1 GAS FIELD COMPONENT- ENVIRONMENTAL MANAGEMENT PLAN

1.1 STATUTORY PURPOSE OF ENVIRONMENTAL MANAGEMENT PLAN

This draft Environmental Management Plan (EMP) has been prepared in accordance with the Terms of Reference (ToR) issued for the Project. It contains mitigation and management measures presented in the draft Environmental Impact Statement (EIS) prepared for public consultation under the process set down by the *State Development and Public Works Organisation Act 1971* (Queensland). The content of this draft EMP will be revised as a result of stakeholder consultation, including comments from the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA) and, following the issue of conditions set by the Coordinator General, will be reissued in an application for an environmental authority to conduct chapter 5A activities.

Under Section 310D of the *Environment Protection Act 1994* (Queensland):

"The purpose of an environmental management plan is to propose environmental protection commitments to help the administering authority decide the conditions of the environmental authority (chapter 5A activities)."

Furthermore, section 309Z(5) requires:

"Despite subsections (1) to (4), if a relevant resource authority for the environmental authority is, or is included in, a significant project—

a. all conditions for the environmental authority stated in the Coordinator-General's report for the project (the Coordinator-General's conditions) must be imposed on the environmental authority; and

b. any other condition imposed on the environmental authority must not be inconsistent with the Coordinator-General's conditions."

QGC will prepare detailed management procedures and performance criteria based on the final EMP to be issued to all contractors to manage environmental compliance of those parties engaged in Project activities.

1.1.1 EMP Overview

This volume presents draft EMPs for construction and operation of the Gas Field Component of the QCLNG Project. These draft EMPs have been prepared based on the findings outlined in *Volume 3* of this EIS.

QGC places a high value on social performance, which it supports by its Social Performance Policy, Standard and Guidelines. A social impact assessment has been carried out for the Project (refer *Volume 8*) and a separate Social Environmental Management Plan has been prepared to address social and community values and impacts.

EMPs for the Gas Field are consistent with BG Group's Business Principles for the protection of environmental and social values across all the company's activities, operations and projects.

BG Group will require QGC, within two years of commencement of Project operations, to prepare and obtain ISO accreditation (ISO 14000) for an Environmental Management System. All Operations EMPs will be reviewed and amended as required to comply with requirements for ISO 14,000 accreditation.

These draft EMPs outline proposed management strategies in accordance with proposed performance criteria for specified acceptable levels of environmental performance. EMPs identify:

- potential impacts on environmental values
- mitigation strategies
- relevant monitoring
- appropriate indicators and performance criteria
- reporting requirements
- appropriate corrective actions should an undesirable impact or unforeseen level of impact occur.

The Activity phases of the Project comprise construction, operations and decommissioning. The structure of the EMP is outlined in *Table 9.1.1*.

Table 9.1.1 EMP Structure

Element/issue	How elements of the Activity phases are to be managed (as it affects environmental and social values).
Policy objective	The Activity policy or management objective that applies to each element.
Performance criteria	Measurable performance criteria (outcomes) for each element of each Activity phase.
Implementation strategy	The strategies, tasks or action program (to nominated operational design standards) that will be implemented to achieve the performance criteria.
Monitoring	The monitoring requirements to measure actual performance (i.e. specified limits to pre-selected indicators of change).
Auditing	The auditing requirements to demonstrate implementation of agreed environmental management strategies and compliance with agreed performance criteria.
Reporting	Format, timing and responsibility for reporting and auditing of monitoring results.
Corrective action	The action (options) to be implemented in case a performance requirement is not reached and the person responsible for that action (including staff authority, responsibility and management structure).

1.2 PURPOSE AND OBJECTIVES

EMPs have been prepared to cover activities associated with the Gas Field Component of the QCLNG Project. As stated in Section 1.1.1, the purpose of these EMPs is to outline appropriate management strategies and actions in order to meet acceptable levels of environmental performance.

The purpose of the EMPs is to provide a basis for an on-site environmental manual for staff, maintenance personnel, contractors and consultants with responsibilities for the Activity phases of the Project.

The objective of these EMPs is to provide:

- environmental management procedures and mitigation measures for control of impacts during the Activity phases of the Project to ensure that environmental requirements are specified and complied with
- environmental performance indicators, monitoring requirements and review procedures for the Project activities
- government authorities, stakeholders and proponents with a common focus for approvals and compliance with relevant policies, approvals, licences, agreements, legislation and other requirements
- the community with evidence that the environmental management of the Project is acceptable.

QGC will have ultimate responsibility for implementing the EMPs.

The Gas Field Component of the Project involves many small, discrete disturbances spread over a large area over a period of 20 years that may impact upon the environment and the community. There is no clear divide between a construction phase and an operations phase as aspects of the Gas Field development, such as well establishment, compression and water management are ongoing.

The Gas Field development will include:

- drilling approximately 6,000 wells with up to 10-15 rigs at peak activity, drilling for 24-hour periods for up to 14 days
- for each gas well, the disturbance of up to 1 ha, with a 0.5 ha permanent hardstand area, and the installation of separators, flares and water and drilling waste sumps
- installation of temporary wellhead pumps
- well maintenance workovers across the Gas Field over 20 years
- building an estimated 27 Field Compression Stations (FCSs) which will include, at each FCS, a vent for pressure management, power-generation facilities and a water-management system, including on-site oily water retention ponds of approximately 0.5 ha each and containment (bunded) areas for oil or chemical storage

- building an estimated nine Central Processing Plants (CPPs) which will include, at each CPP, Triethylene Glycol (TEG) units, a flare, power generation, metering facilities, offices, control rooms, car parks, on-site oily water retention ponds of approximately 0.5 ha each and bunded areas for oil or chemical storage
- laying approximately 3,800 km of underground gas gathering High-Density Polyethylene (HDPE), fibreglass or steel pipelines between the extraction wells, FCSs and CPPs, which will involve trench excavation to a maximum depth of 1.5 m
- approximately 8 mobile camps for 25 personnel for well drilling and establishment for the life of the Project
- approximately 6 to 7 temporary construction camps with approximately 250 to 300 personnel per camp during the construction phase
- approximately 2 permanent camps of 100 personnel per camp and 2 temporary camps of 150 to 200 personnel per camp during operations
- accommodation camps with rooms, ablutions (and sewage treatment plants), kitchens, recreation and administration blocks
- administration and warehouse facilities
- water-management facilities, potentially including desalination and brine concentration plants, approximately 300 to 400 ha of storage ponds (HDPE fabric or clay lined) for balancing water flows and salt disposal landfills
- laying approximately 500 km of underground water gathering HDPE pipelines and water pumping infrastructure between well heads, ponds and water treatment facilities for beneficial reuse options
- building an anticipated 2,000 km of lightly formed and gravelled access tracks (i.e. typically 40 m wide x 150 mm thick) to connect wellheads with other facilities.

1.3 *TRAINING AND COMMUNICATION*

All relevant personnel with management and operational responsibilities for the Project will receive training and an induction into EMPs to ensure they are familiar with the relevant management systems and requirements, as appropriate to their roles and responsibilities.

1.4 *RESPONSIBILITIES*

QGC will be responsible for carrying out the EMP.

All employees are responsible for the environmental performance of their activities and for complying with the General Environmental Duty as set out in *Section 319(1)* of the *Environment Protection Act 1994*, which states:

"A *person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to minimise the harm."*

This section sets out the specific environmental responsibilities of key Project positions. These are preliminary and nominal position titles based on an assumed organisation chart for construction and for operations, but titles and accountabilities may alter as organisational structure are finalised closer to commencement of construction and operations. Revised and updated EMPs with finalised position titles and accountabilities will be prepared prior to commencement of construction and operations.

1.4.1 *Construction Manager / Operations Manager*

The Construction or Operations Manager is ultimately responsible Construction / Operational activities, with support relating to environmental management from specialised personnel. It is the responsibility of the Construction / Operations Manager to ensure that the Project is adequately resourced to enable all personnel to carry out their duties in an environmentally responsible manner.

1.4.2 *Construction / Operations Environmental Manager*

The Construction Environmental Manager is responsible for environmental aspects associated with construction activities and will direct work in a manner that complies with relevant environmental procedures, adheres to all legislative requirements and ensures that all environmental objectives associated with the Project are achieved. This includes implementation of the construction and operations EMPs and the oversight of environmental compliance audits and monitoring programs.

The Construction Environmental Manager and the Operations Environmental Manager will be referred to as the "Environmental Manager" in the relevant sections discussing the CEMP and OEMP. Environmental Officers will report to the Environmental Manager.

1.4.3 *Lands Officer*

The Lands Officer is responsible for all land access requirements and communications with landholders.

1.5 *OBJECTIVES AND PERFORMANCE CRITERIA*

The environmental objectives and performance criteria for each Activity element of the Project are described in *Table 9.1.2*. These objectives and performance criteria will be met by the implementation of the management measures presented in *Section 2* onwards and will be assessed through the audit process detailed in *Section 1.10.*

Table 9.1.2 Environmental Objectives and Performance Criteria

Element	Objective	Performance Criteria
Noise and vibration	To construct and operate in a manner that minimises the impact of noise and vibrations on surrounding residences and industry.	No exceedence of Project derived noise criteria at sensitive receptors. No noise-related complaints received from residents and landholders. Consultation with potentially affected sensitive receptors. Respond to all complaints.
Traffic and Transport	To minimise as much as practicable potential impacts associated with traffic generated by the Project.	Minimal traffic-related complaints and incidents. To minimise impacts on road pavements, or where this is not practicable, to negotiate appropriate contributions or upgrades to road pavement impacts with relevant authorities.
Visual amenity	To minimise impacts on visual amenity associated with the Gas Field.	Respond to all complaints regarding visual amenity and, where feasible, implement mitigation measures. Consultation with potentially affected sensitive receptors.
Lighting	To reduce as much as practicable lighting impacts on sensitive receptors.	Respond to all complaints regarding lighting and, where feasible, implement mitigation measures. Consultation with potentially affected sensitive receptors.
Weeds and pests	To prevent the spread or introduction of pest and weed species as a results of Project activities.	No increase in abundance or distribution of weed and pest species as a result of Project activities.
Air quality and dust	To construct and operate in a manner that minimises impacts on ambient air quality.	No exceedence of Project derived air quality criteria at sensitive receptors. Consultation with potentially affected sensitive receptors. Respond to all complaints on air quality.
Groundwater quality and availability	To protect the quality of the existing groundwater resources and not extract groundwater to the detriment of other groundwater users and biodiversity dependent on groundwater supplies.	Groundwater quality not impacted by activities. Develop trigger levels for the point at which changes to groundwater quality and levels may result in the implementation of groundwater management plans.
Surface water quality	To minimise the potential impacts associated with erosion and to prevent the release of contaminants that may adversely affect downstream surface water quality	No release of contaminants to surface waters outside the boundary of Project infrastructure. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Associated Water storage	To minimise the environmental impacts related to the storage, of Associated Water.	Ponds and water storage facilities will be managed in accordance with a Ponds Operational Plan Guide (POP Guide), Pond Operational Plans (POPs) and the Standard Pond Operating Procedures (SPOPs). Ponds will be designed and constructed to suitable engineering standards. No significant unplanned releases of Associated Water. No contamination of soils and water

Element	Objective	Performance Criteria
		outside the footprint of storage ponds.
Associated Water management	To minimise the environmental impacts related to the transfer, treatment, release or beneficial use of Associated Water.	No significant unplanned releases of Associated Water. No contamination of soils and water outside the footprint of brine evaporation ponds or salt disposal facilities. Associated Water quality meets Project derived criteria specific to each beneficial use. Volume and timing of Associated Water utilised for any beneficial use will be in accordance with Project derived guidelines.
Soil erosion and sediment control	To minimise environmental impacts caused by soil loss and erosion.	Erosion and sediment control techniques implemented onsite where necessary. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Flora and Fauna	To minimise impacts on the abundance and distribution of flora and fauna as a result of Project activities. Progressively rehabilitate disturbed areas where practicable.	Avoid, where practicable, endangered, vulnerable and rare (EVR) flora species and the habitat of EVR fauna. No unauthorised clearing of native vegetation. Permits and approvals in place for any unavoidable disturbance of EVR flora and fauna species. No introduction of declared pests as a result of Project activities. Develop and implement an environmental offsets strategy. Minimise impacts to native vegetation and on habitat fragmentation. Progressive rehabilitation is consistent with the surrounding area and land use post restoration.
Stock access and control	To minimise the impact on stock movements.	Where deemed necessary, stock access will be restricted from petroleum works sites. No stock injured or killed due to Gas Field Activities. No complaints from stock farmers
Soil contamination	No contamination of soils arising from Project activities. To manage any pre-existing contaminated soils such that extent of contamination is not exacerbated by Project activities. Minimise, where practicable, contamination of soils by Associated Water.	No release of contaminants, hazardous substance or dangerous goods to soil. Identify all pre-existing contaminated soils likely to be impacted by Project activities. Where pre-existing contaminated soils are identified, and disturbance by Project activities is unavoidable, develop and implement appropriate management strategies. No contamination of soils and water outside the footprint of water management infrastructure.
Waste management	To minimise waste generation and maximise reuse and recycling of waste products. To dispose of waste in an appropriate manner.	No contamination of soil, air or water as a result of inappropriate waste management. Develop and implement a plan for waste minimisation and management. All waste disposal to be carried out by a

