NORTHERN NETWORK ALLIANCE

MANAGEMENT PLAN

Vegetation Management Plan

Document number: NNA001-A-PLN-013

Notes:

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Date	Reason for Issue	Revision	Originator	Signature	Checked By	Signature	Approved By	Signature
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1 INTRODUCTION

This Vegetation Management Plan (VMP) is one component of the Construction Environmental Management Plan (EMP) which provides a system and procedures to ensure that Northern Network Alliance (NNA) establishes and maintains best practice controls to manage potential environmental impacts during the construction of the Northern Pipeline Interconnector and associated infrastructure (hereafter referred to as the "Project") and, wherever practicable, realise opportunities for enhanced environmental outcomes.

The NN Alliance consists of the following partners:

- LinkWater
- Abigroup Contractors Pty Ltd
- McConnell Dowell Constructors (Aust) Pty Ltd
- Kellogg Brown & Root Pty Ltd

NN Alliance (referred to as the Alliance) is committed to providing the services it offers in a manner that conforms to the contractual requirements and to all relevant regulatory and legislative requirements. To achieve this, the Alliance will plan, implement and control an integrated management system that achieves the stated environmental outcomes.

The Alliance will ensure that controls are properly implemented and regularly monitored to assess their effectiveness. Changes to the controls will be instigated if they are not achieving their objectives.

1.1 Project Description

NPI Stage 2 forms part of the drought contingency pipeline to connect existing and future water infrastructure on the Sunshine Coast with the Brisbane network. The NPI will be constructed in two stages and will allow the transfer of up to 65 ML/d of potable water between the Sunshine Coast and Brisbane. Stage 1 of the NPI project—between Landers Shute water treatment plant (WTP) and Morayfield—is due for completion by 31 December 2008.

The completed NPI (Stage 1 and Stage 2) will supply a target volume of 65 ML/d of potable fresh water to existing facilities at Caboolture for distribution to localities in the greater Brisbane region. NPI Stage 2 will have the capacity to deliver up to 18 ML/d (under existing utilized entitlements for the Noosa Shire).

Subsequent interconnection of Stages of the NPI may be constructed to link with the proposed Traveston Crossing Dam and/or other bulk water sources proposed for the Sunshine Coast. These subsequent Stages are not considered in this report. However, the use of a large diameter pipe capable of transporting bulk water is a basis for the design of both Stages 1 and 2 of the NPI.

The key components of the NPI Stage 2 project are as follows:

- approximately 48 km of underground pipe between Noosa water treatment plant (WTP) and the termination point of NPI Stage 1 at Eudlo;
- a balance tank with a 5 ML capacity;

- three new pump stations; and
- a new water quality management facility (WQMF) and upgrades to an existing WQMF at Landsborough.

A number of additional above-ground facilities would be required for commissioning, operation and maintenance of the system. These include:

- Water quality maintenance structures
- Water branch mains
- Cleaning and communications stations

1.2 Purpose and Scope

Linkwater is committed to conserving and enhancing the biological environment where possible for the duration of the project while achieving positive environmental, commercial and social outcomes. Accordingly, this Vegetation Management Plan (VMP) has been prepared to guide construction activities and subsequent revegetation.

The purpose of the VMP is to identify measures to mitigate the potential impacts of construction activity on terrestrial and riparian vegetation, and to ensure that works are carried out in accordance with the requirements of the *Vegetation Management Act 1999*, the *Environmental Protection Act 1994* and other relevant State and Federal legislation.

1.3 Objectives and Targets

Objectives:

- Minimise the impact of construction on native vegetation, while ensuring all works are completed effectively and efficiently
- Successful rehabilitation and enhancement as measured against pre-construction assessment The performance criteria include the following:

Targets:

- No disturbance to flora outside the required corridor except where deemed unavoidable for construction access
- The width of the corridor constrained when working within endangered regional ecosystems and/or habitat for listed threatened flora species
- Successful rehabilitation and enhancement of disturbed areas within the corridor as measured against pre-construction assessment

The above performance criteria have been developed for this MP to assist to deliver desirable outcomes. The performance criteria will be linked to Key Performance Indicators (KPIs) for the Project.

1.4 Related Management Plans

The VMP forms part of the overall Construction EMP (NNA001-A-PLN-017) for the Project. Where relevant, reference should also be made to the following associated management plans:

- Weed and Disease Management MP (NNA001-A-PLN-016)
- Fauna Management MP (NNA001-A-PLN-007)
- Rehabilitation and Revegetation MP (NNA001-A-PLN-010).

