



Coordinator-General's evaluation report for an environmental impact statement

Northern Pipeline Interconnector – Stage 2 Project

November 2009

**Under Part 4 of the *State Development and Public
Works Organisation Act 1971***

Northern Pipeline Interconnector – Stage 2 Project

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Synopsis

The Northern Pipeline Interconnector (NPI) is a drought response measure set down in Schedule 10B of the *Water Regulation 2002* (the regulation) to supply up to 65 megalitres (ML) per day of potable water to the South East Queensland (SEQ) Water Grid.

The regulation was amended in mid-2008 to incorporate a staged delivery of the NPI, with construction of stage 1 to be completed by 31 December 2008 and stage 2 constructed by 31 December 2011. This amendment principally arose from water modelling undertaken by the Queensland Water Commission (QWC) in early 2008 which showed that the water supply source for NPI stage 1 (Baroon Pocket Dam) could sustain supply of 65 ML per day being transferred to the Brisbane area up until December 2011 and NPI stage 2 being constructed no later than the end of 2011.

Construction of NPI stage 1 was completed in late 2008 and extends from Morayfield to near the Landers Shute Water Treatment Plant (WTP).

NPI stage 2 (the project) is proposed to extend approximately 48 kilometres from near the Landers Shute WTP at Eudlo to the Noosa WTP. The stage 2 pipeline will connect with NPI stage 1 and allow the transfer south of up to 18 ML per day or 6500 ML per annum from an existing water entitlement, authorised under the Water Resource (Mary Basin) Plan 2006, within the Upper Mary River Water Supply Scheme. The entitlement is held by the SEQ Water Grid Manager (SEQWGM). Historically up to 55 per cent of this entitlement has been utilised for urban water supply as part of water allocations held by the previous Noosa Shire Council.

This stage 2 water will be used to supplement supply currently drawn from the Baroon Pocket Dam and being transferred to Brisbane via NPI stage 1. The Baroon Pocket Dam is the principal water supply source for the Caloundra and south Maroochy areas.

The Honourable Paul Lucas MP, Deputy Premier and then Minister for Infrastructure and Planning announced in February 2009 that the stage 2 works would include the implementation of reverse flow capability in both stages 1 and 2 of the NPI. This will afford the Sunshine Coast the same level of water security as the rest of the SEQ Water Grid connected centres. Impacts associated with making the NPI stage 2 reverse flow are assessed as part of the project.


The NPI has also been designed to accommodate additional water from Traveston Crossing Dam (should it be approved) or alternative water supply sources.

The project is approximately 48 kilometres of bi-directional pipeline and associated facilities. The project footprint is approximately 148 hectares, comprised of a 30 metre wide pipeline corridor plus associated facilities of four pump stations, one balancing tank and two water quality boosting facilities.

The proponent for the project is the Southern Regional Water Pipeline Company Pty Ltd trading as LinkWater Projects, a wholly Queensland Government-owned company, incorporated under the *Corporations Act 2001*.

On 21 September 2007, the project was declared a 'significant project' for which an environmental impact statement (EIS) is required, under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The Department of Infrastructure and Planning managed the impact assessment process for this project on my behalf in accordance with the SDPWO Act.

On 24 October 2007, the Commonwealth Minister for the Environment, Heritage and the Arts determined that the project was a 'controlled action' under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Therefore the project also requires



assessment and approval under the EPBC Act by the Commonwealth Minister. The controlling provisions of part 3 division 1 of the EPBC Act are:

- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A).

On 9 September 2009 the proponent made application for the Commonwealth Minister's consideration of a variation of the project's definition under section 156A of the EPBC Act.

The variation arose as a result of:

- omitting the proposal to seek new water entitlements (additional take) from the Mary River
- removing the need to source supplies from the Wappa Dam and the Poona/Cooloolabin systems
- inclusion of a bi-directional function to provide water security to the Sunshine Coast region.

On 8 October 2009, the Commonwealth confirmed that the variation had been accepted.

I note that LinkWater Projects' project alliance partner, the Northern Network Alliance, assessed the potential impacts on matters of national environmental significance (MNES) in accordance with the significant impact guidelines formulated by DEWHA (see Appendix D of the EIS). A buffering capacity of 40 ML per day above the full resource development scenario for the Mary Basin (as established under the Mary Basin Water Resource Plan) was included in the overall assessment of impacts.

Although exceeding the assessment required for the project's current water supply strategy (that is, 6500 ML per annum (18 ML per day)), LinkWater Projects is of the view that this level of assessment provided a greater level of confidence in determining the magnitude of impacts relative to unseasonal fluctuations and extreme events within the Mary Basin.


While the potential impacts on matters relevant to the EPBC Act from the use of existing water entitlements are considered in the EIS, I note advice in the EIS that given that no new water entitlements are being sought from the Mary River, there are no resulting anticipated impacts on endangered, vulnerable and rare (EVR) species or matters of national environmental significance (MNES) in the Mary River due to new entitlements.

The Australian Government has accredited the SDPWO Act EIS process under a bilateral agreement between the Australian and Queensland Governments. Therefore, the EIS process under the SDPWO Act satisfies the process required under the EPBC Act.

The EIS, prepared by LinkWater Projects, was released for public and advisory agency comment on 17 January 2009 until 9 March 2009. A total of 56 submissions was received. As a result of evaluating the submissions I determined that LinkWater Projects was required to prepare a supplementary EIS (SEIS).

Given that the decision to make the NPI reverse flow was taken following completion of the EIS, the identification and assessment of impacts associated with reverse flow pumping has been included in the SEIS. Due to SEIS having information on the reverse flow component, the SEIS was released for targeted public comment as well as being made available to advisory agencies. The SEIS was released on 10 August 2009 until 4 September 2009. A total of 19 submissions was received.

This report has been prepared pursuant to section 35 of the SDPWO Act to evaluate the environmental impacts of the project including those matters requiring assessment and approval under the EPBC Act.



In evaluating the environmental effects, I have considered the EIS, the SEIS, a range of studies and technical reports undertaken in the course of the EIS and environmental management plans prepared by LinkWater Projects and its technical consultants, and public and advisory agency comment on the EIS and the SEIS.

Having regard to the above, I consider that the EIS process conducted for the project has adequately considered the environmental impacts of the project and meets the requirements of the Queensland Government for impact assessment in accordance with the provisions of Part 4 of the SDPWO Act and Part 5 of the *State Development and Public Works Organisation Regulation 1999*.

I recommend that the project, as described in detail in the EIS and the SEIS and summarised in Section 2: Project Description of this report, can proceed, subject to the conditions and recommendations contained in Appendix 1. The conditions and recommendations are provided to manage the potential social and environmental impacts due to the following matters – the Ferntree facility area, the construction method for tunnelling at Pringle Hill, land use, water resources, construction methods for waterway crossings, soil erosion and sediment control, vegetation clearing, construction corridor requirements, air quality, greenhouse gas emissions, noise and vibration, traffic, cultural heritage and waste disposal.

This report will be provided to the Commonwealth Minister for the Environment, Heritage and the Arts, pursuant to section 17(2) of the *State Development and Public Works Organisation Regulation 1999*, to enable a decision on approval of the controlled action for the project pursuant to section 133 of the EPBC Act.

Colin Jensen
Coordinator-General

Date: Signed 6 November 2009

1. Introduction

This report has been prepared pursuant to section 35 of the *State Development and Public Works Organisation Act 1971* (SDPWO Act) to evaluate the environmental effects of the Northern Pipeline Interconnector (NPI) – stage 2 (the project).

The project extends from Landers Shute WTP at Eudlo to the Noosa WTP. A map showing the project is provided in Figure 1.

On 21 September 2007 the project was declared a 'significant project', for which an environmental impact statement (EIS) is required, under section 26 of the SDPWO Act.

On 24 October 2007, the Commonwealth Minister for the Environment, Heritage and the Arts (Commonwealth Minister) determined the project to be a 'controlled action' for potential impacts on the following matters of national environmental significance (MNES):

- threatened species and communities (sections 18 and 18A)
- migratory species (sections 20 and 20A).

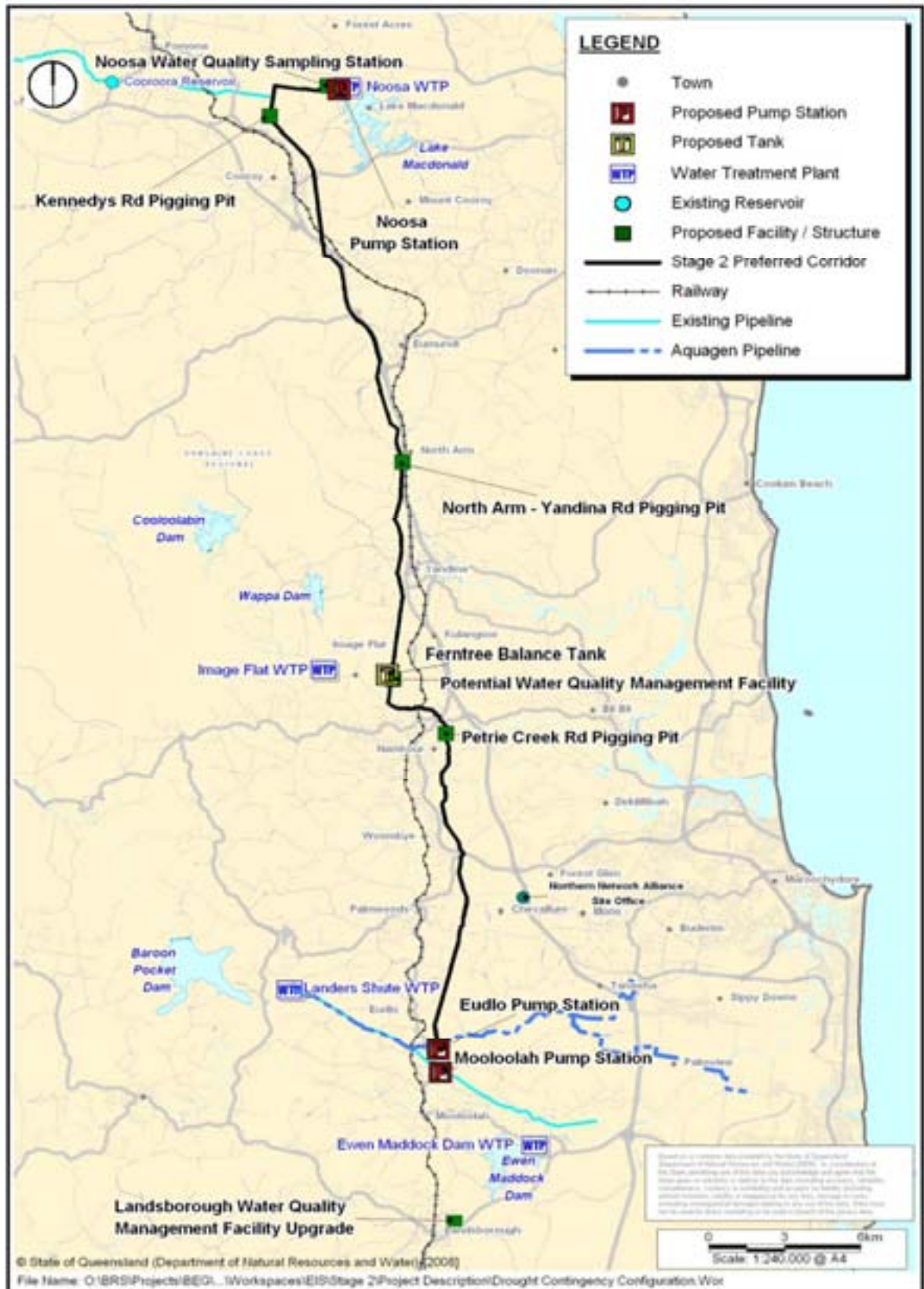
As a consequence, the project requires assessment and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The Australian Government has accredited the SDPWO Act EIS process, under a bilateral agreement between the Australian and Queensland Governments. Therefore the EIS process under the SDPWO Act satisfies the process under the EPBC Act.

For the purpose of this report, the EIS comprises the following documents: Northern Pipeline Interconnector Stage 2, Environmental Impact Statement (December 2008) and Northern Pipeline Interconnector Stage 2, Supplementary Report to the Environmental Impact Statement (July 2009) (SEIS). Both documents were prepared by the Southern Regional Water Pipeline Company Pty Ltd, trading as LinkWater Projects.

In making my evaluation, I have drawn on the information contained in the EIS and in detailed environmental management plans (EMP) prepared by LinkWater Projects to address specific environmental issues associated with each element of the project. In addition, I have considered all public and advisory agency submissions on the EIS and the SEIS; matters raised in correspondence with LinkWater Projects, Commonwealth and state government agencies and government-owned corporations, local government authorities, legal advice and other material relevant to the project.

The objective of this report is to summarise the significant issues associated with the impact assessment of the project on the existing physical, social and economic environments at the local, regional, state and national levels. It is not intended that the report record all the matters that were addressed during the EIS and SEIS process. The report focuses on the key issues that were identified and states the conditions and recommendations under which the project may proceed.

Figure 1 Project locality map



2. Project description

2.1 The proponent

The proponent for the project is the Southern Regional Water Pipeline Company Pty Ltd trading as LinkWater Projects, a wholly government-owned company incorporated under the *Corporations Act 2001*.

LinkWater Projects was established to build the Southern Regional Water Pipeline and has since been tasked with building other pipeline projects that form part of the South East Queensland (SEQ) water grid, including the NPI (stages 1 and 2).

2.2 The project

2.2.1 Overview

The entire NPI project which encompasses both stages 1 and 2 was identified in the state government's Report on the Drought Contingency Projects (2006) and later legislated in Schedule 10B of the *Water Regulation 2002* (the regulation). The regulation directed that the NPI be constructed to provide 65 megalitres (ML) per day by 31 December 2008.

The NPI was one of several projects that were designed to address a forecasted future gap between supply (based on constrained water supply and dwindling water reserves due to prolonged drought conditions) and demand to ensure additional supply was available from a portfolio of SEQ Water Grid projects, which included the proposed Traveston Crossing and Wyaralong dams.


The regulation was amended in mid-2008 to incorporate a staged construction of the NPI, with stage 1 to be completed by 31 December 2008 and stage 2 by 31 December 2011. This amendment principally arose from water modelling undertaken by the Queensland Water Commission (QWC) in early 2008 which showed that the water supply source for NPI stage 1 (Baroon Pocket Dam) alone could sustain supply of 65 ML per day being transferred to the Brisbane area up until December 2011, and NPI stage 2 being constructed no later than the end of 2011.

NPI stage 1 extends from Morayfield to Landers Shute WTP and was constructed as per the regulation by 31 December 2008. NPI stage 2, the subject of this report, will extend from Landers Shute WTP at Eudlo to the Noosa WTP.

Subsequent to the release of the EIS, the scope of the project was varied by the proponent to accommodate:

- omitting the proposal to seek new water entitlements (additional take) from the Mary River
- removing the need to source supplies from the Wappa Dam and the Poona/Cooloolabin systems
- the inclusion of bi-directional function to provide water security to the Sunshine Coast region.

The project will connect with NPI stage 1 and allow the transfer south of up to 18 ML per day or 6500 ML per annum from an existing water entitlement, authorised under the Water Resource (Mary Basin) Plan 2006, and held by the SEQ Water Grid Manager within the Upper Mary River Water Supply Scheme. Historically up to 55 per cent of this entitlement has been utilised for urban water supply as part of water allocations held by the previous Noosa Shire Council.



This water will be used to supplement supply currently drawn from the Baroon Pocket Dam and being transferred to Brisbane via NPI stage 1. The Baroon Pocket Dam is the principal water supply source for the Caloundra and south Maroochy areas.

The NPI will be available to accept water from alternative supplies, such as the Traveston Crossing Dam (TCD) or other future water supply sources. The TCD is currently in its final stages of legislatively required environmental assessment and at the time of writing is under consideration by the Commonwealth government for approval to proceed.

Initially the key components of the project were:

- water pipeline
- a balance tank
- two pump stations for southern flow
- two water quality boosting facility (WQBF) and upgrade to an existing WQBF.

On 20 February 2009, the Honourable Paul Lucas MP, Deputy Premier and then Minister for Infrastructure and Planning, announced a change to the project scope, stating that the NPI would have a reverse-flow capacity from 2012.

Given that this decision was made subsequent to the production of the EIS, the SEIS for the project describes the additional facilities required to facilitate northern flow direction and any environmental implications associated with the construction and operation of these facilities. The additional components required for northern flows are:

- new facilities involving two additional pump stations, connection pipework, valving, a low flow water quality injection point and a chemical dosing system
- connection pipework, valving and ancillary upgrades to an existing water quality management facility (WQMF)
- modifications to the new pump stations originally required for southern flow.

The project will connect otherwise segmented water zones of the Sunshine Coast, which will provide greater security and flexibility of water supply to support growth in the area. As described in section 2.4.3 of the EIS, provision has been made in the pipeline's design for five future off-takes feeding into the Sunshine Coast region's reticulation system for connection to existing or future water distribution networks, further providing for future growth and development of the region.

A map showing the NPI, including reverse flow, is provided as Figure 2.

2.2.2 Water pipeline

The project is approximately 48 kilometres of 1290 millimetre diameter bi-directional underground pipe with a predominant cover of 900 to 1200 millimetres. The project will extend from the Landers Shute WTP, at the northern termination of NPI stage 1 at Eudlo, to the Noosa WTP in the Sunshine Coast region (see Figure 1).

Ancillary infrastructure associated with the pipeline are:

- off-takes
- section or gate valves
- drain-down valves
- air valves
- pigging/clearing pits.

The off-takes to existing or future water distribution networks will be provided at Eumundi, Yandina, Nambour, Pringle Hill and Paynter Creek.



Section valves are designed to isolate sections of pipeline during scheduled maintenance activities or emergency events. Section valves are located at intervals of up to 10 kilometres and will be buried with the pipeline. Some of these valves will have above-ground components which allow them to be turned on and off mechanically, while others will be operated electronically from a remote control area.

Drain-down valves are installed at low pipeline sections to allow water to be emptied during scheduled maintenance activities or emergency events. Water emptied from the pipeline will typically be released through a manhole or pit within the pipeline easement.

Air valves are installed at high points to remove trapped air from the pipeline and improve hydraulic efficiency. These valves require regular maintenance and will be installed in pits to facilitate maintenance access.

Pigging/cleaning pits are installed to allow launch and retrieval of a foam 'pig' for cleaning of the pipeline.

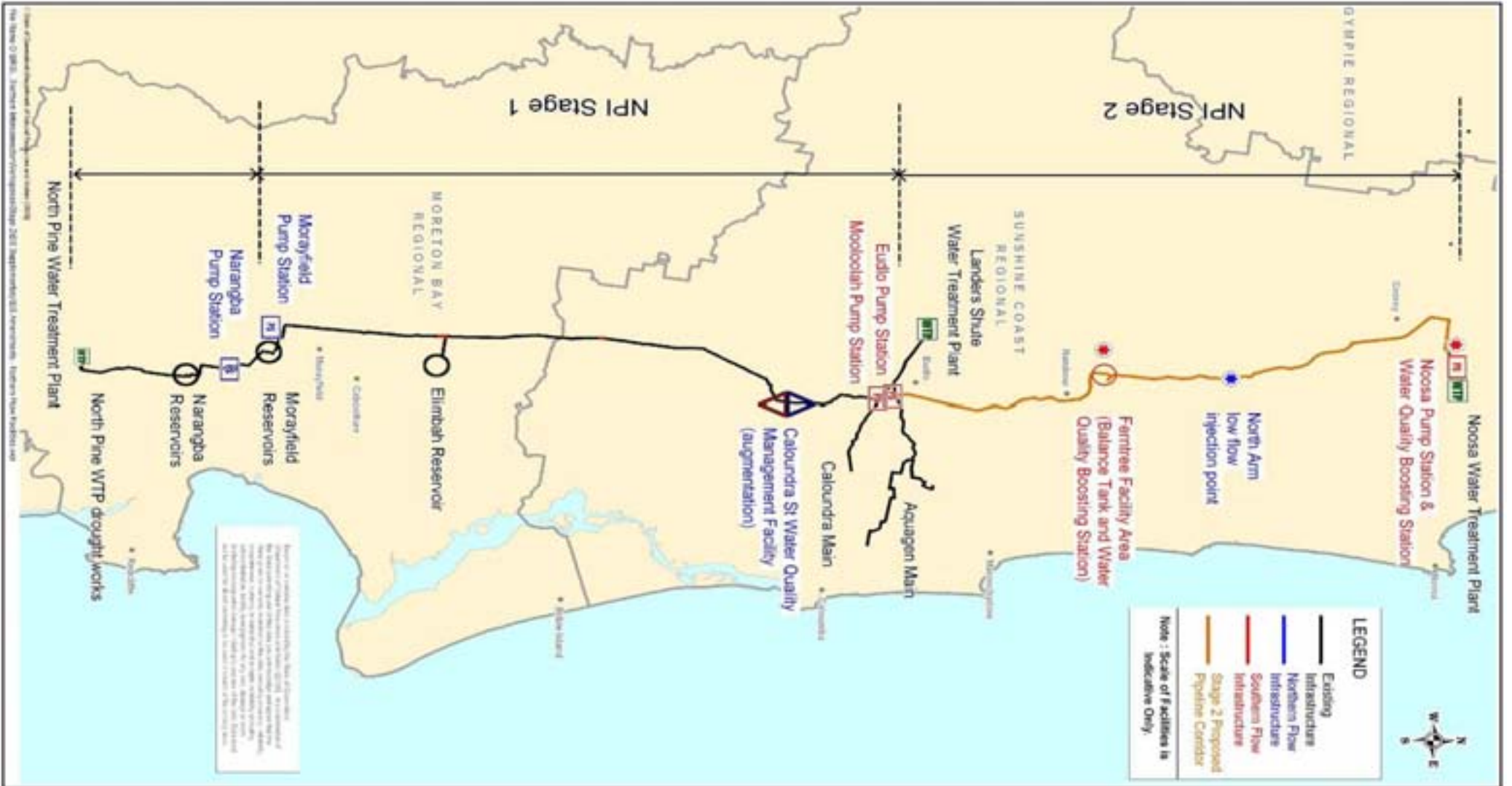
To minimise impacts on property owners and disturbance to native vegetation, the pipeline route is to be located predominately within existing public utility power easements or road corridors. The EIS provides that a pipeline easement of up to 30 metres wide will be acquired where the pipeline is not within the existing power easements. Drainage easements will also be required in certain locations to enable the infrequent discharge of water from the pipeline for maintenance purposes.

The pipeline will cross a number of rivers and creeks in the Maroochy River catchment and the southern extent of the Mary River catchment. Two major tunnel bores have been proposed by LinkWater Projects, one at Woombye to cross the Nambour Connection Road and the other at Pringle Hill. The Woombye tunnel bore will tunnel under Nambour Connection Road to minimise the impact of construction on the Suncoast Christian College and Christian Outreach Centre. A tunnel bore will be used to cross Pringle Hill due to hydraulic limitations and construction constraints over this prominent ridge.

The construction activity is entirely outside of the Coastal Management District and above the highest astronomical tide limit.



Figure 2 NPI map and reverse flow



2.2.3 Balance tanks

A balance tank provides a level of protection against wear and tear on infrastructure due to water hammer within the pipeline. They also split the overall scheme into workable sections that can operate as a local supply in isolation from the rest of the pipeline. Sections can be taken offline for maintenance and repair, with balance tanks providing storage for continuous supply of remaining online pipe sections.

Potential balance tank locations are largely dictated by the elevations of available peaks within close proximity to the pipeline. The presence of a 'head point' at intermediate locations along the pipeline allows gravity flow to occur over the downstream segments of pipeline up to the gravity capacity of the system. Provided the balance tank is sited at sufficient elevation, downstream peaks can be cleared without pipe drills or additional pumping, reducing electricity consumption and associated greenhouse gas production.

One 5 ML balance tank has been proposed for the Ferntree facility area (FFA). It is highly likely that the location of the balance tank will determine future infrastructure associated with transferring water from the proposed TCD or an alternative bulk water supply source. The additional infrastructure associated with TCD stage 1 at the FFA is likely to be a 35 ML balance tank, pump station and an increased WQBF. The access and hardstand at the FFA are proposed to be constructed to accommodate these additional facilities.

2.2.4 Pump stations

The Noosa Pump Station will be located within the Noosa WTP grounds at Lake Macdonald and will operate when surplus water from the treatment plant is available for transfer in the southerly flow direction. This pump station will not operate at times of northern flow direction.


The Eudlo Booster Pump Station will be located at the connection of the NPI and the new trunk main from the Lander's Shute WTP servicing the Caloundra and Maroochy systems. It will be required for both southern and northern flow modes but is expected to be a low-use pump station as it will only need to operate under certain hydraulic extremes. In the southern flow direction it will boost water supplied to the NPI from the Landers Shute WTP main, only at times when the line is at high demand. In the northern flow direction it will boost Brisbane sourced flows into the Caloundra and Maroochy systems.

The Morayfield Pump Station will be required at the existing Morayfield reservoirs to boost flows along the NPI to the FFA. The pump station (above ground) will include two pumps in a blockwork building and a control system located within an electrical switch room. The pump station will be co-located with existing NPI stage 1 works.

The Narangba Pump Station will boost flows from the existing Narangba reservoirs to the Morayfield reservoirs. The pump station will include two pumps within a building and a control system located within an electrical switch room. Additional pipework and associated valving will be required around the Morayfield and Narangba reservoirs to enable northern flows and connection of the Morayfield and Narangba pump stations.

2.2.5 Water quality management facilities

The existing Noosa water quality boosting facility (WQBF) will be upgraded to boost chlorine levels during southern flow direction between the Noosa WTP and the FFA and connection to the existing main to Tewantin. During northern flow direction the WQBF will boost water quality to meet Noosa water supply system standards. The WQBF will consist of a chemical storage building and spill holding tanks with a bunded chemical delivery area. Water quality monitoring equipment will be housed in a building with amenities, office and lunch room.



