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14.0 RECOMMENDED APPENDICES

14.1 Terms of Reference

The Terms of Reference are listed as Appendix A.

14.2 Approval, Licences & Permits

The following section is also provided in Section 2 Legislative Requirements and Project Approvals.

14.2.1 DNRM - Permit to Occupy (Form 104), *Lands Act 1994*

For access across State Land the following Permits to Occupy will be required:

- The pump well located within the boundary of the road reserve at the intersection of the road reserve and the esplanade:
 - Location of the facility refer to Section 4.1;
 - Description of the facility refer to Section 4.1, 4.2 and 4.3 Appendix B;
 - Impact of the construction of the facility refer to Section 7.3;
 - Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
 - Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.4, 7.3 and 7.6.

- The buried pipelines across the salt pan on Special Lease 43315 Lot 55:
 - Location of the facility refer to Section 4.1;
 - Description of the facility refer to Section 4.1, 4.2 and 4.3 Appendix B;
 - Impact of the construction of the facility refer to Section 7.3;
 - Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
 - Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.1 and 4.2.

- The buried pipelines across the beach leading from the pump well to the intake and discharge points offshore:
 - Location of the facility refer to Section 4.1;
 - Description of the facility refer to Section 4.1, 4.2 and 4.3 Appendix B;
 - Impact of the construction of the facility refer to Section 7.3;
 - Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
 - Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.1 and 4.2.

- The track constructed adjacent to the buried pipeline along road reserve from Coventry road to the pump-well:
 - Location of the facility refer to Section 4.1;
 - Description of the facility refer to Section 4.1, 4.2 and 4.3 Appendix B;
 - Impact of the construction of the facility refer to Section 7.3;
 - Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
 - Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.1 and 4.2.

14.2.2 DNRM – Registered Easements (Form 20), *Land Title Act 1994*

A Registered Easement will be required over Special Lease 43314, Lot 55 SB638 (Refer to Figure 1-7 and 4-1). A letter of agreement from the leaseholder has been obtained and will be provided with an application to DNRM.

14.2.3 DNRM – Vegetation Clearing, Vegetation Management Act 1999 and Integrated Planning Act 1997

Vegetation clearing will occur on Lot 8 which is freehold land, in this case an application will be assessable under Section 8 of IPA. The pipeline to the ocean and associated access road will be located on State land (road areas) and leasehold land (Saltpan Lot 55 SB 638 USL 46724) will require a Tree Clearing Permit pursuant to the vegetation Management Act 1999. The information required by DNRM to assess an application for clearing on leasehold land is included in the following sections:

- The location of the area, refer to Section 6.5 and 7.3;
- Description of the vegetation proposed to be cleared, refer to Section 7.3;
- Location, extent and description of any existing land degradation on the property, refer to Section 6.5;
- Action proposed to prevent land degradation refer to Section 4.3;
- Location, extent and description of any remnant vegetation remaining on the property after the proposed clearing, refer to Section 6.5 and 7.3;
- Proposed rehabilitation restoration of vegetation on the property, refer to Section 7.2.

14.2.4 Bowen Shire Council - Approval to Lay Pipelines on Road Areas, *Local Government Act 1993*

Bowen Shire Council has the authority to allow pipelines to be laid in road areas. It is proposed that pipelines would be laid in the road reserves located in figure 1-7. The information required for Council to assess this activity is included in the following sections:

- Location of the facility refer to Section 4.1;
- Description of the facility refer to Sections 4.1, 4.2, and 4.3 Appendix B;
- Impact of the construction of the facility refer to Section 7.3;
- Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
- Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.1, 4.2, and 4.5.

14.2.5 Bowen Shire Council – Development Approval, Material Change of Use, Operational Works, *Integrated Planning Act 1997*

Bowen Shire Council will issue Development Approval. The information provided in the EIS will be used to support an application for the material change of land use to from rural grazing to enable aquaculture activities to occur.

The information required for the development application is provided throughout the EIS.

For example information related to the material change of use of premises is included in the following sections:

- Concept Design Information refer to Section 4.1 & Appendix B
- Number of employees refer to Section 7.10
- Operational works refer to Section 4.5

Sewage and Water Supply Act

Water supply services refer to Section 4.1.

