NORTHERN PIPELINE INTERCONNECTOR PROJECT

Proposed Change to the Northern Pipeline Interconnector (Stage 1) Environmental Impact Statement

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ABBREVIATIONS

GENERAL

CHMP	Cultural Heritage Management Plan
CLR	Contaminated Land Register
CG	Coordinator-General
DEWHA	Department of the Environment, Water, Heritage and the Arts (Australian Government)
DMR	Department of Main Roads (Queensland)
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMR	Environmental Management Register
EPA	Environmental Protection Agency (Queensland)
EPBC	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
GIS	geographic information system
IPA	Integrated Planning Act 1997 (Qld)
NES	National Environmental Significance
NRW	Natural Resources and Water (Queensland Government Department of)
RE	regional ecosystem
REDD	Regional Ecosystem Description Database
ROW	right of way
SAP	sensitive area plan
SDPWOA	State Development and Public Works Organisation Act 1971 (Qld)
VMA	Vegetation Management Act 1999 (Qld)
VMP	Vegetation Management Plan
WTP	water treatment plant

GLOSSARY

Amenity	The quality of being pleasant or attractive; something that contributes to physical or material comfort.
Balance tank	A large water tank provided for temporary storage of water to regulate flows in the water supply system.
Best practice	Implies continual improvement to maintain maximum performance.
Biodiversity	The variety of all life forms; the different plants, animals and micro-organisms, the genes they contain and the ecosystems of which they form a part.
Blasting	The use of explosives to break up or otherwise aid in the extraction or removal of a rock or other consolidated natural formation.
Canopy	The uppermost layer in a forest, formed by the crowns of the trees.
Catchment	The land area drained by a river and its tributaries.
Contaminated Land Register	A register of proven contaminated land which is causing or may cause serious environmental harm, which is maintained by the EPA.
Controlled action	Any activity likely to result in a significant negative impact on a matter of national environmental significance as defined under the EPBC Act, actions taken by the Commonwealth and actions affecting Commonwealth land.
Cultural heritage	Possessing historical, archaeological, architectural, technological, aesthetic, scientific, spiritual, social, traditional or other special cultural significance, associated with human activity.
Ecosystem	A relatively self-contained ecological system defined by the types of organisms found in it and their interactions.
Edge effects	The often negative ecological impacts that occur at the boundaries of ecosystems, particularly where habitats are fragmented or located adjacent to disturbed land uses. These impacts may include changes in species composition, gradients of moisture, sunlight, soil and air temperature and wind speed, amongst other factors.
Endangered species	A species at serious risk of disappearing from the wild if present land use or other causal factors continue.
Environment	The term is used in its broadest sense to include physical, biological, cultural and social aspects.

Environmental Impact Statement	A report documenting the outcomes of investigations into the potential environmental impacts of a project or activity which is typically required as part of state or federal approvals processes.
Environmental Management Plan	Documentation of the procedures and physical methods that will be used to manage a particular activity such that its environmental impact is minimised.
Environmental Management Register	A register of land that has been, or is being used for a notifiable activity under the Environmental Protection Act 1994, and about which the EPA has been notified.
Erosion	The process by which material such as soil or rock is worn away or removed by wind or water.
Fragmentation	The breaking of an entity into smaller parts, referring in particular to an area of habitat being separated such that the resulting smaller areas are not capable of supporting flora and fauna populations to their original level.
Freehold land	Land over which the Crown has granted an interest which carries the exclusive right to the use and enjoyment of the land for an indefinite period of time.
Geology	The science that deals with the earth, the rocks of which it is composed and the changes it has undergone or is undergoing.
Habitat	The locality or environment in which a plant or animal lives.
Hollow	A natural cavity of a tree which provides habitat for fauna species.
Hydraulic	Of or relating to water or other liquid in motion; operated, moved or affected by water or liquid.
Main Roads	Queensland Department of Main Roads.
National Environmental Significance	Specific matters protected under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999.
Not of concern regional ecosystem	A listing under the VMA where a regional ecosystem type occupies more than 30% of its pre-clearing extent and more than 10,000 ha.
Of concern regional ecosystem	A listing under the VMA where a regional ecosystem type occupies 10–30% of its pre-clearing extent or more than 30% remains but is less than 10,000 ha.
Population	A group of individuals of a species living in a certain area.
Pump station	A facility for pumping water to assist its movement through the pipeline.
Regional ecosystem	A vegetation community consistently associated with a particular geology, landform and soil, used by the Queensland Government as the basis for nature conservation planning.

Rehabilitation	Activities undertaken to return disturbed land to a predetermined beneficial land use/productivity.
Remnant vegetation	Wholly and predominantly intact native vegetation, excluding young regrowth.
Riparian	Frequenting, growing on or living on the banks of streams or rivers.
Runoff	The drainage of water from waterlogged or impermeable soil into rivers and creeks; rainfall or other water not absorbed by the soil.
Species	A taxonomic grouping of organisms which are able to interbreed with each other but not with members of other species.
Spoil	Surplus soil and rock material after backfilling pipeline trenches.
Terms of Reference	A document prepared by the Office of the Coordinator-General outlining those issues to be addressed by the EIS.
Terrestrial	Living or found on land, as opposed to in rivers, lakes, oceans or in the atmosphere.
Threatened species	A collective term for plant or animal species considered ‘endangered’ or ‘vulnerable’.
Topsoil	The surface or upper part of the soil, often containing seed or other reproductive parts of plants. Generally the most biologically rich soil horizon.
Trenching	Installation of a pipe by excavating a trench, followed by pipe placement and backfilling with soil and rock material.
Understorey	The vegetation layer between tree canopy and the ground cover in a forest, composed of shrubs and small trees.
Vibration	The rapid back-and-fourth movement, often invisible, in space, of an object against which some force has been applied.
Vulnerable	A native plant or animal species or population whose ability to survive in the wild is compromised by exposure to threatening processes such as habitat destruction or disease.
Waste	Any gas, liquid, solid or energy that is surplus to, or unwanted from, any industrial, commercial, domestic or other activity.
Weed species	A plant growing where it is not wanted or where it poses an ecological risk.

EXECUTIVE SUMMARY

The Northern Pipeline Interconnector (NPI) is a drought emergency pipeline project required and defined under the Water Amendment Regulations of the *Water Act (Qld) 2000*. The NPI project is required to deliver 65 ML/d from the Sunshine Coast to the Brisbane area in a southerly flow scenario for the drought emergency. The project will be completed in two stages.

The NPI Stage 1 project is a declared 'significant project' under Section 26 of the *State Development and Public Works Organisation Act 1971* (SDPWOA). An Environmental Impact Statement (EIS) was prepared for Stage 1 of the project and was assessed by the Coordinator-General on 10 October 2007.

Section 35C of the SDPWOA gives the Coordinator-General the power to review the overall effect of a change to the original assessment of the project. This report is prepared pursuant to s 35E of the SDPWOA to allow evaluation of a proposed change to the NPI Stage 1 EIS.

Apart from the pipeline itself, the NPI Stage 1 project requires construction of a chemical dosing facility to enable the drought water supply scheme to operate. The information presented at the time of publishing the EIS was insufficient to confidently describe the chemical dosing facility. This facility could be augmented under the NPI Stage 2 scenario to include valving, a pump station, and a balance tank.

It is proposed to locate all facilities necessary for the NPI in an uncleared section of road reserve on Old Gympie Road, near Nobels Road (referred to in this report as the Nobels Road site). One of the key drivers was to find a sufficiently elevated site to accommodate the future balance tank and promote gravity feeding of water south to Brisbane. The Nobels Road site also enables connection to the Aquagen main, and subsequent chemical treatment before water is transported to Brisbane. The facilities would be able to service both Stages 1 and 2 of the NPI and co-location would reduce impacts on a number of land owners and the environment. This Proposed Change to NPI Report deals with construction and operation of the pipeline amendment and chemical dosing facility only. The future pump station and balance tank will be assessed under the NPI Stage 2 EIS.

The road reserve area also has the potential to house additional facilities should the Traveston Crossing Dam project be approved, or some other bulk water source be available to supply water to Brisbane. Impacts associated with the construction and operation of the facilities are unknown presently. However, it is anticipated that a suitable assessment process will be completed prior to the commencement of any works necessary for this purpose.

The area of interest is atop a ridge which is heavily vegetated and sits within a State-recognised wildlife corridor. The site retains remnant vegetation that is currently classed as not of concern, but is important foraging and shelter habitat for a number of species of state and federal significance. None of these species will be significantly negatively impacted by construction or operation of the proposed change presented in this report.

The site is adjacent Eudlo Road, public reserve and private property. Significant earthworks are required to prepare the site for construction of the chemical dosing facility and any future structures would require additional earthworks.

The configuration of the site is presented as a number of options. However, it is anticipated that the maximum extent of works will have a total estimated footprint of approximately 2 ha. A maximum of 70,000 m³ of soil and rock is expected to be cut from the site to accommodate all facilities necessary for the NPI (NPI Stage 1 planning allowed for a site development scheme to cater for the overall NPI project facilities i.e. shared buildings for chemical dosing etc).

Due to the critical nature of the works proposed at the Nobels Road site, and the unavailability of alternative sites with sufficient elevation, vegetation and habitat loss will result. The area of impact has been reduced as much as practicable by co-locating structures and by consolidating structures on site as much as possible.

In order to minimise potential impacts prior to and during construction, the works will be strictly governed by further site investigation and a range of management plans. The existing plans will undergo significant review to ensure on-site activities are closely controlled to limit potential impacts.

Implementation of these management and consultation plans will not remove the need for relevant statutory approvals (state and federal).

Timely completion of the chemical dosing facility is required for delivery of water from Landers Shute WTP under the NPI Stage 1 scheme. The level of investigation and assessment, and management measures detailed in this report is sufficient to meet and exceed the requirements of state and federal processes. As a result of detailed route selection studies, site-specific biological investigations and construction optimisation studies, no insurmountable issues were identified.

1 INTRODUCTION

Stage 1 of the Northern Pipeline Interconnector (NPI) project was declared a 'significant project' under Section 26 of the *State Development and Public Works Organisation Act 1971* (SDPWOA) on 4 April 2007. An Environmental Impact Statement (EIS) was prepared for the project and assessed by the Coordinator General on 10 October 2007. Significant changes to some aspects of the project assessed in the EIS have resulted from the need to alter the design.

Under the SDPWOA, the Coordinator-General may evaluate the environmental effects of a proposed change to an approved project, the effects of the change on a project or any other related matters.

