

Section 12 Environmental Management



12. Environmental Management

12.1 Environmental Management Programme

Preventative and management measures will be applied throughout the life of the TTP to ensure that all significant environmental effects associated with the proposed project are minimised, mitigated or avoided. Various tools will be implemented to ensure sound environmental management. These include an Environment Health and Safety (EHS) policy, preparation of hazard registers, audits of environmental performance, environmental management and performance in tendering and contract requirements, inductions and Environmental Management Plans (EMPs).

The development of an environmental hazard register commenced in early 2004 and included the active participation of key stakeholders. Part of project planning will be ongoing development of the internal register of environmental hazards to further identify environmental issues, thus enabling project management to ensure issues are addressed, along with other business priorities, in the early screening and design stages. Progress will continue to be periodically reviewed and documentation updated during project design and execution.

Environmental performance issues relevant to the design, construction and operation of the TTP will be managed by the BOO consortium. A key component of the BOO selection consortium selection criteria will be to demonstrate its ability to achieve the required level of environmental performance and preparedness to work with all stakeholders to effectively manage social impacts with a commitment to the following:

- Environmental Health and Safety (EHS) performance;
- EMP compliant to regulatory, landowner and other requirements;
- auditing of compliance to the EMP including corrective actions;
- workshops and inductions for all personnel focussed on EHS management, cultural awareness and performance;
- presence of on-site EHS and cultural representatives during construction activities.

All personnel involved in the various phases of the TTP will undertake EHS and cultural awareness training, which will involve input from professional EHS staff and Indigenous facilitation groups.

12.2 Environmental Management Plans

Environmental aspects for the TTP will be managed primarily through the development and implementation of EMPs by the BOO consortium for the main stages of the development, including:

- construction
- operation
- decommissioning

All plans will be drawn up in accordance with the TTP commitments presented in **Table 12-1**.

The EMPs will detail measures to minimise actual and potential impacts associated with all phases of the TTP describing or referencing the procedures and equipment proposed to prevent, monitor and manage possible effects. They will outline measures to ensure compliance with all relevant environmental regulations and standards. The EMPs will also identify the timing and scope of individual components and serve as a compliance document – recording the progress of management commitments and their conformity with requirements set by authorities and expectations of the public.

Individual framework EMPs have been developed to demonstrate how potential impacts during construction and operation will be managed. The individual framework plans are presented in **Table 12-2** to **Table 12-19**. The EMPs will also establish monitoring plans. The key monitoring plans are summarised in **Table 12-20**.

The EMPs and monitoring plans will be developed further following the completion of the environmental assessment and finalisation of the project design. A consolidated overarching EMP document will also be developed to bring together all the individual EMPs in accordance with recognised standards and applicable Northern Territory legislation. The EMP will be submitted to the relevant authorities for approval prior to construction or commissioning/operation as applicable. Upon the commencement of construction, EMPs will be reviewed according to a regular timeframe and updated if necessary. These updates will be made in consultation with relevant regulatory authorities.

12.3 Framework Monitoring Programmes

Specific environmental monitoring programmes will be undertaken for the TTP. This will include open trench, weeds, biting insects, erosion, and groundwater monitoring. The monitoring programmes will be outlined in detail within the EMP, and will include:

- a) Information needed to provide a suitable baseline for subsequent monitoring.
- b) The types of project issues that are likely to need monitoring.
- c) The timing and frequency of monitoring.
- d) Policies for evaluating and amending the monitoring programme.

Once detailed design information is available for the TTP the monitoring plans (**Table 12-20**) will be finalised and submitted for approval with the EMPs.

12.4 Commitments

The TTP sponsors are committed to achieving a level of environmental management and performance consistent with national and international standards and statutory obligations during its pursuit of sound business and financial objectives. The BOO consortium will seek to achieve the most economically effective, environmentally sound technology and procedures incorporated into the design of the project to ensure optimal management of all activities.

Accordingly, the TTP sponsors propose several environmental management commitments that will be assigned to the BOO consortium as part of their implementation and delivery obligations. These environmental commitments are summarised in **Table 12-1**.

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■ Table 12-1 Summary of TTP Commitments

ID No	Implementation Phase				Management Commitment/ Action	Objective
	Design	Construction	Commissioning Operation	Decommission		
Environmental Management						
1.	✓	✓	✓	✓	Prepare and implement an Environmental Management System (EMS) . This EMS will include an Environmental Policy, Construction and Operation Environmental Management Plans, commitments to procedures, hazard register, consultation programme, training and inductions requirements, cross cultural training for workforce (where appropriate), auditing and periodic management reviews.	To manage all environmental aspects. Minimise environmental impact. Comply with legal obligations. Continually improve environmental performance.
2.	✓	✓	✓	✓	Prepare and update a TTP Project Environmental Hazard Register . Combined with the Environmental Policy and register of legal and other requirements, this register will provide the basis for each Environmental Management Plan, workplace procedures and personnel training.	Manage all environmental aspects associated with the construction and operation phases of the pipeline.
3.		✓			Prepare and implement a Construction Environmental Management Plan . Individual plans as specified in the following section will cover management of: Cultural Heritage, Waste; Gas Venting, Greenhouse Gas Emissions; Dust; Noise; Traffic, Hydrotesting, Vegetation Clearing, Terrestrial and Aquatic Fauna, Biting Insects, Exotic Species and Weeds, Rehabilitation, Erosion and Sediment Control, Groundwater and Surface Water Protection, Social Impacts; Spills, Emergency and Fire Response; and Safety. The BOO consortium, as the pipeline owner, will audit performance against this EMP and report annually to the regulator.	Manage all environmental aspects associated with the construction and of the pipeline. Outline responsibilities and obligations. Enforce compliance.
4.			✓		Prepare and implement an Operation Environmental Management Plan . Individual plans as specified in the following section will cover management of: Waste; Greenhouse Gas Emissions; Gas Venting; Fire; Social Impacts; Weeds and Exotic Species, Emergency and Fire Response; and Safety. The BOO consortium, as the pipeline owner, will audit performance against this EMP and report annually to the regulator.	Manage all environmental aspects associated with the operation of the pipeline. Outline responsibilities and obligations. Enforce compliance.
5.				✓	Prepare and implement a conceptual Decommissioning Plan by completion of commissioning, and a detailed Decommissioning Plan in consultation with all stakeholders prior to the commencement of decommissioning.	To manage all environmental aspects associated with decommissioning.
6.		✓	✓	✓	All staff will undertake environmental and cultural inductions before commencing work on site.	To minimise environmental impact on site.
Archaeology, Historic and Aboriginal Heritage						
7.		✓			Prepared and implement a Cultural Heritage Management Plan which will require that: <ul style="list-style-type: none"> ■ An archaeologist will be in attendance during pipeline trenching. ■ All works in relation to Cultural Heritage sites are correctly permitted and authorised in accordance with legislative and traditional Aboriginal owners' requirements. ■ The agreed management recommendations of relevant traditional Aboriginal owners for identified sites are implemented. ■ Siting for additional infrastructure including: new access routes, borrow pits, lay down areas, construction camps, anode beds, turning circles and compressor stations will be subject to archaeological and cultural heritage surveys prior to construction. ■ Procedures and arrangements are in place to deal with new discoveries of cultural heritage during construction and the roles of traditional Aboriginal owners in this process are documented. 	To avoid all recorded sacred sites, sites of significance, cultural heritage sites and sacred objects. To protect cultural heritage and prevent disturbance of heritage sites.
Topography/Land Systems/Soils						
8.		✓			<ul style="list-style-type: none"> ■ Confine all construction activities to within the originally approved construction corridor and other approved work areas. ■ Minimise the area of disturbance. ■ Rehabilitate all disturbed areas as soon as practicable. 	To restrict disturbance to the minimal required area and to ensure all areas are selected on appropriate environmental heritage criteria.