Onsite sewage and water treatment procedures are detailed in Section 4.1 and 4.5

14.2.6 EPA – Integrated Authority for Environmentally Relevant Activities, Environmental Protection Act 1994, Integrated Planning Act 1997

The Environmentally Relevant Activities undertaken at Guthalungra will be approved through an environmental authority issued as part of the development conditions placed on the site. Numerous sections of the EIS relate specifically to the information requirements of the EPA.

Level 1: Aquaculture – ERA 1

The Guthalungra proposal triggers the requirement for a Level 1 Aquaculture ERA

The EIS provides relevant information throughout the document, in particular refer to:

- A description of the existing environment, refer to Section 6.0;
- Distances to dam, bore etc on adjoining land, refer to Section 6.3;
- Details of flammable and Combustible materials, chemical or other hazardous materials stored on the land, refer to Sections 4.5 and 9.0;
- Details of the location of any acid sulphate soils, refer to Section 6.3;
- Details of activities and impacts on air and noise refer to Section 6.7, 7.4
- Description of the activity refer to Section 4;
- Details of stormwater generation and disposal, refer to Section 4.1, 7.1;
- Details of waste produced, refer to Section 4.2 and 7.1;
- Details of contaminant releases, refer to Section 4.5 and 7.1 – 7.3;
- Details of operating hours, refer to Section 4.5;
- Details of business trading name, refer to Section 1.1.

Level 1: Dredging - ERA 19

Dredging will be required to construct and lay the intake and discharge pipelines offshore.

The information required to assess the application for this activity is located in various sections of the EIS including the following sections:

- The location of the area and the site, and surrounding environment refer to Section 4.1, 6.
- Location, extent and description of dredging, refer to Section 4.3;
- Details of spoil disposal refer to Section 4.3;
- Description of impacts on wildlife and measures to reduce the impacts refer to Section 6.5 and 7.3;
- Proposed rehabilitation and restoration, refer to Section 4.3

Level 1: Sewage Treatment - ERA 15(a) and (h)

Sewage treatment will be required for the accommodation and staff facilities located on site.

The information required to assess the application for this activity is located in various sections of the EIS including the following sections:

- The location of the area and the site, and surrounding environment refer to Section 6;
- Location, capacity and description of sewage facility, refer to Section 4.1, 4.5;
- Persons responsible for operation and maintenance, refer to section 1.3, 4.4;
- Description of effluent, refer to Section 4.1, 4.5
- Impacts on air, noise and water, refer to Section 6.7, 7.4

Level 1 Seafood Processing – ERA

More than 100 tonnes of product will be processed on – site. The information required to assess the application for this activity is located in the following sections:

- The location of the area and the site, and surrounding environment refer to Section 6;
- Location, extent and description of the processing activities, refer to Section 4.1, 4.5;
- Details of waste treatment and disposal refer to Section 4.3;
- Description of impacts on wildlife and measures to reduce the impacts refer to Section 7.

Level 2 Crude Oil or Petroleum Storing – ERA (Administering Authority, Bowen Shire Council).

Storing crude oil or a petroleum product in tanks or containers having a combined total storage capacity of 10,000 litres or more but less than 500,000 litres triggers a level 2 ERA. Over 10,000 litres of diesel and petrol will be located on site therefore an Authority will be required. Relevant information is located in the following sections:

- The location of the site, and surrounding environment refer to Section 6 and plans in Appendix B;
- Location, extent and description of the storage activities, refer to Section 4.5;

Other approvals not included in the IDAS process that come under the jurisdiction of the EPA and that require a separate permit includes:

An application for sanction pursuant to **section 86 of the Harbours Act 1955** to construct works on tidal lands or waters is required. This will apply to the offshore pipelines and the pipeline construction across the saltpan. The information required by the Coastal Protection Branch of the EPA to assess the application is contained in several sections of the EIS including:

- Location of the facility refer to Section 4.1 and 6;
- Description of the facility refer to Sections 4.1 - 4.5, Appendix B;
- Impact of the construction of the facility refer to Section 7.3;
- Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
- Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4 and 7.