This report updates the project description in the assessed EIS to include amendments to the pipeline route and a chemical dosing facility. It also provides justification for these changes and an assessment of the affected environmental values, thus enabling the Coordinator-General to evaluate the significance and mitigation strategies for any impacts.

1.1 NPI Project Background

The NPI is a drought emergency pipeline project required and defined under the Water Amendment Regulations of the *Water Act 2000* (Qld). The NPI project is required to deliver 65 ML/d of water from the Sunshine Coast to the Brisbane area in a southerly flow scenario for the drought emergency.

The project is being undertaken by the Southern Regional Water Pipeline Company (Trading as LinkWater), a service provider directed under Part 8 and Schedule 10A of the Water Regulation 2002 to undertake works for the provision of a drought contingency project. The Southern Regional Water Pipeline Alliance (SRWPA) has been engaged by LinkWater to complete the works necessary to allow construction to commence on the NPI.

The NPI consists of two stages. The Stage 1 pipeline connects the Landers Shute Water Treatment Plant (WTP) with outlet mains at Nobels Road in Caloundra City to the Morayfield and Elimbah Reservoirs in Caboolture Shire. This allows delivery of drought relief water supplies to the greater Brisbane region through Caboolture and North Pine.

The NPI Stage 2 extends the bulk transfer pipeline system and connects Noosa WTP in Noosa Shire and Image Flat WTP in Maroochy Shire, to the northern end of the Stage 1 NPI pipeline at Nobels Road (see Figure 1.1). The NPI Stage 2 will be assessed under a separate EIS process.

A number of facilities are required for the full implementation of the NPI. For Stage 1, water from the Landers Shute WTP must be dosed prior to being transported (under gravity flows) to offtakes at Elimbah and Morayfield where it will be stored in existing reservoirs. Stage 1 could function independently under supply from the Landers Shute WTP only. However, integration and augmentation of the Stage 2 works is necessary to provide a more reliable system that can transport water from multiple sources.

Stage 2 water will be pumped from the Noosa WTP and boosted from a connection with the Image Flat WTP to a balance tank at the confluence of both Stages. Water of different qualities will mix in the balance tank before being dosed and transported south as described above.

For the State, the site would also provide opportunity for housing facilities necessary to support future bulk supplies such as Traveston Crossing Dam, should it be approved, or another bulk supply. Impact assessment would be required prior to consideration of these facilities under an appropriate approvals process.

1.2 Amendments to an Environmental Impact Statement

On 4 April 2007, the Coordinator-General declared the NPI Stage 1 a 'significant project' under the *State Development and Public Works Organisation Act 1971* (SDPWOA) for which an EIS was required. A referral made to the Commonwealth determined the project was not a controlled action. The Stage 1 EIS was released for public comment in June 2007. A Supplementary Report to the EIS was provided to the CG on 30 August. The CG assessed all relevant information in an Assessment Report on 10 October 2007.

The scope of the Stage 1 EIS assessment included provision for a chemical dosing facility within the uncleared Old Gympie Road Road reserve at Nobels Road (referred to in this report as the Nobels Road site). However, detailed information was not available for publishing in the EIS. The primary purpose of this Proposed Change to NPI Report is to enable public comment on the pipeline connection and the size and operation of the chemical dosing facility.

1.2.1 Statutory framework for changing the EIS

Pursuant to s 35C of the SDPWOA, the Coordinator-General may evaluate the environmental effects of a proposed change to a project, the effects of the change on a project or any other related matters.

A formal notice seeking evaluation of a proposed change was provided to the Coordinator-General on behalf of the NPI in December 2007. Confirmation that an amendment to the EIS is required was received in December 2007.

This report is prepared pursuant to s 35E of the SDPWOA to allow evaluation of a proposed change to the approved project described in the NPI Stage 1 EIS.

1.3 Public Consultation Process

1.3.1 General

Public consultation for this section of the alignment is in accordance with the community consultation process developed for the overall project as part of the NPI Stage 1 EIS. A Stakeholder Consultation Plan was also designed for the project, with the objective of facilitating information networks with key community and stakeholder groups.

1.3.2 Directly affected landholders

The proposed changes in the pipe route and associated facilities at Nobels Road would utilise existing road reserves. The main pipeline would also now be diverted to run through the road reserve and re-join the pipeline north of Nobels Road (see Figure 2.1). As a result, three landholders who were previously directly affected by the presence of infrastructure on their property are now no longer so. One landowner will require permanent access to his property via the Old Gympie Road road reserve. This access would be maintained during the construction and operational phases of the proposed facilities at the Nobels Road site.

The concentration of facilities at Nobels Road may result in indirect amenity impacts. Further, one land owner may be directly affected if the State proceeded with a future bulk water supply, such as the Traveston Crossing Dam, and associated facilities were also situated in this location.

The engagement of landholders has been, and will continue to be, an integral part of the project. With the re-routing of the pipeline, other landowners may be indirectly affected. Every effort has been made to engage nearby landholders on an individual face-to-face basis in addition to the measures outlined in the Consultation Plan. This will be on-going.

1.3.3 Native title

As with any form of title, native title bestows certain legal rights upon the title holder/s. The NPI will meet its legal obligations and fulfil the procedural rights of native title parties.

Land the subject of these changes are not expected to affect native title rights as all parcels have previously been alienated.

2 DESCRIPTION OF CHANGES

This section describes the changed features of the pipeline and associated facilities along the NPI. It reviews the design objectives and provides justification for the changes.

2.1 Change Elements

Apart from the pipeline itself, the NPI Stage 1 project requires a chemical dosing facility to enable the drought water supply scheme to operate.

The Stage 1 EIS envisaged the following:

- A pipeline easement running north over private property from Old Gympie Road to Nobels Road and within existing easements
- Connections to the Landers Shute and Aquagen water pipelines
- A future pump station on the Nobels Road reserve
- A future balance tank partially on private property and the Nobels Road reserve
- A chemical dosing facility somewhere near the confluence of Stages 1 and 2 to treat chlorinated and chloraminated water from the treatment plants.

A Value Management exercise was initiated so the proponent could assess the relative benefits/risks associated with co-locating facilities at the Nobels Road site and changes to the corridor alignment to link the site with existing mainline feeder networks and the NPI. The proposed key change elements are:

- Deletion of the line between Old Gympie and Nobels Roads and construction of a pipeline along the Old Gympie Road Road reserve (near Eudlo Road and Nobels Road)
- Relocation of the connection point to the Landers Shute line to near the intersection of Cogdens Road and the Sandy Road rail line
- Relocation of the connection point to the Aquagen line to near the intersection of Nobels Road and Eudlo Road
- Siting of a chemical dosing facility in the Old Gympie Road road reserve

Figure 2.1 broadly shows the changed elements compared with the Stage 1 EIS. Figure 2.2 shows the proposed layout at the road reserve with reference to potential future works necessitating each element.

2.2 Need for Change

The changes confirm the location and arrangements for infrastructure facilities and are needed for the completion of Stage 1 of the NPI to enable water to be treated and transported effectively under drought flows. Further, the changes would enable efficient integration of the future facilities required for the NPI Stage 2. Co-location of facilities would reduce impacts on a number of landowners. Two technical reports have been produced to justify the location of all NPI facilities at the proposed Nobels Road site. These reports are summarised in this section and attached to this document in Appendix A and B. However, the Report for the proposed change is only required to assess the changes described for NPI Stage 1 – a route alignment deviation and chemical dosing facility. Aspects of the technical reports assessing the balance tank and pump station are provided for information only.

2.2.1 Chemical dosing facility

The chemical dosing facility enables treatment of the water prior to delivery to the greater Brisbane region at Caboolture and North Pine. To comply with pipeline water quality management needs and disinfection requirements of the customers (Caboolture and Brisbane), chemical dosing of the NPI water is required within the vicinity of the Nobles Road balance tank, but no further south than the township of Landsborough. Chemical dosing must occur under a low pressure environment to ensure the size of the facility is minimised.

Water transported by the pipeline will have an increased retention time due to the length of the traverse (47 km) and the low pressure within the pipe. In order to maintain high standards of potable supply, all water in the pipeline will require treatment prior to transport.

2.2.1.1 Size

The chemical dosing facility sizing has been analysed for NPI Stage 1drought flows. Under NPI drought flows scenario, the building would be approximately 35m by 17m. Incorporating potential future bulk water flows, the size of the facility would increase to 42.5m by 18.5m, an additional building length of 6.5m and width of 1.5m.

The types, concentrations and storage volumes of chemicals to be used at the facility are:

- Sodium hypochlorite - 10% - 74 kilolitres
- Sodium hydroxide - 32% - 28 kilolitres
- Aqueous ammonia - 25% - 23 kilolitres
- Sulfuric acid - 60% - 23 kilolitres

All chemicals will be stored in bunded tanks under a relevant Environmentally Relevant Activity certificate of registration (see section 3.2 for a description of these approvals).

The configuration of the site, discussed above, is designed to enable delivery of chemicals by truck. Trucks will enter the site, deliver chemicals at the appropriate storage depot and then exit the site by a two-lane road. A permanent access to the adjacent landowner will be maintained.

The chemical dosing facility will be chain-wire fenced and security lighting will be installed. The security lighting will be of a suitable height and type not to produce any significant off-site luminescent

issues. The power and telecommunications requirements for the site will require upgrades. Discussions have been held with the respective authorities on these upgrades.

2.2.2 Future facilities located at the same site

2.2.2.1 Balance tank

Aquagen currently operates the Landers Shute WTP and the pipelines from the plant. This system supplies almost all of Caloundra City and the majority of Maroochy Shire with potable drinking water. Pipelines from the Landers Shute WTP are intended to provide the drought water supply to Stage 1 of the NPI.

In relation to the introduction of Stage 2 supplies into the NPI, discussions were held with Aquagen regarding the hydraulic control of that system. Aquagen advised that Stage 2 NPI waters should not enter their system (pipelines and clear water storages) upstream of the NPI connection point therefore a balance tank would be required.

The presence of a head point at the junction of Stages 1 and 2 also allows gravity flow to occur over the segment of Stage 1 pipeline (under flows up to the gravity capacity of that system). This reduces electricity consumption and associated green house gas production provided there is sufficient elevation of the tank. This is more pronounced over the design life for operation of the pumps.

A balance tank is therefore needed as part of the NPI Stage 2 works.

2.2.2.2 Hydraulic grade and pump station

The optimum elevation based on hydraulic studies is 140m RL. This elevation allows flow to pass over the Tunnel Ridge Road high point in the Stage 1 pipeline. Any site at a lower elevation would waste the natural pressure head available from the Landers Shute WTP system. It would also reduce the flow that could be achieved in the southerly direction under gravity flow.