ID No	Implementation Phase				Management Commitment/ Action	Objective
	Design	Construction	Commissioning Operation	Decommission		
9.		✓	✓	✓	<p>Prepare an Erosion and Sediment Control Management Plan, which will ensure:</p> <ul style="list-style-type: none"> ■ Construction & maintenance of erosion control structures and devices. ■ Restrict vehicle movements to designated access roads and tracks. ■ Encourage use of multiple passenger vehicles to reduce traffic to and from the construction corridor. ■ Stockpile topsoil in stabilised piles to ensure preservation until required for restoration. ■ Minimise the period between backfill and restoration. ■ Rehabilitation of all work areas to aid restoration, and revegetation as soon as reasonably possible. ■ Erosion is monitored and controlled during pipeline operations. 	<p>To minimise soil disturbance, degradation and erosion.</p> <p>To minimise turbidity impacts on surface and ground waters.</p> <p>To optimise rehabilitation success.</p> <p>To minimise the potential for soil erosion to occur in the long-term during and post operation.</p>
10.		✓			<p>Implement an Acid Sulfate Soils (ASS) Management Plan if construction is required through ASS. The management plan will include:</p> <ul style="list-style-type: none"> ■ Marking of ASS locations. ■ Separation, handling, storage and reinstatement procedures for ASS. 	To minimise disturbance of ASS.
Fauna						
11.		✓			<p>Prepare and implement a Terrestrial and Aquatic Fauna Management Plan. Impacts of trenches upon fauna will be minimised by:</p> <ul style="list-style-type: none"> ■ Minimising the length of trench open at any one time as much as practicable. ■ Ensuring that trench excavation is progressive and that a sufficient number of qualified personnel are available to continually monitor and remove any trapped fauna species from the trench on a daily basis. ■ Locating fauna ramps to allow fauna to escape. ■ Provide fauna shelters in the trench (for example, soaked hessian bags) to provide temporary shelter for fauna whilst in the trench. 	To minimise the impact of construction activities on fauna and habitats.
12.		✓			<p>Prepare and implement a Biting Insects Management Plan to include:</p> <ul style="list-style-type: none"> ■ Prevention of water pooling where biting insects can breed. ■ Use of approved larvicides for control if necessary. ■ Quarantine control for equipment and vehicles travelling from areas where vector mosquito species may carry dengue fever. ■ Incorporate advice from NT DHCS. 	To prevent the occurrence of potential mosquito breeding sites and the presence of adult mosquitoes.
13.		✓	✓	✓	<p>Prepare and implement a Fire Management Plan which will:</p> <ul style="list-style-type: none"> ■ Ensure fires are prevented through workforce induction and procedures. ■ Control spread of any fires accidentally initiated during the construction phase. ■ Incorporate emergency management procedures in the event that bushfires move towards any work area, during construction and throughout operations. 	To minimise the risk of bushfire during pipeline construction and operation, and to prevent the loss of wildlife habitats.
Hydrology/Hydrogeology/Water Quality						
14.	✓				Schedule construction to take place predominantly in the dry season.	To minimise disruption to watercourses, soil degradation/sedimentation, soil instability and dewatering requirements.
15.		✓		✓	<p>Prepare a Groundwater and Surface Water Protection Management Plan which will ensure:</p> <ul style="list-style-type: none"> ■ All sewerage processes and waste water discharges will conform to regulatory requirements. ■ Ensure use of groundwater for hydrotesting, dust suppression, potable supplies is correctly permitted and approved. ■ Set targets for and monitor groundwater consumption. ■ Adopt best practise for the storage and use of liquid chemicals which may pose a pollution threat to ground and surface water resources. 	<p>To maintain the existing quality of water resources.</p> <p>To minimise the potential for water contamination and over extraction.</p> <p>To prevent cross catchment transfer of water.</p> <p>To minimise the potential for excessive aquifer drawdown.</p>
16.		✓			<p>Prepare and implement a Hydrotest Management Plan that will:</p> <ul style="list-style-type: none"> ■ Document how chemical usage has been minimised, extraction and discharge locations selected, and proposed methods to treat and manage water. 	To minimise any adverse impacts arising from the extraction and disposal of hydrotest water.

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17.	✓	✓		✓	Minimise impacts upon sensitive aquatic habitats by: <ul style="list-style-type: none"> ▪ Preventing any short or long term obstructions to fish passages through watercourses. ▪ Reinstating drainage at watercourse crossings and wetland areas. ▪ Selecting watercourse crossing techniques using prepared criteria offering the best environmental and technical solutions while not impacting on cultural values. 	To safeguard sensitive environments, and to prevent obstacles to fish movement.
Vegetation, Flora and Weeds						
18.		✓			Prepare and implement a Vegetation Clearing Plan which ensures that: <ul style="list-style-type: none"> ▪ Areas within the buffer of the compressor station sites that do not require clearing will not be cleared. Fallen timber in these buffer zones will be left in place. ▪ Before clearing commences physically peg the boundaries of the 30 m construction corridor and all ancillary facilities, for example, compressor stations, construction camps, laydown areas, turning circles and anode beds. ▪ The Northern Territory Parks and Wildlife Service is consulted on commercial opportunities for cycad and orchid plants. 	To minimise the amount of vegetation that is permanently cleared. To prevent disturbance of vegetation and flora adjacent to work areas. To minimise off-site impacts on sensitive vegetation communities and habitats. To minimise and manage the introduction and spread of weeds.
19.		✓		✓	Prepare and implement a Rehabilitation Management Plan ensuring that: <ul style="list-style-type: none"> ▪ Pipeline construction areas will be cleaned up after construction and seeded with native seeds, if required. ▪ Only native species will be used for rehabilitation and landscaping. 	To maximise rehabilitation success.
20.	✓				Siting for additional infrastructure or clearing including: new access routes, borrow pits, lay down areas, construction camps, anode beds, turning circles, and compressor stations will be subject to vegetation, flora and fauna assessments.	To minimise the impact on ecologically sensitive areas.
21.		✓			The permanent interest in land will be restricted to a 30 m corridor with only 'low' impact vegetation planted ie shallow rooting systems (a permanent access track adjacent to the pipeline will be maintained for operation/maintenance).	To minimise damage to the pipeline from aggressive tree roots.
22.		✓	✓		Prepare and implement an Exotic Species and Weed Management Plan which ensures that: <ul style="list-style-type: none"> ▪ Existing weed infestations along the construction corridor, access routes and construction camps will be identified and treated prior to commencement of construction activities. ▪ Plant, vehicles and equipment hygiene is established and maintained to prevent introduction and transfer of weeds. ▪ Weeds and feral animals will be monitored. ▪ Burn all green waste not suitable for respreading or reuse provided appropriate permits are in place. 	To minimise the spread and introduction of weeds. To prevent the spread of fauna pests.
Air and Dust Emissions						
23.		✓	✓		Prepare and implement a Greenhouse Gas Emissions Management Plan to include management of: <ul style="list-style-type: none"> ▪ Gas venting. ▪ Vehicle emissions. ▪ Power generation emissions. ▪ Accidental gas releases. 	To minimise the project's impact on global greenhouse gas emissions.
24.			✓		Prepare and implement a Gas Venting Management Plan .	To minimise atmospheric emissions and potential impacts on the environment and nearby communities.
25.		✓			Prepare and implement a Dust Management Plan . This will include measures to: <ul style="list-style-type: none"> ▪ Minimise the area cleared or disturbed. ▪ Moisture condition and treat roads, tracks, laydown areas, stockpiles and other disturbed areas where necessary. ▪ Limit speed along pipeline access routes where required. ▪ Rehabilitate disturbed areas as soon as practicable. 	To ensure dust generation and its effects on the environment and communities are minimised.

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Noise						
26.		✓	✓	✓	<p>Prepare and implement a Noise Management Plan. This will:</p> <ul style="list-style-type: none"> Detail the nature of any planned venting, location, timing and duration of the works and details of potentially affected residences. Ensure compliance with the draft NT Waste Management and Pollution Control (Environmental Noise) Regulations during operation. <p>Ensure that acoustic controls are fitted to noisy equipment including equipment in compressor buildings, vents and pressure relief valves and pre-planning of venting events. As a minimum the acoustic controls will ensure that the noise emitted is within NT occupational health standards.</p>	To minimise the impacts on the environment and public from noise emissions.
Waste and Dangerous Goods						
27.		✓	✓	✓	<p>Prepare and implement a Waste Management Plan. This will:</p> <ul style="list-style-type: none"> Specify measures to reduce, reuse, recycle and recover waste. Incorporate waste minimisation into contractor and supplier selection criteria. Ensure all chemicals used are selected, and managed in a manner which minimises environmental impacts. Ensure any hazardous materials are managed strictly in accordance with regulatory requirements. Monitor waste generation, re-use, recycling, treatment and disposal. Audit waste management performance. Audit effectiveness of consultation on waste management matters. <p>Accurately map the location of any newly approved waste disposal sites along the pipeline route and report these to relevant regulatory authorities and land owners.</p>	<p>To minimise impacts on existing waste disposal facilities.</p> <p>To minimise environmental impacts associated with waste generation.</p> <p>Maximise waste reduction, recycling, reuse and recovery.</p>
28.		✓		✓	<p>Prepare and implement a Spill Contingency Plan. This will require that:</p> <ul style="list-style-type: none"> Construction crew will be trained in fuel handling and how to effectively contain and clean up spills. Spill clean up kits will be available onsite and at every watercourse crossing and where fuel and hazardous materials are used and stored. 	To reduce the risk of accidental spills occurring and ensure effective management measures are deployed in the event of a spill.
Transport and Traffic						
29.		✓		✓	<p>Prepare and implement a Traffic Management Plan to ensure:</p> <ul style="list-style-type: none"> A joint assessment of road conditions by the Project and Road Authorities will take place on all roads to be used by the project prior to major use. Bitumen roads will be horizontally bored to avoid damaging the road surface, unless otherwise agreed in writing with the relevant road authority. Unsealed roads will be open-cut: traffic will flow either via bypass, or steel plates will be used to allow traffic at all times. A speed limit of 80 km/hr on access roads, 60 km/hr along the construction corridor, and 5km/hr will be implemented when passing personnel. Liaison with regulatory authorities to determine the most appropriate outcome for the transportation of large equipment. Roads are maintained in a safe condition during construction. Roads are returned to the agreed pre-construction use condition at the completion of pipeline construction. Access to the construction corridor will be by way of existing tracks and local roads where possible. 	To ensure site traffic is managed in such a way so as not to adversely impact on community, road users and sensitive habitats.
30.		✓			Pipeline construction across major sealed roads and railway will employ HDD or bore. Consultation will take place with the rail authority and operators as early as possible during the detailed design phase.	To minimise the impact on road users.
Socio-Economic						
31.		✓	✓		In consultation with local groups prepare and implement a Social Impact Management Plan .	To mitigate or avoid any negative impacts and optimise any positive impacts through an effective SIMP.

