of development approvals. The SPDG set out the objective that new development must not adversely affect areas of historical significance or indigenous cultural heritage. The SPDG require proponents to do a search of the Cultural Heritage Register for previously identified sites, document impact mitigation measures before start of construction and, for a major development on previously undisturbed land, to undertake a cultural heritage survey using an archaeologist.	

4 Social Values

4.1 Amenity of surrounding communities

Table 27 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities. Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.	Special development (highest level of impact)	Major	Almost Certain	High
		High/medium impact development	Moderate	Likely	Medium
		Low impact development	Minor	Possible	Low

Table 28 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Increased road traffic and associated road safety management issues due to construction and operational activities, including traffic associated with commuting workers, delivery of construction materials, plant and equipment and increased heavy vehicle activities. Elevated levels of air, noise, vibration and lighting emissions along with altered visual aspect of port land and surrounding areas due to construction and operational activities causing reduced amenity of surrounding communities.	Environmental Protection Act / Planning Act - SDAP	1*	Minor	Possible	Low	Low	The EP Act establishes the offence of causing environmental nuisance, which is relevant to noise and atmospheric emissions from industrial activities and traffic. The Act's EIS process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on community values do not occur. The EIS process only applies if preferred by the proponent (voluntary basis) or if required by the regulator based on an assessment against the standard criteria.	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		State Development and Public Works Organisation Act	1*	Minor	Possible	Low		The Act's environmental and social impact assessment process provides for rigorous assessment of major projects to ensure development occurs in a sustainable manner and unacceptable impacts on community values, do not occur.	
		Work Health and Safety Act	2**	Major	Unlikely	Medium		The Act focuses on workplace amenity but may indirectly benefit local communities. Workplace Health and Safety Queensland has developed a Code of Practice on traffic management for construction or maintenance work under the Act. The purpose of this code is to assist persons to manage workplace health and safety risks posed by traffic to workers and other persons while construction or maintenance work is occurring on, or adjacent to, roads.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – liveable communities requires local planning schemes to integrate development outcomes seeking for development to maintain or enhance important cultural landscapes and areas of high scenic amenity. The SPP's State interest – emissions and hazardous activities requires local planning schemes to integrate development outcomes aiming to protect industrial development and major infrastructure from encroachment by development that would compromise the ability of the land use to function safely and effectively. This includes medium-impact, high-impact and special industries as well as industrial land in an SDA.	
		Mackay, Isaac and Whitsunday Regional Plan	3***	Moderate	Possible	Medium		The Plan is a policy document that requires regulatory instruments such as Acts and Regulations to make its provisions enforceable.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								DRO Regional landscape values has a focus on scenic amenity, which is supported by the following policy: plan, design and manage development, infrastructure and other activities to manage and enhance regional landscape values. DRO Environment includes a focus on air quality and noise which is supported by the following principle and policies: - Principle: The environment is protected to maintain the health and wellbeing of the community and the natural environment through effective management of air quality and noise. - Policies: Development minimises air, odour and noise emissions and potential impacts of any minor residual emissions on sensitive land uses through its location, design, construction or operation. Adequate separation distances, amelioration measures or appropriate design ensure more intensive land uses (such as those involving activities that may potentially generate air, odour and noise emissions) have limited impact on sensitive receivers. The programs supporting the policies are as follows: - Identify and protect lands suitable for accommodating significant air quality-impacting and noise-emitting activities from incompatible development. - Plan and manage the interface between land zoned for industry and land used for sensitive land use to support and protect industrial land uses in appropriate locations. DRO Transport includes a focus on efficient, accessible and safe transport. The relevant supporting policy is for the safety and wellbeing of road users to be prioritised throughout the region.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Minor	Unlikely	Low		The LUP precinct mapping includes buffer precincts and/or less intensive activity precincts between operational port precincts and neighbouring land. The LUP Desired Environmental Outcome on community wellbeing includes the objective for land use planning undertaken on Strategic Port Land will not exacerbate noise and other impacts on residents and the community. It also states that NQBP will continue to work with the Mackay Regional Council to ensure land use planning at the interface of Strategic and Non-Strategic Port Land is compatible and does not result in adverse amenity issues and impacts on Strategic Port Lands. It is unclear whether this would translate into DA-related assessment decisions by NQBP or MRC. The SPDG require buffer zones around sites where higher risk activities could impact on neighbouring land users or if environmental emissions (dust, odours, noise etc.) could occur from the site. The SPDG include the objective for the amenity of neighbouring sites and local sensitive areas, such as air and noise quality, to be protected through appropriate controls and management techniques. It requires the project environmental assessment to consider impacts to air quality and noise	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								amenity. It also requires Construction and Operational EMPs to include measures to manage amenity impacts and details specific requirements regarding mitigation of dust and noise/vibration emissions from projects and operations.	
		Mackay Region Planning Scheme - Conservation zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Local Centre zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Low Impact Industry zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Medium Density Residential zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme -	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
		Open Space zone code						within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Rural zone code	1*	Minor	Possible	Low		The zone code includes the following performance outcome on amenity: - Development is located to avoid conflicts between land uses. This could be applied to prevent rural development being located too close to industrial activities at the port.	
		Mackay Region Planning Scheme - low density residential zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Sport and recreation zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - community facilities zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Mixed use zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - High density zone code	1*	Minor	Possible	Low		The zone code includes performance outcomes on amenity: - Development does not generate unreasonable levels of noise, odour, dust, air emission, light or vibration impacts that affect adjoining and nearby sites within a sensitive land use zone and adjoining or nearby site containing an existing sensitive land use. - Where located in close proximity to uses and/or transport corridors generating amenity impacts, sensitive land uses are located, designed and operated to mitigate those impacts.	
		Mackay Region Planning Scheme - Extractive Resources and High Impact Industries overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to minimise potential conflicts between existing and future significant extractive resource areas and high impact activities and sensitive land uses. Overall outcomes are as follows: - Realisation of the full productive capacity of potential extractive resource areas is not compromised by the location of sensitive land uses. - The operation of existing and future high impact activities is not compromised by the nearby location of sensitive land uses. - Adverse impacts from extractive industries and high impact activities on sensitive land uses are avoided. Supporting performance objectives include: - Sensitive land uses, and reconfiguration of a lot that facilitate sensitive land uses, are not located where they are adversely affected by noise, odour, emissions, visual and lighting impacts from high impact activity and Key Resource Area (KRA) processing areas and transport routes. - The community and economic benefits associated with the operation of winning resources infrastructure or high impact industrial activities are not compromised or curtailed by sensitive land uses. - Sensitive land uses and reconfiguration of a lot that facilitate sensitive land uses, are not located where winning resources of non-KRA quarries may be curtailed or restricted, located where they are adversely affected by the following impacts generated by non-KRA processing areas and transport routes. Acceptable outcome for non-KRA quarries is as follows: sensitive land uses and reconfiguration of a lot that facilitate sensitive land uses are not located within 1000m from a non-KRA rock quarry. Yet, acceptable outcomes allow a sensitive land use to be established within high impact activities mapped buffer areas if it can be demonstrated that design measures suitably mitigate nuisance impacts. Sensitive land uses in areas in the high impact activity buffer and not covered by the non-KRA quarry 1000m buffer could potentially be developed.	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								Assuming the nuisance assessment for proposed sensitive land uses in the high impact activities buffer area is based on existing industrial/port facilities, there is potential for sensitive land uses to be approved in such areas as they would potentially be able to demonstrate absence of nuisance from current activities. However, establishment of sensitive land uses could constrain future industrial development.	
		Mackay Region Planning Scheme - Landscape Character overlay code	1*	Minor	Unlikely	Low		The purpose of the overlay code is to maintain and enhance the visual amenity of the region provided by landscape character areas and experienced from image corridors. Overall outcomes are: - Development in landscape character areas is sensitively located and designed so that landscape character attributes are maintained - Development adjacent to image corridors enhances the region's visual amenity by providing high quality built form and landscaping outcomes.	