The WQBF at the FFA will be required to boost the water quality and maintain a standard that meets Australian Drinking Water Guidelines before reaching the Caloundra Street WQMF for southern flow direction. The WQBF will be located adjacent to the balance tank and consist of chemical storage buildings with bunded chemical delivery areas. Water quality monitoring equipment and amenities will be provided on site.

A low flow injection point for water quality may also be required at the North Arm Yandina Creek Road pigging facility to boost chlorine levels between North Arm and Noosa WTP within the pipeline during low flows (in northerly flow direction). Flow volumes of less than 8 ML per day may require additional chemical dosing at this location as determined by the SEQWGM. A small self-bunded chemical dosing system including chemical storage containers will be transported to the site as required. A pipeline water quality sampling and monitoring point will also be located at this site to ensure dosing levels are adequate.

Augmentation to the existing buildings, dosing areas and pumps/skids at the Caloundra Street WQMF will be required to accommodate additional chemicals and procedures during northern flow operation. The northern flow works:

- convert the disinfection regime from chloramination to chlorination
- boosts chlorine levels between the WQMF and the FFA (approx. 27 km) in line with Australian Drinking Water Guidelines.

2.3 Project rationale

The draft SEQ Water Strategy (SEQWS) developed by the Queensland Water Commission (QWC) was released in March 2008 and, in part, highlights the need for interconnectivity between water sources and water users in SEQ through the SEQ Water Grid, to enable water to be transported from areas of surplus to areas of need.

The SEQ Water Grid is the Queensland Government's \$9 billion commitment to substantially upgrade water supplies to meet the needs of an expanding urban population in the region, as well as to 'drought proof' the community through the introduction of new water supplies and, as with the NPI, provide linkages to new and existing water sources to enable distribution to water users across the region.

The primary objectives of the project as they relate to the SEQ Water Grid are to:

- ensure that Brisbane and surrounding metropolitan areas have continuity of essential supplies during drought and in light of the impacts of population growth and climate change
- establish a supply network that ensures the reciprocal security of supply in the event that a water supply shortage occurred on the Sunshine Coast
- integrate the long-term delivery of water from potential future sources, including the proposed TCD.

As previously discussed, since the EIS for the project was published in January 2009, the objectives for the project have expanded to include a reverse flow capacity from 2012.

In summary the project serves the following four purposes:

- drought response
- bulk flows
- water security
- interconnectivity.

Discussion on these purposes is provided in the following section.

2.3.1 Need and alternatives

2.3.1.1 Project need

I note that a number of submissions were received during the EIS and SEIS consultation process questioning the need for the project.

As noted within the EIS, SEQ is one of the fastest growing regions in Australia. Unprecedented population increases over the past decade have coincided with a substantial de-rating of yields from existing water sources following an extensive period of record low-flows. Added to these factors is the risk to water security due to climate change.

These factors have placed increasing pressure on the management and use of water sources for the region. If drought conditions were to persist and water restrictions were the sole means of moderation, available water supplies could become severely depleted in many parts of the region.

The SEQ Water Grid was developed as a short and long-term water security measure, with the key ethos of ensuring connectivity of water supply sources and increasing availability of supply to water users across the region. The NPI project complements this imperative.

2.3.1.2 Policy

I note that the project is a key strategic element of various state government policy documents.

NPI stages 1 and 2 have been identified in the state government's South East Queensland Infrastructure Plan and Program (SEQIPP) (in editions 2006–2026, 2007–2026 and 2008–2026) as a key drought contingency measure and to ensure long-term water supply security. The project is also listed in the SEQIPP 2009–2026.

The SEQIPP is a key component of the regional planning process in SEQ and outlines the Queensland Government's infrastructure priorities to support the South East Queensland Regional Plan.

Previous state government policy that endorsed the project's place in providing valuable additional climate independent water supply for the SEQ region includes Water for South East Queensland: A long-term solution (2006).

In March 2008 the Queensland Water Commission (QWC) released the draft South East Queensland Water Strategy which sets out a new approach to regional water planning designed to meet the region's water supply needs for the next 50 years.

The strategy aims to deliver a new standard of water security for Australia's fastest growing region. In part it sets out a commitment to investigate and secure sites for new climate independent water supplies such as desalination, while acknowledging that sites secured now may not be required for decades to come.

The strategy determines future water supply requirements up to 2056 with forecasting that includes the supply from existing, proposed and new northern water supply sources that will ultimately be reliant on the project for connecting these sources to the SEQ Water Grid.

2.3.1.3 Legislation

In August 2006, when the SEQ region was in its fifth year of extended drought conditions, the Queensland Government's then Minister for Water introduced a Water Emergency Regulation to secure South East Queensland's water supplies.

The *Water Amendment Regulation (No.6) 2006* provided a coordinated set of actions to be undertaken by a number of state and local government entities and provided details on project measures, outcomes, timelines and target water volumes to be achieved.

The project is listed as a measure within this regulation which legislated that the project is to be constructed by 31 December 2008 (NPI stage 1) and for stage 2 to be constructed by 31 December 2011.

Additionally, the project is directed within Part 4A (Drought Contingency Projects) of the *State Development and Public Works Organisation Regulation 1999* as construction works that must be undertaken by LinkWater Projects.

The project has been granted legislative provisions as per section 76E of the *State Development and Public Works Organisation Act 1971* as a 'prescribed project' and 'critical infrastructure project'.

2.3.1.4 Project objectives


The project's key objectives are:

- **drought response:** provide immediate response to a drought emergency declared in SEQ by delivering up to 18 ML per day of water to reduce the reliance on Baroon Pocket Dam for transferring supply to the Brisbane area via NPI stage 1.
- **bulk flows:** provides a longer term planning strategy for the transport of bulk water from any new water supply on or north of the Sunshine Coast. The project is designed with the capacity to transport up to 200 ML per day of water from any future source.
- **water security:** provides a bi-directional (southern and northern flow direction) capacity for moving water to areas where it is required—ensuring water security for the Sunshine Coast.
- **interconnectivity:** the project will connect the otherwise segmented water zones of the Sunshine Coast. This will provide greater security and flexibility of water supply to support growth in the area. Furthermore, a provision for five future off-takes feeding into the Sunshine Coast region reticulation system will be incorporated into the project pipeline design.

2.3.1.5 Drought response

The project will connect with NPI stage 1 and allow the transfer south of up to 18 ML per day or 6500 ML per annum from an existing water entitlement, authorised under the Water Resource (Mary Basin) Plan 2006, and held by the SEQ Water Grid Manager within the Upper Mary River Water Supply Scheme. Historically up to 55 per cent of this entitlement has been utilised for urban water supply as part of water allocations held by the previous Noosa Shire Council.

This water will be used to supplement supply currently drawn from the Baroon Pocket Dam and being transferred to Brisbane via NPI stage 1. The Baroon Pocket Dam is the principal water supply source for the Caloundra and south Maroochy areas.



Water modelling by the Queensland Water Commission (QWC) in early 2008 showed that on the basis of certain inflow assumptions the 65 ML per day transfer from Baroon Pocket Dam to the Brisbane area could be sustained up until December 2011.

Given the pipeline will have dual flow capability, the project will also act as a drought response measure for the Sunshine Coast region in future times of drought.

2.3.1.6 Bulk flows

While final approval of TCD is currently the subject of review by the Commonwealth, should the dam be constructed, there will be an imperative to connect the 70 000 ML per annum supply available from this project (200 ML per day) to the SEQ Water Grid via the NPI. Should the TCD not proceed, the project will connect to future new sources of water supply which is part of QWC's future water supply planning, such as a desalination plant.

2.3.1.7 Water security

Although the Sunshine Coast has not experienced water shortages of the same severity as SEQ in recent years, the vulnerability to drought of the Sunshine Coast water storages has been demonstrated on a number of occasions. For example, the storage level of Borumba Dam declined from full storage capacity to 13 per cent capacity in a period of 19 months (from May 2000 to February 2003). In early 2003, it was estimated that Noosa, which is solely reliant on Lake Macdonald for water, had approximately seven months of supply in reserve.

The Sunshine Coast is currently supplied with water from two systems, the:

- Caloundra and Maroochy system, comprising the:
 - Baroon Pocket Dam and Ewen Maddock Dam servicing Caloundra and the southern portions of Maroochy
 - the South Maroochy system comprising Cooloolabin, Poona and Wappa Dams and servicing urban areas north of the Maroochy River and Petrie Creek through to the previous Noosa—Maroochy Shire boundary
- Noosa and Gympie system, comprising Borumba Dam and Lake Macdonald and servicing the previous Noosa Shire.

The Caloundra and Maroochy system

The QWC has calculated that with repeated mean inflows (i.e. 1984–85 inflows) and targeted water consumption levels (Target 200, being an average regional residential target of 200 litres per person per day), and supply south of 65 ML per day, the combined storage levels for the Caloundra and Maroochy system would remain above 70 per cent capacity until the end of 2011. Under the worst case inflow scenario and Target 200 water usage, the combined storage level may approach 50 per cent storage capacity by late 2011.

Noosa has no alternative supply of treated water and is currently the largest population centre in SEQ in this situation. This is of concern to the Queensland Government and to the Sunshine Coast Regional Council. Connection of Noosa to the SEQ Water Grid via the NPI stage 2 will provide an alternative supply of treated water for Noosa, thereby providing it with the same level of security as the rest of the SEQ grid connected centres.

It is therefore prudent planning that reverse flow to the Caloundra and Maroochy system could be provided now from NPI stage 1 given the availability of stage 1 and that reverse flow for stage 1 has been estimated by the LinkWater Projects as achievable at a cost of \$20 million. It is also logical that, given the availability of stage 1 and the relatively low cost for reverse flow, reverse flow for stage 1 is the most appropriate option to deliver water security for the Caloundra and Maroochy system.

The Noosa and Gympie system

The QWC has calculated that the combined storage level of the Noosa and Gympie system could deplete to just above 30 per cent capacity by the end of 2011 (based on average

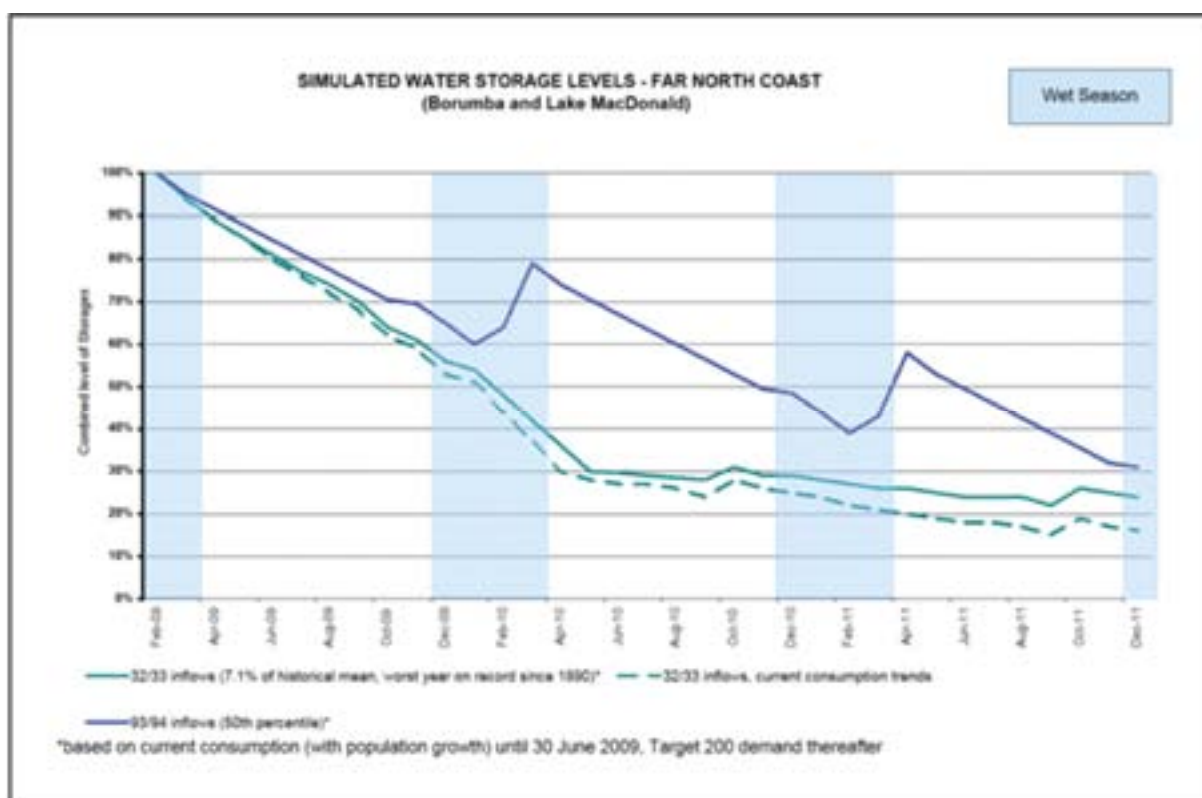
inflows and Target 200 demand management strategies after June 2009), and may fall to 17 per cent capacity by the end of 2011 (based on repeated 1932–33 flows and current consumption). This is shown on Figure 3. The 32/33 inflows are the worst on record.

By the end of 2011 the combined storage levels using 1932/33 flows and Target 200 demand management strategies could be between the two criteria in Figure 3 Simulated water storage levels – far north of:

- 32/33 inflows based on current consumption of 17 per cent
- 93/94 inflows based on Target 200 of 31 per cent.

It is clear that additional water supply sources for the Noosa and Gympie system could be required, possibly as early as the end of 2011. The SEIS notes that the project would be able to supply up to 35 ML per day to the Noosa and Gympie system by this date. It should be noted that Gympie is not attached to the Noosa WTP and that reverse flow connection to the Noosa WTP would not flow to Gympie. However, as Gympie and Noosa share releases from Borumba Dam it may be that reverse flow to the Noosa WTP would allow a reduced or no take from the Borumba Dam by the Noosa WTP, therefore releasing remaining flows, if available, to Gympie.


Figure 3 Simulated water storage levels—far north coast



2.3.1.8 Interconnectivity

Connecting the Caloundra and Maroochy system and the Noosa system would provide enhanced security and flexibility to the Sunshine Coast as a whole.

As detailed in the SEIS, the project will connect the otherwise segmented water zones of the Sunshine Coast. This will provide greater security and flexibility of water supply to support growth on the Sunshine Coast. Furthermore, a provision for five future off-takes feeding into



the Sunshine Coast Region reticulation system has been incorporated into the project's pipeline design.

I accept the QWC's assessment that additional water supply infrastructure is required for the SEQ region, having considered the demand for water in SEQ, existing supply sources within the region, the identified short, medium and long-term water supply/demand gaps and the government's strategy to secure supplies for the region. The project is one part of a portfolio of projects to ensure secure future water supply for SEQ.

Therefore, I am satisfied that, as provided in the EIS, the 'do nothing' scenario is not appropriate and does not accord with the state government's water supply strategy and regional water supply planning policy directives that are working to ensure connectivity across the region and increased access to existing and new future supply sources.

Project alternatives

In relation to alternatives for the project, the terms of reference (TOR) for the EIS required under Chapter 1.4: Alternatives for the project, states:

'This section should describe feasible alternatives for the project, including the option of taking no action, that is, of not building the pipeline. Alternatives should be discussed in sufficient detail to enable an understanding of reasons for preferring certain options and courses of action and rejecting others. Reasons for selecting preferred options should be delineated in terms of technical, commercial, social and natural environment aspects. Demand reduction techniques should be discussed along with alternative supply sources, such as:

other water supply methods including:

- recycling
- dam construction
- desalination
- groundwater.

Section 1.4 of the EIS considers other project alternatives such as a raw (i.e. untreated) water pipeline; a long-term water restrictions regime; use of groundwater as a water supply supplement; construction of various new water supply infrastructure such as desalination, a dam and a recycled water facility. Section 4.2.6 of the SEIS provided more detailed information on some of these alternatives.

As noted previously I accept the QWC's determination that the SEQ Water Grid is a key element in improving the reliability of water supplies across the SEQ region and the project is an essential component of the grid.

Given that reverse flow capability is to be implemented for NPI it is appropriate that consideration is given to possible alternatives to transporting water in a northerly flow direction.

Desalination

The Department of Infrastructure and Planning (DIP) commissioned a study in December 2007 to consider the option of mobile desalination barges on the Brisbane River. The capital costs of the two reverse osmosis mobile desalination units producing 100 ML per day were \$550 million. This extrapolates to approximately \$200 million for the equivalent 35 ML per day supply requirement proposed for the Noosa network under a northern flow direction scenario.

Purified recycled water

In relation to purified recycled water (indirect potable reuse) as a potential alternative to the project's reverse flow to the Noosa and Gympie areas, consideration must be given to the recycled water management plans and validation guidelines necessary to support this water supply option. In particular:

'The receiving water source must be an effective barrier that allows for sufficient management of any risk to the health of the public associated with potential incidents relating to recycled water quality. The recycled water provider should provide evidence of the effectiveness of the barrier at the time of submitting their validation program. A regulator approved drinking water quality management plan that addresses the ongoing management of the barrier, including the ability to manage potential incidents, will be developed by the entity responsible for the receiving water source.

To be an effective barrier, storage conditions should be appropriate to ensure that substantial safety margins are in place to account for any and all possible delays in completing monitoring, communicating results and responding to results where necessary.'

It is unlikely that Lake Macdonald could, at this stage, meet the recycled water management plans and validation guidelines given that reverse flow could provide up to 35 ML per day (approximately 12 800 ML per year) and the capacity of Lake Macdonald is 8000 ML. In addition, LinkWater Projects has advised that the production of purified recycled water requires a whole new plant or an advanced treatment module would need to be added to the existing wastewater treatment plant at Noosa.

Water restrictions

The introduction of high level water restrictions in the Sunshine Coast region could extend existing water supplies and artificially enhance security of supply. However, this option could only be implemented as a short-term measure due to the significant social, economic and industrial impacts that would result if restrictions were sustained.

Both the Department of Environment and Resource Management (DERM) and the QWC were approached by DIP to establish if other water supply sources, through existing unutilised allocations, are available that would provide the same level of service to the Noosa and Gympie system as the rest of SEQ will experience under the SEQ Water Grid. The existing unutilised allocations would need to be capable of providing up to 35 ML per day into the Noosa WTP, the same as the reverse flow from the project. It should be noted that the Noosa and Gympie system is not linked, therefore the reverse flow only directly assists Noosa, however the reduced draw from the Mary River for Noosa from the Coles Crossing pump Station could indirectly free up water for Gympie.

As previously discussed, the QWC made submissions on the EIS and the SEIS that another critical driver for installation of reverse (northern) flow capability is to afford the Sunshine Coast the same level of water security as the rest of the SEQ Water Grid connected centres. Without the NPI's northern flow capability, Noosa is vulnerable to a WTP outage, as it has no alternative source of treated water. The QWC has suggested that in this context, reverse flow for the project is required, and I support this position.

2.3.2 Conclusions

I am satisfied that the project is justified as required under relevant state government water supply strategy and policy imperatives for ensuring adequacy of supply. The project complements other water supply projects and demand management initiatives, both completed and underway.



I am further satisfied that potential alternatives to the project are not feasible given time and cost considerations outlined in the EIS and SEIS. Further, there are no viable alternatives that satisfy all the project objectives which include both supply of water to the Brisbane area and reverse flow capability to ensure connectivity for the Sunshine Coast region to southern water supply sources in the event of future drought.

2.4 Corridor alternatives

As a result of public submissions on the draft TOR a section was added in Chapter 1.4: Alternatives for the project that required:

'In relation to the corridor the following should be provided:

- corridors considered, aided by maps and diagrams
- rationale for selecting the preferred corridor over alternative corridors. This may also be provided in a table. When discussing the rationale the following should be discussed:
 - ecologically sustainable development principles
 - broad costs of each corridor option
 - pipeline lengths
 - number of impacted properties, including tenure and ownership (private/government)
 - co-location opportunities.
- considerations given to alternative engineering and project design solutions.'

Public submissions on the EIS identified several alternative internal corridors, which were addressed by LinkWater Projects in the SEIS. It is appropriate in this report to address both the overall and internal corridor alternatives.

2.4.1 Overall corridor alternatives

In late 2006, the then Department of Natural Resources and Water (NRW) commissioned two reports to progress the business cases for the NPI and the Northern Regional Pipeline (NRP). The NRP, a separate project to the NPI, is proposed to link TCD to the SEQ Water Grid should the dam proceed. The NRW studies concluded that the corridor identified for the NPI was also suitable for the NRP.


The adoption followed a process of risk management/assessment, an independent land access study by Land Access Australia and a workshop by the QWC and the then Department of Infrastructure (DI) in late 2006.

Based on the results of the QWC and the DI workshop, a series of agency consultation sessions were held to identify significant risks/opportunities for the proposed route. The objectives of these discussions were to optimise the route to provide:

- the most direct connection between the target water supply source and receiving points
- a wide construction corridor, remote from public/community areas in comparison to other alternatives, that could be constructed within the regulated timeframe
- engineering solutions that would be used to overcome the difficulties with terrain and any sensitive crossings (e.g. bridges or tunnelling).

Three broad options, as shown in Figure 4, for the pipeline route were developed on the basis of broad engineering, environmental, geotechnical, topographic and community constraints:

- eastern corridor (east of the Bruce Highway through low-lying agricultural land, rejoining the highway near Eerwah Vale)
- central corridor (west of the Bruce Highway and North Coast Railway Line)
- western corridor (through the power easement in steep terrain).



These options were assessed using a multi criteria analysis which compared the engineering, social, environmental, operational and constructability constraints across all options. Although broad constraints were considered, no detailed consideration of local environmental or social impacts was carried out in developing or assessing these options. However, detailed assessment of local community and environmental issues was undertaken as part of the evaluation of the preferred corridor, which has subsequently resulted in minor route modifications.

Key constraints identified for the western corridor precluded this option from further detailed investigation and are listed below:

- large areas of steep terrain with limited access points
- significant areas of hard rock
- pockets of high quality remnant vegetation.

Detailed investigation was undertaken for the eastern corridor on the basis of its largely flat terrain and ease of construction. During this investigation, two variations of the eastern corridor were also developed (see Figure 4). Field investigation of the eastern corridor (including the corridor variations) identified a number of constraints, including:

- waterlogged in swampy areas
- associated potential for actual acid sulfate soils (ASS)
- residential areas around Bli Bli likely to be impacted by the corridor
- significant conservation areas (Maroochy Wetland Sanctuary)
- significant mosquito populations in flooded areas.

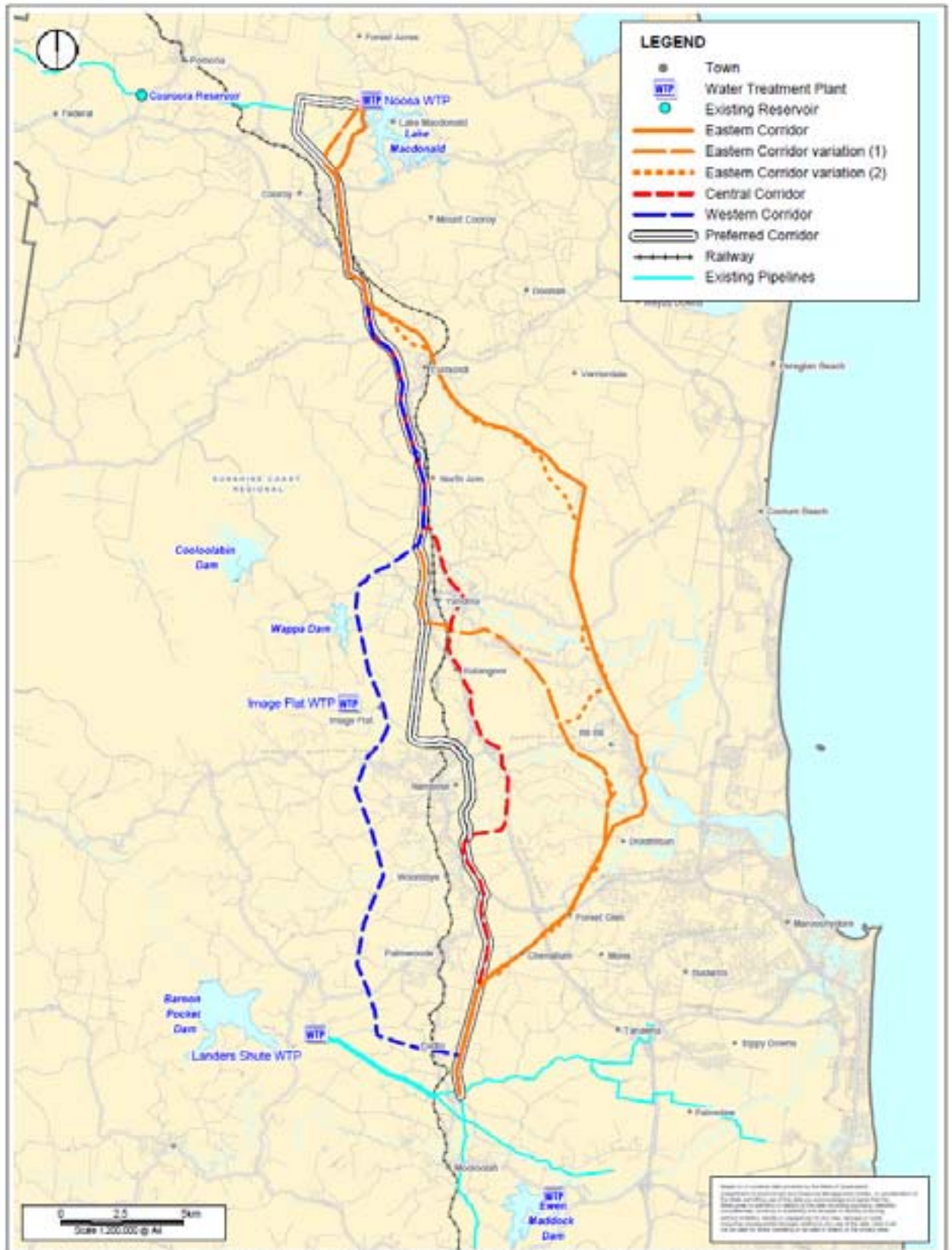
Due to the constraints identified for both the western and eastern corridor options, the central option was flagged for further investigation. A variation of the central corridor was developed, which maximised the use of existing cleared public utility easements (now the 'preferred corridor'). In comparison with the western and eastern corridor options, the preferred corridor:

- makes greater use of existing public utility easements
- reduces impacts on landholders compared to other options
- minimises construction through hard rock areas
- minimises the potential for interaction with acid sulfate soils (ASS) (as compared to eastern option); as evidenced in the eastern option
- minimises the potential for interaction with significant groundwater resources (as compared to the eastern option)
- reduces the number of major waterway crossings (as compared to the western option)
- minimises the impact on sensitive wetland vegetation (eastern option).