2 LEGISLATION AND REGULATORY REQUIREMENTS

2.1 Licences/Permits

The following permits apply to vegetation management for the Project:

- Permit to clear for an ongoing purpose under the *Vegetation Management Act 1999* (Department of Natural Resources & Water) (DNR&W)
- Riverine Protection Permits (RPP) (DNR&W)
- Permit for the taking or destruction of native plants (QPWS).

2.2 Guidelines/References

Key legislation relevant to vegetation management includes:

- *Environment Protection and Biodiversity Conservation Act 1999*
- *Vegetation Management Act 1999*
- *Water Act 2000*
- *Nature Conservation Act*
- SE QLD Regional Vegetation Management Code.

In addition to the above consideration should also be given to the *Land Protection (Pest and Stock Route Management) Act 2002* (Qld), the requirements of which are addressed in the Weed and Disease MP.

2.3 Commitments

The *Environmental Impact Statement* for the proposed NPI Stage 2 has several commitments for the management of Vegetation. Table 1 identifies examples these key commitments.

Table 1. Vegetation Management Requirements/Commitments
(refer NNA EIS 2008, Appendix E for final commitments)

Document	Section	Requirement/Commitment
	3.3	Where required, clearing will be restricted to within a 30 m wide corridor. Permits will be obtained for clearing of mapped native vegetation as appropriate.
	3.3	Construction will limit and/or avoid impacts on endangered remnant ecosystems.
	3.3	Construction will not adversely affect species of national or state significance.
	3.3	Hollow-bearing roadside and habitat trees will be avoided where possible and/or relocated to suitable areas.
	3.3	Construction in or adjacent to endangered ecological communities or threatened species habitats will be managed through specific mitigation plans.
	3.3	Monitoring of the recovery of impacted ecosystems and/or significant species will be implemented and updated as necessary.
	3.3	Construction will result in positive environmental legacy projects.

3 EXISTING ENVIRONMENT

The NPI Stage 2 project area takes in the eastern edge of the Blackall Range, traversing a number of ridges which extend west-east towards the coast. The main line extends in a north-south direction, commencing in the rolling hills around Lake Macdonald and descending onto the floodplain of the North Maroochy River. To the west of Eumundi, the route crosses a steep ridge adjacent to the Bruce Highway, and traverses the western edge of Yandina township onto the South Maroochy river floodplain. South of Yandina, the route crosses two high coastal ridges and the middle reaches of Petrie and Paynter creeks. The corridor rises again before descending onto the flats around Eudlo Creek and ascending steeply to connect with the Stage 1 works at Nobels Road.

Approximately two thirds of the preferred corridor makes use of an existing cleared easement maintained by Energex, or previously established by the now-defunct Gympie to Gatton gas pipeline. These easements have typically been cleared and are often dominated by exotic grasses and pasture species, or regrowth native vegetation.

Intact or near-intact stands of native vegetation of varying quality exist adjacent to the easement, along waterways and in the steeper gullies. Nearly all vegetation within the corridor has experienced some level of disturbance.

Regional ecosystems describe the relationship between major flora species and the environment at the bioregional scale and are derived from linking vegetation mapping units to land zones representing major environmental variables, namely geology, rainfall and landform (Sattler 1999). Much of the preferred corridor is characterised by heavily disturbed urban and agricultural environments and public utility easements which have been cleared of natural vegetation. However, intact stands of vegetation do persist within and adjacent to the corridor along waterways, ridges and steep slopes traversed by the pipeline. The areas of remnant vegetation can be broadly grouped into the following types:

- intact gallery rainforest (RE 12.3.1), sometimes with eucalypt emergents (RE 12.3.2), along waterways
- patches of lowland gallery rainforest of reasonable size which are now rare within south-east Queensland
- large tracts of tall open eucalypt forests along coastal ridges, often contained within national parks and forest reserves
- small areas of *Melaleuca* wetland in riparian depressions around Eudlo Creek and its tributaries

Riparian communities are an important feature of vegetation within the pipeline route. While many creeks are degraded inside the easement, most retain sufficient vegetation to act as corridors between intact habitat patches. These narrow corridors also contain important (and frequently unmapped) remnants of the endangered RE 12.3.1, which are often in good to excellent condition despite the pressures imposed by adjacent land uses. These vine forest elements also persist as an understorey to RE 12.3.2, which occurs frequently as unmapped narrow remnants along waterways in the study area.