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32.	✓	✓	✓	✓	Further consultation will be undertaken before, during and after the statutory environmental approval process to ensure that traditional Aboriginal owners and local communities are aware of and involved in, the development of Environmental Management Plans (EMPs).	To mitigate or avoid any negative impacts and optimise any positive impacts.
33.	✓	✓	✓	✓	Optimise employment opportunities for Aboriginal people and local Territorians.	To maximise opportunities for local people.
Health, Safety and Emergency Management						
34.		✓	✓		Prepare and implement an Emergency and Fire Response Plan .	To prevent uncontrolled fires igniting in the project area. To minimise the potential impacts of fire on the surrounding environment.
35.	✓	✓	✓		Prepare and implement Safety Management Plans , including policies on alcohol, drugs, domestic pets, guns etc will be developed and implemented in consultation with the relevant communities, their representatives and Government.	To minimise risks to workers and public.
36.	✓	✓	✓		Written procedures will be developed for all work to ensure it is undertaken in a safe manner and in accordance with project and regulatory requirements. This will include the provision of Personal Protective Equipment (PPE) as required.	To minimise risks to workers and public.
37.		✓		✓	Temporary fences or appropriate barriers will be erected along the pipeline alignment where required.	To protect the public and livestock.
38.	✓		✓		Safety features will be installed at all scraper and compressor stations including the following: <ul style="list-style-type: none"> ▪ Isolating valves at scraper/compressor facilities will be designed to close remotely. ▪ Mainline valves between scraper facilities will be manual except for the MLV at KP932 Nhulunbuy which will be able to be closed remotely. 	To protect the public and environment and to identify any gas leaks.
39.		✓			The following provisions will be in place to protect the public when the pipeline is placed in a road reserve (crossing or paralleling). <ul style="list-style-type: none"> ▪ Additional depth of cover, 1200 mm directly under the road, and 750 mm minimum below a table drain. ▪ Appropriate signage such as signs at fence line and regular intervals if paralleling the road. ▪ Buried marker tape above the pipeline. 	To provide for the safety of the travelling public.
40.		✓			For the Alice Springs/Darwin rail crossing: <ul style="list-style-type: none"> ▪ A minimum of 3000 mm of pipe cover below the rail line and a minimum of 1200 mm below surrounding area. ▪ Heavy wall pipe within rail reserve. ▪ Appropriate signage such as signs at fence line. 	To provide for the safety of the travelling public.
41.		✓	✓	✓	Property access for landowners will also be maintained.	To minimise disruption to landowners.

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■ **Table 12-2 Framework Waste Management Plan**

Waste Management Plan Format	
Management Issues	<p>During construction and operation, waste will comprise three main streams:</p> <ul style="list-style-type: none"> ■ Solid waste including construction, domestic and green waste. ■ Liquid waste including sanitary wastewater and hydrotest water. ■ Hazardous waste for example used oils and greases. <p>Waste Management issues include:</p> <ul style="list-style-type: none"> ■ Disposal and storage of construction waste, excess materials or surplus excavated material. ■ Disposal and storage of domestic and green waste. ■ Disposal of liquid wastes (including hydrotest and sewage). ■ Disposal of hazardous waste. ■ Waste, if inappropriately managed, has the potential to contaminate groundwater and surface water and pose a risk to human health.
Objective	<p>To minimise impacts on existing waste facilities.</p> <p>To minimise environmental impacts associated with waste generation.</p> <p>Maximise waste reduction, recycling, reuse and recovery.</p>
Targets	<p>Compliance with the NT Government's <i>Waste Management and Pollution Control Act 1998</i> and requirements.</p>
Management Strategies	<p>Develop and implement Waste Management Plans for each phase or component of construction and operations, based on the waste management hierarchy of waste reduction, reuse and recycling.</p> <p>Include details of disposal/transportation routes, frequency of collection, end-of life of the materials in the Waste Management Plan.</p> <p>Ensure all waste is contained appropriately, taking into consideration fire safety, pest and odour control, and protection of water and soil resources.</p> <p>Treat and/or dispose of sewage and putrescibles in accordance with regulatory requirements.</p> <p>Minimise and recycle waste where practicable, or dispose of at approved facilities.</p> <p>Reuse green waste (excess vegetation) after rehabilitation wherever possible.</p> <p>Segregate used oils, greases and tyres from other waste and reuse or recycle, if possible; otherwise dispose of in accordance with legislation.</p> <p>Full time environmental officers will be onsite during all construction activities to ensure waste management procedures and plans are implemented.</p>
Monitoring	<p>Undertake visual inspections for litter/general waste (and clean up if required).</p> <p>Inspect waste storage and disposal facilities to ensure they are functioning sufficiently and dealing adequately with quantities of waste.</p>
Reporting	<p>Waste Management Plans for each phase or component of construction will be held on site and updated in keeping with regulatory requirements.</p> <p>Waste inventory catalogue held on file documenting disposal volumes and types and disposal locations.</p>

■ **Table 12-3 Framework Gas Venting Management Plan**

Venting Plan Format	
Management Issues	<p>Venting along the pipeline and at above ground facilities during commissioning, operations and maintenance may result in minor to significant air and noise emissions, and health and safety concerns.</p> <p>Emergency venting may also be required in the case of a compressor station or pipeline emergency shut down. Under these circumstances gas will be vented from the station or pipeline as quickly as possible.</p>
Objective	To minimise atmospheric emissions and potential impacts on the environment and nearby communities.
Target	To minimise venting.
Management Strategies	<p>Health and safety aspects of venting will be covered by the preparation of Health and Safety Management Plans.</p> <p>During pipeline depressuring the nearest scraper station or main line valve will be closed and venting will be controlled manually.</p> <p>Trained venting crews will be dispatched from the nearest maintenance facility and in conjunction with operations personnel will perform this work.</p> <p>Minimising the volumes of gas released will help reduce risks associated with venting.</p> <p>By allowing pressures in the line to decline prior to venting, the volume of gas released to the atmosphere can be reduced.</p> <p>Notifying any nearby residences of any significant planned venting.</p> <p>Early detection of gas release, minimising the volumes of gas vented where possible.</p>
Monitoring	Pipeline monitoring will be undertaken using a Supervisory Control and Data Acquisition (SCADA) system.
Reporting	Develop reporting procedures consistent with regulatory, local and project requirements.

■ **Table 12-4 Greenhouse Gas Emissions Management Plan**

Greenhouse Gas Emissions Management Plan Format	
Background	<p>During commissioning and operation greenhouse gases and air pollutants will be emitted to the atmosphere from a number of sources including, equipment exhausts, pipeline venting operations and compressor station start-up.</p> <p>Types of emissions that may be generated include:</p> <ul style="list-style-type: none"> ■ carbon monoxide (CO) ■ carbon dioxide (CO₂) ■ nitrogen oxide (NO_x) ■ nitrous oxide (N₂O) ■ methane (CH₄) ■ unburnt hydrocarbons
Management Issues	<p>Greenhouse gas emissions will be generated as follows:</p> <ul style="list-style-type: none"> ■ During construction - emissions of carbon dioxide and nitrogen oxides from combustion of fuel (primarily diesel) in engines of vehicles and generators. ■ During operation - minor losses of gas from failures and maintenance operations (pigging). The major greenhouse gas from such releases will be methane. ■ During operation - small volumes of gas may need to be vented for maintenance of scraper stations or compressor station components. ■ During operation - gas will be burned as fuel in compressors and heaters, primarily releasing carbon dioxide as a greenhouse gas. During compressor station maintenance, emissions will comprise unit venting, station venting, station pipe venting and engine purge.
Objective	To minimise the project's impact on global greenhouse gas emissions.
Management Strategies	<p>Implement maintenance programmes for vehicles and equipment to ensure that vehicles are maintained to prevent excessive exhaust emissions.</p> <p>Implement a traffic management plan to ensure that transportation options are used in the most efficient manner possible.</p> <p>Prepare and implement a detailed Greenhouse Gas Emissions Management Plan.</p> <p>Prepare and implement a Gas Venting Management Plan (refer to Table 12-3).</p>
Monitoring	N/A
Reporting	Reporting to Government as required.

■ **Table 12-5 Framework Dust Management Plan**

Dust Management Plan Format	
Management Issues	<p>During construction dust will be generated as a result of:</p> <ul style="list-style-type: none"> ■ Vehicular movements on unsealed roads. ■ Clearing of vegetation. ■ Earthmoving activities. ■ Pipeline construction for example padding. ■ Blasting. <p>Dust emissions may adversely affect vegetation and fauna, human health and safety, and public amenity. Key activities with the potential for significant disturbance include construction trucks operating along access roads used by the public.</p>
Objective	To ensure dust generation and its effects on the environment and communities are minimised.
Targets	<p><i>National Occupational Health & Safety Commission Act 1985.</i></p> <p><i>Northern Territory Work Health (Occupation Health and Safety Regulations), 2003.</i></p> <p>No complaints logged on proponent's register.</p>
Management Strategies	<p>Inform personnel of the requirements to minimise ambient dust levels through an induction programme.</p> <p>Ensure that vehicles, machinery and loads are properly maintained and covered to minimise dust emissions.</p> <p>Adhere to vehicle speed limits as per Traffic Management Plans (Table 12-7).</p> <p>Regularly water unsealed roads, exposed ground surfaces and stockpiles with water tankers/carts using non-saline water or with an alternative approved substance.</p> <p>Exposed ground surfaces will be minimised.</p> <p>Reinstate ground surfaces using appropriate vegetation cover as soon as possible after backfilling, in order to reduce potential for long term dust generation.</p> <p>Maintain good housekeeping practices to ensure there is no accumulation of waste materials that may generate dust.</p>
Monitoring	Visual monitoring of all sites and access routes to be undertaken.
Reporting	Develop reporting procedures consistent with regulatory, local and project requirements.