A summary of the results of the multi-criteria analysis, including key constraints identified for the corridor options, was provided in the EIS at section 1.4 and is included in Table 1.

Over 90 per cent of the proposed corridor is within existing public utility easements or road corridors, significantly reducing impacts on existing land uses compared to any other alternative. I note that the ability to co-locate with other linear infrastructure will result in significant benefits to the community due to minimising the requirement for additional land and easements.

Figure 4 Pipeline route options



2.4.2 Internal corridor alternatives

Several public submissions on the EIS proposed internal corridor alternatives for:

- in the vicinity of McGilchrist Road and Chevallum—Palmwoods Road
- avoiding Yandina
- following Robinson Road.

Table 1 Results of multi-criteria analysis

Review criteria	Western corridor	Central corridor	Eastern corridor*	Preferred corridor (variation of central corridor)
Length	46.7 km	44.7 km	49 km	48 km
Number of affected properties	Approximately 275	Approximately 237	Approximately 235	Approximately 233
Land access	Majority critical infrastructure easement	Critical infrastructure easement Some NIRs	Majority NIRs** Potentially large landholdings	Majority critical infrastructure easement Some NIRs
Waterway crossings	Five major crossings, including one thrust bore	Five major crossings	One major crossing (marine)	Three major crossings
Cost	High pipe-laying cost Extensive blasting	High cost crossings Extensive blasting	Expensive waterway crossings	Cost-effective waterway crossings
Construction time constraints	Difficult grade Limited access Few areas for laydowns— 20.8 km hard rock Power infrastructure	Difficult grade Difficult crossings High speed traffic corridor Road safety Haulage 10.3 km hard rock Acid sulfate soils	Easy grade No extensive rock Wet trenches Acid sulfate soils All-weather access required	Moderate grade Rock present – not extensive Tunnel bore at Pringle Hill (approximately 12 months)
Construction speed	Slowest	Moderate	Fastest	Moderate
Environmental impacts	Terrestrial	Terrestrial, some marine	Marine Acid sulfate soils	Terrestrial

* This eastern corridor option was taken to be representative of the various eastern options developed. While there are some variations between the eastern options, they are not considered to be significantly different from one another.

** NIR – notice of intention to resume.

2.4.2.1 Following the Energex easement in the vicinity of McGilchrist Road and Chevallum—Palmwoods Road

A joint submission by two residents on the EIS suggested the use of a proposed high voltage easement that follows a route to the east of the preferred corridor. The private submission proposed several advantages for this option, some of these being:

- cost savings from reduced compensation payouts
- no environmental impacts through clearing at their property
- reduced impact to property owners;
- the use of a proposed high voltage easement
- reduced impacts on a nearby horse spelling business.

LinkWater Projects stated that the proposed high voltage Energex easement option would:

- increase the number of encumbered properties
- have greater impacts on vegetation communities and waterways
- increase the pipeline length
- increase the construction costs by approximately \$2.4 million.


In the SEIS LinkWater Projects has suggested that the main environment and construction cost of the proposed alternative are as follows:

- Impacts on landowners: Approximately 10 new properties would be encumbered.
- Environmental impacts: The preferred corridor is located within an existing easement, and will not require clearing of intact remnant vegetation in the section from McGilchrist Road to Bamboo Road. The private submission's alternative alignment would require the clearing of 'endangered' and 'of concern' vegetation between McGilchrist Road and Bamboo Road, including important riparian vegetation along a Eudlo Creek tributary.
- Impacts on construction costs: The length of the pipeline and costings for the preferred alignment and the proposed private submission's alternative are outlined in Table 2, below. The alternative alignment would result in a higher total cost due to this increased pipe length and an increase in the number of bends.

As a result of the private submission and discussions with the submitters, an inspection was arranged by DIP of LinkWater Projects' preferred route and the alternative route. The submitters attended the inspection along with representatives of LinkWater Projects and DIP.

Table 2 Length of pipeline and estimated cost for private submission pipeline alignment option

Alignment option	Pipeline length (km)	Estimated cost (\$m)
Preferred alignment	1.9	5.2
Alternative alignment (proposed HV easement)	2.8	7.6



An inspection by DIP was conducted of the proposed and alternative internal corridor options. The site inspection in the vicinity of McGilchrist Road and Chevallum—Palmwoods Road involved DIP and the property owner and representatives of LinkWater projects. Not all properties along the alternate route were accessed however some parts of the alternate corridor were viewed from adjoining properties.

Based on the information provided in the SEIS and submissions received I am of the view that the proposed route through the McGilchrist Road area has less community impacts, environmental impacts and construction costs. The SEIS acknowledges that impacts on the horse spelling business will be managed through a close working relationship with the landowner. I am satisfied that subsequent conditions placed by me on management of impacts to the community through pre-construction consultation and identification of individual needs and requirements which build on community consultation practices described in the EIS and SEIS by LinkWater will address this issue.

2.4.2.2 Avoiding Yandina

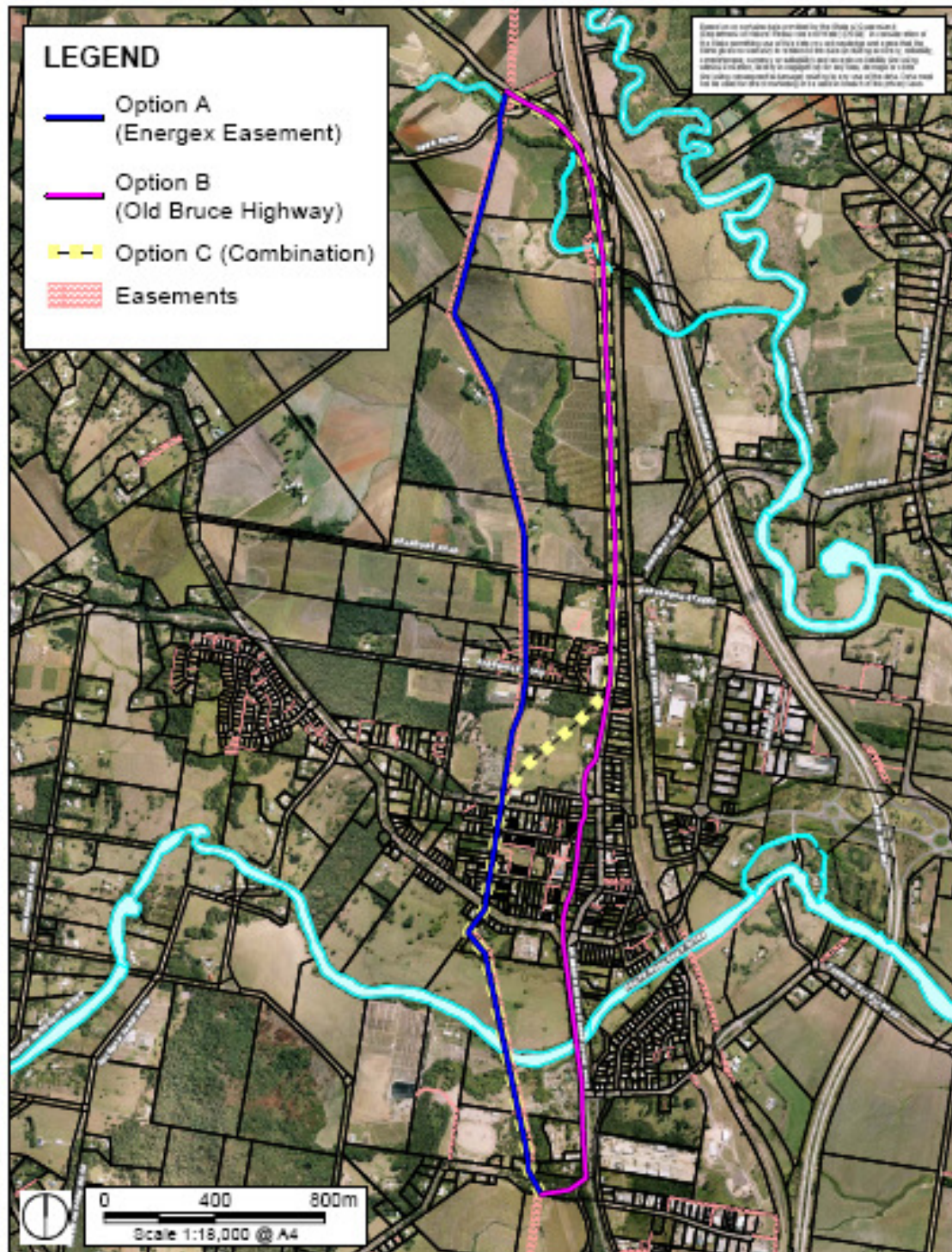
Three alternative route alignments, see Figure 5, were considered through and in proximity to the Yandina township:

- option A: the preferred option, along Buckle Street, the sports complex and Quondong Court
- option B: Old Bruce Highway
- option C: a combination of options A and B.

The preferred corridor in proximity to Yandina was chosen by LinkWater Projects following a multi-criteria analysis including the assessment of construction timeframes, environmental and community impacts. LinkWater Projects has suggested that the preferred corridor presented a number of benefits including:

- use of the existing easement
- decreased impact on the sports complex by following the Energex easement
- reduced clearing footprint through areas of mapped remnant vegetation
- no mapped ASS in the preferred corridor
- increased ease of construction and a reduced construction timeframe
- increased safety compared with working in close proximity to the Bruce Highway.

Figure 5 Three alternative route alignments in proximity to Yandina township



Source: DCDS - © The State of Queensland (Department of Natural Resources and Water) (2008)
 Projection: GDA94 (MGA55)
 File Path: C:\GIS\Projects\NIP\00000001-0000\Workspaces\Stage 2\Drawings\Yandina Alignment Alternative\Date: 25 August 2009



**NORTHERN PIPELINE
 INTERCONNECTOR STAGE 2
 YANDINA
 ALIGNMENT ALTERNATIVES**

- Innovative & Sustainable Water Solutions - Document No: MMA001-GDv-050000-U-015-024-0

In the SEIS, LinkWater Projects has stated that the main impacts on landowners, the environment and construction cost due to the proposed alternatives are as follows:

- Impacts on landowners: The preferred option is located within the Energex easement, whereas options B and C would traverse new properties that are not currently encumbered by a public utility easement (approximately seven and one respectively). Option C (combination) would have the greatest impact on the Yandina sports complex as the alignment traverses the grounds (including the cricket pitch) to join the Old Bruce Highway (OBH) alignment.
- Environmental impacts: The preferred corridor is located within an existing easement, and would not require clearing of intact remnant vegetation north of the sports complex along the OBH. Both of the alternative alignments would result in a greater clearing footprint of endangered and of concern vegetation. The OBH alternative traverses approximately 17 m of ASS; whereas the other two alternatives do not traverse known ASS.
- Impacts on construction: The preferred alignment would reduce the overall time to construct, as the alternative alignments have constrained construction corridors along the OBH and reduced levels of construction productivity. Construction along the OBH also increases safety risks compared to the preferred option.

Based on the information provided in the SEIS and submissions received I am of the view that the route proposed by LinkWater Projects has less community impacts, environmental impacts and construction constraints than other alternatives.

2.4.2.3 Following Robinson Road

A further submission received on the EIS suggested an alternate route for a section of the pipeline of following the Robinson Road reserve rather than the Energex easement. Figure 6: Robinson Road Alternate Route Option shows the proposed route.

Section 4.2.2 of the SEIS responded that this option was considered but discounted on the basis that it resulted in:

- greater impacts on residents along Robinson Road (restricted access during construction)
- increased construction costs (approximately \$1.4 million greater than the preferred corridor—see Table 3)
- restricted construction corridor resulting in an increase in the time taken to construct.

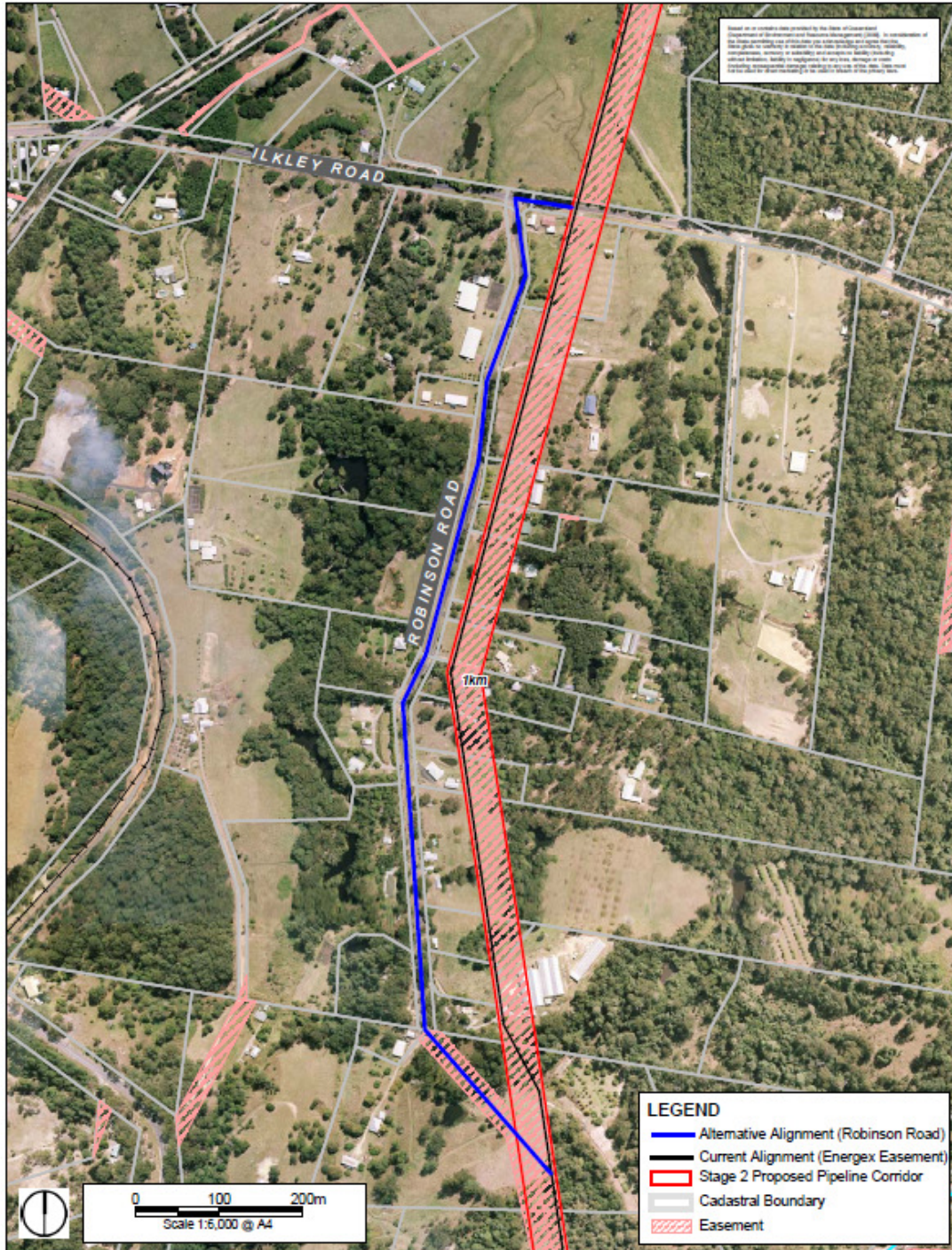
Table 3 Following Robinson Road: estimated construction cost and number of properties affected

Alignment option	Affected properties (approx. no.)	Estimated cost (\$m)
Preferred alignment	13	4.0
Alternative alignment (Robinson Road reserve)	24	5.4

The SEIS further states that to construct the pipeline along Robinson Road one lane would need to be closed, with the other lane remaining open for access to the properties along the road. This would result in a longer construction period through this area and greater impacts on the residents along both sides of Robinson Road.

Based on the information provided in the SEIS and submission received, I am of the view that the route proposed by LinkWater Projects has less community impacts and construction costs, with reduced environmental impacts due to being largely located in an existing utility easement.

Figure 6 **Robinson Road Alternate Route Option**



Source: DCR - @ The State of Queensland (Department of Environment and Resource Management) (2009)

3. Impact assessment process

3.1 Declaration of a significant project

LinkWater Projects lodged an initial advice statement on 11 September 2007 requesting that the project be considered for declaration as a significant project under part 4 of the SDPWO Act. On 21 September 2007 the project was declared, by Gazette Notice (Vol 346, No. 2), to be a 'significant project for which an EIS is required' pursuant to section 26(1)(a) of the SDPWO Act.

3.2 Terms of reference for EIS

Draft TOR for the EIS were released for public and advisory agency comment on 3 November 2007 until 5 December 2007. Advertisements inviting comments on the draft TOR were placed in the Weekend Australian, the Courier-Mail and the Sunshine Coast Daily newspapers. The draft TOR were publicly displayed at:

- Maroochydore Shire Council Chambers
- Nambour Shire Council Chambers
- Sunshine Coast State Development Centre.

A total of 36 submissions on the draft TOR were received, including: 2 state members of parliament, 9 advisory agencies, 2 local governments, 7 local area interest groups, and 16 members of the public. Comments on the draft TOR were received from the following:

- state members of parliament
 - Peter Wellington MP
 - Fiona Simpson MP
- advisory agencies
 - the then Department of Emergency Services*
 - the then Department of Natural Resources and Water
 - the then Department of Main Roads
 - the then Department of Local Government, Sport and Recreation*
 - Energex *
 - the then Environmental Protection Agency
 - the then Department of Primary Industries and Fisheries*
 - the Department of Communities*
 - the then Department of Mines and Energy*
- local governments
 - the then Caloundra City Council
 - the then Maroochy Shire Council
- stakeholder/community groups
 - Northern Network Alliance
 - A submitter on behalf of the Wildlife Preservation Society of Queensland—Sunshine Coast and Hinterland Inc
 - A representative on behalf of the Queensland Conservation Council
 - A representative on behalf of the Australian Wildlife Warriors Worldwide
 - A representative on behalf of the Save the Mary Coordinating Group Inc
 - A representative on behalf of the Mary River Catchment Coordinating Committee
 - A representative on behalf of the Sunshine Coast Environmental Council Inc
- 16 private individuals.

Following the consideration of public and advisory agency comments, the TOR were approved on 8 January 2008.

*Note: the Department of Emergency Services, the Department of Local Government, Sport and Recreation, the Department of Primary Industries and Fisheries, the Department of Communities, the Department of Mines and Energy and Energex indicated that they did not have any comments on the draft TOR for the project.

3.3 Public and advisory agency comment on the EIS

I determined that the EIS, which was prepared by LinkWater Projects, was substantially in accordance with the TOR and on 17 January 2009, released the EIS for public and advisory agency comment until 9 March 2009. Advertisements inviting comments on the EIS were placed in the Weekend Australian, the Courier-Mail and the Sunshine Coast Daily newspapers. The EIS was publicly displayed at:

- Beerwah Library
- Caloundra Library
- Coolum Beach Library
- Kawana Library
- Kenilworth Library
- Maleny Library
- Maroochydore Library
- Nambour Library
- Noosa Library
- Office of the Member for Nicklin
- State Library of Queensland
- Queensland Parliamentary Library
- National Library of Australia
- The then Department of Tourism Regional Development and Industry.

A total of 56 submissions on the EIS were received, including: 1 from the Commonwealth, 11 advisory agencies, 1 from local government, 9 local area interest groups, and 33 members of the public. Comments on the EIS were received from the following:

- advisory agencies
 - Department of Communities*
 - The then Department of Emergency Services
 - The then Environmental Protection Agency
 - The then Department of Main Roads*
 - The then Department of Mines and Energy
 - The then Department of Natural Resources and Water
 - The then Department of Primary Industries and Fisheries*
 - The then Department of Queensland Fire and Rescue Service
 - Queensland Water Commission
 - Queensland Police Service*
 - The then Department of Transport*
- Commonwealth Government
 - Department of the Environment, Water, Heritage and the Arts
- local government
 - Sunshine Coast Regional Council
- stakeholder/community groups
 - A representative on behalf of the Wildlife Preservation Society of Queensland — Sunshine Coast & Hinterland Inc
 - A representative on behalf of the Pringle Hill Progress Association Stake Holder Group
 - A representative on behalf of the Yandina Bowls Club Inc.

- A representative on behalf of the Christina Low Park Conservation Group, Yandina
- A representative on behalf of the Yandina and District Community Association
- A representative on behalf of the Mary River Catchment Coordinating Committee
- A representative on behalf of the Sunshine Coast Environmental Council Inc
- A representative on behalf of the Save the Mary River Coordinating Group
- A representative on behalf of the Eudlo Beekeeping Services and Sunbee Apiaries
- 33 private individuals

Note: the Department of Communities, the Department of Main Roads, the Department of Primary Industries and Fisheries, the Queensland Police Service and the Department of Transport indicated that they were satisfied that the EIS adequately addressed their interests.

The substantive issues raised in these submissions were as follows:

- the need for 18 ML per day of southern flow given that, if dam levels reach 40 per cent, purified recycled water would be available from the WCRWS
- alternatives to providing 18 ML per day of southern flow such as demand management strategies and desalination
- justifying other benefits for the project such as reverse flow and the interconnection of the Sunshine Coast demand areas
- developing access agreements/protocols between the landholder and LinkWater Projects detailing both parties responsibilities and obligations. A suggestion was to develop a Property Access EMP and that it could be included in the land acquisition process.
- internal route alternatives that would avoid impacts at McGilchrist and Chevallum—Palmwoods Road, Buckle Street, Quondong Court, Yandina Bowls Club and Robinson Road
- the use of the Ferntree Facilities Area for the location of one 5 ML tank resulting in the clearing of 6.6 Ha of vegetation including 3.45 Ha of remnant vegetation and the excavation of 175 000 cubic meters of soil. The Ferntree Facilities Area forms part of a wildlife corridor located on a hill top. Should Traveston Crossing Dam stage 1 be approved then this would increase to a 35 ML balance tank and a chemical dosing facility.
- justifying trenching as the preferred construction method across all riverine crossings
- Impacts of the water take from the Mary River on matters of national environmental significance (MNES) such as the Mary River Cod, Mary River Turtle and the Old Lungfish
- concern about the previous soil erosion incidents on NPI stage 1 being repeated for the project
- information on the existing environment, impacts and mitigation strategies involving the tunnel entrances for tunnelling works at Pringle Hill
- restricting constructing hours near residents
- details on how public access to construction works within properties will be restricted
- the EMPs focusing on using best practice environmental management techniques to ensure that environmental harm as a result of the project does not occur. The EMPs allow too much flexibility which leaves open misinterpretation leading to avoidable environmental impacts.

All responses to the EIS were provided to LinkWater Projects.

3.4 Public and advisory agency comment on the supplementary EIS

In early 2009, the Deputy Premier announced that the project would also include the construction of reverse flow works. Although the project had been designed to accommodate future reverse flow, the works required and the construction impacts had not been incorporated in the EIS.

Normally an SEIS is only provided for advisory agency comment. However, the public may be given the opportunity to comment on an SEIS if the scope of the project changes and an additional impact on the public is likely. This consideration is required as the EIS process removes the public's right to comment on impacts that may be available through the integrated development assessment system.

LinkWater Projects was requested by me, on 19 June 2009 under section 35(2) of the SDPWO Act, to provide additional information about the EIS in the form of the SEIS.

LinkWater Projects provided a draft SEIS for my consideration to DIP at the end of June 2009. On 10 August 2009, after additional information was provided by LinkWater Projects, DIP invited comments on the SEIS from the following groups only by 4 September 2009:

- members of the public who provided submissions on the EIS
- surrounding property owners that may be noticeably impacted by the reverse flow works
- all advisory agencies.

LinkWater Projects provided details on the reverse flow works and impacts in the SEIS. Although the reverse flow works may have an impact, this is considered to be minimal and limited to adjoining property owners. It was therefore appropriate that adjoining owners to the reverse flow works were given the opportunity to comment on the SEIS which included the impacts of the reverse flow works.

It was also considered appropriate that, as the SEIS provided substantially more information than that which was provided in the EIS, the SEIS was provided to those members of the public and stakeholders that provided comment on the EIS.

A total of 19 submissions on the SEIS were received, including: 8 advisory agencies, 1 local government, 2 local area interest groups, and 8 members of the public. Comments on the SEIS were received from the following:

- advisory agencies
 - the Department of Environment and Resource Management#
 - the Department of Employment, Economic Development and Innovation*#
 - Queensland Police Service*
 - Department of Transport and Main Roads
 - Department of Community Safety
 - Queensland Water Commission
- local governments
 - Sunshine Coast Regional Council
- stakeholder/community groups
 - A representative on behalf of the Mary River Catchment Coordinating Committee
 - A representative on behalf of the Save the Mary River Coordinating Group
- eight private individuals

Note: * These advisory agencies were satisfied that the EIS adequately addressed their interests.

More than one submission was received from these agencies.

The substantive issues raised in submissions on the SEIS were as follows:

- impacts to agriculture businesses affected by the project
- impacts of tunnelling works at the Pringle Hill site
- route alternatives
- impacts of crossing waterways on water quality and riparian vegetation
- impacts on flora and fauna in the construction corridor
- impacts of construction and associated traffic on road pavement, traffic congestion and road safety
- impacts of soil erosion and sediment control.

All responses to the SEIS were provided to LinkWater Projects.