Table 2 Vegetation within or adjoining the project area

RE Type	Status	Description	Habitat Values
12.1.1	Of concern	*Casuarina glauca* open forest on margins of marine clay plains	Provides estuarine wetland habitat
12.1.2	Not of concern	Saltpan vegetation including grassland and herbland on marine clay plains	Habitat for Water Mouse in southern part of bioregion particularly in areas immediately adjacent mangroves
12.1.3	Not of concern	Mangrove shrubland to low closed forest on marine clay plains and estuaries	Habitat for Water Mouse in southern part of bioregion particularly in areas immediately adjacent mangroves
12.3.5	Not of concern	*Melaleuca quinquenervia* tall open forest on coastal alluvial plains	Habitat for *Phaius australis*
12.3.6	Not of concern	*Melaleuca quinquenervia*, *Eucalyptus tereticornis*, *Lophostemon suaveolens* woodland on coastal alluvial plains	Provides wetland habitat for flora and fauna including Wallum Froglet
12.3.11	Of concern	*Eucalyptus siderophloia*, *E. tereticornis*, *Corymbia intermedia* open forest on alluvial plains near coast	
12.9-10.1	Of concern	Tall shrubby open forest often with *Eucalyptus resinifera*, *E. grandis*, *Corymbia intermedia* on sedimentary rocks (coastal)	
12.9-10.14	Not of concern	*Eucalyptus pilularis* tall open forest on sedimentary rocks	
12.9-10.16	Of concern	Araucarian microphyll to notophyll vine forest on sedimentary rocks	Habitat for *Alyxia magnifolia* and *Pouteria eerwah*
12.9-10.17	Not of concern	Open forest complex often with *Eucalyptus acmenoides*, *E. major*, *E.siderophloia* ± *Corymbia citriodora* on sedimentary rocks	
12.11.2	Not of concern	*Eucalyptus saligna* or *E. grandis*, *E. microcorys*, *E. acmenoides*, *Lophostemon confertus* tall open forest on metamorphics ± interbedded volcanics	Habitat for rare and threatened flora species, including *Cyperus semifertilis*
12.11.10	Not of concern	Notophyll vine forest ± *Araucaria cunninghamii* on metamorphics ± interbedded volcanics	Habitat for *Alyxia magnifolia*, *Graptophyllum reticulatum*, *Macadamia tetraphylla*, *Pouteria eerwah*

12.12.2	Not of concern	*Eucalyptus pilularis* tall open forest on Mesozoic to Proterozoic igneous rocks, especially granite	
12.12.12	Of concern	*Eucalyptus tereticornis*, *E. crebra* or *E. siderophloia*, *Lophostemon suaveolens* open forest on granite	
12.12.15	Not of concern	*Eucalyptus siderophloia*, *E. propinqua*, *E. acmenoides* tall open forest on near coastal hills on Mesozoic to Proterozoic igneous rocks	
12.12.16	Not of concern	Notophyll vine forest on Mesozoic to Proterozoic igneous rocks	Habitat for *Alyxia magnifolia*, *Baloghia marmorata*, *Bulbophyllum globuliforme*, *Floydia praealta*, *Graptophyllum reticulatum*, *Macadamia tetraphylla*, *Triunia robusta*, *Xanthostemon oppositifolius*

3.1 Environmentally Sensitive Areas

Following the surveys undertaken for the EIS, NNA anticipate declaring the following sites along the project corridor as 'environmentally sensitive areas'.