■ **Table 12-6 Framework Noise Management Plan**

Noise Management Plan Format	
Management Issues	<p>Noise during construction will be highly variable. Noise from the construction phase will be generated by:</p> <ul style="list-style-type: none"> ■ Pipeline construction activities. ■ General civil or earthworks at above ground facilities. ■ Blasting (if required). ■ Construction traffic. <p>Noise during operation may result from venting activities (refer to Table 12-3).</p>
Objective	To minimise the impacts on the environment and public from noise emissions.
Targets	<p>Compliance with the provisions of the Northern Territory Government's <i>Draft Waste Management and Pollution Control (Noise) Regulations</i>.</p> <p>Construction activities undertaken in accordance with AS2436-1981 "Guide to Noise Control on Construction, Maintenance and Demolition sites".</p>
Management Strategies	<p>In the event that proposed access routes pass close to residential receptors, further noise assessments will be undertaken and the identification of additional mitigation measures. These measures will be incorporated into the Noise Management Plan. Should night-time construction proceed in these areas, validated noise monitoring will be carried out.</p> <p>Inform all personnel of the importance of minimising noise levels through an induction programme.</p> <p>Issue all site personnel with protective hearing equipment if required.</p> <p>Investigate methods of controlling noise and take actions to control noise if unacceptable noise levels occur. Control options include:</p> <ul style="list-style-type: none"> ■ Use of silencers ■ Use of exhaust mufflers ■ Repair, modification or replacement of a noisy item with a quieter item <p>Truck movements on the construction corridor and access tracks will take place during daylight hours where possible.</p> <p>Night traffic will be avoided but if in the event that no other option is viable access arrangements will be made with landowners and in accordance with local regulatory requirements.</p>
Monitoring	<p>Maintain and monitor the noise control strategies to determine effectiveness.</p> <p>Validated noise monitoring will be carried out should night-time construction be undertaken in areas close to residences.</p>
Reporting	Develop reporting procedures consistent with regulatory, local and project requirements.

■ **Table 12-7 Framework Traffic Management Plan**

Traffic Management Plan Format	
Management Issues	<p>Transportation options during construction will use roads, rail, ship or a combination of these. New access tracks will be required to provide access to the construction corridor and above ground facilities.</p> <p>Infrastructure work will be required along some roads to ensure that the existing roads are in a suitable condition for the movement of heavy vehicles.</p> <ul style="list-style-type: none"> ■ Infrastructure work will be required along some roads to ensure that the existing roads are in a suitable condition for the movement of heavy vehicles. ■ Excess levels of dust produced from heavy vehicle movement (refer to Table 12-5). ■ Increased noise levels (refer to Table 12-6). ■ Structural damage to municipal roads used as haul roads. ■ Threat to wildlife from increased vehicle movement.
Objective	To ensure site traffic is managed in such a way so as not to adversely impact on community, road users and sensitive habitats.
Targets	<p>No complaints received.</p> <p>Zero-incidents safety record.</p>
Management Strategies	<p>Inform all personnel of the site rules regarding traffic through an Induction Programme.</p> <p>Restrict heavy vehicles to travelling only on designated haul routes and ensure they are not loaded beyond legal limits.</p> <p>Ensure all loads are covered so that no material will accidentally fall off.</p> <p>Adhere to posted speed limit on site and along access roads and all project work areas.</p> <p>Truck movements on the construction corridor and access tracks will take place during daylight hours where possible.</p> <p>Night traffic will be avoided but if in the event that no other option is viable access arrangements will be made with landowners and in accordance with local regulatory requirements.</p> <p>The requirement for flags or escort pilot vehicles will be determined during construction. Appropriate licences and permits for the transport of large loads will be obtained prior to construction.</p> <p>Maintain road pavement condition at existing levels and arrange maintenance as necessary.</p> <p>Road use during the wet season will be in accordance with DIPE requirements.</p>
Monitoring	Monitor road pavement conditions for wear and tear and arrange maintenance as necessary.
Reporting	Develop reporting procedures consistent with regulatory, local and project requirements.

■ **Table 12-8 Framework Hydrotest Management Plan**

Hydrotesting Management Plan Format	
Management Issues	Hydrotesting of the pipeline will be undertaken as per AS2885. The key environmental issues are: <ul style="list-style-type: none"> ■ the use of chemicals; ■ potential impacts on flora/fauna; ■ change in water quality of watercourses; ■ erosion and discolouration.
Objective	To minimise any adverse impacts arising from the extraction and disposal of hydrotest water.
Targets	Abide by the provisions of: <ul style="list-style-type: none"> ■ <i>Water Act 1992</i>; ■ the Northern Territory <i>Waste Management and Pollution Control Act (1998)</i>; ■ the Northern Territory <i>Soil Conservation and Land Utilisation Act (1970)</i>.
Management Strategies	Hydrotest water will be sourced from approved sources (local bores, rivers and creeks). The exact methodology for hydrostatic testing will depend on water availability but may include transferring water from one section of the pipe to another to minimise the overall volume of water used. Hydrotest discharge options include: <ul style="list-style-type: none"> ■ discharge to the land ■ dust control ■ evaporation ponds ■ irrigation water
Monitoring	Before discharging to land, ensure that monitoring is undertaken to ensure : <ul style="list-style-type: none"> ■ the receiving ground is not prone to erosion. ■ the water flow does not lead into or adjacent to an existing watercourse. ■ the water does not soak into drainage areas for watercourses or bores used for domestic water supply. ■ the water is not discharged onto a site of significant flora/fauna. ■ all containment and erosion control measures are in place.
Reporting	Develop reporting procedures consistent with regulatory, local and project requirements.

■ **Table 12-9 Framework Vegetation Clearing Management Plan**

Vegetation Clearing Management Plan Format	
Management Issues	<p>Construction activities have the potential to negatively impact on terrestrial vegetation and flora by:</p> <ul style="list-style-type: none"> ■ removing or temporarily disturbing native vegetation; ■ disturbing native vegetation outside of approved work areas; ■ disturbing sensitive vegetation communities and habitats either directly or indirectly through off-site impacts; ■ introducing and/or spreading weed species .
Objectives	<p>To minimise the amount of vegetation that is permanently cleared.</p> <p>To prevent disturbance of vegetation and flora adjacent to work areas.</p> <p>To minimise off-site impacts on sensitive vegetation communities and habitats.</p> <p>To minimise and manage the introduction and spread of weeds.</p>
Targets	<p>No disturbance to vegetation outside of the approved construction corridor and other approved project work areas.</p> <p>No disturbance to sensitive vegetation communities such as monsoon rainforest, riparian forest and wetlands as defined during the construction corridor survey.</p> <p>No new weed species introduced to the project area.</p> <p>Spread of existing weeds in the project area controlled.</p> <p>Compliance with relevant legislation.</p>
Management Strategies	<p>Project design will avoid sensitive vegetation communities and habitats.</p> <p>The total area to be cleared will be restricted to the minimum area required to practicably construct the pipeline, above ground infrastructure, temporary construction sites and access tracks.</p> <p>Boundaries of the working area will be clearly marked on all construction drawings and physically flagged on the ground.</p> <p>The boundaries of the working area will be verified by an environmental officer prior to construction to ensure that sensitive vegetation communities and habitat are avoided as intended in the design.</p> <p>Vegetation will be cleared and rehabilitated progressively throughout construction to minimise the period that communities and habitats are disturbed.</p> <p>Areas required during construction for lay down, access roads, turning circles and sourcing of construction materials will be sited to avoid areas of environmental sensitivity.</p> <p>Sites selected for lay down, access roads, turning circles and sourcing of construction materials will be subject to an assessment by an environmental officer prior to use.</p> <p>Sensitive vegetation communities and habitats in proximity to working areas will be clearly marked and access to these areas will be prohibited.</p> <p>A 500 m buffer of undisturbed vegetation will be maintained around any wet rainforest communities encountered.</p> <p>HDD will be used to construct 12 of the major watercourse crossings in order to avoid impacts on sensitive vegetation communities and habitats.</p> <p>A Watercourse Crossing Construction Management Plan will be developed to provide site specific environmental management guidelines for construction of the pipeline and access tracks across watercourses and areas of saturated soils.</p> <p>Construction in the vicinity of watercourses will take place as early as possible in the dry season.</p> <p>Access for construction vehicles and machinery will be along access tracks that have been subject to environmental clearance and the construction corridor only.</p> <p>Disturbance of watercourse banks and riparian corridors along the construction corridor will be minimised by using access tracks to cross at existing formed crossing locations, where practicable.</p>

Vegetation Clearing Management Plan Format	
	<p>Watercourse crossings along access tracks and the construction corridor will be constructed to protect entry and exit points and to minimise long-term disturbance and erosion of the banks.</p> <p>Disturbance of the riparian corridor of the Latram River will be prohibited to avoid disturbing habitat of the threatened plant species <i>Pternandra coerulescens</i>.</p> <p>Stands and individual Northern Cypress Pine <i>Callitris intratropica</i> trees will be preserved.</p> <p>Landowners will be consulted about the potential for salvage of commercially valuable Cycad species that will otherwise be destroyed during construction.</p> <p>Construction and operational staff will attend environmental inductions and training to make them aware of their environmental obligations.</p> <p>A Rehabilitation Management Plan will be developed (Table 12-13).</p> <p>An Exotic Species and Weed Management Plan will be developed (Table 12-12).</p> <p>A Fire Management Plan will be developed (Table 12-14).</p>
Monitoring	<p>Visual and photo monitoring of vegetation disturbance adjacent to the working areas and in environmentally sensitive areas will be undertaken during construction.</p> <p>Rehabilitation progress will be monitored in accordance with a Rehabilitation Management Plan.</p> <p>Environmentally sensitive areas that are disturbed during construction, such as watercourse crossings and areas of saturated soils, will be monitored to ensure adequate reinstatement and rehabilitation.</p>
Reporting	<p>Reporting procedures consistent with regulatory, local and project requirements will be developed.</p> <p>Unauthorised clearing or disturbance of vegetation will be reported to the Office of Environment and Heritage.</p> <p>Reports on monitoring and incidents will be retained for inspection by the statutory authority.</p>