The major peak at Tunnel Ridge Road to be cleared (elevation of approximately 120m RL), is located 4.65km south of the Nobels Road balance tank. The pump station is needed as part of the NPI Stage 2 to achieve the 65 ML/d design flow rate capacity. This needs to be located north of the Tunnel Ridge Road peak, at the Nobels Road site.

2.2.2.3 Water quality

Three sources will mix at the confluence of the Stage 1 and Stage 2 pipelines at the Nobels Road site. It is logical for a balancing storage to occur at the site of the mixing.

It is undesirable for the water sources from NPI Stage 2 to enter the Aquagen supply system as the water being supplied to Caloundra and Maroochy councils from the Landers Shute WTP would become of variable quality with water from Image Flat and Noosa WTPs mixing with the output from Landers Shute WTP.

The Nobels Road balance tank option (discussed below) enables mixing of the three sources prior to delivery to the greater Brisbane region at Caboolture and North Pine.

2.2.2.4 Size

The drought emergency balance tank is sized to 5 ML which is almost 2 hours storage at the drought emergency regulation flow of 65 ML/d. At a wall height of 10 m, this equates to a diameter of just over 25 m.

The drought emergency pump station will be a variable speed drive, sized to deliver the drought supply flow. The pump station configuration is proposed to be 1 duty, 1 standby arrangement. Hence the pump station duty will be 1062 L/s at 15m head, with a 250kW motor. The approximate footprint of the pump station building will be 13.5m by 10.9m, with an adjacent switchboard building of 8.5m by 4.3m.

2.3 Justification for Site Selection

The decision to co-locate facilities was made after the careful consideration of alternatives. Several sites were assessed in the region of the Nobels Road site, but the road reserve was determined to be the most favourable on a number of levels.

2.3.1 Chemical dosing facility

A comparative exercise was conducted on six sites for siting of the chemical dosing facility. The sites assessed were:

- Land located just to the south west of where the Caloundra water supply main crosses the NPI corridor
- Land located on Eudlo Road, Mooloolah Valley
- Land located at the end of South River Drive
- Land located south of Mooloolah Connection Road, between the intersections with Jelen Drive and Benzara Lane
- Land located on Old Gympie Road, Mooloolah Valley and adjacent to Eudlo Road, Perrins Road and Nobels Road
- Land located on Caloundra Street in Landsborough, just off Steve Irwin Way

Table 2.1 below summarises the sites comparison. The key criteria for sites were:

- Elevation to be compatible with potential future use
- Land tenure – minimised risk
- Proximity to existing and future infrastructure
- Low pressure delivery
- Access
- Potential for future expansion

Table 2.1 Chemical dosing facility sites comparison

	Site					
Feature	Caloundra Main	Eudlo Road	South River Drive	Sth Mooloolah Connection Rd	Nobels Road	Caloundra Street
Elevation (m RL)	30-65 ✓	30-45 ✓	30-40 ✓	25-105 ×	110-140 ✓	30-38 ✓
Land Tenure	Private (with residence) ××	Private (with 2 residences) ×××	Private ×	Private (with residence) ××	Road Reserve ✓	Private ×
Proximity to Supplies / Networks and Stage 2 connection	100 m spur+1.35km (from source water mixing point) ✓	250m spur+1.74km (from source water mixing point) ××	No spur+2.41km (from source water mixing point) ×	No spur + 3.47km (from source water mixing point) ×	No spur + 0 km (from source water mixing point) ✓✓	No spur + 7.95 km (from source water mixing point) ×
Pressure at injection point	High ×	High ×	High ×	High ×	Low ✓	High ×
Geology	Landsborough Sandstone ✓	Qa-SEQ ✓	Landsborough Sandstone + Qa-SEQ ✓	Qa-SEQ ✓	Landsborough Sandstone ✓	Landsborough Sandstone ✓
Road access for delivery & maintenance vehicles	No road frontage. Access road required ×	Road frontage, but access road still required to site ×	Good road access ✓	No road frontage. Access road required ×	Good road access ✓	Good road access ✓
Room for future expansion	Additional land acquisition required ×	Additional land acquisition required ×	Additional land acquisition required ×	Additional land acquisition required ×	Available in road reserve ✓	Additional land acquisition required ×
Flora/Fauna value	Remnant vegetation (mapped of concern) ××	Remnant vegetation (mapped endangered) ×	Cleared ✓✓	Cleared ✓✓	Remnant vegetation (but mapped not of concern) ×	Cleared ✓✓

2.3.2 Future facilities

- In addition to the sites listed above, a total of four sites were assessed for the placement of the balance tank and pump station. These sites were:
- Land located between Paper Road, Mount Mellum and Old Gympie Road, Beerwah
- Land located on Lower Mount Mellum Road, Mount Mellum
- Land located on Tunnel Ridge Road adjacent Ford Road and opposite the intersection of Rose Road
- Land located on Old Gympie Road, Mooloolah Valley and adjacent to Eudlo Road, Perrins Road and Nobels Road
- A summary of the constraints are detailed in Table 2.2 below with similar criteria included as for the chemical dosing facility.

Table 2.2: Future facilities sites comparison

	Site			
Feature	**Paper Road**	**Lower Mt Mellum Road**	**Ford / Tunnel Ridge Road**	**Nobels Road**
Elevation (m RL)	50-175 ✓	125-145 ✓	110-125 ×	110-140 ✓
Land Tenure	Private ×	Private (with residence) ××	Private (with residence) ××	Road Reserve ✓
Proximity to Supplies / Networks / Approved Corridor	1.1 km dual spur ××	1.6 km dual spur ××	100 m dual spur ✓	500 m dual spur ✓
Geology	Landsborough Sandstone ✓	Landsborough Sandstone ✓	Landsborough Sandstone ✓	Landsborough Sandstone ✓
Room for additional facilities	Land available ✓	Limited Land available ×	No Land available ××	Land available ✓
Flora/Fauna value	Remnant vegetation (but mapped not of concern) ×	Cleared ✓✓	Cleared ✓✓	Remnant vegetation (but mapped not of concern) ×

The land relevant to these comparative analyses are shown in Figure 2.3 below.

3 DESIGN AND CONSTRUCTION

In designing the NPI, the overriding objective was to provide infrastructure capable of supplementing the regional water supplies to south-east Queensland to meet the demands of an expanding regional population.

Demonstration of the need and justification of the location of associated facilities have been described in detail in Section 2. This section discusses the proposed design and construction of the facility.

Figure 3.1 shows the conceptual site layout.

3.1 Construction

The configuration of the construction corridor is dependent on a range of site attributes, including:

- Adjacent land impacts
- Topographical
- Environmental
- Existing and required engineering design features.

In conjunction with an implemented community engagement strategy (see Section 1.3 above), local residents and directly affected landowners will be informed of all pre-construction, construction and post-construction activities.

3.1.1 Pipeline

A corridor of up to 30 m is required to allow construction of the pipeline to be completed quickly, safely and with minimal impact on site-based activities and adjacent landowners. In some cases, the easement width may be reduced because of overriding engineering, environmental or social constraints. The corridor may also be used for movement of trucks transporting overburden from the site.

A restricted corridor of 15–20 m will be achieved by reducing the width of the right of way (ROW) and the movement of vehicles and machinery through the construction site. Wherever possible, works will be restricted to existing road reserves or infrastructure alignments.

The main construction phase will involve the establishment of a trench in which to lay the pipeline. Depending on the underlying substrate characteristics, this may be undertaken by a trenching machine, excavator, rock saws, rock hammers or, in hard rock terrain, blasting. A combination of these techniques is likely to be used in most areas.

At the north of the site, there are common areas of pipe between current and future potential uses for the site. In order to reduce impacts on the functional operation of the site for NPI Stage 1, it is intended to lay pipe in preparation for these future uses. Specifically, a section of approximately 100 m in length will have two large diameter (up to 1.6 m diameter) pipes laid within a single trench. Only one pipe will be necessary for the operation of the Stage 1 works. The second pipe would be necessary should a future bulk water source be available. Laying of a second pipe in the same trench as those required for NPI will reduce the overall footprint of works at the site and mitigate the need to retrofit sections already constrained by topographical features.

The logistics for supplying materials for the laying of the pipeline will involve stringing the pipe sections along the ROW where possible and joining the sections, either by welding or using rubber ring joints. Temporary pipe lay-down areas will be established adjacent to the ROW in order to maximise the productivity of pipe-laying crews.

Storage areas will be required for bedding material (sand), overburden or screened trench subsoil. These materials will be placed in the trench to support and protect the pipe coating from external damage. After the pipeline is placed in the trench, the subsoil and topsoil will be replaced to their original horizons.

Details of proposed construction activities and methodologies are included in the approved EIS.

3.1.2 Earthworks and structures

A ridge line was chosen for the works given the need for the facility to be elevated. The majority of the works that occur within the road reserve also take place along this ridge line.

The chemical dosing facility will occupy an area of around 2,700m². Part of the reason for a facility of this size is to allow for the entire area to be bunded, thereby allowing for accidental or emergency spillage. The size of the footprint necessary for the facility will also accommodate bushfire risk mitigation areas and the engineering detail necessary to manage local geological features associated with soil movement. As mentioned above, trucks will deliver chemicals to the site for deposition as appropriate chemicals bays within the facility.

3.1.2.1 Preferred option

The area of land affected around the Nobels Road site is approximately 2.0 ha (Figures 3.1 and 3.2). Land atop this ridge will be reshaped to allow for the chemical dosing facility to be built. Further, preparatory earthworks will be completed during the Stage 1 activity to ensure any future structures can also be accommodated on the site. It is generally envisaged that NPI Stage 1 and Stage 2 construction programs will overlap to minimise disturbance in the area.

A maximum of 70,000 m³ cut would be required to prepare the site for the chemical dosing facility, future balance tank and pump station. Additional site works would be required to site any future facilities necessary for transport of a bulk water supply. However, the size of such a facility will be in the order of:

- Up to two 30 ML balance tanks
- A separate chemical dosing facility
- A separate pump station of as yet undetermined size

3.1.2.2 Optional arrangements

It is envisaged three benched concrete areas could be prepared, with the highest point at the balance tank. Given the topography, batters and erosion controls will be required to avoid loss to surrounding land. The expected cut/fill balance is approximately 56,676 m³ cut and 1,467 m³ fill. This option would affect an area of approximately 1.6 ha.