Table 3 Environmentally Sensitive Areas

Location	Environmental constraints and significant species
Nobels Road site	State wildlife corridor; potential habitat for Large-eared Pied Bat, Marbled Frogmouth, rare raptors and other species
Slope and gully south of Winston Rd South, Woombye	Local east-west wildlife corridor; potential habitat for Tusked Frog and Wallum Froglet and Koala.
Drainage line North of Winston Rd, Woombye	Mapped endangered RE type; Tusked Frog present and potential habitat for Elf Skink.
Gully south of Nambour Connection Rd	Local east-west wildlife corridor; Tusked Frog present and potential habitat for Koala & Lewin's Rail.
Paynter Ck – Crossing 1 & 2	Potential habitat for Giant Barred Frog and local east-west wildlife corridor.
Paynter Ck – Crossing 3	Tusked Frog present and potential habitat for Giant Barred Frog and Elf Skink.
Petrie Creek Crossing	Elf Skink present and potential habitat for Giant Barred Frog and Tusked Frog.
Tuckers Creek crossing behind Maroochy Shire Council Depot, Nambour	Potential habitat for Giant Barred Frog, Tusked Frog and Elf Skink.
Vegetation north of, and running parallel to Tuckers Creek, Nambour	Mapped endangered RE type; potential habitat for Tusked Frog and Elf Skink.
Dams either side of easement at the end of Tuckers creek Road, Nambour	Potential habitat for Tusked Frog and Elf Skink.
Significant 12.3.2 vegetation along Tuckers Creek to the immediate west of the existing easement	Potential habitat for Elf Skink and *O. truncates*.
Duhls Road crossing north to tributary of Tuckers Creek	Potential habitat for Koala, Tusked Frog and Elf Skink.
Caboolture Creek and vegetation to the north	Tusked Frog present and potential habitat for Koala.
Open forest woodland adjacent to Mt Crombe Road	Potential habitat for Tusked frog and Koala.
Woodland and riparian vegetation adjacent to Creighton's Road	Potential habitat for Tusked frog and Koala.
South Maroochy River (incl Mount Coombe Creek)	Degraded endangered vegetation type; potential habitat for Giant Barred Frog, Tusked Frog, Elf Skink, Platypus and Koala
Browns Creek at Lees Rd (93.5 km)	Mapped endangered RE type
Running Creek (94.5 km)	Mapped endangered RE type
Balsam Road (99 km)	Large habitat trees on east side

Location	Environmental constraints and significant species
Sandy Creek (101.1 km)	Known habitat for Tusked Frog; potential for Giant Barred Frog
North of Neeraway Road (103.9 km)	Potential habitat for Giant Barred Frog and Tusked Frog
Gully at Holts Road (105 km)	Regional wildlife corridor; potential habitat for Elf Skink
Unnamed waterways (107.2 km)	Mapped endangered RE type; regional wildlife corridor; potential for Tusked Frog and Koala
Drainage reserve (109.5 km)	Mapped endangered RE type; *Xanthostemon oppositifolius* and *Symplocos harroldii*
Pearsons Road	Mapped endangered RE type; *Xanthostemon oppositifolius* and *Symplocos harroldii*
Six Mile Creek (Left branch) close to Lamonts Road	Mapped endangered RE type; Potential for *Xanthostemon oppositifolius*, *Symplocos harroldii,* Mary River Turtle, Oxleyan Pygmy Perch and Tusked Frog.
Six Mile Creek (Left branch) and Anabranch confluence	*Xanthostemon oppositifolius* and Tusked Frog present. Potential for Mary River Turtle, Mary River Cod, Oxleyan Pygmy Perch and *Symplocos harroldii*

4 POTENTIAL PROJECT IMPACTS

Impacts on vegetation and ecological communities resulting from the construction of the pipeline and associated infrastructure will be primarily associated with vegetation clearance and are common for most species and communities. Potential impacts during the construction period include:

- loss or fragmentation of habitat, resulting in reduced areas of suitable habitat for plant species and reductions in food resources, suitable shelter or breeding sites for fauna
- intensification of edge effects, such as the alteration of micro-climatic conditions which may result in changes of vegetation composition and condition
- the establishment and spread of weed species
- loss of legislatively significant (rare and threatened) flora and fauna species as a result of these impacts
- damage to legislatively significant ('endangered' and 'of concern') regional ecosystems as a result of these impacts
- degraded waterway condition as a result of vegetation clearing within close proximity to waterways.

5 ENVIRONMENTAL MITIGATION MEASURES

The approach adopted by NNA to mitigate potential impacts on vegetation is, in the first instance, to avoid areas of environmental significance by locating the pipeline in existing cleared areas. Where this is not possible, further disturbance to significant vegetation will be minimised by employing a constrained corridor of between 15-20 m rather than a full 30 m wide corridor.

In order to maximise the potential for leaving a positive legacy, the Alliance will reinstate and, where practical, enhance the condition of areas cleared of vegetation for construction works.

5.1 Verification Procedure

The verification procedure is a mechanism to show that the easement has been inspected, all the environmentally sensitive areas are know and delineated, and the construction supervisor has been advised of and acknowledges environmentally sensitive areas. The verification package is a written record and tangible reminder to the construction supervisor that he has environmental obligations ahead of him; and if he doesn't have signoff, then he doesn't have approval to enter that section of the ROW.