■ **Table 12-10 Framework Terrestrial and Aquatic Fauna Management Plan**

Terrestrial and Aquatic Fauna Management Plan Format	
Management Issues	<p>Construction activities have the potential to impact on terrestrial and aquatic fauna by:</p> <ul style="list-style-type: none"> ■ increasing activity levels, vehicle movement, noise and dust; ■ habitat removal and fragmentation; ■ disturbance of sensitive monsoon vine forest, riparian, aquatic and wetland habitats; ■ spread of feral animals; ■ capture in open excavations; ■ introduction and spread of exotic fauna species and fish diseases.
Objective	<p>To minimise impacts on terrestrial and aquatic fauna and habitats.</p> <p>To prevent off-site impacts on fauna and habitats.</p> <p>To prevent long term impacts on sensitive fauna habitats inside and outside the project area.</p> <p>To minimise death of fauna as a result of capture in open excavations.</p> <p>To prevent impacts on threatened species.</p> <p>To prevent the spread of exotic fauna species and fish disease.</p>
Targets	<p>No disturbance of habitats outside of the approved working areas.</p> <p>No long-term impacts on sensitive fauna habitats.</p> <p>Acceptable small numbers of animal deaths due to capture in open trench.</p> <p>No translocation of fishes and other aquatic organisms.</p> <p>No increase in the numbers of feral animals or pest species.</p> <p>Compliance with relevant legislation.</p>
Management Strategies	<p>Project design will avoid sensitive fauna habitats and known habitats of threatened species.</p> <p>The total area of habitat to be cleared will be restricted to the minimum area required to construct the pipeline, above ground infrastructure, temporary construction sites and access tracks.</p> <p>Boundaries of the working area will be clearly marked on all construction drawings and physically flagged on the ground.</p> <p>The boundaries of the working area will be verified by an environmental officer prior to construction to ensure that sensitive fauna habitats are avoided as intended in the design.</p> <p>Construction activities involving excavations will be restricted to the 'dry season' as much as possible to avoid the times of year when fauna are most active.</p> <p>Construction activities in the vicinity of sensitive fauna habitats at watercourse crossings and along the access routes will be prioritised for as early as possible in the dry season.</p> <p>Vegetation will be cleared and rehabilitated progressively throughout construction to minimise the period that habitats are disturbed.</p> <p>Areas required during construction for lay down, access roads, turning circles and sourcing of construction materials will be sited to avoid sensitive habitats such as monsoon rainforest, riparian forests, wetlands and habitats of threatened species.</p> <p>Sites selected for lay down, access roads, turning circles and sourcing of construction materials will be subject to an assessment by an environmental officer prior to use.</p> <p>Sensitive fauna habitats in proximity to working areas will be clearly marked and access to these areas will be prohibited.</p> <p>HDD will be used to construct 12 of the major watercourse crossings in order to avoid impacts on aquatic and riparian fauna habitats.</p>

Terrestrial and Aquatic Fauna Management Plan Format	
	<p>A Watercourse Crossing Construction Management Plan will be developed to provide site specific environmental management guidelines for construction of the pipeline and access tracks across watercourses and areas of saturated soils.</p> <p>Clearing of large trees at watercourse crossings will be avoided where possible.</p> <p>Access for construction vehicles and machinery will be along access tracks that have been subject to environmental clearance and the 30 m construction corridor only.</p> <p>Disturbance of watercourse banks and riparian corridors along the construction corridor will be minimised by using access tracks to cross at existing formed crossing locations.</p> <p>Watercourse crossings along access tracks and the construction corridor will be constructed to protect entry and exit points and to minimise long-term disturbance and erosion and sedimentation of the watercourse.</p> <p>Temporary watercourse crossing and damming structures will be removed as soon as they are no longer essential for construction or operation.</p> <p>No surface water will be extracted and released into a different catchment unless appropriate sterilisation is undertaken.</p> <p>Machinery used in instream watercourse crossing construction will be washed down prior to use in other waterbodies to prevent translocation of biota and disease.</p> <p>Disturbance of the riparian corridor of the Latram River, Giddy River and Cato River will be prohibited to avoid impacts on the habitat of the threatened Wood Frog <i>Rana daemeli</i>.</p> <p>A 500 m buffer of undisturbed vegetation will be maintained around <i>Eucalyptus tintinnans</i> woodlands that occur on the rocky hills around the Chambers River where the threatened Gouldian Finch <i>Erythrura gouldiae</i> has been recorded.</p> <p>In the event that a nest of the 'threatened' Red Goshawk <i>Erythrotriorchis radiatus</i> is encountered measures will be put in place to minimise disturbance of the nesting tree.</p> <p>Clearing of large mature fruiting trees such as <i>Ficus virens</i>, <i>Terminalia microcarpa</i>, <i>Syzygium nervosum</i> and <i>Canarium australianum</i> that provide food resources and act as stepping stones between habitats will be avoided.</p> <p>The time between opening and closing the pipeline trench will be the shortest time possible for construction.</p> <p>The open trench will be interrupted with frequent escape ramps for captured fauna.</p> <p>Open trenches will be inspected on a daily basis, and fauna identified and released; dead fauna will be preserved and deposited with the NT museum.</p> <p>Construction and operational staff will attend environmental inductions and training to make them aware of their environmental obligations.</p> <p>A Rehabilitation Management Plan will be developed (Table 12-13).</p> <p>An Exotic Species and Weed Management Plan will be developed (Table 12-12).</p> <p>A Fire Management Plan will be developed (Table 12-14).</p>
Monitoring	<p>Monitoring of habitat disturbance in and adjacent to the working areas will be undertaken for the duration of construction.</p> <p>Watercourse crossings along the construction corridor and access tracks will be frequently inspected to ensure that fish passage is maintained.</p> <p>Excavations will be regularly inspected by an experienced wildlife handler while open.</p> <p>Weeds and feral animals will be monitored in accordance with an Exotic Species and Weed Management Plan (Table 12-12).</p>

Terrestrial and Aquatic Fauna Management Plan Format	
Reporting	<p>Reporting procedures consistent with regulatory, local and project requirements will be developed.</p> <p>Unauthorised clearing or disturbance of habitats will be reported to the statutory authority.</p> <p>Sightings of 'threatened' species will be reported to the statutory authority.</p> <p>Fauna data from open trench inspections will be collated and reported to NT Parks and Wildlife Service in accordance with a Permit to Take Wildlife for Commercial Purposes.</p> <p>Reports on monitoring and incidents will be retained for inspection by the statutory authority.</p>

■ **Table 12-11 Framework Biting Insects Management Plan**

Biting Insects Management Plan Format	
Management Issues	<p>The construction and operation workforces will be exposed to biting insects, especially where work areas are located within a few kilometres from extensive seasonally flooded vegetated swamps, poorly draining grasslands and floodways, creeks and rivers, and tidal areas. Biting insects in general are a nuisance and mosquitoes can carry diseases that can cause serious health problems.</p> <p>Construction activities could potentially create new breeding habitats for biting insects in the absence of appropriate rehabilitation and ongoing management and maintenance. If new breeding habitats are created nuisance and disease could become a problem for operational workforces and local communities near to the project area.</p>
Objective	<p>To minimise the impacts of biting insects on the construction workforce.</p> <p>To prevent the creation of biting insects breeding sites.</p>
Targets	<p>Minimal impacts from biting insects on the construction workforce.</p> <p>No biting insect breeding sites created during construction.</p> <p>Compliance with relevant legislation.</p>
Management Strategies	<p>All project personnel will be advised at induction of the biting midge and mosquito pest disease problems that they may be exposed to and where the key risk areas are.</p> <p>All personnel will be required to use personal protection measures such as the use of protective clothing, repellents, and to avoid areas of high biting insect activity.</p> <p>All personnel will be advised at induction of the potential mosquito borne diseases that may be carried by mosquitoes that are likely to inhabit work areas and the symptoms of these diseases.</p> <p>Areas around construction camps and high biting insect risk areas where personnel will be working for extended periods will be sprayed with bifenthrin to control adult biting midges.</p> <p>If tented accommodation is necessary, tents will be well screened and impregnated with permethrin or sprayed with bifenthrin to control biting insects.</p> <p>Personnel clothing will be impregnated with bifenthrin if serious biting insect problems are encountered.</p> <p>Construction, reinstatement and rehabilitation will be undertaken to ensure that there is no impoundment of natural drainage or water pooling that can create new biting insect breeding sites, especially near to Port Keats (Wadeye), Palumpa, Dorisvale, Florina, Manbulloo, Katherine, Tindal, Bamyili, Beswick, Bulman and Nhulunbuy population centres and in seasonally flooded areas.</p> <p>Excess spoil from trench digging will be stored appropriately to prevent the impoundment of water.</p> <p>No new borrow pits will be located within 5km of human inhabited areas.</p> <p>Existing borrow pits that are used during construction will be made free draining.</p> <p>Culverts along the construction corridor and access tracks will be of sufficient size to prevent the upstream pooling of water for periods greater than five days.</p> <p>Artificial receptacles such as used tyres, buckets, machinery and any type of receptacle capable of holding water will be stored in a manner that ensures breeding sites for exotic dengue carrying mosquito species are not created.</p> <p>Any artificial receptacle sourced from North Queensland or Tennant Creek will be treated with a chlorine solution to kill any mosquito eggs that may be present.</p>