Figure 3.2 shows the extent of works/batters and the extent of the concrete pad at Nobels Road.

A secondary option would be to site the chemical dosing facility close to the northern edge of the site. Future facilities such as an electrical sub-station could then be co-located on private and public lands adjacent Eudlo Road, minimising the use of the Old Gympie Road road reserve. This configuration limits the use of the site for placing facilities necessary to support a future bulk water supply. This option would affect an area of <1.0 ha.

3.1.3 Earthworks method

Prior to commencing earthworks, the site will need to be cleared of vegetation. All clearing operations will incorporate a trained spotter to ensure that no fauna is harmed during the operation, as detailed in the project Fauna Management Plan. The vegetation will either be mulched, or stockpiled depending on need and purpose, as detailed in the project Soil and Water Management Plan and Vegetation Management Plan. The specific process used will be determined on-site, based on the density of the vegetation and the grade of the terrain.

Upon completion of the clearing and grubbing operation the topsoil will be stripped and stockpiled onsite for respreading in the future. These works are likely to be undertaken by excavators, trucks and dozers. If the terrain is flat enough, and quantity large enough, scrapers may be utilised for the stripping operation.

As the site is positioned on a ridge, it is likely that material of medium strength or higher will be encountered. This may require rock excavation techniques such as ripping, rock hammering or even controlled drilling and blasting to win the material. A relevant Construction Management Plan will guide any blasting activities.

The excavation is likely to be undertaken by either an excavator and truck fleet, or a scraper fleet. Preliminary designs indicate there may be some structural earth fills onsite. These fills would utilise site won material and would be compacted using conventional equipment such as compactors, rollers and water carts.

The balance of earthworks (material surplus or shortfall) is not yet determined. If there is a surplus, material may be transported to other areas of the project for utilisation as backfill; stockpiled on site on a temporary basis for future use; stockpiled onsite on a permanent basis; or disposed of offsite. Stockpiling of overburden onsite may require use of existing slopes within the road reserve. The transport of materials from the site may involve the construction of temporary access roads across the site, or on adjacent lands. In the event of a shortfall suitable materials for the site fills would be sourced and imported for use.

During the operation all excavations would be profiled in accordance with design. This may require the redirection of surface waters generated at the site from rainfall to adjacent properties. These surface

flows would be controlled according to the natural surface conditions of the site, as detailed in the project Soil and Water Management Plan.

The approximate duration for site preparatory and earthworks is expected to range from three to five months.

3.1.4 Access

Adjacent landowner access is currently via the road reserve. This access will be maintained during the construction and operational phases of the project. A legal access arrangement will have to be maintained as part of the permanent tenure arrangements for access to adjacent land parcels (i.e. easement or reshaping the formal road boundaries).

3.1.5 Timing

The NPI Stage 1 has a regulated completion date of 31 December 2008. The completion of Stage 2 has not yet been defined, but this stage is also part of the emergency drought relief regulations and would be completed as soon as is practicable following the Stage 1 works.

3.2 Approvals

The next Section discusses how potential impacts will be managed. It provides for a series of management plans which will be specifically applied to the site. Implementation of these plans will not derogate from the need for relevant statutory approvals as listed in Table 3.1 below. These include vegetation clearing permits, environmentally relevant activity approval (for chemical storage) and road closure permits.

Table 3.1: Statutory approvals required for the works

Legislation	Relevant authority	Action/approval
Environmental Protection Act 994	Environmental Protection Agency	ERA 7
Aboriginal Cultural Heritage Act 2003	Department of Natural Resources and Water	Approved Cultural Heritage Management Plan
Land Act 1994	Department of Natural Resources and Water	Occupying unallocated state land, a reserve or a road
*Vegetation Management Act 1999**	Department of Natural Resources and Water	Ongoing clearing permit
Fire and Rescue Service Act 1990	Queensland Fire and Rescue Service	Storing dangerous goods during the project
Nature Conservation Act 1992 and Nature Conservation Regulation 1994	Environmental Protection Agency	Taking, using or interfering with protected plants
Transport Infrastructure Act 1994	Queensland Transport	Works or encroachment upon a state-controlled road

3.2.1 Vegetation Management Act 1999

The *Vegetation Management Act 1999* (VMA) regulates the clearing of mapped, remnant vegetation on freehold land. The objectives are to:

- preserve remnant regional ecosystems that are endangered; preserve vegetation in areas of high nature conservation value; and preserve areas vulnerable to land degradation
- ensure clearing does not cause land degradation
- maintain or increase biodiversity
- maintain ecological processes and encourage ecologically sustainable land use.

The NPI project will traverse a number of regional ecosystems that are classified as 'endangered' and 'of concern'. Accordingly, any clearing works associated with construction of the pipeline or associated infrastructure must comply with the provisions of the Act.

As the NPI has been declared a significant project under s 26 of the SDPWOA, clearing is deemed to be for a relevant purpose under s 22A(2) of the VMA and an application to clear can be assessed. Clearing would be assessed under Part S of the Southeast Queensland Bioregion ("the Code") adopted on 20 November 2006.

Where the current extent of a particular RE type cannot be maintained, it is a requirement of this approval that any clearing of mapped vegetation is offset in accordance with the Policy for Vegetation Management Offsets (23 August 2007). Applications will be made to NRW as appropriate and approval sought for all relevant areas of clearing. Where vegetation offsets are required, the proponent will enter into an agreement to provide these through the strategic acquisition of land for conservation purposes. Permits will be sought for this area in addition to the approvals already obtained for the NPI Stage 1.

3.2.2 Environmental Protection Act 1994 and Regulation

The *Environmental Protection Act 1994* is administered by the Environmental Protection Agency (EPA) with the objective of protecting Queensland's environment while allowing for development in an ecologically sustainable manner.

Importantly, the Act defines the need for the evaluation of any significant development likely to impact upon the environment. The Act also sets out the requirements for an environmental management plan and establishes rules for defining environmentally harmful impacts and the need for mitigating measures and performance criteria to monitor the success of limiting the effects of adverse impacts.

General environmental duty: In accordance with s 319 of the *Environmental Protection Act 1994*, the NPI project proponent and operator are under a duty not carry out any activities that cause, or are likely to cause, environmental harm unless they take all reasonable and practical steps to prevent or minimise the harm. This "general environmental duty" places a clear onus on the NPI project team to implement measures for preventing environmental harm.

Environmentally relevant activities: The Act also requires environmentally relevant activities (ERAs) to be authorised by an administering authority. These area activities which have the potential to release contaminants into the environment. Schedule 1 of the Environmental Protection Regulation 1998 lists

all ERAs. Level 1 ERAs are considered to pose a higher environmental risk than Level 2 ERAs, but both require a development approval (or code of environmental compliance where one has been approved), and both require the operators have a registration certificate.

3.2.2.1 ERA – Chemical Storage

Storing chemicals (other than crude oil, natural gas and petroleum products), including ozone depleting substances, gases or dangerous goods under the dangerous goods code in containers having a design storage volume of:

- more than 10 cubic metres but less than 1 000 cubic metres; or
- 1 000 cubic metres or more

This type of approval is defined as ERA 7 under schedule 1 of the Environmental Protection Regulation 1998 requires a development permit and a registration certificate.

3.2.3 SPP 1/03: Mitigating the Adverse Impacts of Flood, Bushfire and Landslide.

The site has been assessed against the broad criteria of the SPP. The position of the facility is in a ‘high risk’ area given the vegetation and slope. The site access to the arterial road to the north away from the southerly slopes allows an acceptable timeframes for evacuation. The facility will also adopt mitigation measures such as water storage on site for bushfire fighting purposes.

4 ENVIRONMENTAL VALUES

This section provides an overview of the potential impact and mitigation measures associated with the construction and maintenance of facilities at the Nobels Road site. Some potential impacts and mitigation measures have not been referred to in this report as they have either been adequately covered in the assessed EIS or are not relevant to the change.

4.1 Physical Alteration of the Area

The pipeline is subterranean for the bulk of its traverse and will be installed with a minimum cover of 900 mm by digging and re-covering trenches along the ROW. Disturbance of the substrate will be minimised and any relevant features, including driveways, roads, fences, other infrastructure and landforms reinstated following construction.

While the construction aims to utilise existing easements or road reserves, many are vegetated and will require clearing. Where it is required, clearing to a maximum width of 30 m will occur for pipelaying. Clearing for the earthworks component will be as described above in Section 3.1.3.

Vegetation clearing will be undertaken in accordance with best practice for minimising/avoiding impacts on significant vegetation, minimising the practical width of clearing for construction and keeping surface disturbance and soil removal to a minimum. Clearing of mapped remnant vegetation will require permission under the *Vegetation Management Act 1999* (VMA). All clearing will be in accordance with the project Vegetation Management Plan, with reference to other relevant plans.

The construction of the pump station, balance tank and chemical dosing facilities will result in major earthworks adjacent to the ROW. This work will be guided by an extensive Construction Environmental Management Plan (EMP). The Construction EMP for the NPI project was implemented in October 2006 and will continue for the life of the project.

4.2 Geology and Geomorphology

The site sits along a steeply elevated and rocky ridge line. The majority of works will be in the Landsborough Sandstone formation. Given the elevation and geology of the area, there is a low probability of acid sulfate soils.

The key issues identified for this section of the alignment are as follows:

- A significant length of this section of the alignment is underlain with rock at shallow depth and this will require removal (see Section 3.1.3 above).
- The potential exists for soil erosion and sedimentation from vegetation clearance and trenching operations.

4.2.1 Geotechnical aspects

Initial geotechnical investigations have been conducted, revealing rock underlies a thin layer of surface soil. Further investigations will determine the most efficient method of safe removal of the rock.

Geotechnical aspects of the physical environment that lead to longer construction time and/or excessive costs have significant environmental impacts. The potential for blasting could result in structural disturbance, noise and air pollution and increased site disturbance. All blast impacts will be managed through the existing Blast Management Plan.

4.2.2 Soil erosion and sedimentation

The areas at greatest risk of erosion during construction are those where slopes exceed 10%. All construction activities are guided by the NPI Soil and Water Management Plan to ensure any risk of soil erosion is managed and mitigated.

Initial analysis of the works area indicates that much of the operations will be on or directly adjacent to steeply elevated land (greater than 10%). This will require specific site management strategies to mitigate the risk of significant impacts on adjacent properties. As discussed above, surface waters may be redirected to adjacent properties depending on the natural flow paths identified at the site following earthworks and legal points of discharge.