In practical terms, the verification procedure is as follows:

- The Environmental Officer reviews the environmental information available for the easement some days ahead of construction.
- The Environmental Officer identifies from the GIS and alignment sheets all those areas that represent an environmentally sensitive area. These areas may include rare or endangered flora, particular water crossings, habitat of rare or endangered animals, heritage areas [Aboriginal or European], and noise sensitive areas.
- The Aboriginal Heritage Officer (refer Aboriginal Cultural Heritage procedures) will locate and tag known aboriginal heritage sites with construction tape and certify that this task is complete within the designated section of ROW. A 50 metre buffer is to be maintained around aboriginal heritage sites. The Contractor will construct a delineation fence to define the buffer zone. There is to be no activity of any sort within this buffer zone.
- The Environmental Officer should inspect the easement and physically identify all other known sensitive areas with construction tape.
- The details of the site; instructions and description of marking should be recorded and noted in the Verification Checklist process.
- If the Environmental Officer is unfamiliar with a particular environmental aspect [e.g. rare animal capture or plant identification] he should call in suitably qualified personnel who can assist. Sufficient time should be allowed to ensure availability of specialist environmental advisers.

- Once all environmental issues have been identified and flagged out on a specified section of ROW, the Environmental Officer shall point out all the issues in that section with the construction supervisor. The construction supervisor will explain what actions will be taken to protect environmental values and that suitable machinery and material (e.g. spill containment kit) is available to protect flagged out areas.
- The Environmental Officer and the Construction Engineer shall sign off on the verification package prior to the commencement of works. Construction can then commence on that section of the ROW described in the general purpose record.

5.2 Management of Construction Activities

Table 4 below outlines the management measures to be employed throughout the construction period to manage potential vegetation impacts relevant to the following categories:

- General activities. Effective communication and the education of all site personnel are key measures for ensuring the mitigation of potential impacts on vegetation.
- Sensitive species and environmental areas. Sensitive species and environmental areas include mapped regional ecosystems, threatened plant species and other communities identified under relevant legislation. Sensitive Area Plans (SAPs) will be developed for specific environmentally sensitive areas, and for locations where the presence of listed threatened plant (and animal) species is confirmed (see Section 4).
- Minimise the construction footprint to reduce Vegetation removal.

Table 4 Vegetation Management Strategies

Activity / Construction Item or Detail	Management Mitigation Measures	Responsibility	Timing
General	All construction personnel must complete a site induction prior to commencing works on site.	Area Managers/ Environmental Manager	Pre-construction
	Periodic toolbox training to be provided to all construction personnel to present new information or reiterate information relating to management of vegetation throughout construction.	Supervisors/ Environmental Manager	Pre-construction/ as required
Sensitive Species and Environmental Areas	Develop Sensitive Area Plans (SAP) for critical sections of the ROW containing significant flora and fauna species.	Environment Manager in conjunction with Planning Corridor ecologists.	As required.
	Pre-construction site survey by qualified Environmental Officer to confirm the presence of listed threatened plant species.	Project Botanist/ Site Environmental Officers	Pre-construction
	Document original condition of sensitive communities/species using photographs to inform	Site Environmental Officers/ Planning	Pre-construction