3.5 The Pringle Hill tunnel: construction methodology

A major tunnel bore at Pringle Hill has been proposed by LinkWater Projects. The tunnelling is required due to hydraulic limitations and construction constraints over a prominent ridge in the area.

Three alternative tunnelling options for Pringle Hill were provided in the section 2.2 of the EIS (released in January 2009). By mid-2009 advanced geotechnical investigations had been undertaken to understand the design, construction and timing limitations of the proposed large diameter tunnel option. The SEIS provided further information on this proposed method of tunnelling which utilises roadheader methods with pipe jacking and drill and blasting.

However, subsequent to the release of the SEIS, LinkWater Projects advised me that an alternative technical solution that allows a single tunnel boring machine to undertake the entire 1.1 kilometre excavation of the Pringle Hill works had become available since the initial assessment of the three options in 2008. Therefore, this alternative technical solution is now the preferred construction method for this section.


LinkWater Projects has now provided full details to me on this preferred tunnel option, along with a comparison with previous construction methodologies and justification regarding reduced environmental and social impacts. Table 6, provided by LinkWater Projects at that time, provides a comparison of the construction options at Pringle Hill and their impacts.

I am aware that a report on landholder consultation regarding the development of the preferred construction methodology was produced by LinkWater Projects. This describes the company's consultation with affected landholders in relation to the increased volumetric (that is, subterranean) easement that is required for the preferred tunnelling option.

Consideration of the impacts and mitigation strategies for the preferred tunnelling option at Pringle Hill are discussed in Chapter 4.3 Pringle Hill (Tunnel) of this report.

As discussed previously in Chapter 3.4 (Public and advisory agency comment on the supplementary EIS) above, a SEIS is normally only provided for advisory agency comment. However, the public may be given the opportunity to comment on a SEIS if the scope of the project changes and an additional impact to the public is likely. This consideration is required as the EIS process removes the public's right to comment on impacts that may be available through the integrated development assessment system.

I am satisfied that the changes proposed for tunnelling at Pringle Hill since the release of the SEIS, are a refinement of an option initially provided in the EIS. Further, the changes are not substantial and relative to previous options will reduce environmental and social impacts,



including to adjoining property owners. I have determined that there is not a requirement to provide members of the public with the opportunity to comment on the details of the single loop microtunnel prior to me finalising this report.

I note further information provided by LinkWater Projects that subsequent to the release of the SEIS the company has undertaken extensive engagement with the local community and affected landholders on the preferred tunnelling option.

As described in Chapter 4.3, conditions will apply to the management of this matter to ensure issues are addressed.

3.6 Matters of national environmental significance

LinkWater Projects referred the project to the Department of the Environment, Water, Heritage and the Arts (DEWHA) and sought a determination of the project under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The purpose of the referral was to identify any potential impacts on matters of national environmental significance (MNES).

On 24 October 2007, the Commonwealth Minister determined the project to be a 'controlled action' for potential impacts on the following MNES:

- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A).

As a result, the project requires assessment and approval under the EPBC Act. The Australian Government has accredited the EIS process, to be conducted under the SDPWO Act, under a bilateral agreement between the Australian and Queensland Governments. This will enable the EIS to meet the impact assessment requirements under both Australian and Queensland legislation.

In accordance with the bilateral agreement, DIP has been consulting with the Department of the Environment, Water, Heritage and the Arts (DEWHA) about this project. A copy of the draft TOR, draft EIS and draft SEIS were provided to the DEWHA for comment prior to the public release of these documents.

A separate chapter has been provided in this report addressing MNES: Chapter 5—Matters of national environmental significance.

On 9 September 2009 the proponent made application for the Commonwealth Minister's consideration of a variation of the project's definition under section 156A of the EPBC Act. The variation arose as a result of:

- omitting the proposal to seek new water entitlements (additional take) from the Mary River
- removing the need to source supplies from the Wappa Dam and the Poona/Cooloolabin systems
- the inclusion of bi-directional function to provide water security to the Sunshine Coast region.

On 8 October 2009, the Commonwealth confirmed that the variation had been accepted.

4. Evaluation of environmental effects

4.1 Introduction

The SDPWO Act defines 'environment' to include:

- (a) ecosystems and their constituent parts, including people and communities
- (b) all natural and physical resources
- (c) the qualities and characteristics of locations, places and areas, however large or small, that contribute to their biological diversity and integrity, intrinsic or attributed scientific value or interest, amenity, harmony and sense of community
- (d) the social, economic, aesthetic and cultural conditions that affect, or are affected by, things mentioned in paragraphs (a) to (c).

'Environmental effects' means 'the effects of development on the environment, whether beneficial or detrimental'. These effects can be direct or indirect, of short, medium or long-term duration and cause local or regional impacts.

The project was declared to be a 'significant project', for which an EIS is required, under section 26 of the SDPWO Act on 21 September 2007. As a result, I am required under section 35(3) of the SDPWO Act to prepare a report evaluating the EIS. In evaluating the EIS, I may under section 35(4):

- (a) evaluate the environmental effects of the project and any other related matters
- (b) state conditions under section 39, 45, 47C, 49 or 49B
- (c) make recommendations under section 43 or 52
- (d) if division 8 applies to the project, impose, under that division, conditions for the undertaking of the project.


Schedule 9 of the IPA only exempts certain developments from assessment against a planning scheme. Table 5, Item 4 provides that all aspects of development are exempt from assessment against a planning scheme where:

'the development has been directed under a notice, order or direction under a state law. That is, all aspects of development a person has been directed to carry out under a notice, order or direction made under a state law.'

LinkWater Projects has been directed under Schedule 10B of the Regulation to carry out this project, therefore this project is exempt from assessment against a planning scheme.

Section 36 of the SDPWO Act has the effect that where a project involves development requiring an application for development approval, the Coordinator-General is able to state conditions for the assessment manager pursuant to section 39 of the SDPWO Act. Despite the fact that a project is exempt development pursuant to Schedule 9 of the IPA, certain aspects of the project will require development approvals from the relevant assessment managers nominated in schedule 8A of the IPA. This occurs as a result of certain types of development being listed as assessable development in Schedule 8 of the IPA. Section 39 of the SDPWO Act empowers the Coordinator-General to state conditions which the assessment manager must then impose.

A project 'exempt' status pursuant to Schedule 9 of the IPA relates to the planning scheme and not the exercising of the Coordinator-General's powers.



In evaluating the environmental effects of the project, I have set out findings on the major environmental effects identified during the EIS process. In order to be satisfied that unavoidable adverse environmental effects can be adequately managed, I have set conditions for advisory agencies to attach to the necessary approvals, licences and permits for the project development to proceed.

In making these conditions, I have considered the following:

- information provided in the EIS, the SEIS and detailed EMPs prepared by LinkWater Projects
- comments in formal submissions on the EIS and SEIS
- specific advice sought from advisory agencies.

LinkWater Projects presented a list of commitments as Appendix C in the EIS. These commitments include actions beyond those required to meet statutory approvals and their implementation would enhance the mitigation of potential adverse environmental impacts of the project. Further, LinkWater Projects has prepared detailed construction EMPs to address specific environmental issues identified during the EIS process that are associated with each element of the project. I have considered these EIS commitments and EMPs. Where necessary, I have extended particular commitments or component of an EMP and recommend that LinkWater Projects implements specific actions, in accordance with best practice environmental management.

Table 4 and Table 5, summarise the key environmental issues raised in submissions on the EIS and SEIS respectively, grouped into 15 categories, which I have used when determining the chapters used in this report.

Table 4 Summary of key environmental issues raised on the EIS

	Air quality	Cultural heritage	Ferntree Facilities Area	Greenhouse gas emissions	Hazard and risk	Noise and vibration	Land use and infrastructure	Pringle Hill (Tunnel)	Social and economic environment	Soil erosion and sediment control	Transport/traffic	Vegetation clearing	Waste	Water resources	Waterway crossings
Advisory agencies															
Department of Communities									✓						
Department of Emergency Services					✓		✓								
Department of Local Government Sport and Recreation															
Department of Main Roads										✓					
Department of Mines and Energy							✓								
Department of Natural Resources and Water							✓								✓
Department of Primary Industries and Fisheries							✓	✓				✓		✓	✓
Environmental Protection Agency			✓				✓		✓		✓	✓	✓	✓	✓
Qld Fire and Rescue Service					✓										
Queensland Police Service															
Queensland Transport								✓		✓					
Queensland Water Commission															
Commonwealth Government															
Department of Environment, Water, Heritage and the Arts							✓	✓			✓			✓	✓
Local government															
Sunshine Coast Regional Council		✓	✓	✓			✓	✓	✓	✓	✓	✓	✓		✓
Stakeholder/community groups															
Christina Low Park Conservation Group															✓
Eudlo Beekeeping Services & Sunbee Apiaries							✓								
Mary River Catchment Coordinating Committee														✓	✓
Pringle Hill Progress Association Stake Holder Group								✓							
Save the Mary River Coordinating Group				✓										✓	✓
Sunshine Coast Environmental Council			✓				✓		✓		✓			✓	✓
Wildlife Preservation Society of Qld			✓								✓	✓			✓
Yandina Bowls Club Inc							✓								
Yandina District Community Assoc			✓				✓								
Private individuals															
Submitter 1	✓					✓					✓				
Submitter 2	✓					✓	✓		✓				✓		
Submitter 3							✓		✓						
Submitter 4						✓	✓							✓	
Submitter 5									✓						
Submitter 6							✓			✓					

	Air quality	Cultural heritage	Ferntree Facilities Area	Greenhouse gas emissions	Hazard and risk	Noise and vibration	Land use and infrastructure	Pringle Hill (Tunnel)	Social and economic environment	Soil erosion and sediment control	Transport/traffic	Vegetation clearing	Waste	Water resources	Waterway crossings
Submitter 7							✓								
Submitter 8					✓	✓	✓		✓		✓	✓			
Submitter 9					✓		✓					✓			✓
Submitter 10							✓								
Submitter 11			✓				✓			✓					✓
Submitter 13					✓		✓				✓	✓			
Submitter 14							✓		✓			✓			
Submitter 15					✓	✓	✓		✓		✓				
Submitter 16						✓	✓								
Submitter 17							✓		✓						
Submitter 18															
Submitter 19															
Submitter 20					✓		✓								
Submitter 21							✓					✓			
Submitter 22															
Submitter 23					✓										
Submitter 24															
Submitter 25							✓								
Submitter 26	✓														
Submitter 27					✓		✓								
Submitter 28					✓	✓	✓	✓			✓				
Submitter 29							✓								
Submitter 30	✓					✓	✓								
Submitter 31	✓					✓	✓					✓			
Submitter 32							✓								✓
Submitter 33							✓								
Submitter 34					✓	✓	✓								

*These agencies were satisfied that the EIS adequately addressed their interests.

Table 5 Summary of key environmental issues raised on the SEIS

	Air quality	Cultural heritage	Ferntree Facilities Area	Greenhouse gas emissions	Hazard and risk	Noise and vibration	Land use and infrastructure	Pringle Hill (Tunnel)	Social and economic environment	Soil erosion and sediment control	Transport/traffic	Vegetation clearing	Waste	Water resources	Waterway crossings
Advisory agencies															
Department of Community Safety							✓								
Department of Employment, Economic Development and Innovation [#]									✓						✓
Department of Environment and Resource Management [#]	✓					✓				✓		✓	✓		✓
Queensland Police Service*															
Queensland Transport and Main Roads							✓			✓	✓	✓			
Queensland Water Commission					✓		✓							✓	
Local government															
Sunshine Coast Regional Council							✓			✓					✓
Stakeholder/community groups															
Mary River Catchment Coordinating Committee														✓	✓
Save the Mary River Coordinating Group				✓										✓	
Private individuals															
Submitter 1	✓					✓	✓		✓		✓	✓	✓		
Submitter 2														✓	
Submitter 3							✓	✓	✓		✓				
Submitter 4							✓								
Submitter 5							✓			✓		✓			
Submitter 6							✓								
Submitter 7							✓					✓		✓	
Submitter 8								✓							

Note. * These agencies were satisfied that the EIS adequately addressed their interests.
[#] More than one submission was received from these agencies.

4.2 Ferntree Facilities Area

EIS findings and/or key points

Infrastructure required as part of the project works includes a balance tank to act as a break point for the hydraulic grade within the pipeline and to provide a head point for supply pumps to pump to. As noted in the EIS, a site with elevation that maximise gravity flow potential is required for the balance tank. This minimises the need for pumping and reduces the potential for tunnelling through hills at lower elevations.

In 2007, a siting study for the project and future pipeline requirements (i.e. linkages to future water supplies) was undertaken by LinkWater Projects and identified two potential locations for a balance tank. The sites were identified on the basis of specific engineering requirements.

A potential facilities site at Nobels Road near Eudlo which was identified as part of the NPI stage 1 pipeline development was not progressed as a long-term viable option for the project due to factors including the site's significant environmental value. This matter was finalised during the environmental assessment process for the NPI stage 1 project.

As a result of the determination on the Nobels Road site, LinkWater Projects selected a facilities site located at Ferntree, Kulangoor, as the preferred location for a balance tank. The potential peaks for balance tank sitings considered in the EIS is shown in Figure 7 – Potential peaks for balance tank sitings

As provided in SEIS Appendix L, for the purposes of the EIS a balance tank with a 5 ML capacity was investigated. However, the EIS stated that in the event of a bulk water source (e.g. stage 1 of the Traveston Crossing Dam Project or a desalination plant on the Sunshine Coast) being approved, the 5 ML balance tank at the Ferntree site would need to be replaced with a 35 ML balance tank and a pump station.

The EIS further provided that the Ferntree site would remain the optimal location for facilities required for stage 2 and the future NRP. The EIS has assessed the potential impacts associated with the construction footprint (including vegetation clearing) of a 35 ML balance tank. This assessment was completed to include impacts regardless of the water source as it was the optimal site for the facility. However the EIS is not assessing or seeking approval for any other facilities other than those required for the NPI stage 2.

A number of submissions were received on the EIS regarding the proposed location of the balance tank at Ferntree.

Figure 7 Potential peaks for balance tank sitings

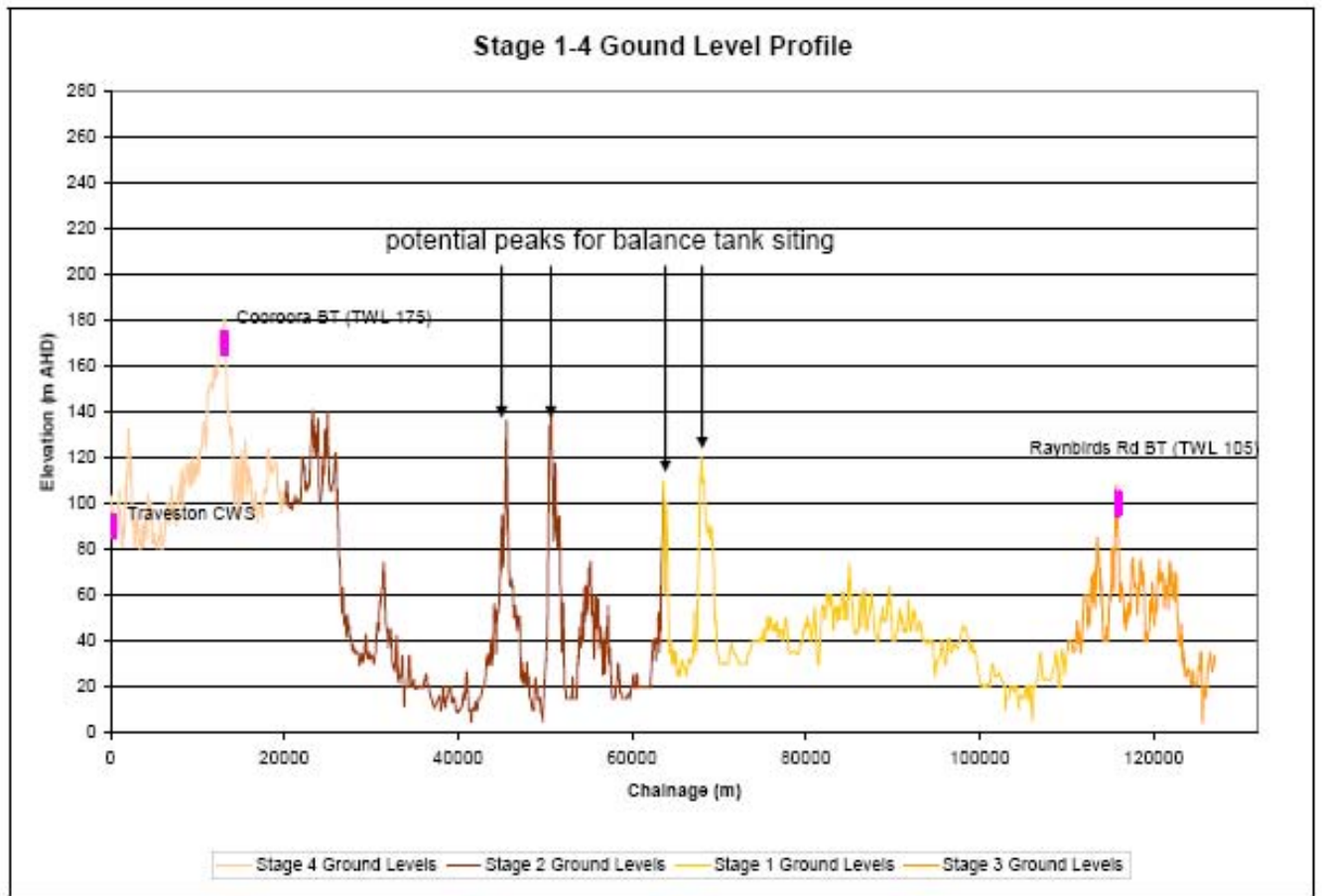
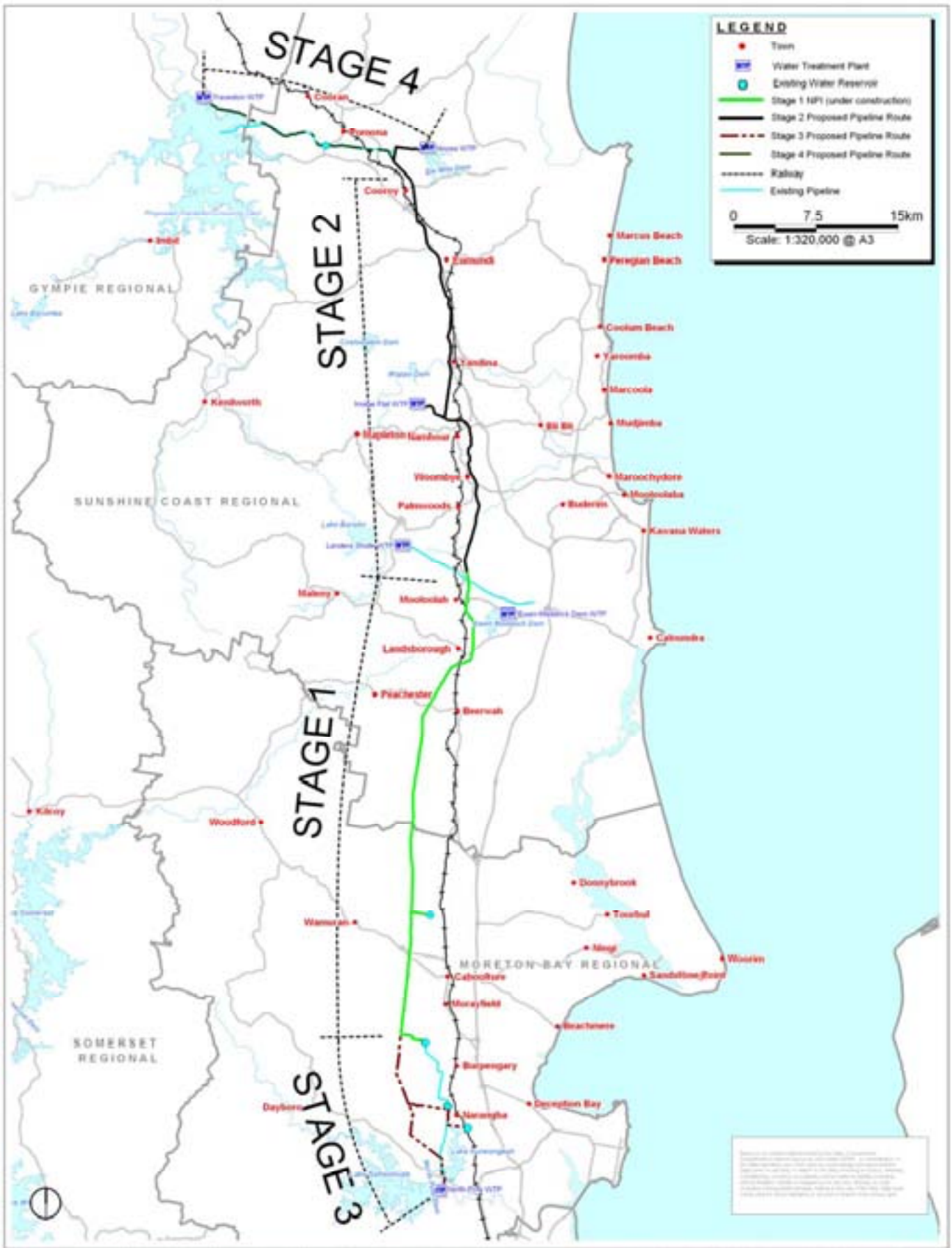
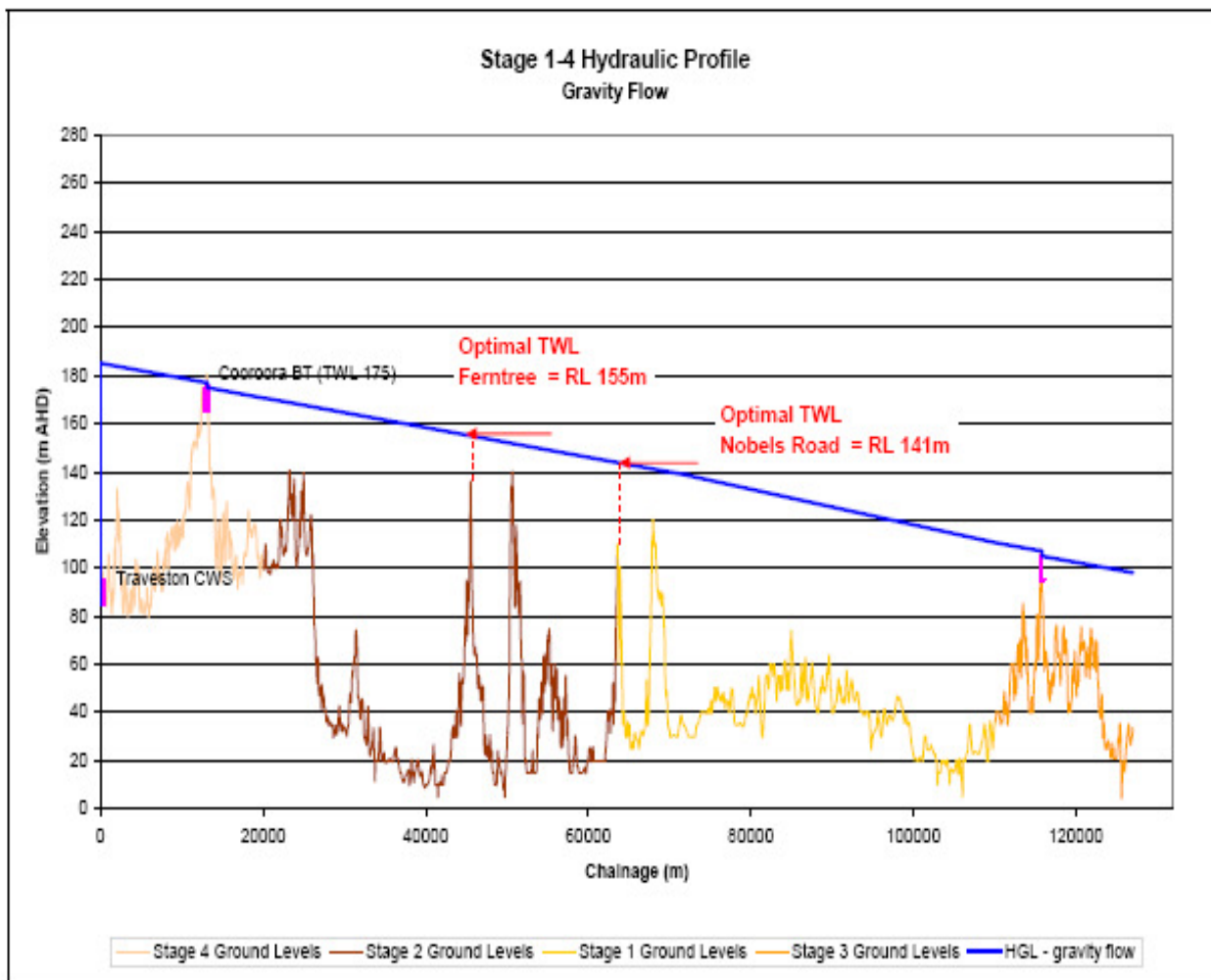


Figure 8 Regional map of major facility requirements for the NRWP



A number of balance tank sites were initially investigated, with the Nobels Road Site 129 m (top of water level 141 m) Australian Height Datum (AHD) and the FFA 143 m (top of water level 155 m) AHD sites shortlisted. These elevations allow flows to pass over a high point at NPI stage 1 located at Tunnel Ridge Road. This is shown in Figure 9 – Optimal balance tank top water level.

Figure 9 Optimal balance tank top water level




As discussed, the Nobels Road option, identified as part of the NPI stage 1 pipeline development, was not progressed as a long-term viable option for the project (or the future NRP) given the site’s significant environmental value.

LinkWater Projects proposed the FFA as the preferred balance tank location for the project and the NRP, and further environmental investigations were conducted.

The FFA will include the construction of:

- a 5 ML balance tank and a water quality boosting station (amended from a water quality management facility (WQMF) as referred to in the EIS)
- an access road and other associated structures (e.g. valve pits and a flowmeter pit).