4.3 Contaminated Land

No known contaminated sites have been identified in the area. Measures to account for contaminated material identified during construction, and measures to avoid contamination as a result of construction, will remain the same as the measures detailed in the EIS.

4.4 Terrestrial Environment

Most of the areas impacted by the change are relatively undisturbed bush land or low density residential land. Some neighbouring parcels of land are under covenants protecting them as nature reserves and indeed the works will intersect part of a State Wildlife Corridor.

Terrestrial environmental features were surveyed to establish the nature of the existing environment and its potential to be impacted by construction. Assessment of biological features comprised both desktop and field studies to determine the likely impacts on species of flora and fauna as well as ecological communities along the proposed area of works.

A specialist flora and fauna habitat assessment was conducted specifically in response to this Proposed Change to NPI Report and has been heavily drawn upon in this section. The full report is included in Appendix C. The report was not conclusive in determining what species would be directly impacted by the works, and further work will be required prior to construction to ensure any species of state or federal significance and identified and managed to prevent long-term negative impacts.

All biological data presented is representative both of the maximum affected footprint and adjacent areas of interest. Together, this area was used to define the study area.

4.4.1 Methodology

4.4.1.1 Vegetation communities

The conservation status of regional ecosystems (RE) within the study area was assessed according to the Queensland *Vegetation Management Act* 1999 (VMA). Under the current classification, REs are categorised according to the proportion of the pre-clearing extent remaining as 'endangered' (<10%), 'of concern' (10-30%) or 'not of concern' (>30%). This represents, on a broader scale, less than a 1% removal of each vegetation community based on the 1:200,000 RE mapping for the wider area.

Based on field investigations, vegetation communities were identified from dominant species, structure and habitat and checked against RE mapping provided by the EPA. Where remnant vegetation had not been mapped, plant communities were equated with the closest matching community listed in the REDD (Regional Ecosystems Description Database).

4.4.1.2 Significant habitats

The EPA's biodiversity planning assessment process uses the Biodiversity Assessment and Mapping Methodology (BAMM) to determine significant habitats in Queensland. The review revealed that the works area forms part of a larger habitat corridor linking other areas in the region.

Caloundra City Plan overlays were also assessed. The overlays re-affirmed State mapping, showing the area as having a high habitat value.

4.4.1.3 Significant species

As part of the desktop phase, species records were obtained from the Queensland Herbarium database, the EPBC Online Protected Matters Database and the Wildlife Online database maintained by the Queensland EPA. The results of searches were used to target the field investigations.

4.4.1.4 Field surveys

Field surveys were undertaken by qualified ecologists in November 2007. Land in and around the area of disturbance was investigated. The survey identified all species encountered, while specifically targeting legislatively protected species. These records are shown in Appendix C and represent observations of species known or likely to utilise the surveyed lands.

4.4.2 Existing values—flora

The area of interest is atop a ridge within a declared road reserve. The site is adjacent public reserve and private property. Significant earthworks are required to prepare the site for construction of associated facilities and the total estimated footprint for the preferred option is approximately 2.0 ha.

The following discussion of vegetation types refers to both the regional ecosystem classifications as utilised by Young and Dilleward (1999) and Young et al. (1999) in Sattler and Williams (1999) and their status ascribed under the *Vegetation Management Act* 1999. The Regional Ecosystems observed for the study area (1:10,000) are tabulated below in Table 4.1. The short description and status for each is that current within Version 5.0 of the REDD (Regional Ecosystem Digital Database on the Queensland Herbarium website).

Table 4.1: Status of Regional Ecosystems mapped or identified within or near the study area.

Floristic and Geological Association	Regional Ecosystem	Status (*Vegetation Management Act 1999*)
Eucalyptus pilularis tall open forest on sedimentary rocks	12.9-10.14	No Concern At Present
Open forest complex often with *Eucalyptus acmenoides, E. major, E. siderophloia* ± *Corymbia citriodora* on sedimentary rocks	12.9-10.17	No Concern At Present
Eucalyptus grandis tall open forest on alluvial plains	12.3.2*	*Of Concern*
Melaleuca quinquenervia open forest on coastal alluvium	12.3.5*	No Concern At Present

Note: (*) indicates these assemblages were identified in the lower shelves, valleys and gullies on minor alluvials.

4.4.2.1 Significant species—flora

Several species listed as being of significance under the *Nature Conservation Act 1992* (Qld) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) were identified in or adjacent to the works area. These species are listed in Table 4.2 below.

A full list of plant species recorded on the alignment is included in Appendix C.

Further work would be needed to confirm the presence of these species in the works area, depending on the approved option. This will then enable pre-construction, base-line surveys (see 4.4.4.1 below) to be completed to assess which species will be directly affected and which may be indirectly affected.

Table 4.2: Significant species identified on or near the works area.

Scientific Name	Common Name	Occurrence	NCA	EPBC
Parsonsia tenuis	Slender silkpod	X	R	R
Alyxia magnifolia	Chain Fruit	X	R	-
Bosistoa selwynii	Heart-leaved Bosistoa	P	C	V
Bosistoa transversa	Three-leaved Bosistoa	X	C	V
Syzygium hodgkinsoniae	Red Lilly Pilly	-	V	V
Macadamia ternifolia	Small-fruited Queensland Nut	-	V	V
Graptophyllum reticulatum	Reticulated Holly	-	E	E
Bulbophyllum globuliforme	Miniature Mossorchid	-	R	V
Phaius australis	-	X	V	V

Notes: X indicates species found in study area, P indicates probably in study area, (-) possibly in study area

(V) is vulnerable, (R) is rare, (E) is endangered, (C) is critically endangered.

NCA is *Nature Conservation Act 1992 (Qld)*

EPBC is *Environment Protection and Biodiversity Conservation Act 1999* (Cth)

4.4.3 Existing values—fauna

Despite the highly disturbed nature of much of the proposed NPI corridor, most of the study area at the proposed Nobels Road site contains native vegetation and landscape features that provide valuable habitat for a range of fauna species.

Further, this habitat is linked with regional habitats. In highly fragmented landscapes like south-east Queensland, the importance of wildlife corridors in conserving biodiversity by facilitating the movement of organisms between habitat 'patches', is increasingly being recognised (Hilty et al. 2006).

An ecological survey report which details the significant species and habitats is included in Appendix C.

4.4.3.1 Significant species—fauna

One amphibian, ten bird, four mammal and one reptile species have either been confirmed for the study area, or suitable habitat has been recorded and particular species are considered highly likely to occur along the route. A host of others may be found within the study area.

A summary of species potentially on site and subsequent potential impacts is shown in Table 4.3. A comprehensive list of potential species can be found in Appendix C. Further work would be needed to identify which species actually occur on site and would be impacted.

4.4.4 Impact mitigation

The primary impacts on flora and fauna associated with the type of infrastructure development proposed are common for most species and include habitat loss and fragmentation, the intensification of edge effects, downstream impacts of soil erosion, soil compaction and damage to tree root systems and the introduction or spread of pest species. This may result in:

- Loss of threatened flora and fauna species and threatened biological communities as a result of these impacts
- Fragmentation of a State Wildlife Corridor
- Damage to associated significant species or regional ecosystems as a result of these impacts.

The Nobels Road site has been identified as providing a superior engineering solution for the NPI Stage 1, and future facilities for the completed system. Given its ecological value, every effort has been made to reduce impacts as much as practicable by co-locating structures and by consolidating structures on site.

The site supports a State Wildlife Corridor. It is not expected that the proposed activity will result in any greater impact to the function and continuity of the wildlife corridor compared to the existing Eudlo Road to the east. Further, for any of the species identified in the biological surveys there is little likelihood of restricted movement through the corridor because of the proposed activity.

Despite the obvious ecological value of the area, engineering imperatives must prevail to the extent that all direct impacts as a result of the construction are unavoidable. Off site impacts are to be managed according to the NPI Construction Management Plan and other relevant management plans. Detailed below is the strategy for mitigating impacts through specific aspects of the construction EMP (see Appendix D).

4.4.4.1 Sensitive area survey

The site survey contained in Appendix C is not specific as to the exact location of significant species in relation to the earthworks. As such, more specific on site investigations would need to be conducted prior to the commencement of works.

A Sensitive Area Management Plan (SAP) will be prepared in response to this investigation to deal specifically with the issues associated with the Nobels Road site. This plan will:

- Determine the location and extent of “no go areas”
- Identify opportunities for translocation of species
- Establish base-line conditions to compare post-construction rehabilitation
- Recommend mitigation strategies for particular species or communities
- Provide a reporting framework for state and federal interests
- Operate in conjunction with the NPIs established plans discussed below.

4.4.4.2 Flora

All clearing activities will be carried out in accordance with the project Vegetation Management Plan which has been developed in consultation with the EPA. This plan sets out a range of measures to minimise the impact of construction activity on vegetation, including briefings for all staff and sub-contractors, the establishment of 'no go zones' to protect significant vegetation and clear delineation of the corridor and areas for clearing.

Revegetation of the impacted area is significantly impaired at the Nobels Road site. The facilities are to be constructed on a concrete pad and must be kept clear. Revegetation of the batters and land bordering the pad will be undertaken in accordance with the management plans.

4.4.4.3 Fauna

Impacts to fauna will governed by a detailed Fauna Management Plan. This plan will operate in conjunction with the Vegetation Management Plan and SAP, to provide the following (among other things):

- Training for construction personnel involved in clearing and construction activities
- Undertaking additional studies for individual significant species as required, to determine the extent of likely impact and species-specific mitigation measures
- Implementing monitoring programs for individual significant species as required
- Engaging professional spotter/catchers to undertake pre-start checks for fauna and to be present during clearing activities
- Implementing appropriate trench management techniques, including regular monitoring of open trenches and erecting fauna exclusion fencing when trenches are unattended
- Setting appropriate speed limits for construction traffic and, where possible, limiting traffic at dawn and dusk when fauna are most likely to be active.

Where significant species have been confirmed for the alignment, further work will need to be carried out prior to the commencement of works to determine the most appropriate measures to minimise impact.

Specific measures for some species identified at the site may include the following:

- Elf Skink (*Eroticoscincus graciloides*)
  - Where they occur, Elf Skinks are often locally common. The minor short-term habitat loss is likely to be insignificant to the long-term security of the population (BAAM 2007).
  - Retain and replace the leaf litter layer and logs from proposed disturbance areas to provide refuge sites.