Biting Insects Management Plan Format	
Monitoring	<p>Personnel will be required to notify a nominated officer of any biting insect problem areas encountered so that the Medical Entomology Branch of NT Health Services can be consulted about appropriate mitigation measures for immediate implementation.</p> <p>Prior to the onset of the wet season following construction all work areas will be inspected to ensure that they have been adequately reinstated to prevent the exacerbation of mosquito breeding or creation of new mosquito breeding sites.</p> <p>The Medical Entomology Branch will be requested to inspect work areas close to human populated areas within one year following construction to ensure that no biting insect breeding habitats have been created.</p> <p>All personnel will be screened for mosquito borne diseases and any person suspected of having a mosquito borne disease will be taken to the nearest health centre for appropriate treatment and advice.</p>
Reporting	<p>Reporting procedures consistent with regulatory, local and project requirements will be developed.</p> <p>Cases of people infected with mosquito borne diseases will be immediately reported to the Medical Entomology Branch.</p> <p>Reports on monitoring and incidents will be retained for inspection by the statutory authority.</p>

■ **Table 12-12 Framework Exotic Species and Weed Management Plan**

Exotic Species and Weed Management Plan Format	
Management Issues	<p>The use of earthmoving equipment, vehicles, and construction materials and fill, sourced from elsewhere in the region, Australia and overseas, has the potential to introduce weeds and exotic fauna species that currently do not occur in the area.</p> <p>Vegetation clearing and soil disturbance creates conditions of maximum suitability for the establishment and spread of weed species. Once weed species become established they compete with native vegetation and they may adversely affect landuse by causing injury to animals and invading pastures.</p> <p>Cane Toads and Crazy Ants are exotic species present in the eastern section of the construction corridor but not in the west. Construction activity could assist the spread of these species which are known to negatively impact on native fauna.</p>
Objective	<p>To prevent the introduction and spread of weed species.</p> <p>To prevent the spread of fauna pests.</p>
Targets	<p>No new weed species introduced into the project area.</p> <p>No spread of existing weed species into new areas.</p> <p>No Cane Toads or Crazy Ants transported in construction vehicles and equipment.</p> <p>New weed infestations identified, reported and treated in a timely manner.</p> <p>Compliance with relevant legislation.</p>
Management Strategies	<p>Existing weed infestations will be identified and treated prior to construction.</p> <p>The locations of all work areas, including borrow pits and lay down areas, will be accurately recorded so that they can be monitored for weed infestations post construction.</p> <p>Plant, vehicles, equipment and materials will be required to be certified weed and pest free prior to being brought into the project area.</p> <p>Construction materials will be certified 'weed free' by the suppliers before being taken into the project area.</p> <p>Washdown pads will be constructed at locations in priority weed management areas and vehicles, plant and construction components and materials will be washed down and inspected prior to entering the project area if not already certified pest-free.</p> <p>Washdown wastewater will be collected and disposed of in a manner approved by the regulatory authority.</p> <p>Weed washdown locations used during the design phase of the project will be monitored for weed establishment.</p> <p>Construction and operation workforces will be trained in weed, Cane Toad and Crazy Ant identification and awareness.</p> <p>Systems will be established for reporting of new weed infestations, and Cane Toad and Crazy Ant sightings.</p> <p>Rehabilitation and landscaping will be undertaken in accordance with a Rehabilitation Management Plan, which will specify that only native vegetation species will be used (Table 12-13).</p> <p>Domestic animals will not be permitted in the project area.</p>
Monitoring	<p>A weed monitoring and treatment program will be implemented prior to the commencement of construction and will continue for the duration of construction and operation. The program will identify appropriate treatment and control techniques for all weed species encountered in the project area.</p> <p>Regular inspections of vehicles, equipment, construction materials and fill will be undertaken to monitor the success of washdown and other preventative measures.</p>

Exotic Species and Weed Management Plan Format**Reporting**

Reporting procedures consistent with regulatory, local and project requirements will be developed.

Infestations of 'declared' weed species in project work areas will be reported to the statutory authority.

Sightings of Cane Toads outside of their current known distribution will be reported to the regulatory authority.

Any sightings of Crazy Ant colonies will be reported to the regulatory authority.

Reports on monitoring and incidents will be retained for inspection by the statutory authority.

■ **Table 12-13 Framework Rehabilitation Management Plan**

Rehabilitation Management Plan Format	
Management Issues	Effective rapid rehabilitation strategies are required to stabilise and restore the land following construction activities so that environmental impacts such as erosion and establishment of weed species are prevented.
Objective	To maximise rehabilitation success.
Targets	Rehabilitation undertaken progressively immediately following completion of construction in an area. Disturbed areas adequately stabilised prior to the wet season. Rehabilitation works proven to be successful following the wet season. No new weed species introduced into the project area.
Management Strategies	A site specific rehabilitation strategy will be developed in consultation with stakeholders and experts in rehabilitation in tropical environments prior to the commencement of construction activities. The strategy will include a rehabilitation timetable and rehabilitation methods proposed for each aspect of the project. Vegetative matter and topsoil cleared from the working areas will be stockpiled separately in discontinuous stockpiles for use in rehabilitation. Soil excavated from the trench will be stockpiled along the trench and returned to the trench after the pipe is laid. The soil will be compacted to a density reflecting natural soil density in 30 cm lifts. The top of the trench will be levelled to natural surface levels to avoid any channelling or windrow effects. Rehabilitation will be staged so that recently constructed areas are rehabilitated as soon as practicable. Only species of flora that naturally occur in the region will be used in rehabilitation. If re-seeding is required in some areas, seed for use in rehabilitation will be collected locally where possible. Limited mulching and hydro-seeding may be applied in specifically sensitive or difficult to manage areas. All windrows and stockpiles will be removed and rehabilitated to the natural surface levels. Erosion control works will be maintained and repaired for the operational life of the project. Remedial works will be implemented where necessary until rehabilitation targets are achieved.
Monitoring	Rehabilitation works will be monitored monthly following completion of construction activities until rehabilitation targets are achieved.
Reporting	Reporting procedures consistent with regulatory, local and project requirements will be developed. Reports on monitoring and incidents will be retained for inspection by the statutory authority. Infestations of 'declared' weed species in project work areas will be reported to the regulatory authority.

■ **Table 12-14 Framework Fire Management Plan**

Fire Management Plan Format	
Management Issues	<p>There will be an increased risk of fire during the construction phase. Potential fire ignition sources include:</p> <ul style="list-style-type: none"> ■ vehicle and plant exhausts; ■ sparks from contact with rock; ■ cooking or camp fires and cigarettes; ■ deliberate ignition. <p>The integrity of the vegetation in and surrounding the project area could be diminished by more frequent fires, especially if they affect fire sensitive habitats such as monsoon rainforests.</p> <p>Reduction of grassy fuels through planned fires will be required to some extent to ensure that wildfires do not burn assets and threaten life and property.</p>
Objective	<p>To prevent uncontrolled fires igniting in the project area.</p> <p>To minimise the potential impacts of fire on the surrounding environment.</p>
Targets	<p>No fires ignited by construction activities.</p> <p>Fire breaks and controlled burns implemented in accordance with advice from the NT Bushfires Council.</p> <p>Compliance with relevant legislation.</p>
Management Strategies	<p>Fires will be lit to remove the grassy fuels along sections of the pipeline route prior to works commencing, especially where exotic weed grasses occur, and where monsoon vine forests and riparian forests occur.</p> <p>Construction workforce will be trained in fire awareness, prevention and safety.</p> <p>A fire fighting unit and persons trained in fire response will be readily available at all locations and at all times during construction.</p> <p>Spark arrestors will be fitted to all earthmoving equipment.</p> <p>Cooking and camp fires outside the approved camp boundaries will be prohibited.</p> <p>Stockpiles of vegetation which cannot be used in rehabilitation will be burnt onsite by personnel trained in controlled burning.</p> <p>An Emergency Response Plan will be developed and implemented.</p> <p>A Weed Management Plan, incorporating weed monitoring and control, will be developed and implemented prior to construction (Table 12-12).</p> <p>Fire breaks will be maintained around above ground facilities.</p> <p>Operational personnel will be trained in emergency fire response.</p>
Monitoring	<p>Review feedback from traditional Aboriginal owners and Bushfires Council.</p>
Reporting	<p>Reporting procedures consistent with regulatory, local and project requirements will be developed.</p> <p>All incidences of uncontrolled fires ignited by construction activities will be reported to the regulatory authority.</p> <p>Reports on monitoring and incidents will be retained for inspection by the statutory authority.</p>

■ **Table 12-15 Framework Erosion and Sediment Control Management Plan (ESCP)**

Erosion Management Plan Format	
Management Issues	<p>Removal of vegetation and disturbance of soils during construction will expose the underlying soils and can lead to:</p> <ul style="list-style-type: none"> ■ Soil loss via wind or water erosion. ■ Loss of topsoil and sub-soils. ■ Increase in sediment load to watercourses with associated impacts on aquatic life. ■ Reduced rehabilitation success. ■ Long term instability of disturbed areas. ■ The requirement for costly rectification measures. <p>At watercourse crossings the removal of vegetation and construction of vehicle crossings may cause scouring of the stream bed and erosion if the outlet or downstream is inadequately protected.</p>
Objective	<p>To minimise soil disturbance, degradation and erosion.</p> <p>To minimise turbidity impacts on surface and ground waters.</p> <p>To optimise rehabilitation success.</p> <p>To minimise the potential for soil erosion to occur in the long-term during and post operation.</p>
Targets	<ul style="list-style-type: none"> ■ No accelerated erosion during and post construction. ■ Cleared areas stabilised and erosion control structures in place prior to significant rain events. ■ Erosion control structures adequately maintained for the duration of construction and operation. ■ All sediment contained within the work areas and no visible increase in the turbidity of downstream surface waters during construction. ■ Topsoil and vegetation matter reused in rehabilitation and landscaping. ■ Erosion identified and mitigated in a timely manner for the duration of construction and operation. ■ Compliance with relevant legislation.
Management Strategies	<ul style="list-style-type: none"> ■ The total area to be disturbed will be restricted to the minimum area required to construct the pipeline and above ground facilities. ■ A detailed ESCP will be developed in accordance with established guidelines for the control of erosion at construction sites (refer to: Sedman 2000; Witheridge and Walker 1996; Hadden 1993). ■ An ESCP will identify site specific construction techniques, management requirements and guidelines for erosion and sediment control for all areas disturbed during construction. ■ Twelve major watercourses will be crossed using HDD. ■ Watercourse crossings on the corridor and access tracks will be sited and constructed in accordance with accepted engineering standards and environmental protection guidelines to minimise downstream impacts. ■ Construction activities involving significant land disturbance will be confined to the 'dry' season. ■ Vegetation will be cleared and rehabilitated progressively throughout construction to minimise the period that bare soil is left exposed to erosion.