Element	Objective	Performance Criteria
		licensed waste contractor. Waste management practices to not result in loss of health to personnel or sensitive receptors.
Mosquito and biting midge	To undertake Project activities such that potential health impacts on Project personnel and nearby sensitive receptors arising from mosquitoes and biting midges are minimised.	Minimise potential mosquito and biting midge breeding sites resulting from Project activities.
Eastern Red fire ant	To prevent spread or introduction of Eastern Red Fire Ant as a result of Project activities.	No evidence of ERFA on Project sites.
Incidents and complaints	To have a process whereby all complaints can be lodged and responded to in an appropriate manner.	Record all complaints and responses in an incidents and complaints register. Respond appropriately to all incidents and complaints.
Environmental induction and ongoing training	To ensure that all Project personnel, including contractors, comply with the environmental requirements of all tasks.	All personnel undergo site inductions and, where necessary, additional training, that address environmental requirements of Project activities. Full compliance with induction and training procedures.
Emergency response for environmental incidents.	To ensure that Project personnel can respond effectively and efficiently in the event of an environmental incident to ensure no long-term adverse impacts on health, safety or the environment.	Any emergency response addressed in accordance with the QGC Emergency Response Plan. Nil government notices.
Fire management	To prevent the initiation of bushfires as a result of Project Activities. To protect Project personnel and key Project infrastructure from bushfire impacts.	Develop and implement and Emergency Response Plan that includes fire management. No unplanned and uncontrolled fires caused by Project Activities. Consultation with all relevant fire management authorities.
Effluent disposal	To release treated effluent and manage sewage sludge without causing environmental harm.	Treated effluent meets quality requirements of design parameters. All sewage sludge is disposed at an appropriate sewerage disposal facility.
Climate extremes and climate change	Climate extremes and climate change do not adversely impact Project infrastructure.	Engineering design of Project infrastructure includes consideration of climate extremes and climate change.
Landscape and character maintenance	To minimise the impact on environmental and community values from the location of infrastructure.	Respond to all complaints regarding impacts on environmental and community values and, where feasible, implement mitigation measures. Consultation with potentially affected stakeholders. Evidence that decision criteria for location of infrastructure includes consideration of environmental and community values.
Topography maintenance	To minimise impacts to topography.	Minimise sediment and erosion release from areas where topography is altered. Consultation with stakeholders regarding topography following decommissioning. Where practicable, sites are returned to

Element	Objective	Performance Criteria
		their original profile upon decommissioning.
Revegetation and rehabilitation	To restore, as far as reasonably practicable, land to its pre-existing condition.	Monitoring of rehabilitation areas occurs at a frequency necessary to determine rehabilitation success. After a suitable period, revegetation occurs naturally and is similar to surrounding vegetation. No weed species introduced. Rehabilitation area stabilised with no significant erosion events.
Decommissioning	To decommission Project facilities such that they do not present and ongoing environmental risk. To plan for decommissioning in consultation with relevant stakeholders.	Develop and implement, in consultation with stakeholders, a detailed decommissioning plan for all facilities prior to the end of their useful life.
Dangerous goods and hazardous substances	To protect Project personnel, the public and the environment from harm due to the transport, storage or use of dangerous goods or hazardous substances.	No unplanned release of dangerous goods or hazardous substances. All transport, storage and handling of dangerous goods or hazardous substances is performed in accordance with applicable legislation, guidelines and standards.

1.6 *CORRECTIVE ACTION*

QGC has adopted the BG Standard for reporting incidents, near misses and hazards. Reports will be investigated for any potential or actual environmental harm, including concerns raised by the community and entered in the complaints register. Corrective actions will be documented and tracked within the BG Synergi incident reporting database. The relevant Environmental Manager will determine whether reporting to any external agency is required.

1.7 *INCIDENT MANAGEMENT*

An environmental incident will be regarded as any incident that harms or has the potential to harm environmental and social values. In the event that an environmental incident occurs, the following steps will be taken immediately:

- ensure safety of personnel and third parties
- prevention of further pollution/environmental harm (including impacts on air, water quality, flora and fauna and noise environment)
- clean-up and/or control of polluting substance(s)
- implementation of mitigation measures to prevent recurrence of similar incident
- reporting and documenting of incident and instigation of incident investigation in accordance with BG Group Standards.

All incidents are to be reported to the relevant Environmental Manager. Incidents likely to cause off-site impacts or significant environmental harm will be reported by the Environmental Manager or Construction / Operations Manager to the Department of Environment and Resource Management (DERM) or appropriate authority immediately, in accordance with statutory requirements.

Incidents that impact EPBC listed species will be reported to DEWHA.

1.8 MONITORING

In order to fulfil the requirements of this EMP, all Activity phases will be monitored against this EMP and according to specific environmental value monitoring plans. All monitoring will be in accordance with the current DERM sampling manuals.

Results of monitoring will be recorded and reported internally and be available for inspection as required by QGC's Environmental Management System (EMS). Any external audits conducted by the DERM or other government agencies and Auditors appointed by QGC for triennial reviews will also be recorded internally and available for inspection.

All monitoring results will be maintained on record for a minimum of five years.

1.9 EMP REVIEW, REPORTING AND UPDATING

The mitigation measures and environmental management procedures included in these EMPs have been designed with the ultimate goal of avoiding or managing identified potential impacts. As noted previously, the content of these draft EMPs will be revised as a result of stakeholder consultation and will be reissued in the application for the environmental authority after the issue of the Coordinator General's conditions.

Once EMPs are implemented, management will consider issues on an ongoing basis and conduct formal reviews of the EMPs, to be undertaken one quarter after commencement of each Activity phase of the Project and annually thereafter for the duration of the each activity phase.

EMP reviews will include a framework for a "corrective action loop", which will ensure that mechanisms are in place with clearly defined actions and responsibilities, to correct any unforeseen impacts or failure of mitigation or management measures to meet their objectives, should they become evident. Accordingly, any unforeseen impacts or any mitigation or management measures which do not achieve their objectives will be reported and an appropriate response action will be implemented and monitored.

Following review of the EMP, documented outcomes will include, as applicable:

- a summary of complaints and response actions to these complaints
- data on the Project's performance in meeting EMP objectives and targets
- a brief description of the causes and effects of any failings, and actions taken to remedy them
- an overall assessment of the environmental performance of the Project
- an assessment of opportunities to improve environmental performance
- suggested changes to the EMP to be made as a result of the review.

An annual performance report will be produced and made available to personnel with operational and management responsibilities, as well as to stakeholders and regulatory authorities. The annual performance report will:

- summarise environmental monitoring results over the preceding year against numerical guideline values, regulatory requirements or agreed commitments, and identify trends and any problems
- summarise any system failures and the action(s) taken to resolve them.

1.10 AUDITING

Environmental audits are intended to determine whether the requirements of the EMP are properly implemented and maintained. Accordingly, auditing is to be undertaken to confirm that activities are carried out in line with the defined requirements, and are producing the required outcomes. The audits will cover the full spectrum, from compliance with strategic procedures to compliance with job-specific procedures. These audits will be initiated by the relevant Environmental Manager and performed by an internal or external auditor. Audits will be conduced annually or as otherwise required.

Audits are to be undertaken in accordance with the procedure below. Audit reports are to be retained and made available for management or regulatory review.

The Audit procedure should be conducted as follows:

1. Review the scope, plan and schedule of the audit.
    a. Examine objective evidence (documented environmental records, direct observations of non-conformance/potential opportunities and personnel interviews) to verify conformance with EMP requirements.
    b. Give specific attention to continual improvement actions developed in response to previous audit findings.
    c. Communicate audit findings, clarify any misunderstandings and summarise the audit findings.
2. The audit program should be reviewed annually and revised to reflect any improvements to the methodology, and changes to the auditors or timeframe of audits.

3. An Audit Summary Report should be completed within three weeks of completing an audit and the results discussed at the next management meeting.
4. The Audit Summary Report shall list all continual improvement actions required to prevent a recurrence of any identified issues or to maximise opportunities for improvement.

Table 9.1.3 below summarises the components of the Project, which will be audited annually.

Table 9.1.3 Audit Requirements

Element to be Audited	Area or Function to be Audited
Application of EMP	Audit to determine the extent of compliance with the various components of the EMP.
Monitoring results and documentation	• Audit monitoring results against relevant guidelines. • Have results of all monitoring and inspection programs been documented? • Have all environmental or health risks been documented and managed?
Incident documentation and emergency preparedness	Reporting and managements of incidents. • An audit to assess management, documentation and reporting of incidents/emergency situations. Are all incidents reported and documented? • Are there options available for improvement and management of processes where incidents have occurred?
Induction, training and awareness	Induction and training registers should be audited periodically to ensure all personnel receive relevant inductions and training, as appropriate to their roles and responsibilities within the scheme.
Management review	Audit whether: • information and environmental management strategies remain current • opportunities for improvement have been identified • requests or directions from relevant stakeholders have been considered • changes in environmental management practices or pollution, contamination or legislation have been incorporated • the EMP has been reviewed/updated to account for changes to the program.

1.11 COMPLAINTS REGISTER

The relevant Environmental Manager will maintain a record of any complaints received. The Construction / Operations Manager and Construction / Operations Environmental Manager (as applicable) shall review complaints and assess or direct responses as appropriate. Corrective actions and other recommendations including, where applicable, modifications to practices and procedures shall be made and closed out under the direction of the Construction / Operations Manager.

2 ENVIRONMENTAL MANAGEMENT PLANS

As described in *Section 1.2*, there is no clear demarcation of a construction phase and an operations phase for the Gas Field development. Draft environmental management plans, specific to identified environmental values consider construction, operations and decommissioning activities. These are described below.

2.1.1 Noise and Vibration

Noise and Vibration Management Plan	
Policy	To construct and operate in a manner that minimises the impact of noise and vibrations on surrounding residences and industry.
Performance criteria	• No exceedence of Project derived noise criteria at sensitive receptors. • Respond to all noise-related complaints received from residents and landholders and implement mitigation measures. • Consultation with potentially affected sensitive receptors. • Respond to all complaints.
Implementation strategy	• Project derived noise criteria determined in accordance with relevant legislation and guidelines. • Undertake noise modeling for infrastructure • Conduct site selection procedures to identify any potentially affected sensitive receptors and any potential topographic influences on noise modeling. • Identify sensitive receptors and record outcomes from consultation. • Placement of infrastructure in locations least likely to impact sensitive receptors. • Purchase of equipment with, as far as reasonably practical, the lowest sound power levels • Where necessary equipment will be fitted with noise control devices • Construct and maintain noise barriers and enclosures around noisy equipment or along the noise-transmission paths. • Conduct majority of construction activities 7 days per week for 12 hours per day, (e.g. 6.30am-6.30pm), except in emergencies or where system operational constraints dictate otherwise. • Construction will be limited in duration at any one site. • Implement noise monitoring and ensure all noise complaints are recorded and addressed. • All machinery and equipment are well maintained
Monitoring and auditing	• Landholder complaints relating to noise and vibration will be recorded and closed out by the Environmental Manager or delegate. • Noise surveys at relevant local residences will be undertaken at the request of the administering authority. • The method of measurement and reporting will be conducted in accordance with the DERM Noise Measurement Manual and/or AS 1055.
Reporting and corrective action	• Complaints relating to noise will be addressed promptly, with further investigations and reporting to the DERM if required. • Routine work reports with maintenance records will be recorded and reviewed by each supervisor or manager.

Noise and Vibration Management Plan	
	• All works that deviate from normal operating conditions will be reported and action initiated (including reporting to relevant agencies where this is warranted/required) to prevent a recurrence of the incident. • Non-compliance and incident reports will be reviewed and closed out by senior management. • Regular reviews, recommendations and corrective actions shall be implemented.

2.1.2 *Traffic and Transport*

Traffic and Transport Management Plans	
Policy	To minimise as much as practicable potential impacts associated with traffic generated by the Project.
Performance criteria	• Minimal traffic-related complaints and incidents. • To minimise impacts on road pavements, or where this is not practicable, to negotiate appropriate contributions or upgrades to road pavement impacts with relevant authorities.
Implementation strategy	• Communities will be consulted about proposed changes to traffic conditions. • All vehicles travelling to, from and within the Gas Field during all phases to follow relevant traffic management plans. • Car pooling and bus services will be implemented where possible to minimise worker journeys. • Personnel movements will be, where practical, be staggered to minimise the number of vehicle movements during peak periods. • Truck deliveries will be restricted to periods of least risk to other road users where possible. • Dangerous goods will be transported along preferred routes in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail, and in accordance with the Queensland Transport Operations (Road Use Management – Dangerous Goods) Regulation 1998 and the Transport Infrastructure Act 1994. • The transport of oversize loads will be restricted to non-peak periods where possible. • Clear signs and signals will be installed on-site to guide traffic movement and increase traffic safety. • Vehicles will observe site traffic regulations (i.e. speed limits). • Necessary approvals for traffic-related activities from relevant authorities will be sought. • Prior to minor construction works, a traffic or access plan will be prepared in order to minimise the impact to landholders, as well as weed spread. • Dust management measures will be implemented. • Impacts on road pavements will be negotiated with the relevant authorities. • A transport safety review will be conducted. • Where necessary, and in consultation with the relevant authorities, road sections (e.g. intersections) may be upgraded. • Construction in road reserves will be planned to minimise disruption and maximise safety of road users. • Rail will be used, where feasible.

Traffic and Transport Management Plans	
Monitoring and auditing	• The number of incidents or complaints received in relation to project traffic will be monitored. • Potential transport network shortcomings will be reported to the relevant authorities and appropriate action taken in agreement with those authorities. • Project traffic volumes will be monitored. • Road conditions will be monitored on a regular basis. • Transport companies will be audited to ensure compliance with company standards.
Reporting and corrective action	• The occurrence of any traffic incidents or complaints will be recorded by the relevant Environmental Officer and reported to the Environmental Manager. • All traffic incidents involving Project personnel will be thoroughly investigated. • In the event of a complaint/incident or failure to comply with requirements, relevant corrective action will be taken.

2.1.3 Visual Amenity and Lighting

Visual Amenity and Lighting Management Plan	
Policy	To minimise impacts on visual amenity associated with the Gas Field. To reduce as much as practicable lighting impacts on sensitive receptors.
Performance criteria	• Respond to all complaints regarding visual amenity and lighting and, where feasible, implement mitigation measures. • Consultation with potentially affected sensitive receptors.
Implementation strategy	• Consultation with landowners and neighbouring occupiers in relation to the location of permanent infrastructure. • Infrastructure screened (e.g. with vegetation) where possible. • Infrastructure will be located in areas where views to the surrounding landscape already contain impacts to visual amenity, where possible. • The site layout and location will allow for a landscape buffer to be installed to the perimeter. • All lighting installed at permanent sites will have guards to direct light downwards. • Lighting will be installed with reference to AS 4282-1997 Control of obtrusive effects of outdoor lighting.
Monitoring and auditing	• Visual amenity will be monitored from potentially affected viewsheds. • Lighting will be monitored to ensure that it meets the aim of reducing excessive leakage.
Reporting and corrective action	• Complaints relating to visual amenity and lighting will be addressed promptly, with further investigations and reporting to the DERM if required. • In response to DERM and or community concerns, appropriate remedies will be assessed in order to minimise potential impacts.