Activity / Construction Item or Detail	Management Mitigation Measures	Responsibility	Timing
	monitoring and rehabilitation.	Corridor ecologists	
	Use of the Verification procedure - Areas not to be cleared should be delineated or temporarily fenced off prior to any commencement of clearing works or construction activities.	Supervisor/ Environment Officer	Pre- construction
	Ensure 'no go zones' are clearly sign-posted/ delineated/ fenced on site prior to the commencement of works to identify the boundaries of environmental communities/sensitive species to be protected.	Environmental Officers/ Project Engineers	Pre-construction
	Ensure construction personnel are trained in the meaning of vegetation 'no go zones' and use of the Verification procedure and the consequences of entering 'no go zones'..	Area Managers/ Environmental Manager	Pre-construction/ as required
	Where practical, width of construction corridor to be constrained to 15 metres when working in areas of 'endangered' vegetation and fauna. Ensure these constrained areas are clearly defined to construction personnel and marked with 'no go' fencing prior to the commencement of works in each area.	Construction Managers/ Supervisor/ Environment Officer	At all times throughout construction
	Development of monitoring protocol based on framework monitoring plan included at Appendix 1.	Environmental Manager	Pre-construction
	Undertaking baseline surveys for identified sensitive environmental areas.	Environmental Officers/ Planning Corridor ecologists	Pre and Post construction
Vegetation Removal	Extent of clearing to be clearly identified on design drawings and fencing positioned on site to ensure clearing is minimised.	Design Manager/ Area Managers/ Environment Manager	Pre-construction
	Habitat trees to be identified and marked as required (also refer to the Fauna Management Plan (NNA001-A-PLN-007).	Environment Officers	Pre- construction
	Vegetation shall only be pruned or removed with the prior approval of the Site Environment Officer.	Site Supervisor/ Environment Officers	At all times
	No vegetation clearance is to be undertaken to accommodate access tracks. If conflicting areas or new areas to be cleared are identified ensure that the Environment Manager is notified immediately.	Area Managers/ Site Supervisor	Prior to construction of access tracks and stockpile locations.
Activities around Vegetation	Avoid compaction of soil, especially around the drip zone of mature trees.	Site Supervisor/ Construction personnel	At all times during construction
	Ensure all construction personnel use only designated access tracks when entering or exiting the site.	Environment Officers/ Site Supervisor	At all times during construction
Materials Handling	• Avoid placement of materials around the drip zones of mature trees.	Site Supervisor/ Construction	At all times during

Activity / Construction Item or Detail	Management Mitigation Measures	Responsibility	Timing
	• Keep fill material, stockpiles, vehicle parking and access tracks clear of the drip-line of trees and shrubs. • Select areas that are already degraded for site access and storage.	personnel	construction

6 CORRECTIVE AND PREVENTATIVE ACTIONS

6.1 Community liaison and complaint management

Complaints represent an opportunity to enhance project environmental performance. All project complaints, including those from members of the public, stakeholder groups and Government agencies, will be managed via the NNA 1800 242 998 phone number to be listed in the Inquiry and Complaints Management Procedure, contained in the Community and Stakeholder Management Plan.

Complaints from any source must be registered using the QESE complaint record section. Where the complaint is environment-related, the complaint will be investigated by the Environmental Manager or Environmental Officer in consultation with the Site Manager or delegate and action/s taken to enable satisfactory closure.

Feedback to relevant personnel will be managed by the community relations team. As required, complaint details (including type and preventative/corrective actions) will be advised to field staff via pre-start meetings, toolbox talks or the Health, Safety and Environment Committee as appropriate.

6.2 Environmental incident/emergency reporting

All project staff and subcontractor personnel shall report all environmental incidents to the Environmental Manager although initial response may go via the Site Manager/Supervisor or Environmental Officer.

6.3 Incident/emergency preparedness and response

An Incident Response Plan will be prepared for the project. This plan documents suitable incident procedures to ensure effective response in the event of an emergency (including environmental emergencies such as fire, flood and large fuel spills).

The emergency procedures shall be tested on a six-monthly basis. Records are to be maintained of all site emergencies and results of emergency practice drills. The Emergency Response Controller for the project will be defined within the Incident Response Plan.

The key to effective prevention of incidents is monitoring, surveillance and training. During construction activities, inspections and preventative action to be performed by the Alliance will include:

- daily inspections of active worksites and completion of routine environmental checklists
- issue and quick close-out of NCR/EIN
- maintenance of constant supervision on site
- ongoing environmental training
- environmental audits of worksites, subcontractors and compliance issues.

Environmental and safety information on hazardous substances (e.g. Material Safety Data Sheets [MSDS]) will be available at the main site office, including information on where and how such substances are to be stored. An up-to-date list of emergency response personnel and organisations will be maintained at the main office and compounds. A list of key environmental personnel will also be included.

Specific measures will also be implemented to minimise the risk of an incident occurring due to spillage, storage of hazardous materials or fire. Further information will be detailed in the Incident Response Plan.

6.4 Incident investigation

All incidents will be documented, investigations conducted and action plans (if required) developed to ensure no repetition of the event. Where current procedures are identified as being ineffective, the CEMP and any relevant WMS will be revised by the Environmental Manager and/or Health and Safety Manager.