Erosion Management Plan Format	
	<ul style="list-style-type: none"> ■ Vegetation will be stockpiled in discontinuous stockpiles and will be re-used to stabilise and rehabilitate work areas. ■ Topsoil will be stripped and stockpiled in stabilised piles less than 1.5 m high and will be reused in rehabilitation and landscaping. ■ Sediment traps, level sills, and silt fences will be installed and maintained to minimise soil loss from the working areas, diversion banks and roll-over banks. ■ Sediment control fences will be installed and maintained at all rivers, creeks and watercourses to prevent silt entering waterways. ■ Temporary drains and banks, stabilised to prevent erosion in areas of high water flows, will be installed where required to control surface runoff. ■ Cross banks (roll-over banks) of down-hill slopes less than 0.5% and wider than two metres will be installed across slopes to prevent down-slope runoff. ■ Cross banks will be installed near the foot of slope of all tracks and roads to divert water and sediment to sills or sediment fences adjacent to the tracks. ■ Drains will be constructed with broad flat bottoms, not v-shaped. ■ All sediment control measures will be re-constructed after construction and commissioning to restore their effectiveness prior to the following wet season. ■ Water trucks and other dust suppression and erosion mitigation measures will be implemented to stabilise soils subject to heavy construction traffic. ■ Access tracks will be stabilised and temporary watercourse crossings removed prior to the onset of the wet season following construction. ■ A storm water and drainage management system will be developed and implemented for all above ground facilities and temporary construction sites.
Monitoring	<p>Monitoring of erosion will be undertaken regularly for the duration of construction and operation. During construction and commissioning particular attention will be paid to soil and vegetation stockpiles and watercourse crossings. During operation particular attention will be paid to areas with high erodibility potential, watercourse crossings and access tracks.</p> <p>Rehabilitation progress will be monitored until areas are adequately stabilised and follow-up monitoring of rehabilitation success will be undertaken after the first wet season following construction.</p>
Reporting	<p>Reporting procedures consistent with regulatory, local and project requirements will be developed.</p> <p>Reports on monitoring and incidents will be retained for inspection by the statutory authority.</p>

■ **Table 12-16 Framework Groundwater and Surface Water Protection Management Plan**

Groundwater and Surface Water Protection Management Plan Format	
Management Issues	<p>Impacts on surface water and groundwater resources may occur as a result of:</p> <ul style="list-style-type: none"> ■ disturbance of vegetation and soils during construction; ■ leakage or spillage from fuel and chemical storage, handling and distribution systems during construction and operation; ■ disposal of sewage and greywater from construction camps; ■ disposal of hydrotest water during commissioning; ■ disturbance of acid sulfate soils; ■ water extraction for use during construction. <p>Contamination of water resources with sediments, hydrocarbons and other chemicals, and/or over extraction may:</p> <ul style="list-style-type: none"> ■ cause changes to the species composition and abundance of aquatic flora and fauna; ■ cause the death of aquatic flora and fauna; ■ cause a decline in health of wetland ecosystems and other groundwater dependent systems; ■ make water unsuitable for consumption by humans and animals.
Objective	<ul style="list-style-type: none"> ■ To maintain the existing quality of water resources. ■ To minimise the potential for water contamination and over extraction. ■ To prevent cross catchment transfer of water. ■ To minimise the potential for excessive aquifer drawdown.
Targets	<ul style="list-style-type: none"> ■ No measurable changes to downstream water quality during construction and operation. ■ No excessive drawdown of aquifers or over extraction of surface waters as a result of water extraction. ■ Compliance with relevant legislation.
Management Strategies	<ul style="list-style-type: none"> ■ An Erosion and Sediment Control Plan will be developed and implemented – Table 12-15. ■ Baseline groundwater and surface water monitoring will be undertaken at selected environmentally sensitive sites over a full seasonal cycle prior to construction. ■ A Hazardous Materials Register detailing the location and quantities of hazardous substances including their storage, use and disposal will be developed and maintained for construction and operation. ■ Fuel and chemical storage, handling and distribution systems will be designed and constructed in accordance with Australian Standards, and will be fitted with leak detection systems. ■ Fuel and chemical storage will be above ground and will be located an appropriate distance from surface waters and high quality groundwater resources. ■ Construction vehicles, plant and machinery will be adequately maintained to minimise the potential for leaks.

Groundwater and Surface Water Protection Management Plan Format	
	<ul style="list-style-type: none"> ■ Frequent visual inspections of fuel and chemical storage, handling and distribution systems, and areas where vehicles, plant and machinery are stored, will be undertaken to identify and fix leaks. ■ All construction and operation personnel will be trained in safe work practices for handling of hazardous substances, and in spill clean up procedures. ■ A Spill Contingency Plan will be developed and implemented. ■ Above ground facilities will be frequently inspected to identify corrosion and leaks, and maintained where necessary. ■ A Watercourse Crossing Construction Management Plan will be developed to provide site specific environmental management guidelines for design and construction of the pipeline and access tracks across watercourses and areas of saturated soils. ■ No water will be extracted from a surface water body for any purpose prior to an assessment of the potential environmental impacts of the amount of water that will be extracted. ■ No water used for any purpose during construction, commissioning or operation will be released directly to a water body. ■ Construction and maintenance works at watercourses will be confined to the dry season. ■ Hydrotest water will be disposed of by ground application in a stable environment following treatment to remove contaminants. ■ Locations for the disposal of hydrotest water will be assessed for suitability by an environmental officer and will be subject to approval by the statutory authority prior to use. ■ An Acid Sulfate Soils Management Plan will be developed and implemented. ■ A Waste Management Plan will be developed and implemented – Table 12-2. ■ Sewage and greywater from construction camps will be disposed of in accordance with relevant environment and health guidelines, and statutory requirements. ■ Waste water treatment and disposal systems will be located 100 m away from production bores, or 400 m in areas with high groundwater sensitivity. ■ Site drainage systems at above ground facilities will be designed to separate potentially contaminated stormwater for treatment and disposal. ■ A decommissioning and rehabilitation plan will be developed in consultation with all stakeholder groups and in accordance with statutory requirements. <p>A Spill Contingency Plan will be developed and implemented (Table 12-19).</p>

Groundwater and Surface Water Protection Management Plan Format	
Monitoring	A water monitoring programme will be developed and implemented based on the ANZECC 2000 guidelines to provide information about environmental performance and hydrological impacts during construction and operation.
Reporting	<ul style="list-style-type: none">■ Reporting procedures consistent with regulatory, local and project requirements will be developed.■ Reports on monitoring and incidents will be retained for inspection by the statutory authority.

■ **Table 12-17 Framework Cultural Heritage Management Plan (CHMP)**

Cultural Heritage Management Plan Format	
Management Issues	<p>Potential loss or impairment of existing cultural environment through:</p> <ul style="list-style-type: none"> ■ Inappropriate management and mitigation to protect known archaeological and heritage sites. ■ Disturbance to previously unrecorded archaeological and heritage sites and sub-surface archaeological materials. ■ Inadvertent disturbance and destruction of unrecorded sacred sites or sites of significance during construction. ■ Disturbance and destruction of areas of current traditional usage through construction. ■ Disturbance of environments and species that are of cultural significance at all areas of project land disturbance. ■ Disturbance to previously unrecorded sites and sub-surface archaeological materials at all areas of project land disturbance. ■ Unauthorised / inadvertent intrusion into restricted areas (sacred sites) during construction by construction workforce. ■ Unauthorised / inadvertent disturbance of cultural heritage sacred sites or objects during construction by construction workforce. ■ Unauthorised / inadvertent disregard for cultural difference and sensitivity during construction by construction workforce. ■ Inadvertent intrusion into cultural knowledge and practices associated with environments and species.
Objective	<p>To avoid all recorded sacred sites, sites of significance, cultural heritage sites and sacred objects.</p> <p>To manage the impact of any inadvertent disturbance to unrecorded sacred sites or sites of significance during construction in a way that minimises impact and allows for an appropriate level of scientific research and salvage of archaeological material.</p> <p>To manage the disturbance of areas of current traditional usage and protect these areas from unnecessary disturbance.</p> <p>To manage the disturbance of environments and species that are of cultural significance.</p> <p>To mitigate the impact of inadvertent disturbance of unrecorded sites and sub-surface archaeological material.</p> <p>To comply with the <i>Heritage Conservation Act 1991</i> and Northern Territory <i>Aboriginal Sacred Sites Act 1978</i> in relation to disturbance of cultural heritage sacred sites or objects.</p> <p>To manage the impact of construction workforce on the social and cultural environment.</p>
Targets	<p>No non-compliance with relevant legislation during all phases of the project.</p> <p>No instances of disturbance / inadvertent intrusion to cultural heritage sacred sites and objects, areas of cultural significance, unrecorded sites and archaeological material.</p> <p>No instances of disregard or insensitivity of cultural difference that may negatively impact the social and cultural environment.</p>