- Powerful Owl (*Ninox strenua*)
  - This species is expected to use habitats for either roosting or hunting, particularly within or near riparian vegetation. While there may be some temporary disturbance during construction, no long-term detrimental impact is anticipated.
  - Conduct pre-start checks for this species and minimise disturbance to forested habitats along the route. Deploy nest boxes if appropriate (fauna consultants to advise on a site-by-site basis).

4.5 Native Title, Historic and Cultural Heritage

The SRWP Alliance will exercise its 'duty of care' with respect to the relevant legislation to minimise harm to Aboriginal and historical (non-Aboriginal) cultural heritage objects, areas and sites. This section provides details of the processes in place to manage historic and cultural heritage for the extended alignment.

4.5.1 Native title

Under the current designation as road reserve, the site is unlikely to retain Native Title. However, future use of the site will require closing of the road and re-establishment of Unallocated State Land (USL) description. This USL could then be purchased via freehold once the Native Title features are identified.

The Alliance, in conjunction with the DoIP whom are responsible for land acquisition, will undertake the relevant notifications in accordance with the specific compliance options (typically 24KA being for water infrastructure). This will be in addition to the notifications already undertaken for the EIS.

4.5.2 Aboriginal cultural heritage

A Cultural Heritage Management Plan (CHMP) has been prepared and approved under the Aboriginal Cultural Heritage Act 2003. The approved CHMP covers the works and activities proposed in this Proposed Change to NPI Report.

The Alliance will work in partnership with the endorsed Aboriginal Party to ensure the construction activities are managed according to the CHMP. Early geotechnical and survey works are being supervised by the endorsed Aboriginal Party within the boundaries of the existing adopted CHMP. Given the specifics of the surrounding area and the low probability of the significant disturbance in the area the Alliance will engage the relevant monitors to conduct assessments on the area prior to any significant works. If required by the parties, monitors will be engaged to be present during clearance and construction activities.

4.5.3 European cultural heritage

A search of the Heritage Register (European) on the EPA website revealed that the study area does not contain non-indigenous cultural heritage sites under the Queensland Heritage Act 1992. Two sites were identified as part of the Stage 1 EIS. These are two lots containing different Glass House

Mountains National Park land (Mt Coochin and The Twins reserve), one to the south-west of Beerwah and the other to the west of Beerburrum.

A web search of the DEWHA database revealed no records of heritage sites of interest in the vicinity of the works.

The only other identified non-indigenous 'reported' place (but not on the register) is near the junction of Mt Beerwah Road with Old Gympie Road, where there is Bankfoot House, an old coaching inn. It will not be impacted by the change. A site-based survey will be conducted to identify any features associated with this type of heritage as there is also local knowledge regarding the old Cobb & Co. coaching road within the road reserve at the site..

The searches undertaken to date account for heritage sites a reasonable distance from the originally proposed alignment in the event minor changes are required. In any event, the Heritage Management Plan will be implemented in respect of the Nobels Road site changes. This requires further investigations are undertaken over and above those associated with the EIS.

Following a desktop assessment, the site may be inspected by a suitably qualified person to audit and verify any unrecorded items of cultural interest which may be impacted (stone walls, old fences, building foundations etc). An outcome of these searches will include the production of a report that assesses the significance of any sites, features and places and identifies any potential impacts that development in the area may have, and recommendations for the avoidance and/or minimisation of impact.

Should any artefact be identified during field survey or construction, the relevant government authorities will be notified. The Alliance acknowledges that any intervention should also be considered for all sites which are directly adjoining any registered heritage place.

4.6 Visual Amenity

For sections of the route where only installation of the pipe is required, the pipe will not be visible as it will be buried approximately one metre underground. Occasionally the pipeline may be visible where areas of steeply undulating land are encountered.

While much of the works associated with the Nobels Road site is to take place in road reserves, these reserves have in large part not been developed and form a well vegetated ridge line. Well vegetated, rural residential land adjoins the reserves and these properties would likely be impacted during the construction phase.

A preliminary visual assessment was conducted in December 2007, where visual assessment points and view-sheds were selected to indicate the visibility of the proposed development in the local landscape. These points were graded from being the most visible to not being visible at all. The preliminary results indicate the following:

- HIGH VISIBILITY POTENTIAL – No areas located within the assessment area.
- PARTIAL VISIBILITY POTENTIAL – A few sites may have partial visibility due to these sites being in close proximity to the access road and proposed building site.
- LOW VISIBILITY POTENTIAL – Some areas along Eudlo Road in the vicinity of 171 to 183 Eudlo Road, may have low visibility, but it appears both local ridgeline and steep slope topography along with significant or scattered trees limit visibility or screen views. A view may be possible from the rear of these properties.

- NO VISIBILITY POTENTIAL – The majority of the areas were assessed in this category. Visibility was limited due to the following factors singly or combined - local topographic elements (ridgelines, valleys and steep slopes), distance and/or significant trees.
- TEMPORARY VISIBILITY – Temporary visibility of the access to the development from Eudlo Road is possible on the approach from Maroochy Shire Council). As this is a steep section, cars will be approaching slower. On this approach, views into the proposed development site are limited as drivers will be on the left had side of the road and on the down slope. The cutting for the road will be visible, but the slope and the vegetation may screen the proposed development site. While the Eudlo Road approach from Caloundra City Council side is totally blocked by the hill and cuttings near the site and significant trees.

The preliminary report is included in Appendix E.

4.6.1 Impact management

4.6.1.1 Pipe route

Clearing of the ROW through formerly timbered areas will have a visual impact from roads, or near individual areas. By ensuring that restoration works adhere to a sound and responsible EMP, the negative aesthetics of a landscape with a cleared ROW can be quickly reduced. As the opportunity for public viewing of construction activities will be limited generally to areas of already cleared vegetation, short-term impacts on visual amenity are expected to be low.

4.6.1.2 Associated facilities

The construction of the chemical dosing facility will result in permanent and visual structures. This facility will likely be constructed on a three tiered concrete pad along the Nobels Road ridge line. For Stage 2, the balance tank will have a peak water level of approximately RL140 m.

As much as practicable, the facilities will be designed with a low profile, will have vegetated bunds surrounding them, and will have a shape, profile and colour to blend with the local environment.

During construction the SRWP Alliance will work with owners to ensure that vegetation previously cleared will be reinstated where possible and managed to protect the integrity of the pipeline. Revegetation will be consistent with the Rehabilitation Management Plan.

Visual disruption due to the presence of machines and workers is temporary. Other potential amenity impacts relating to air quality, noise, vibration and general traffic are addressed below.

Some assessment gaps remain, and further investigation will be undertaken to assess potential impacts and subsequently improve management measures.

4.7 Traffic, Transport and Access Arrangements

A preliminary traffic assessment has identified the likely impacts of the pipeline construction activities on the road network. These impacts are categorised in Table 4.4.

Table 4.4: Potential traffic and access impacts associated with construction

Category	Likely impact
Traffic Management	Temporary loss of access to property owners as a result of constructing road crossings and / or constructing the pipeline along road pavements or verges.
	Reduced roadway capacity and delays created by either reduced number of lanes, reduced lane widths and potential motorist interest in construction activity near to or on road carriageways.
	Increased traffic on roads generated by the workforce home based work trips to the site offices, trips between the site offices and the work site and servicing trips associated with the site offices.
Road pavements	Potential increased deterioration of pavements created by haulage of construction plant and materials.

4.7.1 Impact management

4.7.1.1 Traffic Management - Construction

The construction of the pipeline will require temporary closure of lanes on several roads under the control of the Caloundra City and Maroochy Shire Councils. However, the majority of works will take place in a declared yet unused road reserve, thereby reducing potential impacts on traffic flow.

During the construction phase of the project, significant increases in the volumes of small and large vehicles (including over dimension vehicles) could be expected on the local road systems. The largest vehicle use will be the removal of the rock extracted as part of the approximate 70,000m³ earthworks program for the site. Based on the preliminary investigations into the site it is estimated that there will approximately 10 – 20m³ per truck equating to about 1000 vehicle movements in the extraction period. The extraction will occur from both ends of the works area to minimise the time associated with the earthworks.

In additional there will be ancillary movements such as low loaders and site vehicles which will result in impacts to local road uses. Further, the operational use of local road systems will include regular movement of over dimension vehicles transporting chemicals and other equipment to the facility. These movements are expected to occur at least bi-weekly during the operational phase of the facility.

Due to the potential for local impacts on the local road systems, traffic modelling will be conducted to assess the likely impacts of the works as well as to provide a basis for mitigating these impacts. The route and proposed traffic management arrangements arising from the modelling, will be discussed and agreed in principle by the Caloundra City and Maroochy Shire Councils and Department of Main Roads.

4.7.1.2 Traffic Management – Long Term

As part of the discussions with the relevant agencies and local authorities it is expected that long term ingress / egress arrangements will be resolved including the long term use of the supporting road infrastructure and the requirements for road earthworks, slip lanes, acceleration lanes, turning areas, blind spot mirrors and appropriate signage. Traffic Control Plans (showing the locations and face type

of all temporary signs) will be submitted for approval of the relevant road authority prior to commencement of works on these roads. Road closure permits will be sought as required.

4.7.1.3 Pavements

Procedures have been established to assess any accelerated deterioration of the road pavements as a result of the haulage of construction materials.

For roads under the control of the Caloundra City and Maroochy Shire Councils, the condition of each road affected by the construction or haulage of construction materials, will be inspected prior to works commencing. This inspection will be undertaken using a road condition vehicle. Inspections may be undertaken during or after construction if concerns arise as to the condition of pavements. The appropriate remedial treatments will be negotiated with the Council.

4.8 Air Quality

The existing air quality environment along the pipeline route is influenced by regional air pollutant sources (mainly transport and industry related), with minor contributions from local traffic, construction and commercial/industrial sources. Variations in local air quality will occur due to the proximity of sources such as major roads, regional events such as bushfires and dust storms and variations of meteorological conditions such as wind speed, wind direction and atmospheric stability.

The Queensland EPA continuously monitors air quality at a number of sites throughout south-east Queensland. Results for the two sites closest to the pipeline project (Mountain Creek and Deception Bay) are similar to those from monitoring sites throughout the region. Mountain Creek has lower particulates (PM10) than other Queensland monitoring sites, with a lower than normal variation (Appendix F).

These parameters fall well within the recommended air quality indicators and goals outlined above. As such, the existing air quality environment is taken to be in good to excellent condition.

4.8.1 Impacts

The primary impacts on the existing environment relating to air quality, noise and vibration will result from rock breaking and construction of the water facilities at Nobels Road.

Air pollutants associated with the project are mostly emitted during construction in the form of particulates, with very minor contributions of carbon monoxide (CO) and nitrogen oxides (NOx) associated with fuel combustion from vehicles and plant (Appendix F).