An application for sanction pursuant to **section 47 (1A) of the Beach Protection Act 1968** for activities on unoccupied Crown Land in a Coastal Management Control District or in an erosion prone area. This will apply to the construction and laying of the pipelines through the foreshore and dunes and the construction and operation of the pump station. The information required by the Coastal Protection Branch of the EPA to assess the application is contained in several sections of the EIS including:

- Location of the facility refer to Section 4.1 and 6;
- Description of the facility refer to Sections 4.1 - 4.5, Appendix B;
- Impact of the construction of the facility refer to Section 7.3;
- Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
- Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4 and 7.

14.2.7 QDPI - Fisheries Act 1994

Aquaculture Licence: The *Fisheries Act 1994* requires that aquaculture projects hold permits from the Department of Primary Industries. Fisheries permit requirements will eventually become integrated into the development approvals process through IDAS. The permit issued by QDPI covers the operation of the aquaculture facility, including facility design, disease management and habitat protection. Information related to these requirements is found throughout the EIS.

Marine Plants Permit: An application for a permit to remove, destroy or damage marine plants will be required. This permit is not incorporated into the IDAS process. The margins of the saltpan and the seafloor beneath the submerged pipeline will be the areas affected. The information required by Queensland Fisheries Service to assess the application is contained in several sections of the EIS including:

- Location of the facility refer to Section 4.1;
- Description of the facility refer to Sections 4.1, 4.2 and 4.3, Appendix B;
- Impact of the construction of the facility refer to Section 7.3;
- Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
- Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.1 and 4.2.

14.2.8 GBRMPA – Marine Parks Permit, Great Barrier Reef Marine Park Regulations 1993

The Guthalungra project intends to intake and release discharge waters into the Great Barrier Reef Marine Park around 500m offshore. Pipelines and diffusers will be placed offshore therefore a Marine Parks permit is required. The information required by GBRMPA to assess the application is contained in several sections of the EIS including:

- Location of the facility refer to Section 4.1;
- Description of the facility refer to Sections 4.1, 4.2 and 4.3, Appendix B;
- Impact of the construction of the facility refer to Section 7.3;
- Impact of the operation of the facility refer to Sections 7.3 and 7.4; and
- Ongoing impact mitigation, maintenance and management of the facility refer to Sections 4.1 and 4.2.

14.2.9 Environment Australia – EPBC Act 1999

The following controlling provisions under the EPBC Act 1999 are addressed in various sections of the EIS:

- Sections 12 and 15A (World heritage), refer to Section 6.6;
- Sections 18 and 18A (Listed threatened species and communities) refer to Section 6.5;
- Sections 20 and 20A (Listed migratory species) refer to Section 6.5; and
- Sections 23 and 24A (Marine environment) refer to Section 6.5.

14.3 Research

A number of research projects are currently underway on the Pacific Reef Fisheries prawn farm at Alva Beach. Many of these are ongoing and will be continued at Guthalungra. No site specific research projects have been identified at this stage.

14.4 Consultation Report

The Consultation Report is detailed in Section 10 and the Consultation Plan in Appendix T. Further relevant information can be found in Appendix U and V.

14.5 Study Team

The EIS management team comprises of:

Pacific Reef Representatives:

Executive Manager George Pilioras BEng
Production Manager John Moloney, BSc (Hon), MSc.

Major EIS Contractors:

Seafood Farming Services, Aquaculture Consultants
Carl Young BSc (Hons), MSc MBA
EIS Project Coordinator

Lambert & Rehbein, Environmental Services
Dr Tim Wrigley Ph.D., MSc, BSc (Hons)
Environmental and Management Expertise

Sinclair Knight Merz, Engineering & Technical Services
Ralph Burch BEng (Ag) Hons EWS NIEAust CPEng,
Engineering and Management Expertise

14.6 Glossary of Terms

Terms and abbreviations used in this EIS have the following meaning:

Term	Definition
Acid Sulphate Soils	Soils containing iron-sulphides, which, when exposed to air, produce sulphuric acid
Aesthetics	A system of principles for the appreciation of the beautiful
Ambient	Naturally occurring - in noise impact analysis, the ambient noise levels are the noise levels occurring in the absence of the Project under consideration