2.1.4 *Weeds and Pests*

Weed and Pest Management Plan	
Policy	To prevent the spread or introduction of pest and weed species as a results of Project activities.
Performance criteria	No increase in abundance or distribution of weed and pest species as a result of Project activities.
Implementation strategy	• The Weed and Pest Management Plan will be prepared in accordance with the Land Protection (Pest and Stock Route Management) Act 2002 and will cover terrestrial and aquatic species. • Potential pest species and their potential distributions will be identified. • Ecosystems at the greatest risk of pest invasion will be identified. • No sightings or evidence of further spread of weed and pest species. • Control weed and pest species already present, using acceptable methods. • Weed data on GIS will accurately reflect the on-site species and distribution. • All approved weed washdown facilities will be marked on the maps. • All approved access routes will be identified on the maps. • Chemical controls will be used in accordance with AS 2507 and applied by appropriately licensed personnel. • All vehicles that enter into the Gas Field area will be inspected by qualified weed hygiene personnel and pass through a wash-down facility before entering environmentally sensitive areas or agricultural land. • Waste will not be disposed of in a manner that attracts feral animals. • A survey of proposed work areas will be undertaken before work starts, to evaluate the presence of weed and pest species. • The Traffic Management Plan will be followed in order to minimise weed spread. • Vehicle movements may be restricted through those areas identified with weeds and pests (or stricter controls may be required before transiting these areas). • All personnel will be trained in the required practices for pest management through the Environmental Induction Program. • Local landholders will be engaged in coordinating a response to pest management. • Following decommissioning, weed survey and control will be incorporated into the monitoring plan.
Monitoring and auditing	• Regular surveys, through visual inspections or other means, of potential weeds and pest species will be conducted by qualified personnel. • Monitor disturbed areas for signs of pest invasions. • Regular inspections and weed hygiene logs will be maintained for vehicles and machinery.
Reporting and corrective action	• The Environmental Manager will be responsible for enforcing all procedures and policies relating to Weeds and Pests, as well as maintaining all records. • If weed or pest species are identified in areas previously without the species, control measures will be undertaken in order to remedy and control.

2.1.5 *Air Quality and Dust*

Air Quality and Dust Management Plan	
Policy	To construct and operate in a manner that minimises impacts on ambient air quality.
Performance criteria	• No exceedence of Project derived air quality criteria at sensitive receptors. • Consultation with potentially affected sensitive receptors. • Respond to all complaints on air quality.
Implementation strategy	• Model predicted emissions of air pollutants. • Vehicles and equipment will be maintained to keep exhaust systems and emissions within the limit of air quality criteria. • Design stack heights and discharge velocities to maximise dispersal of pollutants into the atmosphere and ensure that ambient air quality levels meet statutory requirements. • Include air quality criteria in the choice of infrastructure purchase and design. • Use suitable materials, gaskets and sealing. • Offensive odours, dust and particulate matter (PM10) releases are managed so that they do not cause environmental nuisance to sensitive or commercial areas. • Consult with and advise any residents or landholders who may be impacted by temporary dust emissions before activities start. • Activity sites and access roads will be watered as required to minimise the potential for environmental nuisance due to dust. Watering frequency will be increased during periods of high risk (e.g. high winds). • Vehicle access routes will be clearly defined and located to avoid areas of dust, as far as is possible. • The potential for generation of dust will be reduced through management and control (e.g. watering, mulching cleared vegetation to provide a stable surface and the retention of tree buffer zones). • The extent and period of exposure of bare surfaces will be minimised. • A “no burning” policy will be implemented. • All activities directly upwind of sensitive areas during certain times (wind velocity >5 m/s) will cease until wind velocity drops (<5 m/s) and direction changes (wind rose diagrams show a regular wind shift from northerly to southerly from morning to afternoon). • Ensure, through training and induction, that all personnel are aware of greenhouse gases, their role in global warming, and potential sources of emission and management strategies to reduce emissions.
Monitoring and auditing	• Regularly inspect all valves and fittings. • Record all air quality related complaints from neighbouring residential areas. • Visual checks by facility inspectors of defective exhausts. • Monitor air emissions to ensure conformity with Project derived emissions criteria. • Regular inspections during construction activities to review air and dust issues and watering frequency altered as required. • Monitoring of compressor station air emissions through manual sample points within six months of commissioning, and annually thereafter.

Air Quality and Dust Management Plan	
Reporting and corrective action	• Records of all monitoring and auditing activities will be kept, with results reported to the Environmental Manager at agreed intervals. • Recommendations and corrective actions arising from audits, inspections and reviews will be implemented. • All activities that deviate from normal operating conditions will be reported and corrective action initiated (including reporting to relevant agencies where this is warranted/required) to prevent a recurrence of the incident. • Complaints relating to air and dust emissions will be addressed promptly, with further investigations carried out and reporting to the DERM, if required. • Non-compliance and incident reports will be reviewed and closed out by the Environmental Manager.

2.1.6 Groundwater Monitoring

Groundwater Monitoring Management Plan	
Policy	To protect the quality of the existing groundwater resources and not extract groundwater to the detriment of other groundwater users and biodiversity dependent on groundwater supplies.
Performance criteria	• Groundwater quality not impacted by activities. • Develop trigger levels for the point at which changes to groundwater quality and levels may result in the implementation of groundwater management plans.
Implementation strategy	• Prepare a Gas Field groundwater monitoring plan based on EIS findings, relevant legislation and the Field Development Plan. • Establish baseline groundwater conditions. • Develop a conservative initial trigger value for a percentage reduction in the available drawdown, designed to provide an early warning of potential drawdown impacts before they occur. • Develop a conservative initial trigger value for physical or chemical parameter concentrations relative to baseline values, designed to provide an early warning of potential water quality impacts before they occur. • Develop a final trigger value for the percentage drawdown level at which some form of remedial or compensatory action is required for the affected bore owners. • Develop a final trigger value for the compliance criteria at which some form of compensatory or remedial action is required to mitigate the risks posed by the changes to water quality.
Monitoring and auditing	• Strategically located and correctly installed boreholes/monitoring wells will be routinely monitored for water level and contaminants. • Groundwater bore levels will be monitored in accordance with the Gas Field Groundwater Monitoring Plan, to be updated every two years.
Reporting and corrective action	If monitoring indicates trigger levels have been exceeded compared to baseline groundwater data, appropriate remedial or compensatory actions will be undertaken and reporting to the DERM may be required.

2.1.7 Surface Water Quality

Surface Water Quality Management Plan	
Policy	To minimise the potential impacts associated with erosion and to prevent the release of contaminants that may adversely affect downstream surface water quality.
Performance criteria	No release of contaminants to surface waters outside the boundary of Project infrastructure. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Implementation strategy	• Preparation and implementation of a site-specific Soil Erosion and Sediment Control Management Plan (see *Section 2.1.9*). • Installation of temporary drainage works (channels and bunds) where required for sediment and erosion control and around storage areas. • Use of pumps to maintain dry working conditions in temporary excavations, rather than constructing temporary open channels for gravity drainage of temporary excavations where gravity channelling is not acceptable. • Provision of appropriate storage areas away from drainage lines for hazardous substances and dangerous goods, with spill clean-up kits. • All relevant personnel trained in appropriate handling of spill materials and spill prevention. • All fuels and chemicals will be stored and handled in accordance with AS 1940 and AS 3780 to minimise the potential for contamination of stormwater runoff from the site. • The integrity of storage facilities for hazardous substances, dangerous goods and waste holding areas will be controlled by sealed or bunded areas that will be routinely inspected by an appropriately qualified person. • Trenches will be left open only for minimal periods necessary to install pipelines. Trenches will not be constructed prior to impending major rain events. • Vegetation clearance restricted to the smallest area necessary. • Stripping and stockpiling of topsoil from disturbed areas for later use during rehabilitation. Topsoil stockpiles will be stored close to rehabilitation areas, outside drainage lines and protected from erosion (install SESC measures; establish temporary vegetation cover; keep <2 m in height and reuse <12 months). • All ephemeral wetland areas (RE 11.3.27) in the QGC Field will be excluded from development. • All woodlands fringing drainage lines (RE 11.3.25) will be excluded from development except during installation of pipelines/access tracks. • Infrastructure will be located away from major river and creek systems whenever possible. • In cases where traversing a watercourse is unavoidable, the clearance path will, where practical, be designed at an angle of 90 degrees to the watercourse in order to limit the extent of clearing. Clearing will be reduced to the minimum safe width required for installation. • Works in the vicinity of a watercourse or drainage line, such as well drilling, horizontal directional drilling, pipeline or access track construction, will be subject to a layout/design plan or CEMP approved by the Environmental Manager before works start. • Watercourse banks effectively reinstated to prevent scouring. • Watercourse flows and channel crossings not altered. • Measures will be taken to avoid placing water-storage facilities in the Lake Broadwater catchment area (Broadwater Gully), which occurs in the south-eastern corner of PLA 279.

Surface Water Quality Management Plan	
	• Rehabilitation will be negotiated with landholders, where applicable. Unless roads and pads are to be retained for other uses, river environments will be re-contoured and rehabilitated to allow natural revegetation. Local plant species may be sown to stabilise banks and prevent erosion. • A Weed and Pest Management Plan (*Section 2.1.4*) that addresses terrestrial and aquatic species will be prepared prior to construction. • Rehabilitation will be monitored monthly for six months after works are completed and then biannually for two years. • In the event that dewatering of excavations is required, the extracted water will be used for dust suppression, disposed of by irrigation, pumped to the nearest pond or filtered (after settling out naturally or after treatment with gypsum) prior to release. • Associated Water will be managed in accordance with the Associated Water Storage and Release or Beneficial Use Management Plan (*Section 2.1.8*). **FCSs, CPPs and Water Treatment Facilities:** • Drain stormwater falling outside bunded areas away from process areas and systems (i.e. clean water) for managing contaminated stormwater into natural drainage points around the site. • Grade and slope site to ensure stormwater drains away from process equipment. • Fit bunded areas with drains so that stormwater can be drained to the on-site evaporation pond. • Direct bunded drains into an interceptor pit. • Maintenance and cleaning of vehicles will be completed at off-site facilities where possible. If on site, activities will be completed at locations where the potential for the release of contaminants to waters or stormwater systems is minimised, at a single designated maintenance area.
Monitoring and auditing	• Annual audit of controls to minimise impacts on surface water at all facilities and infrastructure • Regular monitoring of activities involving construction in or near watercourses. • Monitoring of construction activities in accordance with the CEMP for the Project. • Rehabilitated watercourses will be monitored in accordance with *Section 2.1.24* of this EMP.
Reporting and corrective action	• The following will be reported regularly: 1. Contractor compliance with approved erosion and sediment control plan. 2. Incidents of erosion or surface water contamination. 3. Results of routine inspections. • The following are classified as incidents relating to surface-water management: 1. Erosion and sediment control plan not prepared and/or implemented. 2. Breach in integrity of bunds. 3. Any temporary sediment basins demonstrating significant reduced available volume. 4. Insufficient housekeeping to prevent general rubbish and contaminants entering stormwater and runoff from the site. • Should an incident/failure to comply occur, the following corrective actions could be considered: 1. Repair soil erosion and sediment controls. 2. Repair stormwater controls. 3. Contain and remedy or dispose of contaminated material/s. 4. Clean out temporary sediment basins. 5. Improve level of housekeeping. 6. Review the relevant plans.

2.1.8 Associated Water Storage

Associated Water Storage Plan	
Policy	To minimise the environmental impacts related to the storage of Associated Water.
Performance criteria	• Ponds and water storage facilities will be managed in accordance with a Ponds Operational Plan Guide (POP Guide), Pond Operational Plans (POPs) and the Standard Pond Operating Procedures (SPOPs). • Ponds will be designed and constructed to suitable engineering standards. • No significant unplanned releases of Associated Water.
Implementation strategy	• Ponds will be designed to cope with a 1:100 annual exceedence probability (AEP) rainfall event, with a 10 per cent allowance for climate change. • The POP Guide will contain the following: 1. An outline of QGC commitments to pond management and the community. 2. Operational responsibilities for compliance. 3. A description of the pond categories. 4. Figures with the location and area of all ponds. 5. Critical water levels (maximum operating and mandatory reporting levels) for each pond. 6. Pond monitoring frequencies by category of pond. 7. A register of all ponds. • POPs will be prepared for each pond. Each POP will consist of the following documents to assist with the management of each pond: 1. A brief outline of pond functionality and legislative requirements. 2. An outline of QGC responsibilities. 3. A key emergency contact list. 4. Access and Location Plan for ponds. 5. A contact list. 6. Monitoring requirements. 7. Constructed drawings to required engineering standards. 8. Pond Log Book. • The Pond Log Book (PLB) will be maintained at the nearest site office and will contain: a. Data recording sheet for various monitoring activities. b. A list of conditions to note and definitions. • The SPOP is a single document that describes the following standard operating procedures (SOP) applicable to all regulated ponds: 1. Organisational responsibilities. 2. Emergency procedures. 3. Emergency contacts. 4. Incident reporting. 5. Normal operating conditions. 6. Repairs and maintenance. 7. Surveillance and monitoring requirements. 8. Pond standard operating criteria. 9. Review and audit requirements. • The SPOP will be maintained at all site and head offices.
Monitoring and auditing	• Monitoring will be in accordance with the POPs and beneficial use plans. • Monitoring will include pond water levels, groundwater quality in surrounding shallow aquifers and pond water quality for a range of analytes. • Pond integrity will be monitored in accordance with POPs.

Associated Water Storage Plan	
Reporting and corrective action	• Breaches of any pond operational document or beneficial reuse plan will be recorded as an incident. • Accidental Releases of Associated Water will be reported. • If mandatory reporting levels are reached, the Environmental Manager will contact the administering authority. • Recommendations and corrective actions arising from audits, inspections and reviews will be implemented.