During dry conditions, on-site construction activities have the potential to generate dust. The impact of a ‘worst-case’ construction scenario was assessed by a specialist consultant using the Ausplume computer dispersion model developed by the Victorian EPA. Based on this modelling, minimal impacts from particulate matter emissions are expected; however, specific construction activities will need to be managed to ensure the impacts of dust generation are minimised.

The following activities are those identified as specific potential sources of dust as a result of construction works:

- Vegetation clearing

- Earthmoving activities and excavation including construction of batters and stabilisation of earthworks
- Movement of vehicles and construction machinery, both within and outside the construction site
- Transport of construction materials, rubble and waste
- Stockpiling of materials
- Build-up of material around erosion and sedimentation controls.

Most of these activities will occur for a limited period at any location along the pipeline route, and will typically be restricted to daylight hours (nominally 7 am to 6 pm). No direct impacts will occur as a result of tunnelling or boring activities as these works are conducted below the surface.

Operational impacts will be limited as infrastructure will be powered by electricity. There is some potential for emissions from diesel-powered backup generators in the event of a power failure. However, generators will be used as an emergency measure rather than as a standard operational procedure.

4.8.2 Impact management

The primary sensitive receptors in the study area are residential properties and sensitive environmental areas in close proximity to the alignment. Work conducted within 20 m of a sensitive receptor will be carried out in accordance with appropriate dust mitigation measures to ensure that any adverse impacts are minimised. Recommended mitigation measures include, but are not limited to:

- Spraying of the ROW by water trucks during dusty conditions in sensitive areas
- Chipping/mulching of cleared vegetation (rather than burning it) for use on cleared areas to minimise wind-generated dust
- Stopping construction activities or applying appropriate control measures upwind of and close to residences during periods of high wind
- Situating activities involving the use of odorous chemicals and dusty or odour-generating construction or maintenance activities downwind of residences where possible
- Reducing dust generation via watering of temporary access roads and open areas when necessary and covering/watering/revegetating exposed areas and stockpiles.

These measures, and any other mitigation strategies relevant to the project, will be incorporated into a specific Air Quality Management Plan to be implemented during construction of the NPI.

4.8.3 Greenhouse gas

The presence of a head point at the junction of Stages 1 and 2 also allows gravity flow to occur over the segment of Stage 1 pipeline under flows up to the gravity capacity of that system. This will reduce electricity consumption and associated green house gas production over the life of the project provided there is sufficient elevation of the tank.

4.9 Noise and Vibration

Description of environmental values

Unattended noise measurements were conducted at 13 locations along the proposed pipeline alignment to determine the existing noise environment. Some noise monitoring locations were chosen to represent the densest residential area or the most sensitive noise receivers adjacent to the proposed pipeline alignment which may be affected by the construction works of the NPI project. Noise monitoring was also conducted at four locations which are representative of the three pump stations and one balance tank along the proposed pipeline alignment. These results for the sites housing the facilities are shown in Table 4.5 below.

Table 4.5: Noise monitoring locations and measured rating background levels (L A90)

Location	Day	Evening	Night
5 Atkinson Road, Bli Bli	42	44	38
693 Diddillibah Road, Diddillibah	40	37	30
415 Lake Macdonald Road, Lake Macdonald	34	35	32
Nobels Road	37	35	27

* *Night-time levels adjusted to account for the influence of cicadas (or other insects).*

† *Noise loggers at Kookaburra Court, Upper Caboolture and Bellmere Road, Bellmere suffered apparent malfunction and no data was collected from these stations.*

The monitoring was undertaken using Acoustic Research Laboratories Type EL 316 and EL-215 environmental noise loggers programmed to record various statistical noise levels over consecutive 15 minute intervals. Each logger was checked for calibration before and after the survey with a Rion NC-73 sound level calibrator, and no significant drift (±0.5 dBA) in calibration was detected. The prevailing weather data was checked, and no significant periods of adverse meteorological conditions occurred during the monitoring period.

The typical (average) LAeq(1hour) for each daytime, evening and night-time period was also noted for the locations potentially affected by operational noise from the pipeline (shown in Table 4.6).

Table 4.6: Measured LAeq(1hour) Noise Levels

Location	Measured LAeq(1hour) Noise Levels (dBA)		
	Day	Evening	Night
Nobels Road, Mooloolah Valley	53	50	47
693 Diddillibah Road, Diddillibah	59	56	49
5 Atkinson Road, Bli Bli	55	53	50
415 Lake Macdonald Road, Lake Macdonald	60	54	48

Attended noise measurements were carried out on 10, 22 and 24 November 2007 using Rion NA- 27 and SVAN 948 Sound Level Meters. The meters were checked for calibration before and after the measurements using a Rion NC-73 calibrator. A summary of the attended noise measurements is presented in Table 4.7.

Table 4.7: Attended monitoring results for Nobels Road.

Date and Time	Observations	Measured Noise Levels (dBA)		
		LA90	LA_{eq}	LA10
10/10/07 14:14	Occasional road traffic noise from Mooloolah Rd. Insect noise.	38	45	48
24/10/07 18:12	Occasional road traffic noise from Mooloolah Rd. Insect noise.	39	51	56
24/10/07 23:54	Distant traffic noise. Insect noise.	33	37	40

It is apparent that some of the night-time noise monitoring locations were influenced by extraneous noise sources such as insects. The one-third octave attended measurement data was adjusted (by interpolation) to remove the influence of the insects. All noise measurements were conducted in general accordance with the Environmental Protection Agency's Noise Measurement Manual and AS 1055.1 1997 Acoustics—Description and measurement of environmental noises: General procedures.

Potential impacts and impact mitigation

Construction

Sound levels are measured in dBA. Sound levels experienced in day-to-day life typically range from around 30 dBA in a bedroom (very quiet) to 80 dBA on a busy street (loud) to 110 dBA near an activity such as steel grinding (extremely noisy). A change of up to 3 dBA in sound level is very difficult for most people to detect, whilst a 5 dBA change corresponds to a small but noticeable change in loudness.

Noise levels during construction will be highly dependent on the type of construction activities undertaken, their duration and location. The most significant noise source will be mechanical plant operation. Table 4.8 provides sound power levels and anticipated noise levels at given offset distances from the pipeline alignment and assumes no acoustic shielding (i.e. from topography, buildings or noise barriers etc.) between construction activities and receiver.

Table 4.8: Acoustic footprint of construction activities

Construction equipment	Maximum sound power level (dBA)	Construction noise levels (dBA)					
		SPL[1] @ 5 m	SPL[1] @ 10 m	SPL[1] @ 20 m	SPL[1] @ 50 m	SPL[1] @ 100 m	SPL[1] @ 200 m
Excavator	110	83	77	71	63	57	51
Cranes	105	78	72	66	58	52	46
Tip truck	111	84	78	72	64	58	52
Generator	107	80	74	68	60	54	48
Backhoe	107	80	74	68	60	54	48
Bored piling rig	116	89	83	77	69	63	57
Rock breaker	137	110	104	98	90	84	78
Directional drilling rig	115	88	82	76	68	62	56

1. *L_{A10} Sound pressure level (derived by subtracting 5 dBA from the maximum sound pressure level).*

To avoid impacting surrounding land uses, construction hours will generally be limited to 7.00 am to 6.00 pm, Monday to Friday and 8.00 am to 1.00 pm on Saturdays wherever possible. Construction during these hours is not regulated and, as such, there is no need to meet specific noise criteria for the majority of construction works.

A set of generic noise limits has been developed. These will be applied where construction works are to extend beyond normal hours (see Table 4.9). For all construction works, comprehensive noise mitigation strategies will be considered and implemented by a project-specific noise and vibration management plan to be developed in consultation with the Queensland EPA. This plan will support the Blasting Management Plan for the site based on the relevant local (implosion and urban mitigation) methodologies and the accepted practice guidelines regulated by the relevant local authority local laws.

Table 4.9: Generic construction noise criteria

	CRITERIA—BY NOISE AREA CATEGORY					
TIME	R1	R2	R3	R4	R5	R6
Monday to Friday						
7.00 am to 6.00 pm	No limit					
6.00 pm to 10.00 pm	45	50	55	60	65	70
10.00 pm to 7.00 am	50					
Saturday						
7.00 am to 1.00 pm	No limit					
1.00 pm to 6.00 pm	50	55	60	65	70	75
6.00 pm to 10.00 pm	45	50	55	60	65	70
10.00 pm to 7.00 am	50					
Sunday and public holidays						
All periods	50					

R1 *Negligible transportation.*

R2 *Low density transportation.*

R3 *Medium density transportation/some commerce or industry.*

R4 *Dense transportation/some commerce or industry.*

R5 *Very dense transportation/in commercial districts/bordering industrial districts.*

R6 *Extremely dense transportation or within predominantly industrial districts.*

Operation

Once operational, the NPI Stage 1 works will not generate any additional noise impacts. However, consideration has been given to the operational noise associated with pumping facilities associated with reverse flow (being a worst case scenario), which will be required to accommodate the potential future transfer of water from the Brisbane network to the Sunshine Coast.

Operational noise limit criteria for the pump station were developed based on the requirements of the EPA's Ecoaccess Guideline Planning for noise control, which is the standard against which the project will be assessed.

Further work will be done to determine whether the predictions of noise levels from major sources such as pumping facilities, can achieve the recommended assessment criterion as is or whether detailed acoustic design will be required.

All noise emissions, including low-frequency emissions from pumps, will be considered in the detailed design phase of future pump stations. Specialist consultants will be engaged to provide advice with respect to acoustic mitigation measures, which typically include, but are not limited to, measures such as:

- Installation of acoustic louvres on air intakes and exhausts
- Installation of ceiling insulation
- Use of noise-absorbing materials for external shells of pump stations.

Any recommendations made by the acoustic specialist will be incorporated into the design of the pump station, and noise levels will be tested during commissioning to ensure compliance with the relevant guidelines (see above).

4.9.1 Vibration

Potential impacts and impact mitigation

Impacts

Monitoring of vibration levels along the pipeline route was not undertaken. The primary impacts of vibration on human environments relate to structural damage and the effects on human comfort. Vibration is measured in millimetres per second (mm/s). Humans can detect vibration levels well below those causing any risk of damage to a building or its contents. Vibration of 0.15 mm/s is at the threshold of human perception, while vibration of 14 mm/s would be very strongly noticeable.