As detailed in section 3.3.5 of the EIS, investigations were undertaken to determine the preferred locations within the FFA for the balance tank and pipeline alignment.



A desktop assessment was completed to identify potential important habitat features and EVR species that may potentially occur within the FFA. Field investigations were then conducted to evaluate the desktop findings in more detail. These investigations included:

- on-foot traverse of the area, recording remnant vegetation types present
- identification of habitat features within the FFA
- identification of environmental constraints
- targeted investigation of sensitive areas within the FFA (i.e. waterways, Ferntree Creek National Park, regional ecosystems with high potential for EVR species).

Environmental values/constraints, engineering, construction, community and cost were factors considered in site selection. Of the options identified in the EIS, the eastern facilities site was selected, along with the western pipeline corridor as the preferred corridor route for connection to the facilities (EIS Figure 3.12).

Compared with the western facilities site option presented in the EIS, the preferred eastern facilities site for the FFA minimises impacts by reducing the:

- extent of clearing required within the state wildlife corridor by maximising the use of existing disturbed areas
- overall area of disturbance from 8 ha to 6.6 ha
- vegetation clearing footprint from 4.65 ha to 3.45 ha
- impacts on EVR species habitat (e.g. rocky outcrops, waterways and wetter gullies).

The FFA will be located entirely within Lot 9 on SP201521. It is the intention of LinkWater Projects to purchase this lot from the Sunshine Coast Regional Council (SCRC). LinkWater Projects notes in section 3.2 of the SEIS that this would provide the opportunity to utilise the majority of the remaining unused areas of the site for open space or conservation purposes. Revegetation and management of existing vegetation on this property would provide ecological benefits for the region by improving the connectivity of the state wildlife corridor and linking important habitat areas.


Recommendation 1

LinkWater Projects will endeavour to purchase Lot 9 on SP201521 from the SCRC which would then be used for part of the vegetation offsets required for the project. Lot 9 on SP201521 must either be retained in perpetuity by LinkWater Projects or a local government or state-owned entity, or that area that is not required for existing or future facilities be incorporated into the adjoining Ferntree Creek National Park or otherwise protected.

The western pipeline corridor route as assessed in the EIS was selected as the preferred corridor within the FFA for access to the balance tank, with a variation to provide for connection to the FFA. This option was selected over the alternative eastern route option on the basis that it minimises environmental impact by maximising the use of existing easements. Importantly, it avoids clearing of intact 'endangered' remnant vegetation and important gallery rainforest habitat within the Ferntree Creek National Park (regional ecosystem (RE) 12.3.1).

A WQBF will be required to boost the water quality and maintain a standard that meets Australian Drinking Water Guidelines before reaching the Caloundra Street WQMF for southern flow direction (SFD) or in the case of northern flow direction (NFD), before reaching the Noosa WQBF. The WQBF at Ferntree will be located adjacent to the balance tank and consist of chemical storage buildings with bunded chemical delivery areas. Water quality monitoring equipment and amenities will be provided on site.

Earthworks will require the excavation of approximately 175 000 m³ of material to reach the required surface level of 143 m AHD for the hardstand area where facilities will be located. Earthworks associated with the access track include excavation of approximately 5000 m³, and use of approximately 3200 m³ of fill. To minimise the movement of spoil from the site,



some of the material will be used for fill and levelling (if it is suitable) within the FFA and for the associated access road.

The hardstand to be constructed for the project at the FFA will be large enough to accommodate future works required for the transport of bulk flows (i.e. one 35 ML balance tank, upgrades to the water quality boosting station and a pump station for TCD stage 1). Approval for the construction of these facilities will be sought separately when required.

Access to the FFA is proposed across the North Coast Railway at grade using an existing occupational crossing. LinkWater Projects have been in discussion with Queensland Rail (QR) about the proposed access arrangements.

Since the release of the SEIS, LinkWater Projects has further refined the access track to the facility proposed at the FFA and the layout of the facilities. This is shown on Figure 10 – Ferntree facility area. The refined access track and facility layout will reduce the clearing impacts and disturbance of the wildlife corridor.

Conclusions

I have considered the submissions and the information provided by LinkWater Projects and I am satisfied that the FFA is the most appropriate location for the proposed facilities for the project. In addition, I am satisfied that the eastern facilities site within the FFA and the western pipeline corridor option as described in the EIS are the most appropriate options for location of the facilities and locating the connecting pipeline infrastructure respectively.

As discussed, a potential facilities site at Nobels Road near Eudlo that was identified as part of the NPI stage 1 pipeline development was not progressed as a long-term viable option for the project (or the future NRP) given the site's significant environmental value. As a result of the environmental assessment work for NPI stage 1 and the EIS process and public and advisory agency submissions on this project, improved environmental outcomes have been achieved.

Although this approval is not an approval of future NRP works associated with the TCD stage 1, I note that the decision to accept the FFA will lead to the location of additional infrastructure associated with the TCD stage 1. I have taken this into consideration when making this decision.

I am satisfied that access to the site across the north coast line can be appropriately managed between QR and LinkWater Projects, however conditions clarifying the obligations of LinkWater Projects are required.

Condition 1

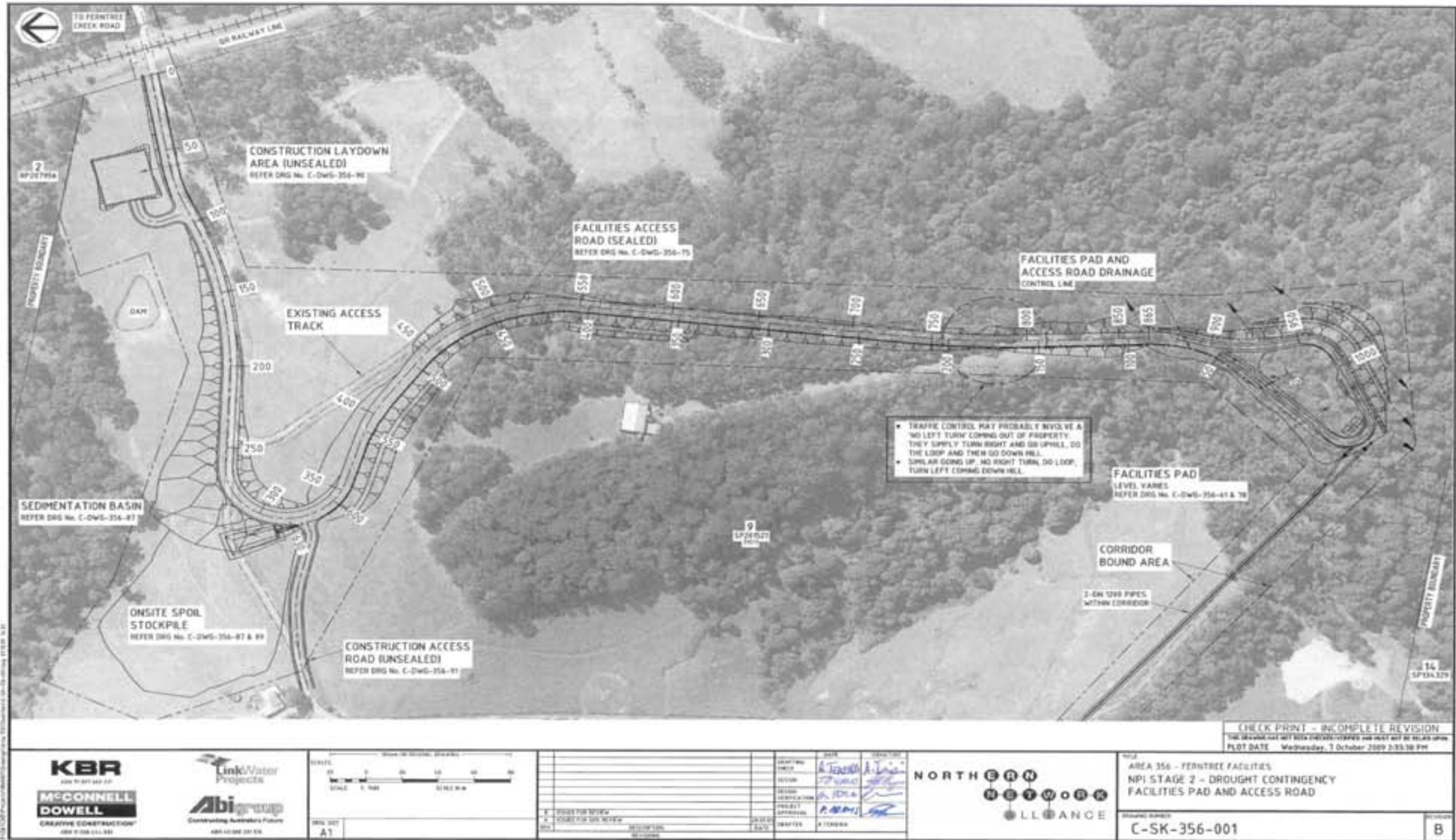
The location of the Ferntree Facilities Area (FFA) facilities are to be constructed in accordance with Figure 10 Ferntree Facility Area. Any variation to the layout is to be approved by DIP.

Condition 2

Before access for the construction of the FFA can occur across the north coast line, the approval of the head lessee for the corridor being the State of Queensland represented by the Department of Transport and Main Roads and the sublessee, being Queensland Rail, must be obtained.



Figure 10 Ferntree Facility Area



4.3 Pringle Hill (Tunnel)

EIS findings and/or key points

A major tunnel bore at Pringle Hill, Nambour, has been proposed by LinkWater Projects. The tunnelling is required due to hydraulic limitations and construction constraints over a prominent ridge in the area.

On 21 August 2008, the Deputy Premier announced that the pipeline would run within the existing Energex easement that traverses Pringle Hill wherever possible. The EIS for the project (released in January 2009) contained three options for construction in the Pringle Hill area as detailed in section 2.2 of the EIS. These included:

1. three micro-tunnels within the existing easement
2. one large diameter tunnel within the existing easement using a road header
3. one long micro-tunnel outside the existing easement.

Initially, a large diameter tunnel (option 2) was favoured for further detailed investigations.

By mid-2009 further geotechnical investigations had been undertaken to understand the design, construction and timing limitations of the proposed large diameter tunnel option. The SEIS provided further information on this proposed method of tunnelling.

However, subsequent to the release of the SEIS, LinkWater Projects advised me that an alternative technical solution that allows a single tunnel boring machine to undertake the entire 1.1 kilometre excavation of the Pringle Hill works had become available since the initial assessment of the three options in 2008. Therefore, this option was proposed by LinkWater Projects as the preferred construction method for this section.


LinkWater Projects has now provided full details to me on this preferred tunnel option, along with a comparison with previous construction methodologies and justification regarding reduced environmental and social impacts. Table 6, provided by LinkWater Projects, compares construction options at Pringle Hill and their impacts.

For the preferred option, the alignment is generally within the existing Energex easement, apart from minor deviations at major bends in the easement and the ends where the exit and entry portals are located.

The single long micro-tunnel will be approximately 1100 metres long at a depth ranging between 10 m and 100 m below surface level (see Figure 11 – Pringle Hill tunnel alignment).

I note that LinkWater Projects has provided that adoption of the single long micro-tunnel will have the following advantages:

- (a) superior environmental outcome due to reduced spoil volume generated (reduced spoil volume of 16 000 tonnes versus up to 54 000 tonnes on previous options). The alternatives would require significant social impact, to remove spoil from the southern portal.
- (b) better transport access to remove spoil from the site. On the whole, truck movements will be mostly isolated to the northern end to retrieve and remove spoil. Other options required spoil retrieval from both north and south portals.
- (c) shorter construction program. A time saving of up to five months will reduce project costs and impacts to the local community.
- (d) reduced construction footprint
- (e) the total construction cost is approximately half that of the alternatives (approximately \$15.5 M as opposed to approximately \$31–36 M).
- (f) while additional easement acquisitions may be required outside the existing easement (estimate of seven), these will not result in removal of any dwellings and in



most instances will require below ground acquisition of a volumetric easement (i.e. subterranean) only, with little or no disturbance to the landholders concerned.

As noted in the SEIS, based upon geotechnical investigations, the tunnel location is likely to intersect with perched water tables associated with the underlying sandstone substrate. Whilst localised dewatering will occur, it is unlikely to result in significant negative impacts on surface ecological features. A search of the online Protected Matters Search Tool did identify the presence of significant species in the area. However, due to the lack of appropriate habitat to support these species, there is low potential for impacts on matters of national environmental significance as a result of the activity.

A report on landholder consultation regarding the development of the preferred construction methodology was produced by LinkWater Projects, which described the company's consultation with landholders over whose properties an increased volumetric easement would be required.

As discussed previously in this report, an SEIS is normally only provided for advisory agency comment. However, the public may be given the opportunity to comment on a SEIS if the scope of the project changes and an additional impact to the public is likely. This consideration is required as the EIS process removes the public's right to comment on impacts that may be available through the integrated development assessment system.

I am satisfied that the changes proposed for tunnelling at Pringle Hill since the release of the SEIS, are a refinement of an option initially provided in the EIS. Further, as they are not substantial and relative to previous options will reduce environmental and social impacts, including to adjoining property owners, I have determined that there is not a requirement to provide members of the public with the opportunity to comment on the details of the single loop microtunnel prior to me finalising this report.

However, I note further information provided by LinkWater Projects subsequent to release of the SEIS states that the company has undertaken extensive engagement with the local community and affected landholders on the preferred tunnelling option.

Construction activities were proposed in the SEIS at Pringle Hill between 6:30 am and 5:00 pm Monday to Friday and, if necessary, 7:00 am to 1:00 pm on Saturdays. I acknowledge as stated in the SEIS that tunnelling activities are indicated as being required 24 hours per day.

I note LinkWater Projects has advised residents that, in the vicinity of Pringle Hill:

'truck movements will occur between the hours of 7:30 am and 5:30 pm Monday to Friday. An estimate of 15 truck movements will occur per day. Truck movements will not occur on weekends. The tunnel boring machine (TBM) will operate 24 hours a day, seven days a week. There will be noise proofing around the launch shaft built to a specification of keeping noise to 45 decibels at night. As a guide, a normal conversation is 60 decibels; a whisper is 15 decibels'.

LinkWater Projects mentioned in the SEIS that an air, noise and vibrations specialist will be engaged to undertake further monitoring at the Pringle Hill tunnel and to advise on preventative and reactive measures required to mitigate impacts.

Spoil management is important for mitigation of impacts on the existing features and the community. To this end, LinkWater Projects has stated in the SEIS that spoil will be removed (to approved locations) from the site only during normal daytime construction hours.

Figure 11 Pringle Hill tunnel alignment



Table 6 Construction options at Pringle Hill and their impacts


Criteria	Construction options		
	Road header tunnel from south and micro tunnel from north	Road header tunnel from north and south	Micro tunnel north to south (preferred option)
Program	12 months	13 months	8 months
Community	Heavy impact on sensitive community at southern end (Pringle Hill Stakeholder Group), lighter impact on northern end.	Heavy impact on southern and northern ends.	Driven from remote paddock at northern end with only light impact on the community at both ends .
Land	Large temporary work area required at southern end, medium temporary area at northern end. Tunnel remains within easement.	Large temporary work area required at southern and northern end. Tunnel remains within easement.	Small temporary work area at southern end and medium temporary area at northern end. Tunnel extends slightly outside the easement.
Spoil (approx.)	40 000 tonne	54 000 tonne	16 000 tonne
Spoil haulage	Northern end resulting in minimal impact. Southern end requires hauling through steep local roads and past several dwellings resulting in large impacts.	Northern end resulting in minimal impact. Southern end requires hauling through steep local roads and past several dwellings resulting in large impacts.	Northern end resulting in minimal impact.

Conclusions

Submissions were received on the EIS with concerns regarding impacts from vibration due to project works at Pringle Hill. LinkWater Projects has not detailed the anticipated vibration impacts as a result of works at Pringle Hill but will be relying on vibration specialists to undertake monitoring at the Pringle Hill tunnel. Should they be determined to be of a level that may cause a nuisance, LinkWater Projects are to advise on preventative and reactive measures required to mitigate impacts. While LinkWater Projects has provided that tunnelling at a depth of at least 10 m below the surface will not impact on property owners or structures, several actions will be required by me to ensure that this is the case.

I note that of the three tunnelling options, the refined micro-tunnelling option will significantly reduce impacts to an acceptable level. However, to ensure that these are further reduced, I have set conditions relating to construction hours in this report in Chapter 4.11 – Noise and vibration as Condition 16. In relation to private properties at Pringle Hill this condition will mean that construction hours within private properties are to be limited from 7:00 am to 5:00 pm Monday to Friday. No work is acceptable on Saturdays, Sundays or public holidays.

This condition does not limit construction activities involving underground activities where access to private properties is not required, however for tunnelling locations, in order to limit the amount of construction traffic the removal of spoil is not permitted outside of the hours specified above. For tunnelling works, should access to private properties where the nearest occupancy is less than 50 metres in distance from the access point or above ground activities



and works be required, then construction activities can occur if the resident consents in writing to access outside these hours.

Condition 3

In relation to dwellings that are within 40 m of the horizontal alignment at Pringle Hill, LinkWater Projects must:

- **engage an independent assessor to undertake structural inspections of buildings prior to the commencement of any potentially damaging construction activities (such as blasting, rock breaking, pile driving, or dynamic compaction)**
- **ensure that all project blasting operations are carried out in accordance with the Australian and New Zealand Environment and Conservation Council guideline ‘Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC, 1990)’**
- **engage a vibration specialist to undertake daily monitoring at the Pringle Hill tunnel and to advise the Department of Infrastructure and Planning (DIP) on preventative and reactive measures required to mitigate impacts. If any impact, such as structural damage to buildings, is identified, then LinkWater Projects must undertake appropriate corrective action, which may include compensation to the owner for such impacts.**

Condition 4

In addition to the normal reporting arrangements with LinkWater Projects, the vibration specialist referred to in condition 3 is to provide fortnightly reports to DIP directly with the information provided being at the discretion of DIP. At any time DIP may require LinkWater Projects to direct the vibration specialist to attend meetings with DIP, advisory agencies or the public.

To clarify any uncertainty, as with any conditions where it is not specified otherwise, the costs involved with this condition are the responsibility of LinkWater Projects. As the vibration information is provided, DIP can alter the frequency of these reports.

4.4 Waterway crossings

EIS findings and/or key points

A list of all the waterway crossings intersected along the corridor and a ranking of their environmental values was provided in the EIS and has been provided in this Report as Table 7. The location of these waterway crossings is shown on Figure 12. The criteria provided by LinkWater Projects in the EIS defining the ranking categories, i.e. low, moderate and high environmental values, are listed below. An example photograph of each category is included at Figure 13.

Low environmental values:

- within an existing cleared easement or cleared at crossing point
- no significant environmental features that may be impacted by trenching (e.g. significant species, 'endangered' or 'of concern' regional ecosystem (RE))
- low stream order (less than 3)[∞].

Moderate environmental values:

- within an existing cleared easement but retaining some intact riparian vegetation at and/or adjacent to the crossing point or not within an existing easement and supporting some intact riparian vegetation
- 'endangered' or 'of concern' RE at or adjacent to crossing point or other environmental features which may be impacted by trenching (e.g. significant species)
- moderate stream order (3 or greater)[∞].

High environmental values:

- not within an existing cleared easement
- crossing point supports intact riparian vegetation
- 'endangered' or 'of concern' RE at or adjacent to the crossing point
- other environmental features that may be impacted by trenching (e.g. significant species)
- moderate to high stream order (3 or greater)[∞].

I have decided that, as there are 45 waterway crossings, the method used by LinkWater Projects in the EIS of defining crossings by categories is the most appropriate means by which crossings' impacts can be considered and mitigation strategies developed. The SEIS latter defines waterway crossings with high environmental values as significant waterway crossings.

As shown in Table 7, LinkWater Projects determined that most waterway crossing points have low environmental values. Only three waterway crossing points were identified in the EIS as having high environmental values. LinkWater Projects advised in the EIS that consequently, field investigations were only undertaken at waterway crossing points that were classed as having moderate or high environmental values.

[∞] Note: stream order is a means of classifying different types of streams. For streams that are defined as waterways (as according to the Queensland *Water Act 2000*) an understanding of their capacity to carry water is required. As some waterways may only carry water infrequently (such as 1st order streams) compared to those that carry water frequently (2nd order) and or those permanent waterways (3rd order) there is a need to make a distinction. For the streams/waterways that are low stream order, they may not actually be classified as waterways, whereas those of a high order are likely to be permanent waterways. This then influences the way they are assessed and protected against various impacts.

The findings of the waterway crossing assessments were summarised in this EIS and discussed in greater detail at Appendix L of the EIS.


Submissions on the EIS

Many of the submissions raised concerns about open trenching as the base option for all waterway crossings, especially those considered to be of moderate or high environmental significance. In particular, submissions raised concerns about the environmental impacts open trenching may have on aquatic and riparian habitats and suggested that consideration be given to alternative crossing methods, or justification be provided as to why trenching is a preferred method. For example, the then Department of Primary Industries and Fisheries (DPI&F) acknowledged 'the significant monetary costs associated with directional drilling/micro tunnelling', however the direct and indirect impacts of trenching, even with the mitigation measures proposed, on waterway ecosystems processes and fish habitats are unacceptable, particularly where alternatives exist.

Table 7 Waterway crossing rankings

Sub-catchment	Low environmental values	Moderate environmental values	High environmental values
Six-Mile Creek	Five tributaries of Lake Macdonald, fourteen tributaries of Six-Mile Creek (left branch), Six-Mile Creek at the Lake Macdonald Spillway	Two tributaries of Lake Macdonald and Six-Mile Creek (left branch) (southern crossing)	Six-Mile Creek (left branch) (northern crossing)
North Maroochy River	Steggalls Creek and three of its tributaries, Browns Creek, a tributary of North Maroochy River, Running Creek (two crossings), Bunya Creek, Gold Creek and three of its tributaries, six tributaries of North Maroochy River, Caplick Creek and two of its tributaries, Sandy Creek and three of its tributaries and seven tributaries of North Maroochy River	North Maroochy River and one tributary of North Maroochy River	None
South Maroochy River	Mount Combe Creek and six tributaries of South Maroochy River	South Maroochy River	None
Upper Maroochy Estuary	Seven tributaries of Rocky Creek and Rocky Creek	None	None
Petrie Creek	Ten tributaries of Tuckers Creek	Tuckers Creek and two tributaries of Tuckers Creek	Petrie Creek
Paynter Creek	Eleven tributaries of Paynter Creek	Paynter Creek (two southern crossings)	Paynter Creek (three northern crossings)*
Eudlo Creek	Un-named creek south of Eudlo Creek sub-catchment, six tributaries of Acrobat Creek, twelve tributaries of Eudlo Creek	Acrobat Creek and Eudlo Creek	None
South of Eudlo Creek	Un-named creek south of Eudlo Creek sub-catchment		

* The above table and following information describes the three northern crossings of Paynter Creek within the existing easement. The corridor in this section has not been fixed pending further investigation.



Another submission which raised concerns about this matter was provided by the Wildlife Preservation Society of Queensland and states in part that:

'In regard to the crossing of waterways, in order to mitigate or avoid adverse effects on aquatic fauna, we recommend that this be undertaken by either piling or span bridging, raising the pipe on a structure above the channel; or micro tunnel or thrust bore, tunnelling under the stream bed; rather than by trenching, excavating and laying pipe through the bed of the waterway, with its attendant disturbance.'

LinkWater Projects has asserted in the EIS that trenching is far more cost-effective and the construction time frame is far less compared with piling and microtunnelling. For example, the construction time frame for a trenched crossing of the North Maroochy River is estimated at one week, compared with up to six weeks for the construction of a piled crossing. Longer construction time frames associated with piling and tunnelling will likely increase the time between construction and reinstatement and increase the risk of sediment erosion and adverse impacts on water quality.

Figure 12 Location of waterway crossings

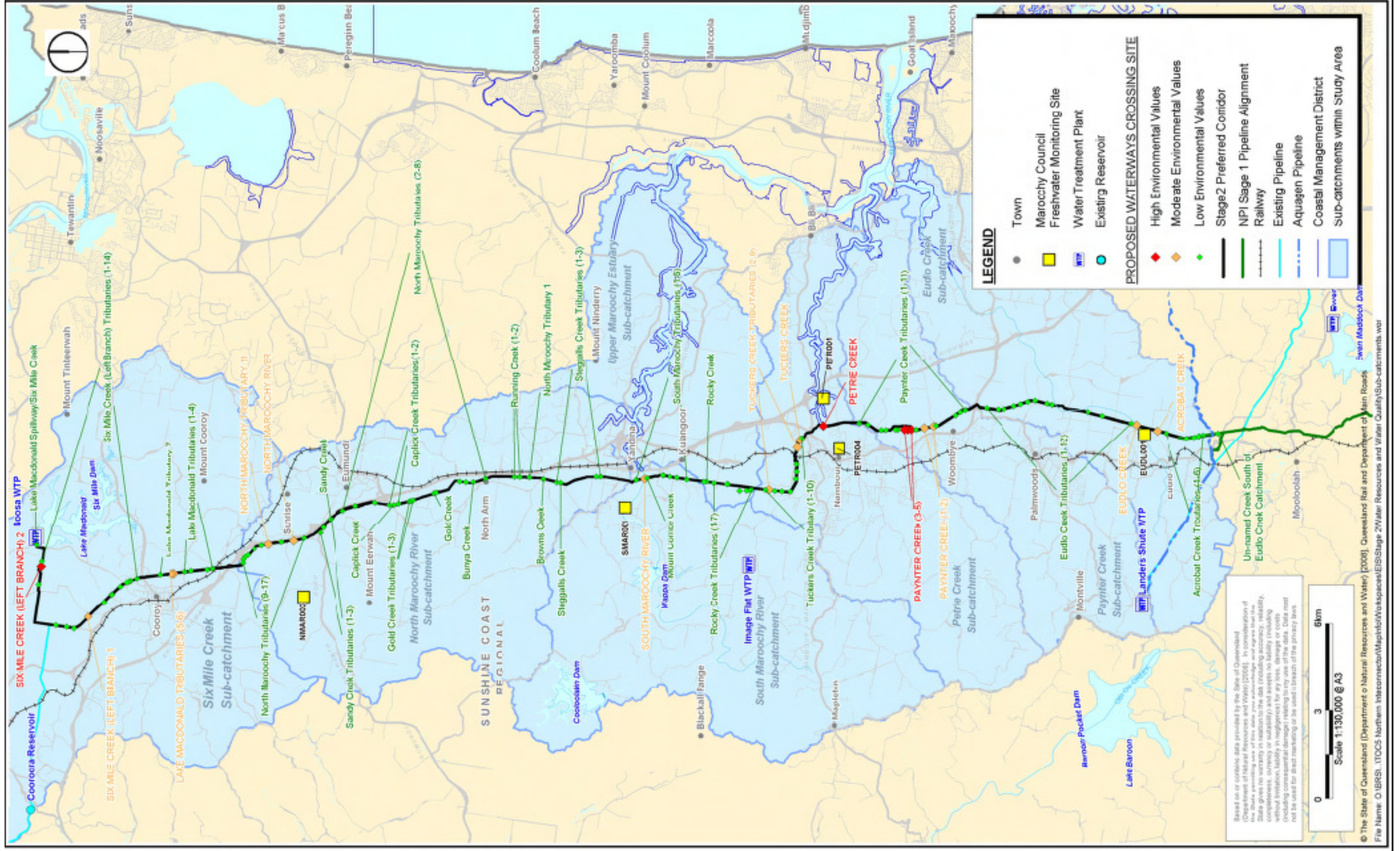


Figure 13 Example photographs of waterway crossings with low, moderate and high environmental values



Low environmental values:
Browns Creek is an example of a waterway with low environmental values. It is cleared at the crossing point and disturbed by an existing road.