Cultural Heritage Management Plan Format	
Management Strategies	<p>A detailed Cultural Heritage Management Plan (CHMP) will be developed.</p> <p>Archaeological surveys will be undertaken during pegging of all project work areas where preliminary surveys and desktop reviews have predicted a high archaeological potential.</p> <p>Archaeological sites with moderate to high significance that occur within 150 m of project areas will be afforded appropriate protection from disturbance during construction.</p> <p>Archaeological sites with moderate to high significance that cannot be afforded protection will be dealt with in accordance with the requirements of the statutory authority.</p> <p>Consent to disturb sites of low archaeological significance that occur in the project area will be sought from the statutory authority.</p> <p>Where the pipeline traverses the Northern Australian Railway heritage site the construction corridor will be fenced and access outside of the corridor will be prohibited.</p> <p>Mitigation and reporting measures will be developed in the CHMP to deal with any inadvertent disturbance of previously unrecorded sites and subsurface archaeological materials.</p> <p>Disturbance of areas of current traditional usage during construction will be kept to a minimum.</p> <p>Archaeologists to monitor ground disturbance associated with installing the pipeline and other relevant earth disturbing phases of construction (clear, grade and trenching), in accordance with legislation and final agreement with NLC and traditional Aboriginal owners.</p> <p>The construction corridor will be stabilised and restored in a manner that will prevent erosion.</p> <p>Mitigation and reporting measures will be developed in the CHMP to deal with any inadvertent disturbance of previously unrecorded sites and subsurface archaeological materials.</p> <p>Construction and operations workforce will be thoroughly briefed on restricted areas, and rules and disciplinary measures will apply where breaches occur.</p> <p>Construction workforce will undertake cross-cultural awareness training to minimise the likelihood of inadvertent disregard for cultural difference and sensitivities.</p>
Monitoring	<p>Monitoring of the CHMP will be undertaken against key performance indicators identified in the CHMP.</p> <p>Monitoring of effectiveness of stabilisation of erosion control along the pipeline will be undertaken during construction and operations.</p> <p>Monitoring of the activities and impact of the construction workforce on the social and cultural environment will be undertaken during construction and operations through the processes established in the social impact management plan (SIMP).</p>
Reporting	<p>The results of the archaeological surveys will be reported to the regulatory authority prior to construction.</p> <p>Archaeological findings during construction will be reported to the regulatory authority in accordance with reporting and mitigation measures identified in the CHMP.</p> <p>Reporting requirements will be identified in the CHMP and the SIMP.</p>

■ **Table 12-18 Social Impact Management Plan (SIMP)**

Social Impact Management Plan (SIMP) Format	
Management Issues	<p>Potential impact on communities affected by the TTP through the following (summarised) issues:</p> <ul style="list-style-type: none"> ■ Lack of understanding of the TTP. ■ Language barriers. ■ The appropriate methodology for consultations/community education sessions. ■ Unrealistic expectation of benefits to be delivered by the project. ■ Methodology and timing to communicate more specific information. ■ Expectations, capacity and take-up of potential employment and training opportunities. ■ Expectations, capacity and take-up of potential business development/contracting opportunities. ■ List of concerns expressed by interviewees during the course of the TTP SIA consultations. ■ Community interaction with non-Indigenous workforce(s). ■ Impact of construction workforce. ■ Potential for community to react violently to a serious negative social impact event. ■ Alcohol and drug issues. ■ Security services and communication/interaction with local police. ■ Level of female employment in construction workforce. ■ Access of construction workforce to recreational areas and town. ■ Granting of favours. ■ Wider affected Aboriginal community views about project. ■ Distribution of land agreement benefits. ■ Impacts of possible upgrades to roads and increased traffic. ■ Capacity of the community to respond to change. ■ Ongoing monitoring of social impacts.
Objective	To mitigate or avoid any negative impacts and optimise any positive impacts through an effective SIMP.
Targets	<p>Successful implementation of the SIMP.</p> <p>No instances of serious negative social impact events.</p> <p>Close and harmonious relationships between key local stakeholders and the Project.</p> <p>Exceeded Key Performance Indicators (KPIs) in social impact strategies.</p>
Management Strategies	<p>Phase 2 SI Management Planning</p> <ul style="list-style-type: none"> ■ Immediate commencement of a communications campaign throughout the central and eastern regions affected by the TTP, in particular at Katherine and Nhulunbuy. ■ Consultation with key stakeholders including (but not limited to) Community Government Councils, relevant Territory and Commonwealth agencies and the NLC. ■ Conduct of an independently facilitated workshop in Katherine and Nhulunbuy to receive presentations on the SIA Report and to discuss and formulate potential mitigation / optimisation strategies. ■ Development of final SIMP, including negotiations with key contributors and participants. ■ SIMP in place and ready for implementation by Project Final Investment Decision (FID).

Social Impact Management Plan (SIMP) Format	
	<p>Phase 3: SI Management Plan Implementation</p> <ul style="list-style-type: none"> ■ Progressive increase in development and implementation as the Project moves toward FID. ■ Full implementation during construction and operations phases of the Project. <p>It is expected that the SIMP may include the following type of strategies:</p> <ul style="list-style-type: none"> – Project communications; – Cross-cultural exchange/awareness; – Cultural heritage management; – Indigenous training and employment; – Indigenous business development; – Community/project protection; – Traffic management; – Community partnerships.
Monitoring	<p>Monitoring of the implementation of the SIMP will be undertaken against Key Performance Indicators contained in the Plan.</p> <p>Monitoring of the SIMP will be an ongoing and intensive process during the construction phase of the Project.</p> <p>During the operations phase of the project it is expected that monitoring activity will reduce to the level manageable within normal day to day relationships between key local stakeholders and the Project.</p>
Reporting	<p>Consultation about the performance against Key Performance Indicators (KPIs) in the SIMP will be held with key local stakeholders on an annual basis.</p>

■ **Table 12-19 Spill Contingency Plan**

Spill Contingency Plan Format	
Management Issues	<p>Spills can occur during transport or refuelling accidents or due to poor packaging, rupturing of tanks, improper handling or use of construction materials and accidents.</p> <p>Spills of oil and hazardous materials have the potential to contaminate land, surface and groundwater.</p>
Objective	<p>To reduce the risk of accidental spills occurring and ensure effective management measures are deployed in the event of a spill.</p>
Management Strategies	<p>Construction crew will be trained in fuel handling and how to effectively contain and clean up spills.</p> <p>Spill clean up kits will be available onsite, at every watercourse crossing and where fuel and hazardous materials are used and stored.</p> <p>The volume of chemicals and hydrocarbons that will be stored on site will be minimised.</p> <p>Camp laydown areas will be used for the storage of hazardous materials and equipment.</p> <p>All fuel and hazardous materials will be handled and stored in bunded areas in accordance with the corresponding Materials Safety Data Sheets (MSDS) and Australian Standards.</p> <p>Fuelling equipment will be located at least >40 m away from watercourses.</p> <p>Each construction site will have an approved emergency plan to deal with accidental spills.</p> <p>Repair leaks in tanks immediately upon discovery.</p> <p>Signs will be installed identifying restricted fuelling areas.</p> <p>Fuel nozzles will be equipped with shut-off valves and drip trays provided.</p>
Monitoring	<p>Conduct routine equipment maintenance.</p> <p>Each construction crew will be provided with adequate absorbent materials and spill kits at hand to clean up any small spills.</p> <p>Materials onsite with Material Safety Data Sheets.</p>
Reporting	<ul style="list-style-type: none"> ■ Records of all spill events. ■ Emergency spill plan will be developed and kept up-to-date. ■ Monthly reporting of spill events, near miss events, corrective actions and auditing.

■ **Table 12-20 Summary of Key Monitoring Plans**

Monitoring Plan	Issues Covered	Phase
Open Trench Monitoring	Inspections of open trench to remove trapped fauna.	Construction
Archaeological and Cultural Heritage Monitoring	Archaeologists to monitor ground disturbance associated with installing the pipeline and other relevant earth disturbing phases of construction (clear, grade and trenching), in accordance with legislation and final agreement with NLC and traditional Aboriginal owners.	Construction
Clearing and Rehabilitation Monitoring	Visual and photo monitoring of vegetation disturbance and rehabilitation. Protection of environmentally sensitive areas. Rehabilitation measures and success.	Construction and operation
Weed Monitoring	Inspections of vehicles, equipment and construction materials. Treatment of declared noxious weeds. Identification and removal of grassy weeds (for example Gamba Grass) that may cause fire risk.	All phases
Water Quality Monitoring	Surface water flows and quality, including first flush. Groundwater levels and quality.	Construction
Biting Insect Monitoring	Inspections of reinstatement of disturbed areas prior to wet season. Monitor artificial receptacles and drains for mosquito larvae. Inspections for creation of mosquito breeding habitats within one year following construction. Screen construction workforce for mosquito borne diseases.	All phases
Pest Species Monitoring	Presence of Cane Toads <i>Bufo marinus</i> . Presence of Crazy Ants <i>Anoplolepis gracilipes</i> .	Construction and Operation
Erosion and Sediment Control Monitoring	Inspections of areas with high erodibility potential. Inspections and maintenance of sediment control measures.	All phases

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