An environmental investigation includes the following basic elements:

- advising the environmental authority(ies) if any substantial pollution has occurred
- identifying the cause and extent of and responsibility for the incident
- identifying and implementing the necessary corrective action
- identifying the personnel responsible for carrying out the corrective action
- implementing or modifying controls necessary to avoid a repeat occurrence of the incident
- recording any changes required to written procedures.

All personnel are required to report all incidents, as incident reporting is regarded as a valuable method of addressing shortcomings in procedures, training or equipment, and is an opportunity for improvement. It is also an offence not to report to the EPA any incident causing serious environmental harm.

6.5 Non-conformances

Non-conformances will be resolved according to the Quality Management Plan. The Environmental Manager or delegate will issue a Non-conformance Report (NCR) or an Environmental Improvement Notice (EIN) in response to inappropriate or non-conforming work methods, equipment selection, maintenance of controls or other identified concern.

In the event of a non-conformance:

- the nature of the event will be investigated by the Environmental Manager
- advice may be sought from a specialist
- monitoring may be undertaken
- the effectiveness or need for new/additional controls will be reviewed
- an appropriate preventative and corrective action will be implemented
- strategies will be identified to prevent reoccurrence
- the NCR will be closed-out
- environmental documentation/WMS will be reviewed and revised
- will be documented on QESE.

7 INSPECTIONS AND MONITORING

7.1 Inspections

Inspections will be undertaken on a weekly basis to ensure compliance with the measures detailed in this VMP. Results of these inspections will be recorded in the Weekly Inspection Checklist (G-FRM-001).

7.2 Monitoring Requirements

In general, the Alliance is responsible for monitoring its own and any subcontractor's conformance with the VMP. Key monitoring requirements and responsibilities with respect to vegetation management are summarised in Table 5.

Table 5 Monitoring Requirements

Monitoring requirement	Frequency/timing	Performance criteria	Responsibility
Field survey for listed species	Pre-construction	Minimal loss of significant species through clearing or construction	Construction/ (Corridor) Environment Teams
Documenting original condition of vegetation to be cleared through Sensitive Area Plans	Pre-construction	Adequate benchmark for reinstatement	(Corridor) Environment Team
Review Sensitive Area Plans for site specific requirements	Pre-construction planning	Successful implementation of mitigation measures in sensitive environmental areas	Environment Officer
Relocation of any significant species within pipeline alignment	In the week prior to construction or as appropriate	No loss of significant species populations	Environment Officer
Implement restricted width corridor as required	Pre-construction planning	No unnecessary clearing of vegetation	Environment Officer
Fence off areas around environmental communities/species	On the day (or prior to) clearing in accordance with the verification proceedure	No damage to existing significant species or communities	Environment Officer
Appropriate access and traffic management are in place and are complied with	Prior to commencing works on site	No damage to native vegetation or compaction of soil around trees	Environment Officer
Visual inspection of re-established habitat areas	Monthly following reestablishment	Successful reinstatement in accordance with revegetation plan	Environment Officer

8 DEFINITIONS AND ACRONYMS

Acronyms	Glossary
AHD	Australian Height Datum
ANZECC	Australian and New Zealand Environment and Conservation Council
AS/NZS	Australian and New Zealand Standard
ASS	Acid Sulphate Soils
BCC	Brisbane City Council
CAR	Corrective Action Requests
CGAC	Coordinator-General's Approval Conditions
CGR	Coordinator-General's Report
CHMP	Cultural Heritage Management Plan
CRMP	Community Relations Management Plan
DES	Department of Emergency Services
DNRM&W	Department of Natural Resources Mines and Water
DPIF	Department of Primary Industries and Fisheries
EIN	Environmental Improvement Notice
EIR	Environmental Inspection Report
EIS	Environmental Impact Statement (Draft) as prepared by SRWP Co. April 2006
EMP	Construction Environmental Management Plan
EMR	Environmental Management Register (administered by the EPA)
EMS	Environmental Management System (as defined under ISO14,001)
EPA	Queensland Government Environment Protection Agency
ERA	Environmentally Relevant Activity
ESD	Ecologically Sustainable Development
KCB	Koala Coast Bushland
Linkwater	SRWPCo now trades as Linkwater, which is 100 per cent owned by the Queensland Government
NCR	Non-Conformance Report
NHMRC	National Health and Medical Research Council
NNA	Northern Network Alliance
NPI	Northern Pipeline Interconnector
PASS	Potential Acid Sulphate Soils
PM_{10}	Particulate matter with a diameter of 10 microns or less
QESE	Quality Environment Safety Engineering Database
QASSIT	Queensland Acid Sulfate Soils Investigation Team
ROW	Right of Way
SCR	Site Communication Record

SEIS	Supplementary Environmental Impact Statement
SAPs	Sensitive Area Plans
SRWP Co.	Southern Regional Water Pipeline Company
VC	Verification Checklist
VMP	Vegetation Management Plan
WMS	Work Method Statement

9 REFERENCE DOCUMENTS

DNR&W, 2006. Interim Policy for Vegetation Management Offsets, Department of Natural Resources, and Water, 2006.