Moderate environmental values:
Paynter Creek (southern crossing) is an example of a waterway with moderate environmental values. Note the break in riparian canopy through the easement. Regrowth is slowly occurring under a cover of woody weeds.



High environmental values:
Petrie Creek is an example of a crossing with high environmental values.

Left photo: The creek and the weedy regrowth on the south bank.

Right photo: The degraded RE 12.3.1 vegetation on the north bank, which provides habitat values.



LinkWater Projects has suggested in the EIS that the cost of piling the South Maroochy River is estimated to be \$850 000 and would likely have significant impacts on visual amenity; however, a trenched crossing will have no visual impact following reinstatement and revegetation, and is estimated to cost \$300 000. The costs associated with a tunnel-bore of the major waterways would be in excess of \$1 million per crossing.

After reviewing submissions on the EIS I informed LinkWater Projects that further information was required on the impacts and proposed mitigation strategies for waterway crossings in the SEIS. In reaching this decision I have been guided by my review of the EIS and also the significant comments received as a result of submissions on the EIS.

Response in the SEIS to submissions on the EIS

The SEIS refers to a more robust and comprehensive assessment of waterway crossing methodologies being undertaken to determine the most appropriate crossing method for individual waterways.

Since the publication of the EIS, additional ecological assessment studies have been conducted along the pipeline route as part of the sensitive area management. Some of the riverine crossings originally assessed in the EIS as having moderate environmental value have not been included as significant waterways, as detailed field investigation did not identify sensitive environmental features at or downstream of the crossing point. Waterways excluded were a tributary of Tuckers Creek, a tributary of North Maroochy River, Eudlo Creek and Acrobat Creek. LinkWater confirms in the SEIS that environmental mitigation measures will be implemented at these crossings via the project's construction environmental management plan.

Detailed field investigations elevated a number of waterway crossings initially listed as having low environmental value to having moderate environmental value. Those that were re-categorised include:

- Six Mile Creek tributary (Pearsons Road, Cooroy)
- Six Mile Creek at the Lake Macdonald Spillway
- Browns Creek
- Running Creek
- Sandy Creek
- Mt Combe Creek
- Rocky Creek
- Tuckers Creek tributary.

I note that a number of the creeks originally assessed in the EIS as having moderate environmental values have not been elevated to being categorised as significant waterways, as detailed field investigations did not identify sensitive environmental features at, or downstream of, the crossing point. Waterways excluded were a tributary of Tuckers Creek, a tributary of North Maroochy River, Eudlo Creek and Acrobat Creek (different to those listed in the dot points above).


LinkWater Projects noted that regardless of the crossing methodology selected, all potential impacts will be managed through the project's soil and water management plan with appropriate sediment and erosion control measures and water quality monitoring during and post construction activities. Where multiple crossings of one waterway are required, the potential cumulative impacts will be managed through the EMPs and where appropriate sensitive area plans for the area (for example, Six Mile Creek crossings).

LinkWater Projects proposed in the SEIS that the construction corridor width will vary according to the preferred construction method determined during the crossing assessment. The construction corridor will be constrained where possible to reduce the level of disturbance to the bed and banks of the waterway.

LinkWater Projects proposed that the reinstatement of the bed and banks (if required) will be done in accordance with the project's revegetation and rehabilitation management plan and be restored to as near to their original profile as possible, stabilised through the use of riprap, jute matting and rehabilitated with riparian vegetation endemic to the local area.

Selection of construction method for waterway crossings

The SEIS details that the construction methods for pipeline crossings of waterways was determined via a series of workshops that resulted in a multi-criteria assessment being undertaken to determine the preferred construction method. Outcomes of the workshops are included in Appendix J of the SEIS. As detailed in the SEIS, the aim of the waterways crossing methodology assessment was to take into consideration various factors to determine



the most appropriate construction method that balanced impacts. The assessment process consisted of the following five phases and outcomes.

Phase 1—Develop evaluation criteria and subsequent weightings for comparative evaluation of crossing options.

The criteria used for the multi-criteria analysis included:

- value
- safety
- program
- people
- integration
- stakeholders
- fit for purpose
- environment.

Phase 2—Identify all practical options for waterway crossings.

A number of pipeline construction methods are available to facilitate waterway crossings. These include above ground methods such as piling or spanning and below ground methods such as trenching or tunnelling.

Phase 3—Develop evaluation criteria to identify waterways that are considered significant and therefore identify waterways to be included in the crossing option evaluation process.

Significant waterways were defined based on the environmental values present, or potentially present, near to and at the crossing point. The environmental values used as significant waterway evaluation criteria were determined by LinkWater Projects and are outlined in Figure 4.9 of the SEIS. Environmental values assigned to each crossing point were derived from desktop studies and field investigations carried out by qualified personnel.

The SEIS confirmed that a total of 14 waterway crossings were identified by LinkWater Projects as significant (see Table 8 for significant waterways and explanation and Figure 14 for their locations).

Phase 4—Develop a short-list of feasible construction methodologies for each significant waterway crossing.

Each significant waterway was evaluated against each crossing methodology to determine which methods are technically feasible.

Phase 5—Assess social and environmental issues, engineering constraints, cost considerations and site constraints for each of the crossing options at each crossing to identify the preferred crossing methodology.

Ratings were assigned for each sub-criterion for each waterway in the workshop. The ratings were determined based on:

construction method

- measurement unit assigned
- sub-criterion definition
- definition of the rating scale.



Table 8 Significant waterways and descriptions

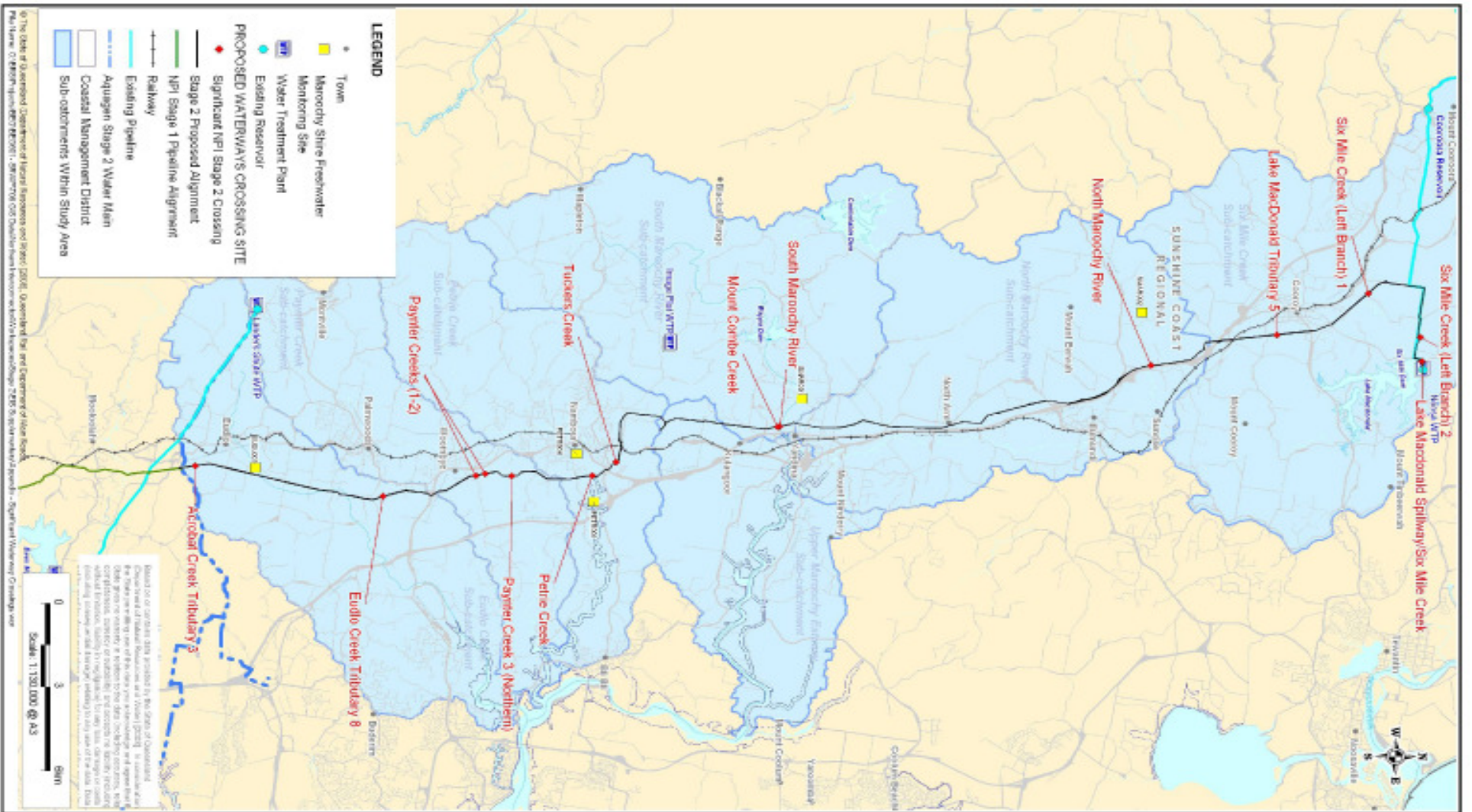
Phase 1 (L, M, H rating and additional information from environmentally sensitive area investigations)								Phase 2: Detailed analysis of waterways with M and H ratings and L rating with additional information.								Phase 3: Evaluation and selection of significant waterways for MCA analysis - field investigation notes							
Name	Approx. stream order	Rating in EIS (L, M, H)	Potential significant species and/or habitat (NCA, MNES)	Significant vegetation (NCA, MNES, RE)	Ecosystem Function (stream order, downstream significance)	Significant Y/N	Explanation																
Acrobat tributary 3	1	L	✓	✓	✓	Yes	Intact riparian vegetation within corridor (regrowth under power lines). Potential for Tusked Frog.																
Eudlo tributary 8	1	L	✓	✓	✓	Yes	Intact riparian vegetation within corridor (regrowth under power line). Potential for Tusked Frog and Elf Skink.																
Paynter Creek 01	5	M	✓	✓	✓	Yes	Potential habitat for Giant Barred Frog and Elf Skink. RE 12.3.2 either side of crossing point. Local wildlife corridor.																
Paynter Creek 02	5	M	✓	✓	✓	Yes	Potential habitat for Giant Barred Frog and Elf Skink. RE 12.3.2 either side of crossing point. Local wildlife corridor.																
Paynter Creek Northern crossing	5	H	✓	✓	✓	Yes	Riparian vegetation (12.3.1) intact on northern bank but disturbed/open on southern bank at crossing point. Northern side extends to patch of 12.3.1 vegetation with pools and wet areas.																
Petrie Creek	>4	H	✓	✓	✓	Yes	Potential habitat for Giant Barred Frog. Riparian vegetation degraded RE 12.3.1/12.3.2 within corridor. Elf Skink present. Potential habitat for Tusked Frog. Local wildlife corridor.																
Tuckers Creek	>4	M	✓	✓	✓	Yes	Potential habitat for Tusked Frog, Giant Barred Frog and Elf Skink. Regrowth of RE 12.3.1 (confirmed via EPA moratorium map).																



	Phase 1 (L, M, H rating and additional information from environmentally sensitive area investigations)		Phase 2: Detailed analysis of waterways with M and H ratings and L rating with additional information.			Phase 3: Evaluation and selection of significant waterways for MCA analysis - field investigation notes	
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Name	Approx. stream order	Rating in EIS (L, M, H)	Potential significant species and/or habitat (NCA, MNES)	Significant vegetation (NCA, MNES, RE)	Ecosystem Function (stream order, downstream significance)	Significant Y/N	Explanation
Mount Combe Creek	3	L	✓	✓	✓	Yes	Potential habitat for Giant Barred Frog, Tusked Frog, Elf Skink, Platypus and Koala. Riparian vegetation RE 12.3.2/12.3.1, degraded at crossing point.
South Maroochy River	>5	M	✓	✓	✓	Yes	Potential habitat for Giant Barred Frog, Tusked Frog, Elf Skink, Platypus and Koala. Riparian vegetation RE 12.3.2/12.3.1, degraded at crossing point.
North Maroochy River	>5	M	✓	✓	✓	Yes	Potential habitat for Giant Barred Frog, Tusked Frog, Elf Skink, Platypus and Echidna. Riparian vegetation 12.3.1, degraded at crossing point. State wildlife corridor.
Lake Macdonald tributary 5	3	M	✓	✓	✓	Yes	Potential for Giant Barred Frog, Tusked Frog and Alyxia magnifolia. Riparian vegetation RE 12.3.1/12.3.2, field confirmation 12.3.1 regrowth.
Six Mile Creek (Left Branch) 01	>4	M	✓	✓	✓	Yes	Potential for Xanthostemon oppositifolius, Riparian vegetation RE 12.3.2/12.3.1, degraded at crossing point.
Six Mile Creek (Left Branch) 02	>5	H	✓	✓	✓	Yes	Xanthostemon oppositifolius present. Potential for Mary River Turtle, Mary River Cod. RE 12.3.2/12.3.1. Existing pipelines cross above ground at crossing point.
Lake Macdonald Spillway/Six Mile Creek	N/A	L	✓	✓	✓	Yes	Mary River Cod present. Potential habitat for Lungfish and Mary River Turtle.

Figure 14 Location of significant waterway crossings



Sensitivity Analysis

A sensitivity analysis was used to examine the results under different weighting scenarios. Seven scenarios were chosen based on the assumptions that all ratings are true and correct, and all weightings are uncertain. The scenarios used to test the multi criteria analysis were either unbiased or biased to an extreme as shown in Table 9.

Table 9 Scenario descriptions

Scenario No.	Scenario description
Scenario 1	All criteria and sub-criteria are evenly weighted
Scenario 2	Criteria weighting assigned from paired comparison with sub-criteria weighted evenly
Scenario 3	Costs, program and constructability heavily weighted (cost – 5; program and constructability – 4; environment and stakeholders – 2) with MCA team determined sub-criterion weightings
Scenario 4	Costs, program and constructability heavily weighted (cost – 5; program and constructability – 4; environment and stakeholders – 2) with even sub-criterion weightings
Scenario 5	Environment and stakeholders heavily weighted (environment – 5, stakeholders – 4; constructability – 3; programs and costs – 2) with MCA team determined sub-criterion weightings
Scenario 6	Environment and stakeholders heavily weighted (environment – 5, stakeholders – 4; constructability – 3; programs and costs – 2) with even sub-criterion weightings

The results of the sensitivity analysis were provided in the SEIS as Table 11. These results were based on an average for each of the six scenarios. I requested from LinkWater Projects details of the sensitivity analysis for each of the six scenarios. It was not surprising that scenario 3 where cost, program and constructability was heavily weighted the result favoured trenching, while with scenarios 5 and 6 where environment and stakeholders were heavily weighted, that the results favoured tunnelling.


Submissions on the SEIS

In response to the SEIS the Department of Environment and Resource Management (DERM) indicated its preference was that crossings should avoid interference with waterways to the greatest extent practicable and, to this end, directional drilling or bridging are preferred over trenching, particularly for the more significant waterways.

This view was shared by numerous submissions, including the Sunshine Coast Regional Council (SCRC). The SCRC questioned the construction method decision making framework (SEIS Appendix J) used by LinkWater Projects and believes that this was used to justify the position presented in the EIS that trenching through stream crossings is the best option. The SCRC asserts that the scenario analysis skews the outcomes away from LinkWater Projects' least preferred option of tunnelling, by assigning a relatively low weighting for 'environment' (28 per cent) compared to a combined weighting of project-related issues of 51 per cent (value, program and constructability).

Conclusions

I find that construction of the pipeline across a number of significant waterways could adversely affect environmental values through the removal of riparian vegetation, potential scouring and erosion of stream banks, disturbance of the stream bed, and associated reduction in water quality downstream. I am satisfied that the project's water crossing



management plan, soil and water management plan and rehabilitation management plan will mitigate potential adverse environmental impacts on the waterways being crossed.

However, in relation to the 14 significant waterway crossings, I have determined that to minimise the environmental impacts to an acceptable level that a number of these should be either tunnel bored or piled. I have formed this view based on the:

- submissions received on the EIS and SEIS
- desktop studies and field investigations carried out by both internal and external qualified personnel on behalf of LinkWater Projects that identified 14 significant waterway crossings
- unique environment at, or associated with, the 14 significant waterway crossings
- results of the sensitivity analysis provided in the SEIS
- evaluation of the individual scenarios prepared at the request of DIP by LinkWater Projects.

The scenarios used in the sensitivity analysis in the SEIS in Appendix J are a useful guide to define the appropriate waterway crossing, however several submissions have suggested that the environmental weightings used in the multi-criteria analysis were not given enough weight. In determining which waterway crossings should be constructed by methods other than trenching, I have taken into consideration the sensitivity analysis for scenarios 5 and 6 where environment and stakeholders were heavily weighted.

To further minimise impacts on the environment that may not be considered sensitive I am of the view that the width of construction activities at waterway crossings involving trenching should be reduced to 10 m wherever possible. The reasoning for this direction is discussed in Chapter 4.8 Vegetation Clearing of this report.

Should construction activities for the project in watercourses require the impoundment of water or other interference with the flow of water, LinkWater Projects will be required to obtain a Waterway Barrier Works approval prior to construction from the Department of Employment, Economic Development and Innovation (DEEDI). In obtaining such an approval, LinkWater Projects will need to demonstrate to DEEDI how its environmental duty of care will be discharged.

Condition 5

Part A:

The following waterway crossings are to be either tunnel bored or piled:

- **Paynter Creek Northern**
- **Petrie Creek**
- **Tuckers Creek**
- **South Maroochy**
- **Mount Combe Creek**
- **North Maroochy River**
- **Six Mile Creek (left branch) 02**
- **Lake Macdonald Spillway.**

For each of the waterway crossings listed above, prior to construction LinkWater Projects is to seek the approval from the Department of Infrastructure and Planning (DIP) on the crossing method to be undertaken.

To inform DIP's consideration, a working group is to be convened involving independent experts on significant species and inviting participation from DEEDI (Queensland Primary Industry and Fisheries), DERM (Environment), SCRC and DIP. Minutes of the meeting are to be taken.



A waterway construction methodology selection process is to be undertaken involving the working group. Of criteria considered within the process, the criteria of environment is not to receive a lower weighted rating relative to other criteria.

Following the process, a sensitive area plan (SAP) for each of the crossings indicated in the first list above is to be produced that will detail how the recommended construction method will be undertaken to minimise environmental impacts.

For each of the crossings, the results of the process, a copy of minutes of all working group meetings on the crossing and a copy of the proposed SAP is to be provided to DIP at least one month prior to construction at the waterway crossing.

Part B:

To understand the overall schedule of the listed waterway crossings, a program of consideration for each of the crossings, proposed construction timeframes and timeframes for the above assessment process is to be provided to DIP within two months of the release of this report.

Condition 6

The construction area within 20 metres of the bed and banks of a watercourse is not to exceed 10 metres in width. This applies to watercourses as defined in the *Water Act 2000*.

However, should LinkWater Projects demonstrate prior to construction to the satisfaction of DIP that unsatisfactory safety impacts could not be reasonably avoided then the width can be increased, but to no greater than 15 metres in total.

Condition 7

Activities associated with the construction of the pipeline within watercourses are to be carried out in a way that does not impound water or otherwise unduly interfere with the flow of water without securing a Waterway Barrier Works approval from DEEDI.

For works in a watercourse as per the definition provided in the *Water Act 2000*, LinkWater Projects is to obtain advice from DERM to ensure best practice environmental management outcomes are achieved.

4.5 Land use

EIS findings and/or key points

The corridor predominantly crosses rural and agricultural land and has been selected to minimise potential impacts on future development opportunities. The majority of the preferred corridor has been located within existing, cleared powerline easements to minimise additional encumbrances to landholders. Other affected tenure types include leasehold, reserves, road reserves, state-owned land (including railways) and unallocated state land present along most watercourses. The gradient of the pipeline route varies from relatively level alluvial terraces of the floodplains to steeply undulating terrain near Nambour and Eudlo.

The construction impacts are localised and temporary in nature and include road closures, temporary removal of structures (for example, fences and gates) and access restrictions across the corridor. Specific impacts, including noise, vibration and dust are addressed in other chapters in this report.


A variety of agricultural products are grown in the study area, including ginger, pineapples, passionfruit, bananas and a range of tree crops. The corridor also traverses the western edge of former cane growing areas. The EIS identified that 24 per cent of the route has been classified as Class A good quality agricultural land (GQAL) and approximately 23 per cent as Class B. Class A is defined as highly productive land suitable for current or potential crops with minimal limitations and Class B is land that is considered less versatile, being marginal for current or potential crops. The EIS confirms that assuming a 30 m wide corridor, construction of the pipeline works will disturb approximately 34 hectares (ha) of Class A land and approximately 33 ha of Class B land.

Acid sulfate soils (ASS) occur naturally within low-lying areas, below 5 m AHD. If ASS are disturbed and exposed to oxygen (in the presence of moisture), they may produce sulphuric acid and iron compounds which can be detrimental to the environment. Impacts may include disturbance to aquatic habitats, corrosion of infrastructure containing concrete and metal (e.g. culverts, bridges and stormwater drains) and elevated levels of sulphuric acid and heavy metals being leached from the soil and discharged to receiving waters. This could cause adverse impacts to waterways, aquatic plants and animals. The EIS found that the corridor traverses only limited low-lying areas where ASS has the potential to be encountered.

Two minor sections of the corridor where the pipeline crosses floodplain areas lie below 5 m AHD, being Petrie Creek and South Maroochy River crossings. In the event that ASS is detected LinkWater Projects has committed to develop before construction commences an ASS Management Plan in accordance with the *State Planning Policy 2/02 – Planning and Managing Development involving Acid Sulfate Soils*.

Searches for contaminated land identified properties listed on the Environmental Management Register (EMR) and on two properties adjacent to an affected property. I note that sites recorded on the EMR generally pose a low risk to human health and the environment under the current land use and the listing criteria may only apply to a small part of the total land portion within the registered lot number. No matches were found on the Contaminated Land Register (CLR). However, while the project does not traverse any registered contaminated land sites, LinkWater Projects will implement mitigation measures in the event contaminated land is encountered during construction.

LinkWater Projects has advised that after the completion of pipe laying, the corridor will be reinstated, where possible, to the previous condition. The productivity of the land will be restored to as near as practicable to its former use. However, for operational and maintenance access, some activities will need to be restricted. A 5–10 m exclusion zone from the centre of the pipeline will be required preventing the planting of deep-rooted vegetation. The depth of cover over the pipeline of 900–1200 mm will allow the re-establishment of shallow-rooted crops such as ginger and pineapples.



LinkWater Projects will engage with each individual agricultural and residential landholder to negotiate a landowner construction and rehabilitation plan (LCRP). The LCRP will assist both parties to understand each other's responsibilities and commitments during construction and rehabilitation.

The project will result in temporary and permanent impacts on landholders. Where the route crosses freehold land, an easement will be established for construction and maintenance access. As the project is a water supply measure being undertaken by a state-owned authority, DIP will be responsible for acquiring easements pursuant to the SDPWO Act and the *Acquisition of Land Act 1967*. Financial compensation will be paid to individual landholders. Under the legislative processes, compensation terms will be assessed by independent valuers at no cost to the landholder.

Several issues were raised in submissions on the EIS on the impacts of the project on land use. Energex sought that for works within the vicinity of high voltage infrastructure that LinkWater Projects undertakes appropriate and timely consultation with Energex on safety requirements. I note that, as undertaken on its previous pipeline projects, LinkWater Projects has committed to working within the provisions of the Co-Use Agreement between DIP and Energex for the undertaking of the project works. The Co-Use Agreement stipulates specific measures and exclusions that a proponent must include in its design and construction of infrastructure in the Energex corridor to ensure matters such as safety and constructability are accounted for to Energex's satisfaction. LinkWater Projects has confirmed that these have been accommodated into the project as described in the EIS and SEIS.

The then DPI&F drew attention to the potential commercial impacts to local agricultural producers, whose properties and/or commercial activities would be affected by the pipeline construction. Compensation for matters affecting land holdings is claimable in accordance with the land acquisition process being undertaken for the project, and therefore such impacts will be addressed accordingly.