2.1.9 Associated Water Management

Associated Water Management Plan	
Policy	To minimise the environmental impacts related to the transfer, treatment, release or beneficial use of Associated Water.
Performance criteria	• No significant unplanned releases of Associated Water or saline brine produced from treating water. • No contamination of soils and water outside the footprint of brine evaporation ponds or salt disposal facilities. • Associated Water quality meets Project derived criteria specific to each beneficial use. • Volume and timing of Associated Water utilised for any beneficial use will be in accordance with Project derived guidelines.
Implementation strategy	• Each beneficial use or release of Associated Water will be subject to a site-specific plan, which will detail as a minimum: − the receiving environment − daily limits − quality of the water − duration of use − monitoring requirements − landholder details and requirements − any regulatory approvals specific to the proposed use. • Water quality criteria for each beneficial use will be determined in consultation with relevant stakeholders. • Water transfer and treatment facilities will be designed to minimise the potential for accidental release of Associated Water. • Water treatment facilities will produce water of the quality required for specific beneficial uses. • The volume of saline brine waste will be minimised through brine concentration and brine evaporation. • Brine evaporation ponds and salt disposal facilities will be designed to minimise the potential for release of contaminants. This may include double lining with geo-fabric. • A landfill site for the purposes of salt storage will be selected on the basis of having all, or the majority of, the following characteristics: • a deep natural groundwater table that will minimise the risk of groundwater interfering with the integrity of the landfill sealing liner and the associated risk of salt leaching from the landfill into groundwater • suitable clay materials for sealing the landfill will be present onsite. These clays would ideally cover the landfill site to a depth of at least 500mm below the finished floor level • the landfill will not be located on a surface watercourse or intersect a buried streambed • topography will be conducive to construction with minimum earthworks

Associated Water Management Plan	
	• the site will have stable geology and landscape morphology • the landfill will not be located on good quality agricultural land and will be accessible via all-weather roads • the landfill will be located as close as possible to the water treatment facilities. • The landfill will be constructed as a waste management facility and be engineered to applicable Australian and DERM standards. • Nominally, the design would consist of an excavation which would be sealed with a combination of double-layered liners (such as a clay liner and a plastic liner). The landfill would be filled in segments. Once each segment is full, it would be capped with a double sealing system similar to the excavation base. • The cell-system of segmenting the landfill ensures that if a breach develops in any one of the cells, it will not compromise the integrity of the entire landfill. It also simplifies the process of identifying the location of the problem and simplifies the repairs. • Landfills will be recorded on the Contaminated land Register as necessary. • Water treatment chemicals will be stored in appropriately designed and bunded storage tanks in accordance relevant standards and guidelines for dangerous goods.
Monitoring and auditing	• Associated Water quality will be monitored at the well head, storage ponds, water treatment facilities and beneficial user. • The volume of Associated Water produced will be monitored. • Water treatment facilities will be audited on an annual basis to ensure compliance with operating requirements. • QGC will install and maintain appropriate monitoring systems, such as groundwater sampling bores, at the brine evaporation ponds and salt disposal landfill sites. This information will provide early indications of any leak developing from the sites.
Reporting and corrective action	• All unplanned releases of Associated Water or saline brine will be investigated and corrective actions taken. • Any contamination of soils or water from seepage from brine evaporation ponds or salt disposal facilities will be investigated and corrective actions taken. • Any exceedences of water quality guidelines for a particular beneficial use will be investigated and corrective actions taken. • Any exceedences of water volumes to be supplied to a particular beneficial use will be investigated and corrective actions taken.

2.1.10 Soil Erosion and Sediment Control

Soil Erosion and Sediment Control Management Plan	
Policy	To minimise environmental impacts caused by soil loss and erosion.
Performance criteria	Erosion and sediment control techniques implemented onsite where necessary. No failures of sediment and erosion control techniques leading to unacceptable sediment release.
Implementation strategy	• Site-specific Erosion and Sediment Control Plans (ESC Plans) will be prepared in accordance with requirements of the Institution of Engineers, Australia (Qld). • Keep the work area to a minimum so that the smallest possible ground area is disturbed. • Where appropriate, installation of temporary sediment basins to capture sediment laden runoff from site. • Stabilising cleared areas not used for infrastructure with vegetation or appropriate surface treatments as soon as practicable following earthworks, to minimise erosion. • Diversion channels and silt fences will be constructed around the topsoil stockpiles to prevent erosion and loss of topsoil. • Branches will be stick-raked into piles and left to provide animal habitat and to assist in revegetation and erosion control. If landholders are strongly opposed to stick-rake piles, mulching is the next preferable method. • Place erosion control structures such as diversion drains, whoa boys, rock-check dams and silt fences or traps at key locations (swales, stormwater pit inlets, around stockpiles) to capture the suspended sediment. • Conduct weekly inspections of all erosion control structures to ensure they are operating efficiently. Additional inspections should be conducted after storm events. • Divert stormwater away from exposed soil to reduce overland flow or channel flow on vulnerable soils. • Avoid disturbing highly erodible soils where possible. • In areas where the risk of soil erosion is medium or high, the seeding of perennial grass may be required. • Provide bunding around stockpiles to prevent the material from being washed away. The height of the bund depends on the site location, the volume and type of material being stockpiled, as well as the topography. • Reinstate all drainage pits and clean out accumulated sediment or leaf litter in pits after storm/heavy rain events. • Reinstate all existing erosion-control structures after storm/heavy rain events. • Divert stormwater away from disturbed channels or swales to minimise the flow of water and risk of erosion. • Minimise disturbance to existing drainage channels. This may involve constructing a temporary access bridge across small swales and channels. • If flow modification is necessary during Activity phases, reinstate the drainage channel on completion of works.

Soil Erosion and Sediment Control Management Plan

- Protect batters and disturbed areas from erosion by constructing small diversion/contour banks on the batter. This prevents sheet flow eroding the soil on the batter.
- Repair any damage caused directly or indirectly as a result of the proposed works (e.g. to roads, pipes, drains and gutters).
- Stabilise soils by revegetating exposed surfaces or by other means such as mulching or jute matting.
- On completion of works, reseed the ground with the appropriate species.
- Excavate during dry weather where possible.
- Remove temporary erosion-control structures when no longer required.

Stockpiles

- Stockpile topsoil close to rehabilitation areas and away from drainage lines.
- Install ESCs around stockpiles.
- Keep stockpiles <2 m in height and aim to reuse within 12 months.
- Stockpiles should be vegetated or covered, depending on size.
- Stockpile topsoil and subsoil separately to allow better site restoration.
- Stockpile batter slopes should not exceed 1V:3H.
- Stripped material with a low-to-very low fertility will be improved with a suitable NPK fertiliser (controlled or slow- release) during reseeding.
- Where fertility is low, composted organics will be added to the stripped surface layers with soil water holding, drainage (leaching) and nutrient retention, and will help stabilise the topsoil to resist erosion and promote healthy plant growth.
- Dispersive and/or heavy clay subsoil will be stockpiled separately from the topsoil. Inclusion of these materials can result in a hard setting or crusting that impedes seed germination, restricts water entry and increases risk of erosion.
- The duration of stockpiling will be minimised to reduce nutrient rundown and colonisation by weeds.
- Where stockpiles are to remain throughout the operations period for use during decommissioning, soil removed for later use during rehabilitation will be landscaped into low mounds, sown with an appropriate plant mix and managed to ensure adequate ground cover is maintained. This will minimise erosion and leaching of nutrients from the soil and will provide a seed source when the material is eventually used.

General Mitigation Measures

- Preserve topsoil quantity and quality.
- Topsoil stripping depths will, subject to further analysis, conform to the requirements in Volume 4, Chapter 4.
- Control overland water flows around disturbed areas by implementing drainage design plans prepared by a suitably experienced person.
- Maintain the low-erosion condition of the area by stabilising soils during and post disturbance.
- Maintain the cropping productivity of the area by reinstating an

Soil Erosion and Sediment Control Management Plan

adequate amount of topsoil following disturbance.

- Maintain the salinity levels in soil surface layers by returning soil in the order removed wherever possible and storing subsoils separately to topsoils.
- Keep subsoil salinity deep below the surface of disturbed areas (replant salt-tolerant tree species where possible).
- The soil management group of the area to be disturbed will be confirmed and control measures will be applied based upon the specific issue identified and the control measures outlined.
- Avoiding major earth works in periods of wet weather can substantially reduce the risk of erosion. Where this is not possible, all standard control measures will be adopted and special measures implemented on sloping areas with dispersive texture-contrast soils.

Erosion Control Measures

- Minimising access and disturbance to only essential areas.
- Diverting upslope stormwater run-off from around disturbed areas.
- Incorporating run-off control devices to reduce slope length on access tracks and on other disturbed areas of bare ground.
- Stripping and stockpiling of “topsoil” to occur immediately before starting bulk earthworks.
- Ensuring “stockpiles” are constructed on the contour, protected from run-on water with diversion banks or similar device upslope, and formed with run-off control devices immediately down slope.
- Revegetating or rehabilitating disturbed areas as soon as works are completed.
- Designing channels/drains and inlet and outlet works to convey water at least up to the design peak flow.
- Incorporating check dams and/or sediment retention basins within major development sites to slow peak discharge and reduce sediment load in water entering the local waterways.
- Placing all water quality and quantity control structures above the riparian zone.
- Designing sediment-retention basins to adequately handle dispersive soil material in the dispersive texture-contrast soils and to handle clay subsoil material in all other areas.
- Installing energy dissipaters at drainage outlets.

Watercourses

- Locate crossing points where turbulence minimal and away from bends in stream or where two drainage lines meet.
- Ensure there is no active undercutting of either bank and no dumping of sediments within the stream bed.
- Minimise the extent of vegetation removal and disturbance by narrowing corridors required for construction.
- Implement horizontal directional drilling for pipeline construction when disturbance to a watercourse is deemed unacceptable by the Environmental Manager.
- Rehabilitate disturbances as soon as possible by refilling and slightly compacting, capping with at least 200 mm of suitable topsoil and revegetating the site.

Soil Erosion and Sediment Control Management Plan	
	Dissected Terrain • Minimise infrastructure and access tracks in dissected terrain. • Locate any essential tracks on gentle grades diagonally across the slope rather than perpendicular to it. • Minimise drainage line crossings or, where necessary, locate entry and access points at an angle to the drainage line, leaving sufficient capacity for uninterrupted stream flow. • Incorporate general all-purpose fertilisers into local topsoil material used for planting during revegetation or import special planting media. **Sloping Areas with Dispersive Texture Contrast Soils** • Treat any clay subsoil that is exposed on cut batters or areas of hard fill as soon as possible through amelioration, capping with planting media or impermeable material, or both. • Grubbing operations outside any earth works footprint must leave at least 100 mm of undisturbed soil material (surface and/or subsurface layers) on top of the clay subsoil. • The land surface outside an earth works footprint should be leveled immediately after any clearing and grubbing operations are finished. The leveling should create a slight convex shape that spreads run-off water away from the disturbed area rather than allowing it to concentrate. • In particular, any holes should be filled with soil from the surface and/or subsurface layers. If necessary, suitable topsoil should be brought in to ensure no clay subsoil remains exposed. The leveled surface may have to be lightly compacted to minimise movement from rain/running water. • The land surface on top of laid flowlines or pipelines and adjacent service tracks should be left in a slight convex shape that spreads run-off water away from the pipeline or track rather than allowing it to concentrate. • The pipeline mound should have a cap of at least the original topsoil depth of suitable, ameliorated topsoil and this planting material should be seeded with appropriate species. • If a pipeline or access track is not mounded, slope length along the disturbed area should be reduced by placing run-off control devices (such as whoa boys, sediment fences, straw bale banks or geotextile socks) at regular intervals to intercept and slowly spread water off the area; such devices should be used even on very gentle slopes of 1-2 per cent. **Areas with Severe Subsoil Salinity** • Sample excavated subsoil in high risk areas to confirm extent of salinity. • Deep burial or capping of excavated subsoil at a suitable depth, nominally at least 300 mm of suitable topsoil following construction activities. This will allow plants that are being established to achieve a reasonable root layer before encountering the saline material. • If saline subsoil is to be stockpiled for a short period, the stockpile will be bunded to prevent water running onto the pile from further upslope, and to detain run-off water within the stockpiled area.
Monitoring and auditing	• Routine maintenance inspections will be conducted of all ESCs to identify areas where erosion is occurring and where action is required.

Soil Erosion and Sediment Control Management Plan	
	• All erosion control measures should be monitored for at least 12 months. • Erosion and sedimentation controls will be inspected following any significant rainfall event. • During decommissioning, a permanent ESC Plan will be prepared and will detail ongoing monitoring and auditing requirements.
Reporting and corrective action	• In the event of a control measure failing, the Environmental Officer shall record it, as well as the reasons for failure and appropriate actions undertaken. • Remedial measures will be put in place should any controls fail. • Any defects revealed by maintenance and inspection of erosion and sediment control structures will be rectified immediately, and these works are to be cleaned, repaired and augmented as required to ensure effective erosion and sedimentation control thereafter. • The Environmental Manager is responsible for ensuring all necessary ESCs are installed and operating effectively.

2.1.11 Flora and Fauna

Flora and Fauna Management Plan	
Policy	To minimise impacts on the abundance and distribution of flora and fauna as a result of Project activities. Progressively rehabilitate disturbed areas where practicable.
Performance criteria	• Avoid, where practicable, endangered, vulnerable and rare (EVR) flora species and the habitat of EVR fauna. • No unauthorised clearing of native vegetation. • Permits and approvals in place for any unavoidable disturbance of EVR flora and fauna species. • No introduction of declared pests as a result of Project activities. • Develop and implement an environmental offsets strategy. • Minimise impacts to native vegetation and on habitat fragmentation. • Progressive rehabilitation is consistent with the surrounding area and land use post restoration.
Implementation strategy	• Minimise the area to be cleared during Activity phases. • Prepare a formal application to remove vegetation on sites where relevant. • The total area to be cleared for Activity phases will be restricted to the minimal area required. • The area to be cleared will be marked prior to any works commencing. • Any clearing within or close to watercourse or wetland vegetation communities will employ adequate erosion and sedimentation mitigation measures to ensure that aquatic ecosystems are not impacted and vegetation is not affected. • Cleared vegetation will be either stick raked or chipped and stored for use as mulch during site rehabilitation works and/or in surrounding vegetated areas susceptible to erosion. • A Site Rehabilitation Plan that covers all areas disturbed during Activity phases, but not covered by built structures and infrastructure, will be prepared and implemented. The plan will include the control of introduced weed species, which can colonise disturbed areas, and the use of local native plant species to the fullest extent possible. • Access of personnel to areas outside the disturbed areas only with the approval of the Environment Officer. • Access to the sites will be restricted to prohibit unauthorised entry to the surrounding undisturbed areas. Access restrictions will be implemented to prevent unauthorised clearing, recreational driving, uncontrolled bushfires and the spread of introduced weed species. • A weed control program will be implemented over the Activity sites, which will include: 1. effective management methods to control spread of declared weed species 2. routine monitoring of the Activity sites to identify any new incidence of weed infestation 3. provision of information for personnel on the identification of declared weeds 4. wash-down protocols for any vehicles 5. procedures for weed eradication and disposal. • Stockpile areas and haul roads required during Activity phases will be clearly defined, so that weed establishment and the potential spread of plant diseases may be contained. Stockpiles will be developed in previously cleared areas, with adequate open-spaces buffers, where possible.