4.2 Industrial safety

Table 29 Initial risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood

Risk Description			Initial Risk		
OUV (Y/N)	Potential impacts, threats or pressures	Development activities	C	L	Original risk
N	Industrial incident causing harm or health impacts to surrounding communities.	Special development (highest level of impact)	Major	Likely	High
		High/medium impact development	Major	Possible	Medium
		Low impact development	Minor	Possible	Low

Table 30 Post management risk

Key: OUV: Outstanding Universal Value; C: Consequence; L: Likelihood; MM applic.: Management measure application; PM risk: Post-management risk

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
N	Industrial incident causing harm or health impacts to surrounding communities.	Environmental Protection Act	2**	Moderate	Unlikely	Medium	Low	The Act establishes a permitting system for ERAs, which are activities with the potential to cause environmental harm. This includes chemical manufacturing (ERA 7), chemical storage (ERA 8), hydrocarbon gas refining (ERA 9), gas production (ERA 10) and oil refining and processing (ERA 11). While ERAs focus on risks of environmental harm, the controls required under EAs indirectly act to protect human safety (e.g., air quality).	The combined application of Commonwealth, State, Local Government and port-specific instruments to these potential impacts/threats/pressures from new development is comprehensive.
		Planning Act	1*	Moderate	Rare	Low		The Planning Regulation makes a material change of use on land registered as contaminated or potentially contaminated assessable development. SDAP Code 13 addresses the case where a site is identified as having substantial unexploded ordinance (UXO) potential and requires remediation of the site or management of the risk. The Planning Regulation makes a material change of use for a hazardous chemical facility assessable development. SDAP Code 21 sets out performance objectives. The purpose of the code is to protect human health and safety, and the built environment from off-site risks resulting from physical or chemical hazards and to protect hazardous chemical facilities	

Risk Description		Risk Treatment Plan and Post Management Risk							
OUV (Y/N)	Potential impacts, threats or pressures	Existing management measures	MM applic.	C	L	PM risk	Combined risk	Matter for consideration	Summary findings
								from off-site hazard scenarios at existing hazardous chemical facilities or natural hazards.	
		Work Health and Safety Act	1*	Minor	Rare	Low		The Act and associated regulation regulate industrial facilities that store quantities of chemicals above set thresholds through the Major Hazard Facility MHF) licencing process. Operators of MHFs are granted licences of up to five years if the regulator is satisfied that the facility is able to operate safely, and that the safety management system can control risks identified. Risks considered include impact to neighbouring premises from explosions or accidental toxic emission releases. For explosion risks, management measures include requirements for buffer zones.	
		State Planning Policy	2**	Moderate	Possible	Medium		The SPP is a policy document that requires regulatory instruments such as Acts, Regulations or local planning schemes to make its provisions enforceable (except assessment benchmarks). The SPP's State interest – emissions and hazardous activities requires local planning schemes to integrate development outcomes seeking to protect sensitive land uses from emissions and hazardous industrial activities.	
		Transport Infrastructure Act / Land use plan / Sustainable Port Development Guidelines	1*	Moderate	Rare	Low		The LUP Desired Environmental Outcome on community wellbeing includes the objective for port operations to prioritise the safety and security of all visitors and employees accessing port land. The SPDG include the objectives to minimise the hazards and risks of new developments to port users and local communities, and locate hazardous industries or infrastructure away from other industries and any sensitive receptors. A series of specific requirements support these objectives (e.g. fire safety, materials storage, risk assessments).	