Conclusions

I have found that the limited restricted use of good quality agricultural land is an unavoidable consequence of the project and that this loss has been minimised through the location of the majority of the pipeline in existing Energex power line easements. As provided in the project commitments, impacts on GQAL will be minimised by increasing the depth of cover of the pipe wherever possible. The limited restricted use of the good quality agricultural land is in accordance with State Planning Policy 1/92: Development and Conservation of Agricultural Land as there is an overriding need for the project in terms of the benefit to the community of a secure water supply. Compensation to affected property owners for the disruption to their use and enjoyment of land is an appropriate mitigation.

To ensure impacts on affected landowners, including primary producers, are minimised, I make the following recommendation:

Recommendation 2

LinkWater Projects is to engage directly with affected landowners to develop specific landowner construction and rehabilitation plans (LCRP). Each LCRP is to be property-specific and to be negotiated with the landowner prior to construction. The LCRP is to include detail on the rehabilitation commitments, timeframes and compensation entitlements.

4.6 Water resources

EIS findings and/or key points

A number of submissions from stakeholders/community groups and private individuals suggested that the EIS and SEIS did not assess the cumulative impacts on the Mary River catchment of the project and the proposed TCD.

As previously discussed, the southern flow water for the project will be sourced from an existing (partly utilised) entitlement allocated under the Water Resource (Mary Basin) Plan 2006 (Mary Basin WRP). This entitlement of a total of 18 ML per day is held by the SEQ WGM within the Upper Mary River Water Supply Scheme. Historically up to 55 per cent of the entitlement has been used by the former Noosa Council for urban use.

This project will therefore only draw an additional 8.1 ML per day on average per year (above historical usage) from the Mary River. The water will be extracted from the existing Sunshine Coast Regional Council pump station at Coles Crossing. This entitlement does not form part of the proposed TCD water allocation. All cumulative impacts of allocating water in a catchment were taken into consideration by the then Department of Natural Resources and Water (DNRW) when developing the Mary Basin WRP.

Although the project is being designed to accommodate the transfer of water between the Sunshine Coast and Brisbane from the proposed TCD (should it be approved) or an alternative future bulk water supply source, it is also being developed for other reasons that are addressed in Chapter 2.3 Project Rationale of this report. The potential impacts associated with extraction of water from the Mary River catchment via the TCD stage 1 have been assessed as part of that project's separate EIS process.


The allocation of the water within a catchment is a separate statutory process to the approval for specific infrastructure to extract a water allocation. The *Water Act 2000* requires the preparation of a WRP and resource operations plan (ROP) under a process designed to ensure that water is equitably managed to preserve the balance between human consumptive demands and the needs of the environment.

It is within this prescribed process that the impacts on species, ecosystems and other environmental and socio-economic matters of the water extraction from the catchment are considered and assessed. The Mary Basin WRP, which is subordinate legislation to the Water Act, was approved in July 2006 following consideration of submissions on the draft WRP. The Mary Basin WRP identifies the availability of water and defines principles and objectives for the sustainable management and taking of water in the Mary Basin.

The ROP is the primary instrument for implementing the WRP. It states the day-to-day operating rules so that the management of dams, weirs and other water infrastructure will meet the objectives of the WRP, including the environmental flow objectives. The ROP also details the monitoring required to ensure that the objectives of the WRP are met. The monitoring and reporting requirements are designed to ensure that any adjustment or review of the WRP can be addressed promptly.

During consultation on the draft TOR between DIP, LinkWater Projects and the DEWHA, it was determined that the environmental impact assessment should address the potential impact on matters of national environmental significance (MNES), being listed threatened and migratory species:

- expected to use habitat within and immediately adjacent to the project corridor for nesting, breeding and foraging
- that live in or rely upon riparian and aquatic environments that may be affected by waterway crossings and harvesting of water from the Mary River.



However given the variation to the project's scope as previously discussed in this report, the proposal to apply for a licence to harvest water from the Mary River is not proceeding and therefore environmental impact assessment on the taking of additional water from the Mary River is no longer relevant.

LinkWater Projects has not relied on the WRP as justification for using the partly utilised entitlement of 18 ML per day and has assessed the impacts of the additional water take on MNES. The EIS process has considered the impacts of taking the remaining unutilised entitlement on MNES. This has been discussed in detail in this report in Chapter 5: Matters of national environmental significance.

Conclusions

I have found in Chapter 2.3 Project Rationale of this report that there is an immediate need for the project and that should the proposed TCD proceed, that the project will also serve to transfer water from the TCD into the SEQ Water Grid. The general environmental impacts of the water extraction for this project under an existing water entitlement have been adequately addressed as a result of the WRP process and in relation to MNES the specific environmental impacts have been addressed as part of the EIS process.

The associated water take for the proposed TCD has also been assessed as part of the WRP process. The specific environmental impacts such as on MNES for the TCD project have been assessed as part of the EIS process for that project.

I am satisfied that the water take of up to an additional 8.1 ML per day on average per year from the existing water entitlement for this project will not adversely impact on the Mary River environment.

4.7 Soil erosion and sediment control

EIS findings and/or key points

Although NPI stage 1 and stage 2 are separate projects, I note that concerns were raised by the then EPA and the then Caloundra City Council about unfavourable soil erosion events that occurred in the undertaking of the NPI stage 1 project. Private individuals also raised concerns about previous unfavourable soil erosion events that occurred during the October to March construction period for NPI stage 1. Private individuals and stakeholder community groups also questioned, based on the previous unfavourable soil erosion events, the ability of LinkWater Projects to comply with commitments and EMPs referred to in the EIS for the project.

There is potential for soil erosion and sediment releases to watercourses during the construction and rehabilitation stages of the project due to the removal of vegetation, excavation and general disturbance associated with construction activities. This could occur until rehabilitation measures stabilise the affected soils. Sediment releases to watercourses can result in adverse impacts to aquatic flora and fauna as well as impacts on downstream water users due to increases in turbidity. Intense rainfall events on areas of disturbance also have the potential to cause significant sediment releases.

The erosion risk for the project area is influenced by the extent of vegetation clearance and soil disturbance, slope and soil type, with the greatest risk occurring where slopes exceed 10 per cent. There is also the potential for erosion of alluvial soils as a result of flooding around waterways during construction or destabilisation of creek and river banks.

LinkWater Projects noted in the EIS that approximately 15 km of the corridor traverses high to very high risk areas for soil erosion (excluding the Pringle Hill tunnel), with a further 15 km in medium risk areas. In particular, the poorer sandy soil types (which may overlay dispersive clay subsoils) which have developed on the steeper hills between Nambour and Yandina will be the most susceptible to erosive forces. Areas of side slope to the south of Yandina are also dissected by creek/drainage lines and there is a likelihood of encountering groundwater seepage in some locations. Swelling clays that lose strength on wetting also contribute to the risk of localised slumping of trench faces.

The EIS further states that the potential for erosion in high risk areas will be higher during the summer months, when rainfall is generally higher or during localised flooding. Thunderstorms occurring during the summer wet season generally have larger raindrops and a higher terminal velocity (8–9 m/s) than winter rainfall events. It has been estimated that 50 per cent of all erosive rainfall events in SEQ occur between December and February, with up to 80 per cent occurring during the October to March period.

LinkWater Projects has proposed that mitigation measures in accordance with the 'Maroochy Manual for Erosion and Sediment Control 2007' and the 'Soil Erosion and Sediment Control — Engineering Guidelines for Queensland Construction Sites 1996' will be implemented during construction.

The following were examples provided in the EIS of further measures to be undertaken to minimise erosion and sediment impacts:

- tunnelling to avoid steep terrain at Pringle Hill
- undertaking construction through the steep sections outside the December to February period, thereby reducing the probability of high intensity rainfall events causing a significant erosion hazard by around 50 per cent
- preparing and implementing special area sediment and erosion control plans for areas at high risk of erosion, to include measures such as rapid rehabilitation and modified construction techniques as appropriate (e.g. sediment fencing and logs and sediment basins)

- mulching cleared native vegetation in situ to provide a level of cover over exposed soils.

As a result of submissions made on the EIS, LinkWater Projects provided further information at the request of DIP on erosion and sediment control management practices. LinkWater Projects confirmed in the SEIS that erosion and sediment control is a high priority for the project and is to be managed via the project's soil and water management plan.

To date, preliminary erosion and sediment control plans have been developed for the entire project alignment, and detailed site-specific erosion and sediment control plans will be prepared prior to construction in areas with high erosion risk, in accordance with the Maroochy Manual for Erosion and Sediment Control.

The SCRC challenged some of the contents of the soil and water management plan in Appendix Q of the EIS. The SCRC felt strongly that the SEIS did not address these concerns, but states that erosion and sediment control will be in accordance with the Maroochy Manual for Erosion and Sediment Control.

LinkWater Projects indicated that discussions will continue with the Sunshine Coast Regional Council (SCRC) regarding erosion and sediment control measures through continuing working group meetings.

In terms of the statement by LinkWater Projects in the SEIS that consideration will be given to avoiding works in steep sections of the alignment (high erosion risk areas) from December to February and June to October to minimise risk of erosion due to higher and more intense rainfall during these months, as part of the verification procedure LinkWater Projects has engaged the Special Services Unit from the Bureau of Meteorology (BOM) to provide construction area specific weather forecasts. The project's construction environment manager will receive these updates on a daily basis which will assist in identifying the probability of significant rainfall events, to better inform construction activity decisions and to minimise potential environmental harm.

Conclusions

I am satisfied that the mitigation strategies discussed in detail by LinkWater in the EIS and SEIS and reiterated in the project's commitments and EMPs will generally mitigate soil erosion impacts of the project. However, I have found that the following conditions are required to clarify the undertakings given in the EIS and SEIS.

Condition 8

LinkWater Projects must ensure that all land disturbance construction activities comply with the requirements set out in the 'Soil Erosion and Sediment Control — Engineering Guidelines for Queensland Construction Sites (The Institution of Engineers, Australia (Qld), 1996, or later version)'. In addition LinkWater Projects must ensure that the project is constructed in accordance with the Maroochy Manual for Erosion and Sediment Control.

Condition 9

During the October to March period, LinkWater Projects must not undertake clearing or trenching work within the Q5 flood level of watercourses as defined in the *Water Act 2000* or on slopes that exceed 10 per cent if the Bureau of Meteorology forecasts a significant rainfall event in the vicinity of that location within the next 48 hours.

Predictions on the likelihood of the occurrence of a significant rainfall event (raindrops with a terminal velocity (8–9 m/s) or higher) are to be sought from the Special Services Unit of the Bureau of Meteorology on a daily basis during this period.

4.8 Vegetation clearing

EIS findings and/or key points

The majority of the pipeline route traverses heavily disturbed urban areas, agricultural lands and cleared public utility easements. However, intact stands of vegetation still exist on ridges and steep slopes and along waterways. Areas of remnant vegetation in the study area can be grouped into the following types:

- intact gallery rainforest (RE 12.3.1), sometimes with eucalypt emergents (RE 12.3.2) occurring along waterways
- patches of reasonable size of lowland gallery rainforest now rare within SEQ
- small areas of *Melaleuca* wetlands in riparian depressions such as those around Eudlo Creek and its tributaries
- large areas of tall open eucalypt forests along coastal ridges, often contained within national parks and forest reserves.

The conservation status of REs within the study area was assessed according to the *Vegetation Management Act 1999*. Of the 15 RE types occurring in the study area, 9 are classified as 'not of concern', 5 as 'of concern', and 1 as 'endangered'.

Riparian zones with intact native tree canopies provide stream bank stability, act as wildlife movement corridors, prevent erosion and improve water quality in associated aquatic ecosystems (McDonald et al. 2006). Values of intact riparian vegetation include:

- preventing the establishment of invasive exotic species requiring well lit conditions (e.g. smothering legumes, Cabomba)
- providing corridors for local fauna movement through areas otherwise devoid of native vegetation
- lowering water temperatures
- providing shelter and a source of debris for in-stream habitats.

Areas of significant riparian vine forest vegetation occur along most of the permanent waterways intersected by the pipeline. These include:

- Paynter Creek (northern crossings) — RE 12.3.1
- both Six Mile Creek (left branch) and its anabranch — RE 12.3.1/12.3.2
- remnant corridors along the South and North Maroochy Rivers — RE 12.3.1
- Eudlo Creek and tributaries, Tuckers Creek and Petrie Creek — all support elements of the two riparian community types with varying degrees of disturbance (Petrie Creek has degraded RE 12.3.1/12.3.2 with Camphor Laurel *Cinnamomum camphora*).

Botanical survey located four listed EVR plant species within the proposed corridor (see Table 10), three of which occur along or adjacent to waterways within or adjacent to the power easement. Plant species of national environmental significance are also addressed in more detail in this report in Chapter 5: Matters of national environmental significance.

One of the key criteria in selecting the preferred corridor was to identify the shortest feasible route that limits the environmental impacts of the project. To achieve this, the route follows existing disturbed easements and road corridors wherever possible to minimise additional disturbance to native vegetation and habitat areas. However, in some locations some clearing will be required to enable construction of the pipeline and associated facilities.

The EIS identified that clearing of approximately 20.5 hectares of remnant vegetation is required by the project. However, in further information provided subsequent to the EIS, LinkWater Projects states that, based on further advice from DERM, clearing of approximately 26.9 ha of remnant vegetation is required. This increase is due to the identification of further

assessable regional ecosystems not identified on the regional ecosystem map utilised within the EIS assessments.

Table 11 summarises estimated clearing areas for each of the RE types identified in the project area. These areas are based on the following:

- a maximum corridor width of 40 m
- approximately 4 ha of clearing for the Ferntree balance tank.

I acknowledge advice from an agency provided in a submission on the EIS that LinkWater Projects must establish 'offset areas' for the loss of remnant vegetation that is listed as 'of concern' or 'endangered' under the *Vegetation Management Act 1999*, as part of its applications for permits to clear vegetation required under this Act.

The nature and extent of the 'offset areas' will be developed in consultation with the DERM as a part of obtaining approval for these permits. LinkWater Projects has advised that appropriate offsets will be sought through Ecofund Queensland. The nature and extent of the 'offset areas' identified by Ecofund will be considered by DERM in the process of assessing the offset proposal put forward by LinkWater.

While the amount of offsets to be provided will be dependent on the offset options provided by Ecofund, it is acknowledged that the clearing area:offset area ratio can vary between 1:1 and 1:4 depending on the environmental significance of the vegetation being cleared and the quality of the offset being proposed. Guidelines for determining the appropriate ratio to apply are described in the DERM *Policy for Vegetation Management Offsets - 28 September 2007*.

Table 10 EVR plant species recorded in the study area

Species	Status	Location/s	Comment
<i>Xanthostemon oppositifolius</i> , Southern Penda	Vulnerable (EPBC)	Six Mile Creek (left branch) and anabranch Lake Macdonald	Mature trees and juveniles located within vine forest remnants (RE 12.3.1/12.3.2) in the northern part of the project area. Potential for impact where plants occur within the corridor
<i>Phaius tancarvilleae</i> , Swamp Orchid	Endangered (EPBC, NCA)	Paynter Creek (northern section)	Located on the margins of RE 12.3.1, adjacent to cleared easement. Potential for impact where individuals occur within the corridor.
<i>Alyxia magnifolia</i> , Large-leaved Chain Fruit	Rare (NCA)	South of Cooroy Mountain Road	Growing along the edge of a cleared easement (RE 12.11.2). Some potential for impact in the event clearing is required outside the corridor.
<i>Symplocos harroldii</i> , Hairy Hazelwood	Rare (NCA)	Pearsons Road (near crossing of Six Mile Creek (left branch))	Recorded within small drainage reserve within a recent subdivision at Racehorse Lane. Minor potential for impact as directly adjacent to the corridor.

Table 11 Estimated clearing areas of remnant vegetation

Regional ecosystem	Conservation status	Clearing area (ha)	% clearing of right of way (174.90 ha)	% clearing of SEQ bioregion 2003 remaining area
12.3.1	Endangered	2.98	1.70%	0.03%
12.3.2	Of concern	5.40	3.09%	0.07%
12.3.5	Not of concern	0.60	0.34%	<0.01%
12.3.6	Not of concern	0.11	0.06%	<0.01%
12.3.11	Of concern	1.36	0.78%	<0.01%
12.9-10.1	Of concern	3.35	1.92%	0.07%
12.9-10.14	Not of concern	0.21	0.12%	<0.01%
12.9-10.16	Of concern	2.64	1.51%	0.03%
12.9-10.17	Not of concern	1.17	0.67%	<0.01%
12.11.2	Not of concern	0.01	<0.01%	<0.01%
12.11.10	Not of concern	0.93	0.53%	<0.01%
12.12.2	Not of concern	0.03	0.02%	<0.01%
12.12.12	Of concern	1.04	0.59%	<0.01%
12.12.15	Not of concern	6.85	3.92%	0.01%
12.12.16	Not of concern	0.21	0.12%	0.00%
Total		26.89 ha	15.37% of ROW	

* Source information: Accad et al. (2006). Remnant Vegetation in Queensland. Analysis of remnant vegetation 1997-1999-2000-2001-2003, including ecosystem information. Brisbane: Queensland Herbarium, Environmental Protection Agency.


Note: This information includes assessable regional ecosystems not identified on the regional ecosystem map and determined by DERM as requiring an offset.

The primary residual impacts on terrestrial flora values associated with the project identified through this assessment are:

- clearing of remnant vegetation at the Ferntree balance tank site
- clearing of remnant riparian vegetation along waterways
- damage to individual plants or suitable habitat for the EVR flora species listed in Table 10 above.

LinkWater Projects has developed a vegetation management plan that outlines the strategies to minimise the impacts on vegetation, regional ecosystems and areas of environmental significance. This includes the development of sensitive area plans for specific environmentally sensitive areas and for locations where the presence of listed threatened species is confirmed and is designated as 'no go zones'. These plans determine the best strategy in terms of exclusion zones, relocation of individual plants and seed collection for propagation, as appropriate. Under the vegetation management plan, there is a requirement for the construction corridor to be constrained to 15–20 m when working in areas of endangered flora, and where practicable within other sensitive areas.

I note that the project area includes streams and ecological systems that may provide habitat features that are suitable for a number of species of significance and the establishment of a linear construction corridor may temporarily impact on habitat availability and breeding populations where these are present. Given that suitable habitat in the project area typically occurs as long narrow strips along streams, the use of waterway crossing methods that



minimise disturbance to stream beds, banks and riparian vegetation, such as micro-tunnelling, has been considered in this report in Chapter 4.4: Waterway crossings.

The project's fauna management plan has measures designed to mitigate the potential impacts of construction activity on fauna within the project area, and to ensure that works are carried out in accordance with the requirements of the EPBC Act, *Nature Conservation Act 1992* and *Environmental Protection Act 1994* and other relevant legislation. The fauna management plan has several mitigation measures, such as exclusion fencing, trench plugs and ramps, shade cloth over open trenches to protect trapped animals, and fauna monitors to remove animals trapped in trenches.

The mitigation strategies to be employed for the project with respect to terrestrial flora values were discussed in the EIS as specific and general mitigation measures. These have been reflected in the EMPs proposed by LinkWater Projects.

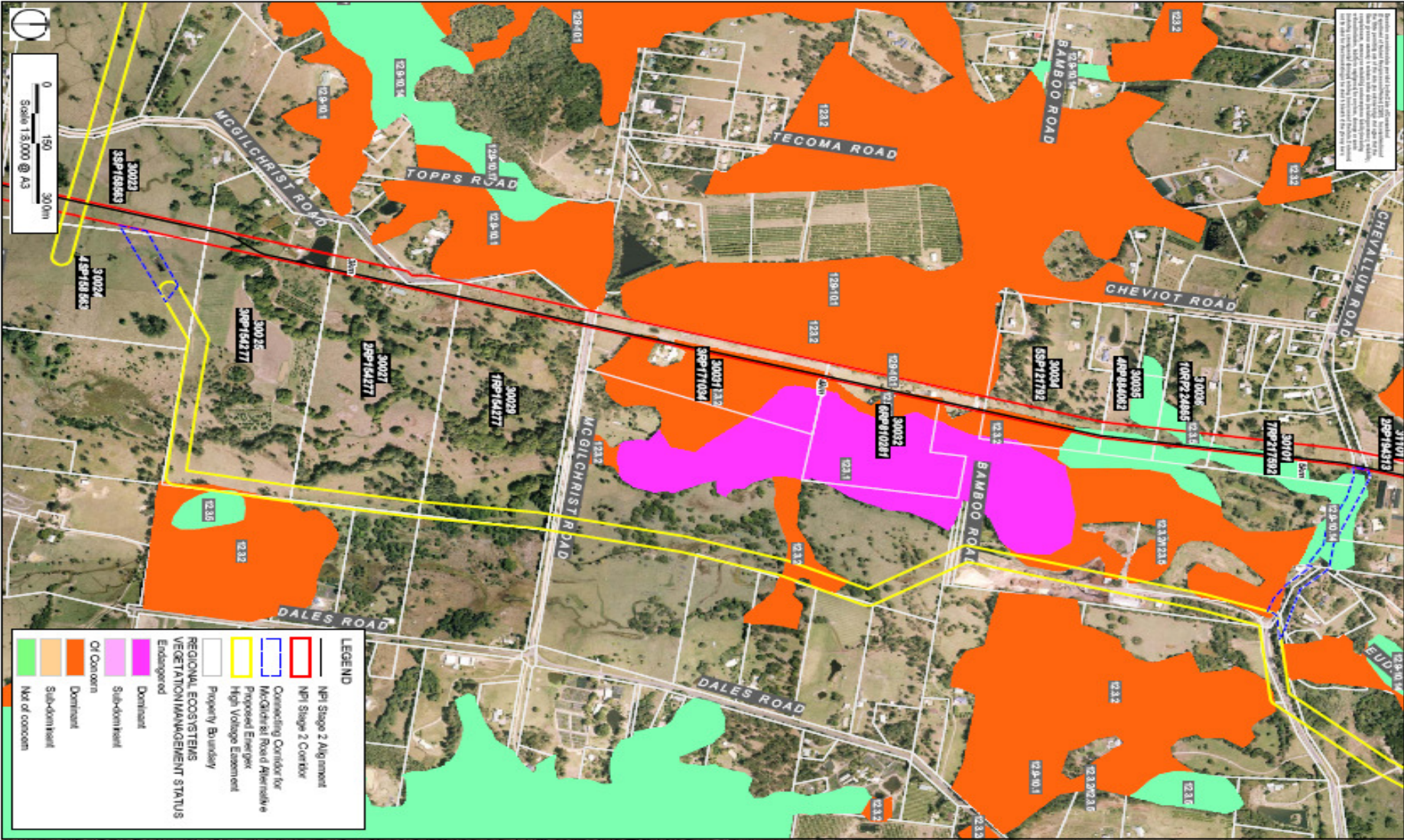
It was noted, as a result of an inspection requested by joint submitters of a private submission on the EIS (inspection discussed in this report in Chapter 2.4.2.1 – Following the Energex easement in the vicinity of McGilchrist Road and Chevallum-Palmwoods Road, that up to 30 metres of the existing 40 metre wide easement had been cleared.

At the inspection representatives of LinkWater Projects advised that, for safety reasons, the full width of the corridor would be cleared. LinkWater Projects was given the opportunity to justify this need in the SEIS, but this information was not provided. This has highlighted an issue of unnecessary corridor clearing. LinkWater Projects has asserted in response to the private submission that the preferred corridor is located within an existing easement, and will not require clearing of intact remnant vegetation. DIP requested from LinkWater Projects an aerial photo of the route options at McGilchrist Road and Chevallum — Palmwoods Road which showed the vegetation management status. This map is provided as Figure 15.

A separate discussion involving the vegetation clearing impacts of the Ferntree balance tank site is provided in this report in Chapter 4.2 Ferntree Facilities Area.



Figure 15 Aerial photo of the route options at McGilchrist Road and Chevallum—Palmwoods Road



Conclusions

I find that the construction of the project has the potential to impact regional ecosystems and sensitive areas. In order to reduce the impacts on vegetation and ecosystems, it is essential to have a comprehensive management plan that minimises vegetation clearing and disturbance. I accept that the proposed vegetation management plan will minimise vegetation clearing and disturbance and develop a monitoring and inspection schedule to ensure that the mitigation plans are effective.

I find that the construction of the project would result in the clearing of remnant native vegetation, including relatively small areas of vegetation communities of conservation significance. I note that LinkWater Projects has committed in the EIS to minimising the disturbance of these vegetation communities through the design and location of the pipeline predominately in an existing power line easement.

I find that the construction of the project has the potential to cause injuries to fauna during all stages of project construction. I accept that the proposed vegetation management plan and the fauna management plan are the appropriate mechanisms for addressing any such potential injuries.

In relation to the alternative route inspection for McGilchrist Road and Chevallum — Palmwoods Road, it is evident by comparing the cleared areas of the aerial photo with what exists in the field that clearing has not been undertaken over the full width of the easement as assumed in the EIS assessment. Therefore, if the easement is cleared to the full width an additional approximate 10 metres of remnant vegetation will be impacted.

This inconsistency will be resolved through a condition set by me which ensures that clearing impacts are limited. This approach would be consistent with LinkWater Projects' approach to limit environmental impacts through using existing cleared easements as the preferred pipeline route. My conditions relating to this section are provided at the end of this chapter.