Term	Definition
Amenity	Pleasantness or agreeableness
Annual full time equivalent	In economic analysis, a means of describing employment generation on a consistent basis - part time, casual and full time jobs (permanent or temporary) are grouped together and expressed in terms of annual full time equivalents which amount to full time employment for one person for one year
Antibiotics	Chemical compounds used to limit bacterial numbers
BOD	Biological oxygen demand
Borehole	A hole drilled through the strata to obtain geological specimens or to provide access for geophysical devices
Brackish/estuarine	Water with a salinity value between fresh (0 parts per thousand (ppt)) and sea water (35 ppt), usually mid to high end of this range
Broodstock	Mature adult prawns from which larval prawns are produced in a hatchery
CRC	Cooperative Research Centre for Aquaculture. A Commonwealth organisation which acts to coordinate, fund and foster cooperation between Australian aquaculture researchers and producers
Chlorophyll <u>a</u>	An indicator of the total concentration of algal material in water
Discharge	Water which is released from an aquaculture farm either from production or settlement ponds, usually via a distinct discharge channel
Dry Out	The process of leaving ponds without water in them to enable the soil to dry completely resulting in sterilisation, breakdown of organic nutrients and ensuring water retention
DNRM	Department of Natural Resources and Mines
EC	Electrical Conductivity
EIS	Environmental Impact Statement
Endemic	Animals or plants restricted to, or present in, a geographical region or locality, such as an island or continent
Environment	Collective term for the conditions in which an organism lives, e.g., the pond environment, or, in this aquaculture context, the natural biological system external to the farm
Environmentally Relevant Activity (ERA)	An activity that is likely to have an environmental impact
EPA	Environmental Protection Agency
Ephemeral	Existing for a short time only, transitory for a river, one that is not always in flow
Erosion	Wearing away often used in reference to the effect of running water or wind on soil
Erosion Potential	The ease with which a particular body of soil can be eroded
ESD	Ecologically Sustainable Development
Exceedance	An even that constitutes the breach of some guideline or standard level for a particular type of measurement
Freeboard	Distance above a water level in the case of flooding levels, having 5m of freeboard means being 5m above the water level
FSL	Full Supply Level
Fugitive Emissions	Uncontrolled air emissions such as emissions from a vehicle exhaust
Greenhouse Gas	An number of gases known to contribute to the total global warming effect including carbon dioxide, methane, nitrous oxide and some fluorine containing compounds



Term	Definition
Gross Regional Product (GRP)	The total value of goods and services produced in a given region
Gross State Product (GSP)	The total value of goods and services produced in the State of Queensland
Growout	The part of the aquaculture process which occurs in ponds, during which the prawns grow to market size
Hectare (ha)	A metric unit of area comprising 10,000 m ² e.g., 100 m x 100 m
Hatchery	A land-based building in which spawning, fertilisation and larval rearing occurs
Hormones	Broadly, a biological molecule which causes a specific physiological response when combined with the appropriate receptor cell or organ. Of concern because of their potential impact on non-target species if generally released
Infiltration	With reference to soils, the process by which water penetrates soil
Infrastructure	The installations and services that form the foundation of community or national activity including water supply, power stations, sewerage, roads, housing etc
Kilowatt (kw)	A unit of electrical power equivalent to 1000 watts
Km	Kilometres
L _{max}	The maximum noise level is defined as the highest noise level which occurs during any noise event occurring over a particular time period
L _{eq}	The average noise level is defined in terms of the equivalent continuous sound level. This is the constant sound level over a given time period which is equivalent in total sound energy to the time-varying sound level measured over the same time period
L ₁₀	Is defined as the noise level exceeded for 10% of the measurement period. It is sometimes referred to as the average maximum noise level
L ₉₀	The background noise level is defined in terms of the level exceeded for 90% of the measurement period (L ₉₀). This is commonly referred to as the background noise level.
Lifecycle	The transition through various growth and developmental stages from egg to mature adult to subsequent egg production
M	metres
m ³	A volumetric measurement of 1m x 1m x 1m or 1000 litres
Management	Managing or decision making about controllable aspects of a process or operation, e.g., production of prawns
Megalitre (ML)	One million litres
Megawatt (MW)	A unit of electrical power one megawatt is equal to one million watts
Microgram (mg)	One one-millionth of a gram
Micron (mm)	A unit of measurement equal to 1/1,000 th of a millimeter or one one-millionth of a metre
Milligram (µg)	A unit of measurement equal to 1/1,000,000 th of a gram
Multiplier	An economic device used to calculate the total direct and indirect effects of an economic even (such as investment) on the basis of the direct effects e.g. calculating total jobs created in a region when 100 construction jobs are created