Flora and Fauna Management Plan

- An appropriate fire-management regime will be implemented over the sites, consisting of periodic (as appropriate) inspections of fuel load and moisture content in vegetated areas.
- Stockpile vegetation so as not to impede vehicles, stock or wildlife for >2 days.
- No clearing within 50 m of watercourses or their high banks or within 100 m of wetlands or springs.
- Minimise significant disturbance at any time and provide ground cover, leave mature trees and avoid soil compacting in order to promote regrowth.
- Individual site pre-clearance surveys will be undertaken for each proposed road, well pad and pipeline (and other infrastructure), as is currently the practice, to enable detection and avoidance of flora and fauna values whenever possible, but should be expanded to include:
  - recording of the presence or absence of EPBC and VMA listed communities and species
  - confirmation of the results of EVR flora field clearance searches and fauna microhabitat features
  - identification of permitting requirements, and
  - noting the presence or absence of declared weed species in order to develop site-specific weed management options (control, vehicle and machinery washdowns).

Ecological Constraints Zones

- For each activity site, ground truth the ecological constraints in accordance with the ecological constraints mapping developed for the draft EIS.

Zone 1 Minimal Ecological Constraints

- Final rehabilitation requirements for sites in this zone will be negotiated with the landholder. In most cases, they will provide for the return of areas to productive agricultural land.

Zone 2 Medium Ecological Constraints

- Vegetative waste as a result of clearing will be mulched or distributed across adjacent areas where it may provide refuge for terrestrial species. Felled vegetation will not be burnt.
- Infrastructure and access lines should be located along existing easements where possible.
- Individual site pre-clearance surveys should be undertaken for each proposed road, bore pad and pipeline (and other infrastructure), as is currently the practice, to enable detection and avoidance of flora and fauna values whenever possible, and should be expanded to include them.
- A record of the results of the EVR flora field clearance searches and fauna microhabitat features will be maintained.

Zone 3 High Ecological Constraints

Zone 3 (High Ecological Constraints) areas include all State Forests (excluding Gurulmundi State Forest). For these areas, the following recommendations are made:

- Site access will only be along existing cleared tracks, fire trails and easements. Where this is not possible, access is to be negotiated with DERM state forest management staff
- DERM and/or independent flora and fauna consultants will be involved in detailed pre-clearance surveys as part of early planning for infrastructure locations.
- In order to minimise fragmentation effects, well pads for gas extraction will be of a minimum safe area and placed against the edge of existing easements where possible

Flora and Fauna Management Plan

- "Best Available Technology" will be used to minimise clearing requirements.
- Access tracks will be incorporated into well pad clearance areas where possible to minimise total clearing requirements.
- Extraction methodologies that minimise the density of well pads in these areas (e.g. horizontal drilling) will be investigated and used where practicable.
- Vehicles and machinery will require washdown before entering state forests, if they have come from Zone 1 areas or known weed areas. The control of buffel grass is a key consideration in this zone.
- Access tracks will be regularly inspected for weeds and control measures employed where serious environmental or declared weeds are identified. It is recognised that some weed species may have been established in areas prior to the Project's commencement, and so less emphasis will be placed on these. The primary objective of this recommendation is to control spread of weeds that may occur as a direct result of the Gas Field development.

Zone 4a and 4b Very High Ecological Constraints

Zone 4a and 4b areas have the highest ecological values and have the potential to be significantly impacted by Gas Field activities. It is therefore recommended that all non-linear Gas Field infrastructure be excluded from these areas. The construction of gathering systems and access tracks should follow the criteria in Zone 3 throughout the areas, with avoidance of new disturbance being the primary objective.

Zone 4a areas are considered to have higher conservation values than Zone 4b. They are distinguished from each other only for the purpose of enabling planning for linear infrastructure to avoid Zone 4a areas in preference to Zone 4b areas in locations where such areas are unavoidable.

Areas within Zone 4a include:

- Gurulmundi State Forest and the Environmentally Sensitive Area immediately north west of the State Forest. The location of linear infrastructure (e.g. pipelines and access tracks) through this area will be determined by ecologist field studies at the detailed design stage to follow existing tracks and previously disturbed areas where possible and to avoid or minimise disturbance of highest value areas (e.g. EVR plant populations, high quality fauna habitats, steep terrain). QGC will not undertake drilling or development of non-linear infrastructure in this area prior to government endorsement of detailed development plans showing proposed production techniques and infrastructure locations. Such a plan would be based on detailed ecological investigations within this area and would aim at ensuring that any such development would be undertaken in an ecologically sustainable and acceptable manner.
- EPBC Act listed Ecological Communities, and
- DERM defined Category B Environmentally Sensitive Areas which, in the Gas Field, include:
  - VM Act Endangered REs
  - additional REs classified as Endangered under DERM's Biodiversity Status

Areas within Zone 4b include:

- RE 11.3.27 (ephemeral wetlands)
- Buffer zones adjacent to watercourses in accordance with the Environmental Authority conditions for QGC's existing operations, namely:

Flora and Fauna Management Plan

- 50m from Stream Order 1 and 2 watercourses
- 100m from Stream Order 3 and 4 watercourses, and
- 200m from Stream Order 5-8 watercourses.

It is recognised that in a small number of instances linear infrastructure (e.g. collection lines, pipelines and access tracks) will be unable to avoid transecting linear remnants and watercourses of very high ecological value (i.e. Zone 4 a and b areas). Provided such unavoidable impacts are minimised and compensated for by offset initiatives the proposed activities will not have a significant impact on the conservation values of these areas.

EPBC listed flora and fauna will be avoided wherever possible. If, in exceptional circumstances, EPBC listed flora cannot be avoided, offset initiatives are proposed.

Rehabilitation

- Rehabilitation will be negotiated with the landholder, where applicable. Unless roads and well pads are to be retained for other use, areas will be ripped and allowed to naturally revegetate. Hardened road surfaces will be removed or regraded to restore the original land surface as much as possible.
- A re-seeding plan will be developed based on soil types, existing local vegetation characteristics and landholder preferences along the alignment. In areas of native vegetation, revegetation will be allowed to occur naturally without re-seeding.
- Where re-seeding is considered necessary to avoid erosion of other environmental damage, local provenance native seed will be used for regeneration, if available. If local provenance seed cannot be collected or purchased, native seed from other parts of central Queensland should be acquired from commercial operators and re-spread in these locations.
- Monitoring and control of weeds will be conducted on an ongoing basis during the life of the Project. A Weed Management Plan that addresses the construction, rehabilitation and operation phases of the Project will be prepared prior to construction. This Plan will include hygiene protocols to minimise the likelihood of introduction and spread of environmental, agricultural and declared weeds.
- Vegetative waste as a result of clearing will be mulched or distributed across adjacent areas where it may provide refuge for terrestrial species. Such wastes will not be burnt.
- Rehabilitation will be monitored on a monthly basis for six months after works are completed and then biannually for two years.
- In areas zoned as High Constraint, rehabilitation will occur in close liaison with DERM staff and restoration will aim to restore or maintain biological processes and natural systems.

Environmental Offsets

An environmental offsets strategy will be developed prior to the commencement of the Project. That strategy will identify the environmental offset activities which will be established to compensate for the unavoidable clearing of ecologically significant areas (e.g. Endangered/Of Concern REs, wetland areas, EVR flora/fauna habitat and fauna movement corridors). It is envisaged that there will be opportunities to undertake most offset activities within or in close proximity to the Gas Field (as opposed to removed locations).

Fauna

- Bushland and habitat surrounding Activity areas will be managed to prohibit any unauthorised disturbance so as to maintain the areas habitat values.
- Access of workers to areas outside the designated Activity sites will be permitted only with the approval of the relevant Manager.

Flora and Fauna Management Plan	
	• Where possible, dead trees, stags and hollow branches will be salvaged from the areas to be cleared and relocated to the surrounding undisturbed areas to create compensatory shelter. • Where possible, the timing of clearing operations will be selected to minimise impacts on breeding species. • Gaps will be provided in pipeline corridors for the movement of fauna. • Prevent entrapment of fauna in pipes (through night caps) or trenches (not leaving trenches open for >2 days). • Provide escape ramps in trenches for fauna. • Check trenches for trapped fauna before backfilling. • Identify potential microhabitats for fauna (e.g. hollow-bearing trees) and fauna habitats, with fauna handlers required to be present at the clearing. • Hollow-bearing trees will be felled in a manner that reduces potential for fauna death. Felled trees will be inspected after felling and fauna will be relocated or receive assistance if injured. After felling, hollow-bearing trees will be left unmoved overnight to allow animals to move of their own volition. • Plans will be developed to monitor and control populations of vertebrate feral pests (refer *Section 2.1.4*). • Linear features such as roads and pipelines will be built to allow for their intended purpose but should allow revegetation as much as possible to minimise impact on terrestrial fauna movements. • Fauna handlers will be present to survey for, and as necessary relocate, wildlife immediately prior to and during clearing activities in all locations identified as containing suitable fauna habitat during the pre-clearance surveys. • Road kills will be monitored in areas of high conservation and response strategies (e.g. reduced speed zones) will be developed where required.
Monitoring and auditing	• Routine inspections of undisturbed areas by the Environmental Officers to identify any evidence of vegetation disturbance, weed infestation and fire management issues. • Inspections of planned disturbances to ensure that they comply with Flora Management Plan requirements. • Areas planted with offsets areas will be monitored to determine the success of offsets plantings. • Records will be maintained of fauna casualties. • Routine inspections of undisturbed areas by the Environmental Officer to identify any evidence of habitat disturbance or feral pests. • Rehabilitation areas will be monitored frequently following initial rehabilitation efforts and then less regularly thereafter. • During Activity, the Environmental Officer will monitor site clearing to ensure that: 1. vegetation areas and flora species to be cleared are well defined 2. there is no unauthorised disturbance of the surrounding habitat area 3. compensatory shelter is established where necessary. 4. an animal retrieval program is implemented where necessary.
Reporting and corrective action	• The Environmental Officer will report any incidents of disturbance or weed infestation or feral pests to the Environmental Manager as necessary • The following constitute an incident or failure to comply:

Flora and Fauna Management Plan	
	− unauthorised disturbance of vegetation outside the defined Activity areas − evidence of weed infestation − evidence of feral pests − no Fire Management Program prepared or implemented − no Site Rehabilitation Plan prepared or implemented − unauthorised Activity within a particular ecological constraints zone − animal retrieval program not implemented during clean-up − hollow-bearing trees not felled appropriately − failure to obtain a necessary permit. • In the event of a failure to comply, investigations will be undertaken into the cause of the incident or failure to comply, and the appropriate actions taken to overcome the problem and prevent recurrence. • The offset strategy will guide the effective establishment of offset plantings.

2.1.12 *Stock Access and Control*

Stock Access and Control Management Plan	
Policy	To minimise the impact on stock movements.
Performance criteria	• Where deemed necessary, stock access will be restricted from Activity sites. • No stock injured or killed due to Gas Field Activities. • No complaints from stock farmers.
Implementation strategy	• Where there is a risk to stock safety or Gas Field infrastructure, stock may be restricted from accessing certain areas. • Landholders will be consulted to determine stock movement requirements. • Agreements reached with landholders to restrict access during Activities so that stock is not unduly disrupted. • Landholder requirements communicated to all relevant QGC personnel. • Upon decommissioning, sites will be rehabilitated to ensure there is no impediment or potential to cause harm to stock. If infrastructure is to remain, it should exclude stock access with permanent fencing.
Monitoring and auditing	• Stock access will be incorporated into the annual audit. • All stock injuries or deaths attributable to the Project will be recorded and investigated. • All personnel will be aware of landholder requirements and will communicate any breaches (e.g. fences in need of repair).
Reporting and corrective action	• Complaints will be addressed promptly by Land Access Officer and recorded in the incident reporting database if non-compliance with landholder requirements is identified. • Corrective action will be taken to prevent any repeat of stock injuries or deaths attributable to the Project.

2.1.13 *Soil Contamination*

Soil Contamination Management Plan	
Policy	No contamination of soils arising from Project activities. To manage any pre-existing contaminated soils such that extent of contamination is not exacerbated by Project activities. Minimise, where practicable, contamination of soils by Associated Water.