The highest vibration impacts are expected to occur during the construction phase of the project. The major potential sources of ground vibration are blasting, bulldozers (ripping) and hydraulic rock breakers.

Bored piles are proposed for this project as they will reduce noise and vibration impacts. No building damage or human comfort impacts are expected to be associated with vibration from bored piling activities.

Also, no building damage or human comfort impacts are expected to be associated with vibration from bulldozers and hydraulic rock breakers, as vibration levels at distances greater than 30 m are usually below 0.2 mm/s. Rock breakers generally create high vibration levels at close distances; however, buildings and their occupants are less susceptible to the higher frequencies vibration. Vibration levels caused by heavy rock hammering at various distances are shown in Table 4.10. Detailed geotechnical investigations are required to determine those locations where blasting or rock hammering is required.

Table 4.10: Rock hammering vibration

	Vibration level (mm/s) at given distance					
	5 m	10 m	20 m	30 m	40 m	50 m
Heavy rock hammering	4.50	1.30	0.40	0.20	0.14	0.10

Based on these levels and the likely offset distance to the nearest houses along the pipeline route, there should be no building damage or human comfort impacts associated with vibration from the rock break operation.

Heavy trucks passing over normal (smooth) road surfaces generate relatively low vibration levels, typically ranging from 0.01 mm/s to 0.2 mm/s at the footings of buildings located 10 m to 20 m from a roadway. Very large surface irregularities can cause levels up to 5 to 10 times higher.

Provided all truck routes are maintained to avoid large surface irregularities (e.g. potholes), there will be no building damage or human comfort impacts associated with vibration from truck movements on this project.

The highest vibration impacts are expected to occur during the construction phase of the project. The major potential source of ground vibration is blasting. Blasting will only be considered where the geology is too hard for the use of the excavator. It may be required near Nobels Road, given the hard sandstone north of the Mooloolah Valley.

Assessment of the vibration levels associated with general construction activities such as piling and general traffic movement, has indicated that pipeline construction will not result in any damage to buildings or human comfort impacts.

It is not anticipated that any vibration impacts will be generated during the operational phase of the NPI.

Impact mitigation

General construction activities and equipment will not require vibration mitigation; however, blasting activities will need to be specifically addressed to ensure vibration impacts are minimised.

The blasting noise and vibration levels can be reduced by consideration of the following:

- Reducing the maximum instantaneous charge (MIC) by using delays, reduced hole diameter and/or deck loading
- Investigating alternative rock-breaking techniques
- Establishing times of blasting to suit local conditions.

The use of these techniques would be assessed and recommended accordingly via the Blasting Management Plan. It is anticipated that compliance with the nominated criteria for blasting can be achieved by these techniques when correctly implemented via the recommended blast monitoring program.

To ensure any potential vibration impacts are monitored, building condition inspections will be undertaken prior to the commencement of construction activities such as blasting, pile driving, excavation by hammering or ripping, dynamic compaction or demolition of structures where these works are in close proximity to sensitive receptors. A copy of the inspection report will be provided to each affected property owner.

Vibration due to the construction process has the potential to affect services such as buried pipes, electrical and telecommunication cables. Recommended vibration criteria for electrical cables and telecommunication services such as fibre optic cables range from between 50 mm/s and 100 mm/s. However, although the cables may sustain these vibration levels, the services they are connected to,

such as transformers and switch blocks, may not. Should such equipment be encountered during the construction process, an individual vibration assessment will be carried out.

4.10 Waste

The treatment of specific waste streams are managed through the implementation of a project-specific waste management plan, developed in consultation with the Queensland EPA as part of the construction EMP. The following hierarchy is applied to the management of waste from the facility:

- waste avoidance through optimising construction methods, using minimal packaging and using strict purchasing specifications
- waste recycling through the identification and use of waste recycling centres, or by returning wastes to the product manufacturer for reprocessing
- transport of waste to a registered landfill operation that will explore all alternative waste management strategies prior to final disposal

4.10.1 Construction

The bulk of waste being produced will be as overburden. This overburden will be in the order of 70,000 m^3 of spoil produced from the earthworks operation. Removal and disposal of this material is discussed above.

Many of the other waste materials generated by pipeline construction can be reduced, reused or recycled. Those which cannot be reused or recycled will be disposed of in an environmentally responsible manner. Other wastes can be minimised by quantifying material requirements accurately during the planning and procurement for the facility.

Where waste is unavoidable and has been classified into its waste type, it can then be removed to an appropriate disposal site. The waste management plan details the aspects of waste management, including handling, segregation, transport to landfill.

4.10.2 Commissioning

During commissioning, the release of contaminated wastewater will be the key concern because of the potential to impact on the water quality of any receiving water bodies. The primary source of contamination will be residual chlorine resulting from the use of sodium hypochlorite for pipe flushing and disinfection. Chlorine is a moderately reactive element, which is readily neutralised upon reaction with air, sunlight and other surfaces it contacts. Alternatively, chlorine may be neutralised through the use of dechlorination chemicals.

Potential uses and locations for the release of commissioning waters will be investigated as detailed design progresses; however, the volumes of water are not expected to be significant and are unlikely to cause significant environmental impact, subject to appropriate management. The following will be adopted with respect to the release of commissioning waters to the environment:

- reuse of commissioning waters wherever feasible
- consultation with the Queensland EPA to develop guidelines for the release of commissioning waters to the environment
- no direct discharge of water into a flowing watercourse, wetland, sewerage or stormwater system
- neutralisation of chlorinated water to an acceptable standard prior to release
- diversion of water back to source storages for treatment where appropriate

4.10.3 Operation

Small amounts of waste will be generated as a direct result of ongoing operation and maintenance of the pipeline and facility. All chemical wastes will be managed under the ERA registration certificate, but other wast products may also be generated. This waste is likely to include:

- used oil from vehicle oil changes
- replaced bearings and other worn mechanisms
- replaced failed equipment
- materials common to a typical fieldwork environment, such as waste paper, food scraps and packaging
- green waste from ongoing maintenance of the site.

4.10.4 Decommissioning

The overall NPI will be designed for a 75-year operational life and will have a life expectancy of between 70 and 100 years. It is unlikely that any pipe, unless substantially damaged, would ever be decommissioned and dug up. The current method of reconditioning old pipe is to insert a new pipe inside the old or to reline the existing pipe with the latest materials. However, in 75 years' time there may be more economical and environmentally friendly methods for reconditioning old pipelines.

Should any section of the pipe be decommissioned at any time in the future, the steel pipe and valves could possibly be recovered for scrap metal; however, the GRP would always be waste. Any waste from decommissioning will be managed in accordance with legislation and best practice waste disposal methods at that time.

4.11 Cumulative Impacts

In addition to the proposed activity, a number of other large infrastructure projects are currently planned in the vicinity of the site. These include:

- Landsborough to Nambour Rail Corridor Study - the study area wholly encompasses the private property to the direct west of the existing road reserve identified for the Nobels Road site
- Traveston Crossing Dam Stages 1 and 2 (not yet approved) or other water supply sources as determined by the State - it is highlighted that this location may be suitable for other elements of future water infrastructure subject to further scoping and assessment by the State. Preliminary concepts suggest that these facilities may potentially include two 30ML balance tanks, an additional pump station and additional chemical dosing facilities. Any works of this nature are likely to be outside of the footprint proposed in this report and is likely to require significant earthworks potentially extending beyond the road reserve boundaries.
- NPI Stage 2 - completion of the NPI Stage 2 would require augmentation with the chemical dosing facility discussed herein as well as construction of the 5ML balance tank and pump station described above. These activities are subject to a separate EIS.

Completion of all proposed projects listed above could result in the following:

- Fracturing of the functionality of the State Wildlife Corridor
- Increase the perimeter length of edges along currently intact remnant ecosystems. This would maximise the creation of habitat edges and detract from existing ecological processes. Without suitable mitigation, this could result in significant long-term impacts for habitat specialist species.
- Significant impact on the visual amenity of the immediate site and any lowland vistas
- Increase the permeability of the site to potential weed and pest species infestation

5 CONCLUSIONS AND RECOMMENDATIONS

In accordance with the Terms of Reference adopted for the assessed EIS, this proposed Proposed Change to NPI Report has identified and assessed a range of environmental impacts associated with the planning, design and construction of the NPI in the Nobels Road area.

For integration of the NPI, the need to house the balance tank at the proposed site at Nobels Road is based clearly on engineering considerations. With this, the optimal design solution is to locate the pump station and chemical dosing facility at the same site, thus consolidating like-infrastructure at the same site.

It is important to note that while the chemical dosing facility could be augmented to manage the water requirements of the NPI, the structure will need to be operable for treatment of Stage 1 water by the regulated completion date of 31 December 2008. An approvals process commensurate with the urgency of this timeframe will provide the least risk outcome for delivery of this fast-track program.

Due to the critical nature of the works proposed at Nobels Road, and the unavailability of alternative sites with sufficient elevation, vegetation and habitat loss will result. However, no significant negative impacts were identified that could not be managed through relevant mitigation strategies and plans. The area of impact has been reduced as much as practicable by co-locating structures and by consolidating structures on site as much as possible. Depending on the final design for the site, further reductions in the area of the footprint could be expected.

In order to minimise potential impacts prior to and during construction, the works will be strictly governed by the following:

- Community consultation processes and Stakeholder Consultation Plan
- Construction Environmental Management Plan
- Cultural Heritage Management Plan
- Heritage Management Plan
- Sensitive Area Management Plan
- Vegetation Management Plan
- Fauna Management Plan
- Soil and Water Management Plan
- Rehabilitation Management Plan
- Blast Management Plan
- Noise and Vibration Management Plan
- Air Quality Management Plan
- Weed and Disease Management Plan

Implementation of these management and consultation plans will not remove the need for relevant statutory approvals (state and federal). On this basis, completion of the works necessary for the NPI could proceed with minimal long-term negative impact on surrounding natural systems.

A significant concern is the cumulative impact associated with current planned infrastructure projects in the area. Particularly, the planned Landsborough to Nambour Rail Corridor Study identifies the area to the west of the site as being with the focus area. Further, construction of facilities necessary to support a future bulk water supply could also be co-located at the site. Completion of all planned studies would result in significant long-term negative impacts at the site.

Timely completion of the chemical dosing facility is required for delivery of water from Landers Shute WTP under the NPI Stage 1 scheme. It is considered that the level of investigation and assessment detailed in this report is sufficient to meet the requirements of state and federal processes. As a result of detailed route selection studies, site-specific biological investigations and construction optimisation studies, no insurmountable issues were identified.

6 REFERENCES

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