Term	Definition
Noise	Includes vibration of any frequency, whether emitted through air or another medium Environmental noise levels are most commonly expressed in terms of the 'A' weighted decibel scale, dB(A). This scale closely approximates the response of the human ear, thus providing a measure of the subjective loudness of noise and enabling the intensity of noises with difference frequency characteristics (e.g. pitch and tone) to be compared
Nutrients	Any of various chemical elements or compounds which may be used by plants or animals for nutrition. In an aquaculture context usually nitrogen, phosphorus or organic carbon compounds
Pan Evaporation	The rate of evaporation (usually measured in millimeters per day) from a standard evaporation pan
Particulate matter	Term used to describe particles that are suspended in the air
pH	A scale used for the measurement of the acidity or alkalinity of a substance (concentration of H ⁺ ions)
Pond reared	Prawns grown to market or broodstock size in a pond environment
Postlarvae/larvae:	A developmental stage, from about ten days after hatching, when prawns are moved from hatchery to farm.
Q100	In storm and flood prediction, refers to a 1 in 100 year storm
Qualitative	Concerned with quality a qualitative assessment is one where what is being measured can only be described according to general qualities - see: quantitative
Quantitative	Concerned with quantity - a quantitative assessment is one where specific numerical values can be assigned to what is being measured - see: qualitative
Reduced Level (RL)	A surveyors term used to describe elevation relative to a consistent reference point in Australia, reduced levels are elevations above or below the Australian Height Datum (AHD)
Runoff	Water that flows along the surface of soil following rainfall the portion of rainfall that is not infiltrated or evaporated
Sediment	Any inorganic or organic material which has settled out of the water
Total Nitrogen (TN)	A measurement of the total concentration of nitrogen in water
Total Phosphorus (TP)	A measurement of the total concentration of phosphorus in water
Total Suspended Particulates (TSP)	A measurement of the total concentration of particulate matter in air
Total Suspended Solids (TSS)	A measurement of the total concentration of particulate matter in water
TPA	Tonnes per annum
Tidal areas	Considered to be land between Highest and Lowest Astronomical Tide levels
Total Particulates	The total suspended particulate matter (TSP) refers to particles less than 50 microns (mm) diameter in the air
Waterbirds	Birds ecologically dependent on wetlands. It includes traditionally recognised groups popularly known as wildfowl, waterfowl and shorebirds/waders.

14.7 Specialist Studies

Refer to the Appendix list below for specialist studies:

14.8 Appendix List

Appendix A – Cross-referencing of ToR

Appendix B – Concept Design Information - Sinclair Knight Merz

Appendix C – Raw Water and Wastewater Treatment Systems Specifications – Sinclair Knight Merz

Appendix D – Treatment Discharge Calculation Excel Spreadsheets – Lambert and Rehbein

Appendix E - Water Quality Management - Preliminary Concepts - Ken Hartley and Assoc.

Appendix F – Acid Sulphate Soils Report - DJ Douglas and Partners

Appendix G – Geotechnical Report – DJ Douglas and Partners

Appendix H – Flooding Study, Sinclair Knight Merz

Appendix I – Tides in Abbot Bay – Dr. Peter Ridd, James Cook University, Townsville

Appendix J - Bathymetry –Aquamap

Appendix K – Coastal Geomorphology – Ms Dalla Pozza and Dr. Hopley, James Cook University, Townsville

Appendix L – Seagrass Survey, Scientific Marine Pty Ltd

Appendix M – Flora and Fauna Report - Ecotone Environmental Services

Appendix N - Noise Report – Sinclair Knight Merz

Appendix O – Geohydrology Study – Sinclair Knight Merz

Appendix P – Coastal Erosion Report

Appendix Q – Water Quality Modelling for Abbot Bay – CRC for Reef Research, Townsville

Appendix R – Traffic Study - Lambert and Rehbein

Appendix S – Induction Training and Workplace Health and Safety Policy – Pacific Reef Fisheries

Appendix T – Consultation Plan

Appendix U – Media Releases, and Correspondence from stakeholder groups

Appendix V – ToR and membership of TAG.