Soil Contamination Management Plan	
Performance criteria	• No release of hazardous substance or dangerous goods to soil. • Identify all pre-existing contaminated soils likely to be impacted by Project activities. • Where pre-existing contaminated soils are identified, and disturbance by Project activities is unavoidable, develop and implement appropriate management strategies. • No contamination of soils and water outside the footprint of water management infrastructure.
Implementation strategy	• Strategies for the prevention of potential land contamination will include: 1. Construction of appropriate spill-containment facilities for all chemicals and fuel storage areas (in accordance with AS 1940 and AS 3780). 2. Establishing and maintaining a hazardous material register detailing the location and quantities of hazardous substances including their storage, use and disposal. 3. Induction and training of personnel and implementation of safe work practices for minimising the risk of spillage. • Remediation of contaminated land will use the most appropriate available method to achieve required commercial or industrial guidelines. • Validation sampling of any remediated area will be used to establish the site as "clean" as per the relevant DERM Contaminated Land and National Environment Protection Measure (NEPM) Guidelines. • Bunds are required for all liquids with the potential to cause material or serious environmental harm. Storage of volumes of less than 1000 L without bunding will be permitted only if the recovery of spillage is easy, stored containers are undercover, they have an impervious base or drums are on or within containment pallets. • A refuelling procedure will be developed for all mobile equipment and Job Safety and Environmental Analysis (JSEA) completed for selection of on-site refuelling locations. • Store liquids >50 m from water bodies. • Bunded collection sumps will be on a graded floor with no connection to sewer or water bodies. • Bunds will minimise rainwater collection (temporary or permanent roof). • Water quality checks will be conducted before water is discharged. • Oil-Water Separators will only be used in vehicle areas where capture sumps are not tainted by biological contaminants from green or putrescible wastes. • Bunds' discharge pipes will be above ground and be constructed over the bund walls. Pumps will be operational when the bund is full. • Bunds will not have leaks. • DERM will be notified as soon as reasonably possible of any contamination causing or threatening significant environmental harm from spills. • Spill-absorbent materials (not sand) will be on hand for use on minor spills. • All contaminated absorbent materials will be removed according to the Waste Management Plan. • As soon as reasonably possible after contaminant release, it will be stopped, rectified, remedied and recurrence prevented. • Any existing contaminated sites that may be encountered will be reburied and any Gas Field infrastructure will be relocated. • If contaminated sites are encountered during well pad establishment or trenching for pipeline laying, contaminated material will

Soil Contamination Management Plan	
	appropriately managed. • All chemicals and oils will be managed in accordance with the DGSM Act with respect to Flammable and Combustible liquids, and spill-containment facilities built in accordance with AS1940 and AS3780. • Potential contaminated lands and lands upon which notifiable activities have been carried out will be listed on the DERM Environmental Management Register (EMR). • Contaminated land assessments to be undertaken at sites with a reasonable chance of contamination, those areas where notifiable activities have been undertaken and at properties listed on the EMR/Contaminated Land Register. • Site-based management plans will be prepared to ensure ongoing environmental management post-decommissioning is appropriately dealt with in accordance with the regulatory requirements and best practice at that time. • Rehabilitation activities associated with the disposal of saline residues and ponds will involve a physical and chemical investigation of soils and ground waters to determine: − area extent of saline contamination − undisturbed land form characteristics − landholder requirements (e.g. preferred vegetation type). • Waste management has been addressed in *Section 2.1.14*. • Associated Water management has been addressed in *Section 2.1.9*. • Effluent management has been addressed in *Section 2.1.17*.
Monitoring and auditing	• The integrity of storage facilities for hazardous materials and wastes and bunded areas will be routinely inspected. • Regular equipment inspections and maintenance will be performed. • The EMS will incorporate the review of the current EP Act and determine the contaminated land status of current activities. • Spills will be monitored post clean-up to ensure the site has been remediated. • All incidents of contamination will be recorded and followed up.
Reporting and corrective action	• If an area of contamination is reported, the cause will be identified and the area of contamination contained. This may involve isolating the source or implementing controls around the affected site. • The Environmental Officer will keep records of routine visual inspections and will report any contamination incidents to the relevant Manager. • The following will be classified as an incident or failure to comply in relation to soil contamination management: 1. Breach in integrity of bunds. 2. Release of contaminants 3. Failure to notify relevant authorities on encountering pre-existing contaminated land 4. Non-compliance with AS 1940 and AS 3780. 5. Should an incident/failure to comply occur in relation to soil contamination management, a selection of the following corrective actions will be considered where relevant: 1. Rectify storage/handling non-compliance. 2. Contain and remediate or dispose of contaminated material/contaminants. 3. Investigate and implement measures to prevent recurrence.

2.1.14 Waste Management

Waste Management Plan	
Policy	To minimise waste generation and maximise reuse and recycling of waste products. To dispose of waste in a manner that does not cause contamination of soils, water or air.
Performance criteria	• No contamination of soil, air or water as a result of inappropriate waste management. • Develop and implement a plan for waste minimisation and management. • All waste disposal to be carried out by a licensed waste contractor. • Waste management practices to not result in loss of health to personnel or third parties.
Implementation strategy	• A register of waste streams will be developed • All identified waste streams will be reviewed for optimal, efficient and effective management • Management strategies for specific waste streams will be developed by relevant manager before Activity commences. • Burning of vegetative wastes will not be conducted. • On completion of each section of Activity, all waste material will be removed from the workplace. No wastes will be buried or disposed of on-site without local government and/or DERM approval. • The relevant Manager will advise of designated disposal areas for each Activity. • Councils will be consulted about their capacity to receive waste. • All wastes will be disposed of by an appropriately licensed waste contractor. • Putresible solid waste will be stored in covered, standard general waste containers to prevent odours and public health hazards, and disposed of by a licensed waste contractor. • General rubbish and non-recycled glass, paper, plastics and related materials will be disposed of to landfill at a commercially operated facility. • General camp waste will be taken for disposal at a local landfill. • Food wastes will be collected, where practicable, considering health and hygiene issues, for disposal off-site. • Refuse containers will be located at each worksite. • Scrap metal and plastics (e.g. HDPE offcuts) will be collected on site, stored at a central location and preferentially recycled • Oil filters will be stored in a marked container that allows the oil to drain out but not escape. Oily rags will be stored in a marked oily rag bin. • Waste oils will be skimmed routinely from temporary oily wastewater dams and stored in onsite waste oil tanks for disposal by licensed waste contractors. • Oily water ponds and interceptor pits will be pumped out periodically by a licensed waste company for treatment and disposal. • Where practical, wastes will be segregated and reused/recycled (e.g. scrap metal). • All personnel will be instructed in Project waste management practices and procedures as a component of the environmental induction process. • Suppliers will be requested to minimise packaging. • A high emphasis will be placed on housekeeping and all work areas

Waste Management Plan	
	will be maintained in a neat and orderly manner. • All equipment and facilities will be maintained in a clean and safe condition. • Effluent and biosolids management is described in *Section 2.1.17*. • Chemical wastes will be collected and appropriately labeled for safe transport to an approved chemical waste depot or collection by a liquid waste treatment service. • Waste triethylene glycol (TEG) gas dehydrating reagent will be stored in onsite petroleum-grade waste oil tanks and managed in the same manner as waste oils. • Grease traps from each camp kitchen will be pumped out approximately once every month. Grease trap waste will be removed by a licensed waste transport company for disposal at appropriate waste disposal facilities. • Storage, transport and handling of all chemicals will be conducted in accordance with all legislative requirements. • Containment bunds and/or sumps will be drained periodically to prevent overflow and subsequent pollution of the surrounding land and/or water body. • All hazardous wastes will be appropriately stored in bunded areas away from watercourses and in accordance with legislative requirements. • Hazardous wastes such as solvents, rust-proofing agents and primer will be managed in accordance with the requirements of relevant legislation and industry standards. • A hazardous materials inventory for the Activity period will be prepared. • Material Safety Data Sheets (MSDS) for hazardous materials will be available on-site during Activities. • Hydrocarbon wastes, including lube oil, will be collected for safe transport off-site for reuse, recycling, treatment or disposal at approved locations. • All liquid waste in drums will be stored in a bunded area or on bunded pallets as per the procedure for storing hazardous substances. • Waste tracking applies to all regulated, controlled and hazardous wastes such as oil, spent oil filters, oily rags and spent oil absorbent. Correct waste-tracking forms will be obtained and used. • Only licensed transporters, recyclers and disposal facilities will be used. • Copies of the licenses of waste transporters, disposers and recyclers will be kept on site and up to date. • All operations will be planned and carried out in a manner that reduces the generation of waste and ensures it is transported and disposed of appropriately. • Wastes will be segregated and bins or storage areas labeled to ensure the correct items are disposed of appropriately. • Employees generating waste will be trained in proper storage, transport and disposal of general, regulated and recyclable wastes. • Waste soil and rock will be relocated so that it does not interfere with drainage paths. Approved wastes may be relocated to the ponds. • All quantities of waste will be recorded to identify better waste minimisation strategies. • The contents of any container/vessel will be clearly identifiable. An appropriate label will be attached to the container/vessel at all

Waste Management Plan	
	times. • Storage of any hazardous waste material will be in compliance with the Australian Dangerous Goods Code. • Unknown substances must be identified prior to disposal. This may require off-site laboratory testing. • When a new waste stream is identified, investigations will be conducted to determine the options to reuse, recycle, reclaim or reprocess the waste materials. A lifecycle assessment to investigate opportunities to minimise the environmental impact associated with new products or processes will then be conducted. • Littering includes the loss of waste onto roads from a trailer or back of a vehicle and disposal of cigarette butts or other items thrown from cars, including cigarette butts thrown onto the ground outside offices or camp rooms. It will be obligatory for all waste items to be placed in the correct waste disposal receptacles. • Drilling waste muds or sludges will be contained in a pit for disposal, remediation or reuse. • General waste will be reused, recycled or removed to QGC's waste transfer station for temporary storage until disposed to the appropriate waste disposal facilities. • General waste, including vegetation, will not be burnt. • Regulated Waste will be removed and transported from the site by a person with a current DERM authority. • Regulated Waste will be temporarily stored on-site where it will not contaminate land or water or be a fire hazard, and there will be approved signage. • Regulated Waste records of pickup date, description, quantity, origin and destination, as per DERM waste tracking requirements, will be kept. • No public health issues, increases in pest species or feeding of native species from uncontrolled food waste disposal. • Waste management practices will not result in harm to fauna and flora. • Pest species' numbers will be monitored to ensure pest numbers do not increase due to waste management practices. • Green waste will be stockpiled as vegetation (refer *Section 2.1.11*). • Upon decommissioning, all waste facilities will be rehabilitated and subject to a contaminated land assessment. Waste will be removed off-site to a licensed disposal location. • All personnel will be trained in correct waste disposal methods.
Monitoring and auditing	• Housekeeping checks will be conducted to ensure waste is being transferred and stored correctly and that no littering is occurring. • Regular inspections of waste disposal areas for compliance with waste management plans, EA conditions and relevant legislation. • Campsites and Activity areas will be inspected after relocation to ensure no waste material remains. • On a regular basis sample environmental parameters from soil and water that may be affected by waste disposal • A complaints register will be maintained detailing complaints about waste management including litter, odour, soil or water contamination and visual amenity • A record will be maintained of all impacts to health that are potentially attributable to waste management.
Reporting and corrective action	• Employees and contractors will maintain records of all monitoring and auditing activities and report results to the Environmental Manager at agreed intervals.

Waste Management Plan	
	• Recommendations and actions arising from audits and reviews will be implemented. • Routine work reports will be recorded and reviewed by Environmental Officers. • All complaints due to waste management practices will be investigated. • All incidents that deviate from normal operating conditions will be reported and action initiated (including reporting to relevant agencies where warranted/required) by the contractor to prevent a recurrence of the incident. • Non-compliance and incident reports will be reviewed and closed out by senior management.

2.1.15 *Effluent Disposal*

Effluent Disposal Management Plan	
Policy	To release treated effluent and manage sewage sludge without causing environmental harm.
Performance criteria	• Treated effluent meets quality requirements of design parameters. • All sewage sludge is disposed off at an appropriate sewerage disposal facility.
Implementation strategy	• Each camp will have a treatment system capable of treating the maximum amount of effluent generated from the camp kitchen and accommodation. • Sewage treatment plants (STP) will be subject to a site- based management plan, also detailing the irrigation of treated effluent. • All regulated waste must be recorded and tracked in accordance with the EP regulations, which includes keeping records of the pickup date, waste description, quantity, origin and destination. • Sewage will be treated to Class A Effluent standard • Raw sewage will be gravity-fed into a pump well and balance tank(s) and will then flow through treatment units composed of a number of components including: − a primary tank which undertakes sedimentation, digestion and storage of solid matter − balance tank for flow equalisation − aeration tank to reduce organic matter − clarifier for further removal of residual suspended solids − final effluent tank for disinfection and storage of treated water − filter feed tank, gravity-fed from the final effluent tank − ultra filtration membrane − chlorine dosing − final treated effluent tank with three days wet-weather storage. • Sanitary bio-solids or sludge from camp sewage treatment operations will be disposed at commercially licensed offsite facilities as necessary. • Sludge from the onsite wastewater treatment facilities will be pumped out periodically and transported to the nearest licensed wastewater treatment works. • Treated effluent will be irrigated to suitable areas. • The treated effluent disposal site will be fenced. • The final treatment method will be selected in consultation with the relevant Council and DERM.
Monitoring and auditing	• Significant sewage treatment plants with irrigation mechanisms will be tested every six months and be subject to daily, weekly and monthly checks.

Effluent Disposal Management Plan	
	• Daily treated effluent discharge limits will be reviewed monthly. • The annual audit will encompass effluent waste tracking and a review of the STP. • The waste transfer station will record all wastes that it manages on-site. • Soil and water quality in and around irrigation areas will be tested on a regular basis. • The quality of treated effluent discharged to land will be monitored in accordance with the Project derived quality requirements.
Reporting and corrective action	• The waste transfer station will use an on-site EMS program to manage all wastes. • Any non-compliance with sewage management plans will be followed up and corrective actions taken • Irrigation regimes will be amended depending on the results of soils and water quality monitoring.

2.1.16 Mosquito and Biting Midge Management

Mosquito and Biting Midge Management Plan	
Policy	To undertake Project activities such that potential health impacts on Project personnel and nearby sensitive receptors arising from mosquitoes and biting midges are minimised.
Performance criteria	Minimise potential mosquito and biting midge breeding sites resulting from Project activities.
Implementation strategy	• Ensure potential mosquito-breeding sites, including equipment and materials that pool water, are avoided or drained regularly. Any such equipment or debris no longer required for activities will be disposed of as soon as possible. • Environmental Officers, Campsite and Office Supervisors and Construction Superintendents trained to recognise mosquito-breeding activity and the treatment of breeding sites. • Periodic inspection of any ponded water to ensure no mosquito breeding occurring. • Where practical, removal of any mosquito breeding site from Project related source. • If necessary and in consultation with the relevant authorities, appropriate treatment of Associated water storage ponds will occur. • An assessment of work areas will be undertaken prior to works and on an ongoing informal basis to identify potential breeding sites. • Potential breeding sites created by construction activities, such as potholes, depressions and wheel ruts, to be filled as soon as practicable to prevent ponding. • Drainage systems for stormwater, irrigation and sewage effluent will be designed to minimise mosquito and midge breeding. • Construction camp facilities will be fitted with protective barriers, such as fly screens and air-conditioning. • Insect repellent will be made available to site personnel as required. • Any required specific area control plans based on assessment of potential breeding sites will conform to the Environmental Protection Agency Mosquito Management Code of Practice for Queensland.
Monitoring and auditing	• A record of inspections for mosquitoes and biting midges will be maintained. • Areas of ponding and pooled water that cannot be easily removed or backfilled will be inspected regularly for presence of larvae by the Environmental Officer.