Environmental Protection Act 1994

Environment Protection and Biodiversity Conservation Act 1999

Land Protection (Pest and Stock Route Management) Act 2002 (Qld)

Nature Conservation Act 1992 (Qld)

Natural Assets Local Law 2003

NNA 2008, NNA Draft Environmental Impact Statement (EIS), Northern Network Alliance, Queensland

NRM&E 2004. Regional Vegetation Management Code for Ongoing Clearing Purposes in the South-East Queensland Region, Department of Natural Resources, Mines and Energy.

SRWPA 2006a, Northern Pipeline Interconnector Draft Environmental Impact Statement (EIS), Southern Regional Water Pipeline Alliance, Queensland.

State Development & Public Works Organisation Act 1971 (Qld)

Vegetation Management Act 1999 (Qld)

Water Act 2000 (Qld)

APPENDIX 1

Monitoring plan (sensitive Environmental areas)

Linkwater is committed to conserving and enhancing the biological environment and achieving positive environmental outcomes wherever possible. This framework monitoring plan provides a framework for ecological monitoring of the recovery of vegetation in sensitive environmental areas impacted by construction of the NPI Stage 2.

A sensitive environmental area may be defined as:

- any area where the presence of a listed threatened flora or fauna species is confirmed on the alignment
- Endangered or Of Concern RE's (e.g. 12.3.1)

The primary monitoring objective is to determine the success of rehabilitation and habitat enhancement efforts at particular sites impacted by construction along the route. The methods outlined below will assist in the establishment of baseline conditions at sites identified as sensitive environmental areas and provide a framework for ongoing monitoring of rehabilitation and revegetation efforts in these locations.

The monitoring plan should be read in conjunction with, and included as an appendix to, the Vegetation Management Plan (NNA001-A-PLN-013).

Methodology

Ecological monitoring will comprise qualitative and quantitative methods aimed at documenting the recovery/rehabilitation of impacted vegetation communities over a defined time period. Photographic monitoring is a suitable method for visually recording the change in a vegetation community over time, whereas quadrat/transect methods will provide quantitative data concerning the change over time of the structural and floristic elements of a given area.

Baseline conditions at a given site will be established prior to the commencement of works through the development of an Environmentally Sensitive Area Plan (ESAP).

Photographic Monitoring

Photographic monitoring will provide a visual record of the same area over a defined time-scale for sensitive areas identified along the pipeline route. Photographs will be taken from fixed monitoring positions at approximately six-month intervals. The results may be interpreted at a later date, and would be linked to observations recorded from quadrat/transect studies at the site.

Quantitative Monitoring

The main aim of the following methods is to record quantitative data concerning the structural and floristic aspects of the community that can be interpreted for the purposes of assessing regeneration and revegetation.

Quadrat-based sampling

Quadrat-based sampling methods will be determined for individual locations on the basis of size, habitat type and vegetation features. A variety of information will be recorded as appropriate including, but not limited to, full lists of vascular flora species, diameter at breast height (DBH) of mature trees, dominant species, foliage percentage cover (FPC) of dominant species, presence of large stags, hollows and other habitat features.

Line-intercept method

The line-intercept method is a simple, unobtrusive technique to record linear measurements of dominant plant species within a community. Transect length will be dependent on the size of the impacted community, the type of habitat being sampled and the density of dominant species. Data will be recorded onto proformas and calculated as the percentage cover of each plant species by totalling the intercept measurements for individual species on a given transect. Species composition can be calculated by dividing the percent cover for each species by the total cover for all species.

Species-specific Monitoring

Where the presence of significant flora species is confirmed, the particular characteristics of the affected population will be documented prior to the commencement of construction. Relevant features will be recorded including the number and distribution of individual plants and any evidence of recruitment. Future monitoring of significant species populations will be designed depending on the particular requirements of that species and will draw on the quantitative method