Mosquito and Biting Midge Management Plan	
	• The Mosquito and Biting Midge Management plan will be reviewed periodically to ensure continuous improvement of the program.
Reporting and corrective action	• Records of any medical treatment of Project personnel required arising from mosquito borne disease or biting midge activity will be maintained by the Environmental Manager. • Where breeding sites are identified, the following corrective action will be taken: − investigate reasons behind the increase − employees will be re-trained in mitigation measures − work policies and procedures will be reviewed to improve the management system.

2.1.17 Eastern Red Fire Ant Management

Eastern Red Fire Ant Management Plan	
Policy	To prevent spread or introduction of Eastern Red Fire Ant (ERFA) as a result of Project activities.
Performance criteria	No evidence of ERFA on Project sites.
Implementation strategy	• Imported fill and landscaping materials sourced from the vicinity of Fire Ant Restricted Areas will be accompanied by a movement certificate / declaration form provided by the contractors. • Movements of vehicles from a restricted area will follow Department of Employment, Economic Development and Innovation (DEEDI) requirements, such as inspection and wash-down. • Construction site personnel will be briefed on fire ant identification and management through site environmental or toolbox meetings.
Monitoring and auditing	• All sites where ERFA have been reported and actions taken to eradicate ERFA will be monitored on a regular basis.
Reporting and corrective action	• The Environmental Manager will be responsible for maintaining all records and liaising with the Construction Manager and DEEDI as required. • Any fire ants identified on site will be reported to DEEDI and any advice on eradication of ERFA implemented. • Should fire ants be identified on site, or non-compliance with DEEDI requirements occur, the following actions will be undertaken: − An investigation will be undertaken to identify the reasons behind any non-compliance − Employees will be re-trained as appropriate. − Work policies and procedures will be reviewed to improve the system.

2.1.18 Incidents and Complaints

All environmental incidents, near-misses and hazards will be reported via the Synergi incident reporting system in accordance with the BG Group Standard for incident reporting. Complaints will be handled by the Land Access Officer in the first instance, who will liaise with the complainant(s) and the Environmental Manager for an effective resolution. The Environmental Manager has responsibility to ensure that all complaints are addressed and appropriately closed off.

Incidents and Complaints Management Plan	
Policy	To have a process whereby all complaints can be lodged and responded to in an appropriate manner.
Performance criteria	• Record all complaints and responses in an incidents and complaints register. • Respond appropriately to all incidents and complaints.
Implementation strategy	• All environmental incidents will be recorded in the Synergi database, with corrective actions assigned and followed up by the responsible person for a particular incident. • The complaints form will document at least the following information: − Time, date and nature of complaint. − Type of communication (telephone, letter, email, visit). − Name, contact address and contact number (if provided). − Response and investigation undertaken as a result of the complaint. − Action taken and signature of person investigating complaint. • Each complaint will be investigated as soon as practicable and, where appropriate, action taken to remedy the cause of the complaint. If DERM advises alleged nuisance, it will be investigated and DERM advised of any action proposed or undertaken, and records will be kept of all complaints.
Monitoring and auditing	• The Environmental Officer will maintain the complaints register and ensure all complaints are resolved. The complaint form will be checked by the Environmental Officer within two weeks of complaint receipt to ensure follow-up action has been taken to resolve the issue. • Where required, the relevant authorities will be informed of complaints.
Reporting and corrective action:	• All complaints and incidents are to be reported to the Environmental Manager. • Should further incidents occur or complaints be received in relation to previous occurrences, an appropriate selection of the following corrective actions will be undertaken: − Additional environmental awareness training of the workforce with respect to the procedures to be followed for environmental incidents or complaints. − Investigation into why the incident/complaint was not addressed within the specified timeframe. − Incident/complaint follow-up according to the results of the investigation. − Where required, work place practices will be reviewed.

2.1.19 *Environmental Induction and Training*

Environmental Induction and Training Plan	
Policy:	To ensure that all Project personnel, including contractors, comply with the environmental requirements of all tasks.
Performance criteria	• All personnel undergo site inductions and, where necessary, additional training, that address environmental requirements of Project activities. • Full compliance with induction and training procedures.
Implementation strategy	• Develop an induction training plan that explains environmental obligations, the purpose of the EMP and any issues new starters, whether permanent or contractors, must be aware of. • All personnel will receive site inductions which will include environmental responsibilities.

Environmental Induction and Training Plan	
	• Training programs will be conducted as required. • All site staff will be made aware of the Project EMP, EA conditions, environmentally sensitive areas and environmental responsibilities. • Identify the skills required to effectively implement the Project; and the EMP and its procedures or sub plans. Ensure the skills of relevant personnel working on the site are also included. • As a minimum, everyone will have basic environmental training and be familiar with the EMP, their respective roles and responsibilities. • Identify and describe how, when and with whom specific skills training will occur. • Ensure all site/facility staff are aware of their responsibilities in implementing work instructions or procedures contained in the EMP. • Ensure a document exists that clearly lists who will require training, the frequency of training and the procedure to document training activities. Identify to what basic level or standard training will be targeted.
Monitoring and auditing	• The success of the training programs will be assessed and documented. • Non-compliance with training will be recorded
Reporting and corrective action	• In the event of a staff member not being adequately trained or inducted, training activities will be undertaken as necessary. • The training or induction programme will be revised accordingly.

2.1.20 *Emergency Response for Environmental Incidents*

Emergency Response for Environmental Incidents Management Plan	
Policy:	To ensure that Project personnel can respond effectively and efficiently in the event of an environmental incident to ensure no long-term adverse impacts on health, safety or the environment.
Performance criteria:	• Any emergency response addressed in accordance with the QGC Emergency Response Plan. • Nil government notices.
Implementation strategy	• A detailed Emergency Response Plan will be prepared and will include the following: − Response procedures in the event of a fire, chemical release, spill, leak, explosion, equipment failure, bomb threat, natural disaster (including severe storm and flood events) or any other likely emergency. − Communication arrangements and contact details. − Roles and responsibilities of relevant personnel. − Emergency controls and alarms. − Evacuation procedures. − Emergency response equipment. − Leak detection and control points. − Training requirements. − Site access and security. − Notification and reporting to DERM. − Spill-containment procedure. − The safe recovery of spillage. − Clean-up and rehabilitation. − Incident investigation. − Emergency response training (refer *Section 2.1.19*). − Monitoring and detection systems. − Callout contact lists.

Emergency Response for Environmental Incidents Management Plan	
	− Measures to halt spills such as control pumps, etc. − Requirements for remediation or disposal of contaminated soil (refer *Section 2.1.13*). − Personnel responsibilities. − Equipment requirements. − Location, storage, maintenance and transport of equipment to site. − Communications and logistics.
Monitoring and auditing	• The effectiveness of the Emergency Response Plan will be tested at least annually and audited.
Reporting and corrective action:	• The Environmental Manager will be responsible for compiling the results of testing and auditing programs. These results will be reported to the relevant senior management. • The following constitute incidents or failure to comply: 1. Emergency Response Plan is not prepared or implemented. 2. Emergency response equipment is not provided. 3. Emergency response training is not undertaken. 4. Emergency response procedures not followed in the event of an incident. • In the event of an incident or failure to comply, a selection of the following actions will be undertaken, as appropriate: 1. Prepare or implement the Emergency Response Plan. 2. Provide the necessary equipment or training. 3. Investigate why the emergency response procedures were not followed and implement mitigating measures.

2.1.21 Fire Management

Fire Management Plan	
Policy	To prevent the initiation of bushfires as a result of Project Activities. To protect Project personnel and key Project infrastructure from bushfire impacts.
Performance criteria	• Develop and implement and Emergency Response Plan that includes fire management. • No unplanned and uncontrolled fires caused by Project Activities. • Consultation with all relevant fire management authorities.
Implementation strategy	• Minimise fire risk through evaluation processes and management of those risks (i.e. fire prevention). • Restrict high-risk activities in accordance with local fire bans or in times of high fire danger. • Maintain a plan for rapid and co-ordinated response to the outbreak of fire through an established Fire Response Plan in conjunction with the local metropolitan and rural fire brigades. • Implement evacuation procedures and hazard reduction. • Implement and maintain building fire detection and alarm systems, emergency lighting, fire hydrants, fire hose reels, fire extinguishers and service checks to relevant specifications as per Australian Standards. • Undertake Fire Safety Awareness Training as part of site inductions. • Conduct regular fire drills and record exercises and actions generated. • Conduct periodic fire equipment audits.

Fire Management Plan	
Monitoring and auditing	• Fire equipment inspections to be carried out as advised by Management. • Fire management plans to be reviewed at least annually or following a fire event. • Fire drills conducted at least annually.
Reporting and corrective action	• Extinguish fire if safe to do so. • Report all fire events to Project Manager. • Notify fire brigade and implement evacuation procedure if appropriate. • Review fire management plans following fire events.

2.1.22 Climate Extremes and Climate Change

Climate Change Mitigation Management Plan	
Policy	Climate extremes and climate change do not adversely impact Project infrastructure.
Performance criteria	Engineering design of Project infrastructure includes consideration of climate extremes and climate change.
Implementation strategy	• Final compressor specification will be determined during detailed engineering design, but will consider potential climate changes, particularly average temperature and rainfall changes. • Ponds will be designed to cope with a 1:100 annual exceedence probability (AEP) rainfall event, with a 10 per cent allowance for climate change. • Revegetation strategies will include the selection of drought-tolerant grass species for stabilisation purposes. • Strategies to mitigate impacts from extreme climate events and climate change include: − providing wet weather access to all construction sites − reduction, where appropriate, of construction activities during wet weather − sediment and erosion controls will be designed and implemented to cope with high rainfall events − ensuring adequate dust, sediment and erosion management (refer *Section 2.1.10*) − monitoring short and long term weather predictions − designing all water storage areas to take into account significant wet-weather events − ensuring gathering lines are buried deep enough to not be affected during flooding events − training personnel in the risks to themselves and equipment from extreme temperature events − developing and implementing emergency response plans for extreme events including fires and flooding − ensuring that all personnel are aware of and have rehearsed emergency response measures in the event of flooding, fire and cyclones − locating major infrastructure (e.g. compressors) above floodplains.
Monitoring and auditing	• Engineering designs of Project infrastructure include considerations of climate extremes and climate change. • Audit of construction methods in accordance with engineering design that includes consideration of climatic extremes and climate change. • Record all instances of failure of Project infrastructure caused by climatic extremes.
Reporting and corrective action	• All Activities impacted by extreme weather will need to be re-assessed in the light of any failures resulting in environmental impacts.

Climate Change Mitigation Management Plan	
	• All damage to structures will be recorded and any actions to remediate sites will be recorded.

2.1.23 *Landscape and Character Maintenance*

Landscape and Character Maintenance Management Plan	
Policy	To minimise the impact on environmental and community values from the location of infrastructure.
Performance criteria	• Respond to all complaints regarding impacts on environmental and community values and, where feasible, implement mitigation measures. • Consultation with potentially affected stakeholders. • Evidence that decision criteria for location of infrastructure includes consideration of environmental and community values.
Implementation strategy	• QGC will aim to minimise the impact on rural lifestyle values through: − appropriate siting of Gas Field infrastructure − use of technology that creates the least disturbance − progressive rehabilitation of disturbed areas − direct liaison with potentially affected stakeholders. • Mitigation measures to reduce impacts on landscape character, land use and existing infrastructure include: − ensuring appropriate buffers are maintained between Gas Field infrastructure and existing and planned development, or where this is not practicable, ensuring Gas Field infrastructure design meets the safety requirements for developed areas − appropriate consultation with landholders and occupants in relation to the provision of access for Gas Field construction and ongoing maintenance during operation − liaison with mining permit, claim or lease holders to consider overlapping tenure issues and ensure that existing legislation has been considered − minimising impacts on GQAL through appropriate construction techniques and/or minimising construction and camps in areas designated as GQAL − ensuring that the construction footprint and associated work areas are minimised in environmentally sensitive areas such as state forests and watercourse crossings and approaches. • All gathering lines will be appropriately signposted • Appropriate notification and management of noisy and dusty activities particularly in proximity to residential areas, roads and schools. • Identify all public and private infrastructure within the Gas Field prior to construction • Seek broad consent from all Native Title claimants for all current and future acts required to develop and operate the Gas Field • Where commercially viable quantities of millable timber are identified with DERM, QGC will provide compensation or sufficient lead time for DERM to arrange for the salvage of this timber. • Gas Field infrastructure will not be established, without prior consultation with potentially impacted parties, in areas where quarrying activities occur. • Gas Field operations will not be conducted within areas that cause

Landscape and Character Maintenance Management Plan	
	disturbance to animals at intensive animal-rearing operations. • All precautions will be taken to minimise damage to farm infrastructure. • Gas Field development will not be conducted in existing urban, residential and recreational areas, as defined under local planning schemes. • Individual access and entry protocols will be agreed and documented through close consultation with all landholders. Care will be taken to minimise disruption to existing lifestyles of landholders. **High Value Cropping Land** • As far as possible, drill sites and associated infrastructure will be located along paddock boundaries, access areas, etc, and not within areas of cultivation. • Where the only option is placement within a cultivation area, the wellheads will be positioned, in consultation with the landholder, to cause the least obstruction to the normal working patterns and to the overland flow of stormwater within the paddock. • Where possible, and with landholder consultation, access tracks will be located along internal headlands or contour banks. • Disturbance to existing erosion-control measures will be avoided as far as possible. Where disturbance is necessary, the duration of disturbance will be minimised and restoration promptly completed. • Well establishment areas will be progressively rehabilitated, although a final well pad area of 5,000m^2 is expected.
Monitoring and auditing	• A record of all instances of non-compliance with this plan will be maintained. • Location and design of infrastructure will be subject to a rigorous selection process where potential conflicts with existing land use and landscape character are identified. • Actual development sites will be inspected to determine compliance with site selection and design requirements.
Reporting and corrective action	• All complaints about impacts on land use and landscape character will be followed up and corrective actions taken.

2.1.24 *Topography Maintenance*

Landscape & Character Maintenance Management Plan	
Policy	To minimise impacts on topography.
Performance criteria	• Minimise sediment and erosion release from areas where topography is altered. • Consultation with stakeholders regarding topography following decommissioning. • Where practicable, sites are returned to their original profile upon decommissioning.
Implementation strategy	• Only 1 per cent of the field area is considered to have a significant topography restriction (i.e. areas with a relief ≥ 90 m and or slopes >10 per cent) in terms of field development. These areas include dissected plateaus and hills. To the greatest extent possible, these areas will be avoided for development of the Gas Field. • The Activity area will be returned to original or stable contours, re-

Landscape & Character Maintenance Management Plan	
	establishing surface drainage lines and other land features. • Where areas of significant topographic restriction cannot be avoided: − access of specialist heavy machinery will be limited − excavation will be carefully managed − special measures to build access tracks with appropriate grade will be adopted − development sites with significant topographic restrictions will be subject to a detailed site development plan.
Monitoring and auditing	• Development sites will be inspected to ensure compliance with site development plans.
Reporting and corrective action	• Instances of non-compliance will be investigated and corrective actions taken.

2.1.25 Revegetation and Rehabilitation

Revegetation and Rehabilitation Management Plan	
Policy	To restore, as far as reasonably practicable, land to its pre-existing condition.
Performance criteria	• Monitoring of rehabilitation areas occurs at a frequency necessary to maximise rehabilitation success. • After a suitable period, revegetation occurs naturally and is similar to surrounding vegetation. • No weed species introduced. • Rehabilitation area stabilised with no significant erosion events.
Implementation Strategy	• Rehabilitation of disturbed areas will be undertaken progressively. • Roads will be deep-ripped to relieve compaction. • Topsoil application will only take place after subsoil respreading and will be evenly spread and left with a slightly rough surface. • Seeding of long-term topsoil stockpiles will be carried out with an appropriately designed seed mix. • Topsoil will be respread prior to revegetation of areas to be rehabilitated at completion of site activities. • Prior to the re-spreading of topsoil, the ground surface will be ripped to assist with binding of the soil layers, water penetration and revegetation. • Where sufficient topsoil is available, topsoil will be re-spread to a minimum depth of 75 mm. • Driving vehicles on freshly topsoiled areas will be prohibited. • Revegetation will take place as soon as practicable after topsoil is spread. • Subsoils displaced and not utilised may be stockpiled in locations approved by the landholder for use during operations. • Imported topsoil, of an appropriate quality and weed free, may be required for additional road repairs, and will only be used with landholder approval. • Flagging will be used to identify rehabilitation areas. • Erosion and sediment control measures will be installed where necessary (refer *Section 2.1.10*). • Native vegetation will be respread over the area to assist in the distribution of seed stock and provide shelter for fauna. Distribution of vegetation will be controlled to ensure that any erosion or subsidence that may occur will not be concealed during subsequent monitoring inspections.

Revegetation and Rehabilitation Management Plan

- Native groundcover and shrubs will be encouraged to revegetate wherever appropriate to minimise habitat barrier effects in significant habitat areas.
- A reseeding plan based on soil types, existing local vegetation characteristics and landholder preferences will be developed.
- Seeding will be utilised where rapid restoration is required (e.g. watercourse crossings and potential high erosion areas).
- Where disturbed areas are to be re-planted or reseeded, preference will be given to local native species. However, non-native and non-invasive grass seed stock may be used where approved by the landholders to provide environmentally acceptable short-term surface stability.
- Trees and shrubs will be allowed to regenerate naturally on cleared areas not required to be kept tree free for the purpose of operation.
- Where applied, seed will be evenly dispersed over the entire disturbed area.
- Seeding will take place as soon as practicable following clean-up and topsoil placement.
- Fertilisers and soil supplements will be used only as necessary and with the agreement of landholders and authorities.
- Temporary access roads will be closed and rehabilitated to a condition compatible with the surrounding land use.
- Where access routes are to be retained, but are not public access, the entry will be disguised (e.g. by dog-legging, brush spreading).
- Disused silt fences will be removed.
- Fences or other barriers will be installed where appropriate and where approved by the landholder, to minimise unauthorised easement access.
- During construction of larger facilities (compressors, ponds, etc) the topsoil will be stored adjacent to the site, in a stable and safe location, for rehabilitation purposes.
- Once drained, the soil from a fill pile (generated from drill sump construction) will be mixed with the mud in the base of the sump to form a thick paste. If the original sump water TDS was below 4,000 ppm (nominally), the mud may be removed from the sump to mix and dry on the drill pad to accelerate the restoration process, but all material will be replaced back in the sump at the end of rehabilitation.
- Once the mud has been dried and mixed sufficiently, the sumps will be backfilled with the remainder of the fill pile. Stored topsoil will then be placed over the top of the sump. The filled area will be formed with a slight mound to account for subsidence, overlapping the edges of the pit and compacted.
- The area between the edge of the drill pad and the edge of lease will be deep-ripped and seeded. If the lease is on a slope, a diversionary drain will be formed on the uphill side of the drill pad.

Associated Water Storage Facilities

- The rehabilitation and decommissioning of each water storage pond, brine storage pond and salt disposal landfill will be subject to a detailed engineering plan.
- A decommissioning plan will include alternatives to minimise the footprint of former storage ponds by pumping hypersaline residue (e.g. >30,000mg/L) into a purpose-built storage facility. The contained material would require an engineered capping option followed by vegetation cover with minimal root penetration.
- Embankment material will form a cover over the pond base, and

Revegetation and Rehabilitation Management Plan	
	stored topsoil will be utilised to support the growth of a grass species mix. • Following decommissioning, groundwater flow modeling of the clay-lined ponds will be used to estimate the area affected by salty pore water below the pond footprint. The wetting front should cease after pond dewatering, allowing the soil to desaturate. • Should an alternative Associated Water disposal facility not be available, in situ encapsulation of the saline material may form the basis of the closure and rehabilitation concept. Encapsulation material will comprise material with a low permeability and will insulate against infiltration, percolation and salt migration. • In general, rehabilitation activities associated with the disposal of saline residues and storage ponds will involve a physical and chemical investigation to determine the area extent of saline contamination, undisturbed landform characteristics and landholder requirements (e.g. preferred vegetation type). • Individual rehabilitation plans will depend on many factors that are site-specific: landform features, slope, water-flow restrictions in the landscape and soil type and quality.
Monitoring and auditing	• Regular inspections will be undertaken during the Activity period for subsidence, presence of weeds, revegetation success and stability. • Photo-monitoring points will be established. • Monitoring of a restored pipeline ROW and well pad areas will occur every month for the first 12 months. Weed controls may be required. A report on the ROW and well pad reinstatement will be produced after a six-month period and after 12 months, detailing groundcover establishment rates, erosion and sediment control effectiveness and photos from monitoring points. • Until regrowth is established, significant (e.g. riparian zones) areas and any seeded areas will be monitored regularly to ensure growth and, if necessary, appropriate reapplication of seed will be carried out. • The success of restoration will be assessed by comparing the percentage cover and species diversity in the Activity area with that of adjoining land. • Monitoring will also include an assessment of the effectiveness of weed-control measures. • The process of monitoring and rehabilitation will conclude only once the site becomes stable. • The decommissioning and rehabilitation plan will include monitoring requirements post decommissioning. • Soils, surface water and groundwater will be monitored at locations surrounding Associated Water storages containing saline residues that have been decommissioned and rehabilitated.
Reporting and corrective action	• Any sites not displaying stability (after 12 months) will undergo additional rehabilitation using a method approved by the relevant authority or landholder. • Recommendations and actions arising from audits and reviews will be implemented. • Routine reports will be recorded and reviewed by Environmental Officers. • Non-compliance and incident reports will be closed out by the Environmental Manager to ensure prompt rectification and change management. • Should monitoring of rehabilitated Associated Water storages indicate non-compliance, further rehabilitation strategies will be

Revegetation and Rehabilitation Management Plan	
	developed and existing strategies reviewed. • Landholder complaints will be recorded and appropriate actions implemented and closed out by the Project Manager or delegate.

2.1.26 *Dangerous Goods and Hazardous Substances*

Dangerous Goods Management Plan	
Policy	To protect Project personnel, the public and the environment from harm due to the transport, storage or use of dangerous goods or hazardous substances.
Performance criteria	• No unplanned release of dangerous goods or hazardous substances. • All transport, storage and handling of dangerous goods or hazardous substances is performed in accordance with applicable legislation, guidelines and standards.
Implementation strategy	• Training of personnel in accordance with AS 3780 – the storage and handling of corrosive substances. • Training for people using hazardous materials. • Transfer of liquids in accordance with AS 3780 and the Australian Dangerous Goods (ADG) Code. • Hazchem signage in accordance with the ADG Code. • Segregation of corrosive substances that are kept in bulk from incompatible goods and goods with which they may react dangerously, in accordance with AS 3780. • Preparation of individual Material Safety Data Sheets (MSDS). • MSDS register on site and available to all employees. • Implementation of clean-up procedures for spills. • Spill management materials will be provided at any fuel or chemical storage location. • Suitable compound drainage in accordance with AS 3780. • Prevention of spilled chemicals from entering the stormwater system. • Spills contained within bunds. • Bulk container filling in accordance with AS 3780. • Design of bulk containers to be resistant to all likely sources of corrosion (particularly any product spills). • Provision of compounds (bunded areas) for all above-ground bulk containers of corrosive substances in accordance with AS 3780. • Storage in bunded areas that are designed and constructed so that they are safe and suitable for conditions of use in accordance with AS 1940. • Identification of the location as a Hazardous Area. • Ensuring there are no ignition sources in the vicinity of the bunded area. • Maintenance of spill kits including pumps and hoses for transferring spilt liquids. • All tanks and drums to be in bunded area. • Regular inspection of bunded areas. • All chemicals and fuels will be stored either in lined bunds or on self-bunded pallets. • All hazardous materials to be clearly labeled. • Fuelling area to have containment for spills, and spill kits. • Contaminated material would only be removed from the work area with the approval of the DERM.
Monitoring and auditing	• Dangerous goods locations inspected on a regular basis for compliance with relevant standards and plans. • Record of all incidents involving dangerous goods.

Dangerous Goods Management Plan	
	• Inspection of MSDS for all dangerous goods. • Inspection of training records for those handling dangerous goods.
Reporting and corrective action	• Instances of release of dangerous goods followed up and corrective actions taken to minimise probability of reoccurrence. • Release of potential contaminants reported to relevant authorities as appropriate.

2.1.27 *Decommissioning*

When infrastructure is no longer in use (operating as part of the CSG production process), QGC will decommission any part of the Gas Field in accordance with the regulatory requirements and accepted Best Management Environmental Practice of the day. Such infrastructure would include well heads, compression stations, ponds, water treatment facilities and any above ground pipeline infrastructure.

Prior to final decommissioning of Gas Field facilities, QGC will investigate potential environmental issues and impacts associated with the abandonment in accordance with Guidelines for the Assessment and Management of Contaminated Land and rehabilitation requirements set out in the current Environmental Authorities for Petroleum Activities.

Decommissioning Plan	
Policy	To decommission Project facilities such that they do not present and ongoing environmental risk. To plan for decommissioning in consultation with relevant stakeholders.
Performance criteria	Develop and implement, in consultation with stakeholders, a detailed decommissioning plan for all facilities prior to the end of their useful life.
Implementation strategy	• A decommissioning and rehabilitation plan will be prepared prior to the Project ramp down, utilising information acquired during progressive rehabilitation. • Decommissioning of the Gas Field facilities is expected to be completed in three phases: − dismantling and removal of the above-ground facilities − destruction and removal of hardstand areas − restoration and rehabilitation of land in accordance with DERM requirements or as agreed with landholders. • General decommissioning principles for different infrastructure types are as follows: − Well site equipment will be removed from the site. Wells will be decommissioned by plugging and sealing. − Inactive, buried gas and water-gathering pipelines will be decommissioned in situ consistent with the requirements of the AS 2885. − The removal of below-ground structures (e.g. pipes) may cause unnecessary environmental disturbance. It is therefore expected that the pipe will be left in the ground. The abandoned pipe shall be purged of gas, filled with an inert substance and cathodic protection devices and associated utility structures left intact. This will prevent ground subsidence associated with the corrosion of the pipe, which may result in surface-water diversion, ponding and erosion. Below-ground facilities will be cut off and blinded below ground level. All sites shall be rehabilitated following completion of termination.

Decommissioning Plan		
		– Access tracks will be decommissioned should they not be required by the landholder. – Field Compression Stations (FCS), Central Processing Plants (CPP) and associated infrastructure, such as interceptor pits, triethylene glycol (TEG) units, and high-density polyethylene (HDPE) liners for ponds, will be removed from the site. – Items such as compressors and driver engines will be recycled or salvaged for potential reuse by a third party where possible. – Hardstand areas will be removed where not required by the landholder, with footings buried in a suitable location, preferably a decommissioned pond footprint. Compacted material will be deep ripped or removed from the site depending on the final land use requirements. – Flares will be removed from the site. – Ponds and water storage facilities may remain at the request of a landholder only if they do not contain hazardous substances; have been subject to a contaminated land assessment and possess structural integrity suitable for the future purpose. – Ponds will be rehabilitated as described in *Section 2.1.25*. – Water treatment facilities will be wholly removed from the site. Treatment units, or components thereof, will be recycled or salvaged for potential reuse by a third party where possible. – Accommodation camps, administration buildings and warehouses will be removed from the site, unless a landholder requests to retain aspects of this infrastructure. – Energy infrastructure may remain if a further appropriate use can be foreseen. Otherwise it will be dismantled for recycling, scrap metals or transported to a waste disposal facility. – Waste transfer facilities will be decommissioned by the removal of all waste materials off site to an appropriate disposal location. To support the decommissioning and rehabilitation plan, waste facilities will be scheduled for decommissioning subsequent to the aforementioned items.
	•	All sites shall be left clean and safe.
Monitoring and auditing	•	Compliance with the Decommissioning Plan will be audited during the decommissioning phase
	•	All instances of non-compliance with the Decommissioning Plan will be recorded.
	•	Decommissioning and rehabilitation success will be monitored for a period agreed with the relevant authorities.
Reporting and corrective action	•	Any instances of non-compliance with the Decommissioning Plan will be investigated and corrective action taken.