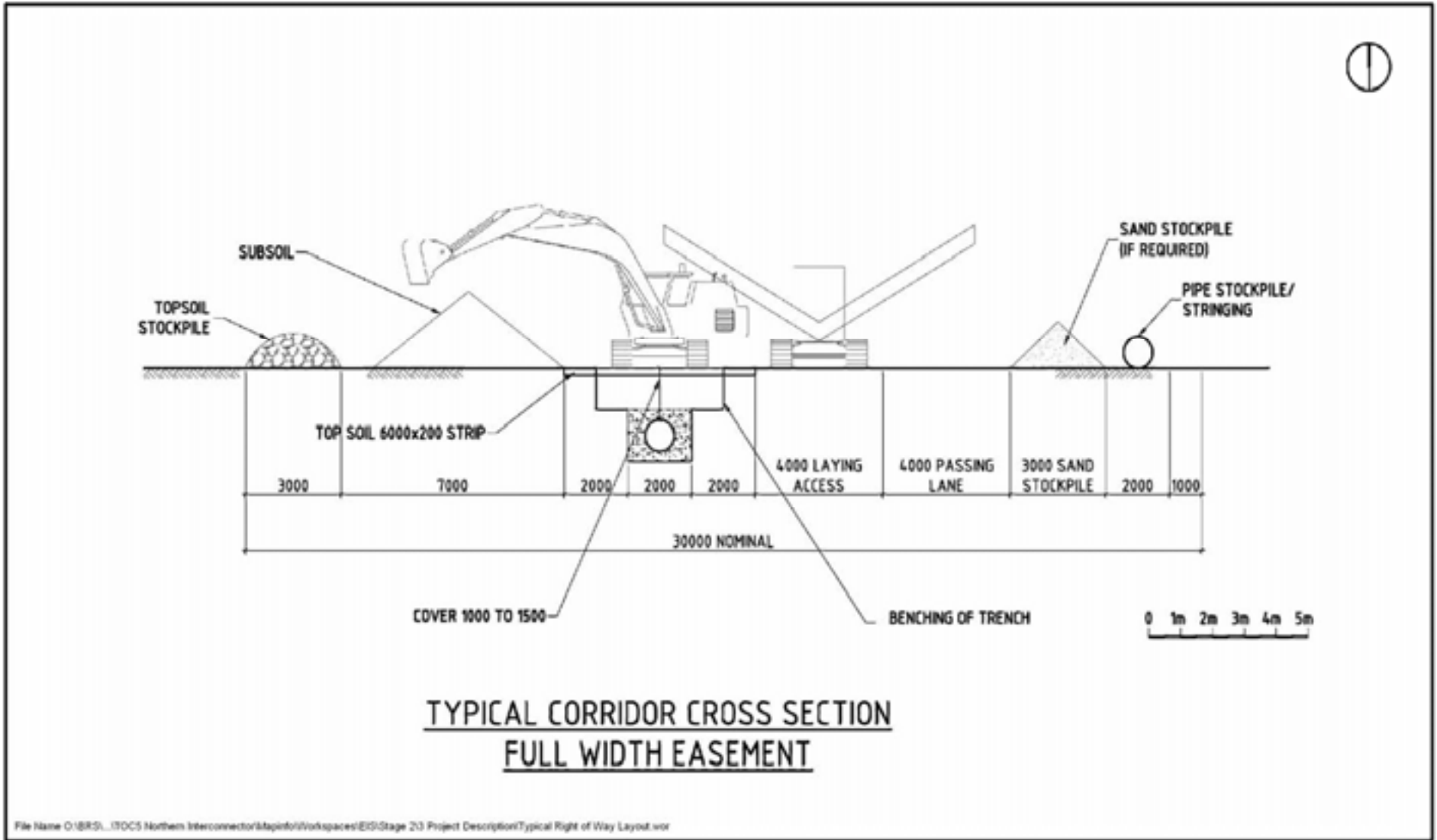
Under the vegetation management plan proposed by LinkWater Projects, there is a requirement for the construction corridor to be constrained to 15–20 m when working in areas of endangered flora, and where practicable within other sensitive areas.

In Chapter 4.4: Waterway crossings and Chapter 5—Matters of national environmental significance I have restricted the construction width to 10 m in those areas where environmental values may be impacted. In restricting the construction width to 10 m I have considered the typical construction width corridor requirements figure provided by LinkWater Projects in the EIS and provided in this report as Figure 16. It is my view that the construction width can be reduced to 10 m in areas of environmental value. This view is based on the opportunity not to place topsoil, subsoil or construction materials next to the trench but to rather use transportation to store these items at more suitable nearby locations. I acknowledge that the transportation of these materials may increase environmental impacts, however this will be addressed in Chapter 4.10—Greenhouse gas emissions. I am satisfied that this impact will be offset by the reduction of impacts to areas of environment value.

I have also formed the view that corridor clearing for non-environmentally sensitive areas, those that I have not restricted to 10 m, is not to exceed 20 m in width. I have formed this view informed by advice provided by LinkWater Projects within the EIS as included in this report at Figure 16 – Typical corridor width construction requirements which indicates that a 20 m width is sufficient to allow for construction activities. I acknowledge that this will require additional transportation rather than stockpiling, however, as a majority of the corridor has already been cleared to a width of 40 m this will allow for sufficient stockpiling adjoining those areas which have been constrained to 10 m or 20 m. To avoid any misunderstanding, clearing of regrowth that is under 3 m in height is acceptable.



Figure 16 Typical corridor width construction requirements





In order to minimise impacts to sensitive regional ecosystems and to manage unavoidable impacts associated with the clearing of vegetation, I require the following:

Condition 10

No additional clearing of vegetation is to occur where the existing cleared corridor width is 20 metres or greater. Note this condition does not pertain to regrowth of less than 3 metres in height.

However, should LinkWater Projects demonstrate to the satisfaction of DIP prior to clearing being undertaken that the restricted corridor width will generate unsatisfactory safety impacts that cannot be reasonably avoided, then the width can be increased, but to no greater than 30 metres in total.

Condition 11

To ensure compliance with the Regional Vegetation Management Code for Southeast Queensland Bioregion 20 November 2006, all clearing of assessable vegetation must be undertaken in accordance with an environmental management plan that incorporates the following:

- clearing management plan
- rehabilitation/revegetation plan
- weed management plan.

Condition 12

LinkWater Projects is required to ensure that progressive rehabilitation, including re-contouring, topsoil replacement, and re-vegetation that is, for non-weed areas, consistent in species composition and density with the pre-construction state, occurs as soon as possible after construction activities are completed in each area disturbed. Rehabilitation is to be monitored for success against the design criteria and corrective actions taken if rehabilitation is not proving successful.

In sections of the Energex easement, LinkWater Projects is to consult with Energex at least six months prior to revegetation commencing on the proposed rehabilitation/revegetation plan, to ascertain if revegetation may present a future impairment to its power line infrastructure. For certain areas, it is acknowledged the plan may then need to be adjusted accordingly.

4.9 Air quality

EIS findings and/or key points

The existing air quality environment in the project area is influenced by regional 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 in meteorological conditions such as wind speed, wind direction and atmospheric stability. Appendix M of the EIS provides a report on air quality for the project corridor undertaken by external consultants, Heggies Pty Ltd.

Much of the route will traverse sparsely populated rural residential areas, however there are some locations where the route passes close to residences and community facilities. LinkWater Projects has suggested that the air quality will be managed in accordance with the recommendations outlined in the Heggies assessment, the objectives and targets set in the project's planning environmental management plan (PEMP) and requirements established in the air quality, noise and vibration management plan (to be used during construction). This plan has been developed to ensure construction activities within close proximity to sensitive receptors, including residences, other buildings and sensitive environmental sites, are managed to minimise dust generation.

Pump stations will be powered by electricity, with back-up diesel generators used only in the event of a power outage on the connecting grid. As such, gaseous emissions to the local air shed during operation of the project are expected to be minimal. Electricity demands for pumping during the operational phase are likely to be the most significant project-related source of greenhouse gas emissions (Discussed in Chapter 4.10: Greenhouse gas emissions).

Air quality impacts of the project will be primarily associated with construction activities such as the generation of dust during earthmoving operations such as excavation, vegetation clearing, vehicle movement and wind erosion of exposed areas. I note the EIS's advice that earthmoving activities and wind erosion generally give rise to coarser dust fractions, which are frequently more significant in terms of nuisance and amenity than as a potential threat to human health.

The EIS provides that 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. The EIS further confirms that no direct impacts are likely to occur as a result of tunnelling activities as these works are conducted below the surface. No other major air contaminants are anticipated to result from the construction phase.

The EIS confirms that dust will be mitigated by the use of water trucks as necessary. Dust emissions from cleared areas will be minimised through the undertaking of various strategies, including prompt and progressive reinstatement of disturbed areas in order to stabilise soils and prevent wind blown dust emissions as detailed in the EMP and associated plans.

The EIS acknowledges that the presence of increased vehicle use on any unsealed roads may also cause localised dust impacts to residences located adjacent to haul routes. These effects will generally be of short-term duration as the construction teams work through the area.

Air quality parameters as described in the Environmental Protection Policy (EPP) (Air) 1997 guidelines and National Environment Protection Measure (NEPM) air quality standards, the national and state compliance goals for air quality, were current at the time of preparation and release of the EIS, however the EPP (Air) 2008 air quality guidelines have since been introduced and are provided at Table 12. LinkWater Projects has confirmed in the SEIS that

additional air quality monitoring will be undertaken to ensure the amended parameters will be met.

Table 12 EPP (Air) 2008 air quality guidelines

Pollutant	Environmental value	Averaging period	Ambient air guideline
Carbon monoxide	Health/wellbeing	8 hours	9 ppm (11mg/m ³)
Nitrogen dioxide	health/wellbeing	1 hour	0.12 ppm (250µg/m ³)
	health/wellbeing	annual	0.03 ppm (62µg/m ³)
	health and biodiversity of ecosystems	annual	0.016 ppm (33µg/m ³)
PM10	health/wellbeing	24 hours	50µg/m ³
Total suspended particulate matter	health/wellbeing	annual	90µg/m ³
Total suspended particulate matter	health/wellbeing	annual	90µg/m ³

Conclusions

I am satisfied that the mitigation measures described in the EIS, SEIS and project commitments will avoid adverse impacts to air quality and will accord with the EPP (Air) 2008 guidelines. However, the mitigation strategies discussed in detail by LinkWater Projects in the EIS and the following conditions will ensure that any impacts are acceptable.

Condition 13

Dust and particulate matter must not exceed the following levels when measured at any sensitive receptor:
dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions), or a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, at a nuisance sensitive or commercial place downwind of the site, when monitoring in accordance with: Australian Standard AS 3580.9.6 of 2003 (or more recent editions) ‘Ambient Air – Particulate matter – Determination of suspended particulate PM10 high-volume sampler with size-selective inlet – Gravimetric method’; or any alternative method of monitoring PM10 which may be permitted by the latest edition of the administering authority’s ‘Air Quality Sampling Manual’.

I have nominated the DERM as the responsible agency to ensure compliance with this condition.



Condition 14

When requested by the DERM, dust and particulate monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter, and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place and at upwind control sites and must include for a complaint alleging:

- **dust nuisance and dust deposition**
- **adverse health effects caused by dust,**

the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere over a 24hr averaging time.

I have nominated the DERM as the responsible agency to ensure compliance with this condition.

4.10 Greenhouse gas emissions

EIS findings and/or key points

Human-induced climate change is now recognised as a key impact associated with the use of energy for domestic purposes and development. The four largest sources of greenhouse gases in Queensland are power production, petroleum fuel use, land clearing and methane production by livestock. The Queensland Greenhouse Strategy estimates that around 867 kilograms (kg) of carbon dioxide (CO₂) is released for every megawatt of electricity produced.

The Commonwealth Department of Climate Change (DCC) divides greenhouse gas (GHG) emissions into direct (or point source) emissions and indirect emissions. Direct emissions are produced from sources within the boundary of an organisation and as a result of that organisation's activities, while indirect emissions are defined as those generated in the wider economy as a consequence of that activity (DCC 2008).

The primary sources of GHG emissions associated with the project include the:

- burning of diesel fuels for vehicles, plant and machinery during construction (direct emissions)
- use of electricity for site offices during construction (indirect emissions)
- ongoing electricity requirements for the operation of pump stations (indirect emissions).

Clearing of vegetation at a landscape scale also has the potential to result in the loss of 'carbon sinks', thereby reducing opportunities for reabsorbing carbon released into the atmosphere. However, the clearing footprint associated with the project is relatively minor and will be partially offset by revegetation efforts and the provision of vegetation offsets in accordance with the *Vegetation Management Act 1999*.

Estimation of GHG emissions associated with the project was undertaken in accordance with the National Greenhouse Accounts Factors (NGAF) workbook prepared by DCC. The scope that emissions are reported under is determined by whether the activity is within the organisation's boundary (direct or Scope 1) or outside it (Scope 2 and Scope 3).

In accordance with the NGAF, GHG emissions were calculated using:

- direct (or point source) emission factors — these give the kilograms of CO₂ equivalent (CO₂-e) emitted per unit of activity at the point of emission release and are used to calculate Scope 1 emissions
- indirect emission factors — these are used to calculate Scope 2 emissions from the generation of the electricity purchased and consumed as kilograms of CO₂-e per unit of electricity consumed.

The major source of direct construction-related emissions will be as a result of the use of diesel fuel for vehicles, plant and machinery, with indirect (Scope 2) emissions occurring as a result of electricity use at site offices. These emissions were estimated in the EIS over the life of the project to be approximately 8200 tonnes of GHG.

The maximum energy consumption for all pumps for the NPI is estimated at around 6.5 GW.h/a. This is roughly equivalent to the energy consumption of a large shopping centre. Table 13 provides a comparison of the electricity consumption and GHG emissions of major electricity users in Queensland.

Anticipated GHG emissions associated with these pumping requirements were calculated using the indirect emission factors as outlined in the NGAF and assumed that pumps would operate for 23 h/d for 365 d/a. Based on these calculations, electricity used to operate the

pump stations is predicted to generate approximately 3400 tonnes per annum of GHG emissions.

Table 13 Electricity consumption of major electricity users in Queensland

Energy user type*	Estimated annual energy use	Estimated annual GHG emissions (t CO ₂ -e)
Desalination plant	200 GW.h/a	202,225
Coal mine	100—200 GW.h/a	99,630—199,261
Major road tunnel infrastructure	35—45 GW.h/a	34,870—44,833
Major hotel/resort	10—15 GW.h/a	9,963—14,944
Large high rise unit complex	5—10 GW.h/a	4,981—9,963
Large shopping centre	5—10 GW.h/a	4,981—9,963
Theme park	1—5 GW.h/a	996—4,981

* Energy consumption statistics sourced from Gold Coast Desalination Alliance 2007

Conclusions

LinkWater Projects has proposed in the EIS mitigation strategies for GHG emissions as a result of the construction and operation of the project. LinkWater Projects has raised the opportunity of mitigating GHG emissions by lowering greenhouse production energy forms or by purchasing 'credits' from renewable energy production for conventional coal fired power. LinkWater Projects suggested that this may include the use of renewable energy power sources in the regional water supply system or the purchase of credits or offsets, such as green power or forestry sequestration, amongst others.

I am satisfied that, from the perspective of GHG emissions, this project is the most appropriate means of delivering water, however given the importance of GHG emissions to the world I have found it necessary to turn LinkWater Projects' suggestion of purchasing 'credits' from renewable energy production into conditions.

Although this may in the short-term slightly increase the cost of water for consumers, it is my belief that the community would accept this slight increase. Over time, with GHG emissions policy implementation, the cost of electricity from CO₂ generation will clearly increase. Other environmental mitigation strategies such as vegetation clearing offsets or improved sediment control measures add additional construction costs that inevitably find their way to the consumer. These have been accepted over time by the construction industry and the consumer.

Condition 15

From completion of the project's commissioning until 31 December 2019, the entity responsible for the infrastructure (the entity) must purchase at least 10 per cent of all the project's operational electrical energy requirements from accredited renewable energy ('green power') sources.

From 1 January 2020, LinkWater Projects must purchase at least 20 per cent of all the project's operational electrical energy requirements from accredited renewable energy ('green power') sources.

The entity must produce a greenhouse offset plan that, at a minimum, provides details of offsets commitments for greenhouse gas emissions generated directly from the construction and operation of the project's infrastructure. The greenhouse offset plan must be submitted to DIP for approval within three months of the release of this report.



The greenhouse offset plan must detail the:

- **greenhouse gas emissions to be offset associated with the construction of the project, supported by detailed greenhouse gas emission calculations**
- **greenhouse gas emissions to be offset associated with the proportion of the project's operational electrical energy requirements not purchased from accredited renewable energy ('green power') sources**
- **proposed offsets, which may include contributions to Ecofund Qld or another accredited offsets program acceptable to the Coordinator-General, and the methodologies for calculating the offsets**
- **proposed actions and associated timeframes to achieve the offsets within the whole-of-life operating timeframe for the project and an ongoing reporting regime relating to progress against subsequently approved timeframes.**

The entity must implement the greenhouse offset plan following DIP's approval of the plan.

DIP may have regard to subsequent advice provided by the entity on seeking approval for amendment to the terms and requirements of the plan should the requirements of this condition be superseded by future state and Commonwealth policy and legislation requirements regarding management of carbon emissions.

4.11 Noise and vibration

EIS findings and/or key points

The EIS lists results of investigations undertaken by Heggies Australia Pty Ltd regarding noise quality impacts that may be generated by the project and indicates controls that can be applied to minimise the effects of noise. Noise monitoring was undertaken along the pipeline route including at sections where the pump stations are to be located (Appendix M of the EIS).

The EIS confirms the project will generate noise emissions from activities such as excavation, blasting, rock breaking and truck movements. Construction will be carried out in areas that have typically low background noise levels and in easements within private properties. Consequently, careful consideration needs to be given to ensure proper and effective noise abatement strategies and measures are developed and implemented.

LinkWater Projects has committed to limiting construction, including haulage activities, to daytime hours (from 6:30 am to 5:00 pm Monday to Friday and 8.00 am to 1:00 pm on Saturdays), as much as practicable to avoid or minimise any impacts on sensitive receptors.

I note that some after hours works are required for micro-tunnelling or tunnel boring. For the NPI stage 1 project I note LinkWater Projects committed to limiting, as much as practicable, construction hours from 7:00 am to 6:00 pm Monday to Friday and 8:00 am to 1:00 pm on Saturdays. Therefore the minimised hours proposed for NPI stage 2 are a good starting point for reducing impacts on the community through the generation of noise.

LinkWater Projects has proposed in the EIS that for construction works extending outside normal working hours the following generic limits will be adhered to:

Monday to Friday:

6:00 pm to 10:00 pm—background + 10 dBA LA max, adjusted (adj), 15 min
10:00 pm to 7:00 am—sleep awakening criterion of 45 dBA LA max internal.

Saturday:

1:00 pm to 10:00 pm—background + 10 dBA LA max, adj, 15min
10:00 pm to 7:00 am—sleep awakening criterion of 45 dBA LA max internal.

Sunday/public holidays:

Sleep awakening criterion of 45 dBA LA max internal.

The main source of continuous noise from the operation of the project will be from the pump stations. These will be acoustically designed buildings ('pump halls') housing up to two pumps which are required to facilitate the transfer of water south to Brisbane.

The EIS confirms that criteria for the assessment of the operational noise emissions are determined in accordance with the DERM's Ecoaccess Guideline 'Planning for Noise Control'. This guideline requires prior knowledge of the ambient noise environment and takes into account four factors: the control and prevention of background noise creep, determination of planning noise levels, containment of short-term noise emissions, and sleep disturbance.

To ensure compliance with the DERM's Ecoaccess Guideline 'Planning for Noise Control', the following noise control measures, amongst others, were proposed in the EIS by LinkWater Projects:

- increasing separation distances between pump stations and sensitive receptors wherever possible
- absorption in the pump hall in the form of an acoustic tile ceiling or custom absorptive treatments on the walls to reduce reverberant noise

- increased ceiling/roof insulation
- detailed design of the transformer enclosure.

As previously described, a variation to the project's scope was made subsequent to the release of the EIS regarding inclusion of bi-directional water flow. LinkWater Projects provided details on the reverse flow works in the SEIS, including the upgrading of the proposed pump stations at Eudlo and Noosa and the related impacts in the SEIS.

It was therefore appropriate that adjoining owners to the reverse flow works were provided with a copy of the SEIS and were invited to comment on the additional pumping works.

As provided in the SEIS, all proposed sites selected for the NFD facilities are located on existing water infrastructure sites, existing affected properties with impacts previously addressed in the EIS, land owned by the Queensland Bulk Water Transport Authority (Narangba pump station), Seqwater or council-owned land.

The main potential impacts associated with the construction of the northern flow direction (NFD) facilities are:

- dust
- noise
- increased traffic movements.

The main potential impacts associated with the operation of NFD facilities are:

- noise
- greenhouse gas emissions.

While the above matters will be mitigated in line with general measures described in the EIS, SEIS and conditions in this report related to reducing nuisance impacts of project works, I require the proponent to undertake comprehensive consultation with property owners and residents in the vicinity of the facilities required for northern flow facilities as design of these facilities is further developed. This is provided for in Condition 12, Part C.


Vibration

The EIS stated that the primary impacts of vibration on human environments relate to structural damage and the effects on human comfort. 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 noticeable.

Vibration levels associated with general construction activities, such as microtunnelling, piling and general traffic movement, will not result in any damage to buildings or human comfort impacts. For example, measurements taken at a tunnel site on LinkWater Projects' Southern Regional Water Pipeline project recorded a vibration level between 0.3 mm/s and 1.0 mm/s directly above the tunnel bore machine at 5.5 m depth. Vibration levels decrease with distance from the source, and levels such as these will not result in any damage to surrounding structures.

The major potential sources of ground vibration are more intensive construction activities, particularly blasting (if required), bulldozers and the use of hydraulic rock breakers. Blasting has a high potential for impact on human comfort and will only be considered where the geology is too hard for the use of an excavator.

The EIS confirms that limited blasting is expected for the project, and in the event that blasting activities are to be conducted, a qualified operator will be engaged. The operator will be instructed to adhere to the project-specific blast management plan and site-specific work method statements (WMS) which will detail site mitigation measures to ensure the potential



impacts are minimised. This will be developed in accordance with the DERM's Ecoaccess Guideline 'Noise and vibration from blasting'.

Several submissions on the SEIS from private individuals raised concerns about the potential construction noise and vibration impacts of the project. I have noted concerns raised within submissions and for those issues that will not be addressed within the requirements of relevant state policy and legislation, I have sought to condition the project where appropriate to manage impacts.

Construction noise and vibration issues specifically related to the proposed works at Pringle Hill are addressed in this report in Chapter 4.3 – Pringle Hill (Tunnel). Conditions related to vibration are included in that chapter.

Conclusions

I am satisfied that any noise impacts experienced by persons in proximity to the construction corridor will be temporary in nature. However, as the pipeline travels through easements within rural residential properties with low existing background noise levels the construction noise impacts need to be carefully managed. It should be noted that this project is scheduled for completion at the end of 2011 and therefore time is not of the essence. I therefore believe that construction hours can be limited to reasonable hours that reflect the delivery timeframe for the project.

I also find that vibration associated with blasting activities during the construction phase has potential to cause damage to nearby buildings. Except for the construction works at Pringle Hill, I do not believe that the vibration impacts for the project will be of concern. I have provided further comment and conditions about vibration impacts at Pringle Hill in this report in Chapter 4.3 – Pringle Hill (Tunnel).

In order to ensure that the noise impacts of the project are acceptable I have set the following conditions:

Condition 16

Part A:

Construction hours within private properties (including access to private properties) are to be limited from 7.00 am to 5.00 pm Monday to Friday. Except in the case of an emergency, access to private properties is not to occur outside these times. No work is acceptable on Saturdays, Sundays or public holidays.

Construction hours outside private properties are to be limited from 7.00 am to 6.00 pm Monday to Friday and 8.00 am to 1.00 pm on Saturdays. No work is acceptable on Sundays or public holidays.

This condition does not limit construction activities involving underground activities where surface access to private properties is not required, however, for tunnelling locations, in order to limit the amount of construction traffic the removal of spoil is not permitted outside of the hours specified above.

For tunnelling works, should surface access to private properties where the nearest occupancy is less than 50 metres in distance from the surface access point or above ground works be required, then construction activities can occur if the resident consents in writing to surface access outside these hours.

Part B:

LinkWater Projects is to engage an acoustic expert to advise on managing potential impacts arising from construction activities. The results of acoustic monitoring will be considered when developing plans to mitigate impacts on sensitive noise receptors.

Part C:

On the matter of facilities required for northern flow direction, LinkWater Projects is to consult with members of the local community on the facilities as design details are progressed. Input from the community on the facilities is to be invited and considered by LinkWater Projects.

During final design assessments for these facilities, LinkWater Projects is to engage an air and noise specialist to undertake an air, noise and vibration assessment of the NFD facility areas and several sensitive receptors in the vicinity.

These air, noise and vibration assessments will include information on the current ambient air conditions and background noise monitoring. The results of the background monitoring will be incorporated into the design considerations for facilities to minimise potential impacts on adjacent areas.

Once completed, the results of these assessments and design recommendations are to be made available to the DERM and affected landowners in a report format.

Condition 17

When requested by the DERM, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the administering authority. Monitoring must include:

- LA 10, adj, 10 mins**
- LA 1, adj, 10 mins**
- the level and frequency of occurrence of impulsive or tonal noise**
- atmospheric conditions including wind speed and direction**
- effects due to extraneous factors such as traffic noise**
- location, date and time of recording.**

The method of measurement and reporting of noise levels must comply with the latest edition of the administering authority's noise measurement manual.

4.12 Traffic

EIS findings and/or key points

Section 3.8 of the EIS provided an assessment of the impact of the project on the road network and road users within the vicinity of the project. This assessment included changes to traffic and/or road arrangements during construction of the project. Safety during construction and ongoing property access were key issues raised by members of the public on the EIS.

LinkWater Projects discussed the transport method and road haulage routes in the EIS. The main items requiring transport will be machinery (e.g. excavators and dozers), pipes and associated materials (e.g. line pipe, pipe fittings, pumps, concrete and structural steel). Both machinery and materials will be transported on semi-trailers to temporary lay-down areas. It is estimated that approximately 10–15 loads of materials will be delivered to lay-down areas per day.

Pipe will be delivered regularly, if not daily (dependent upon manufacturing schedules) to designated lay-down areas with pipe sections then transferred to worksites on an as-needed basis. Truck movements will increase when the 1290 mm diameter mild-steel, cement-lined pipe is transported from the stockpile onto the right of way (ROW) as only one pipe per truck will be transported along the pipeline ROW. The pipe lengths are likely to generate oversize loads. LinkWater Projects will transport the pipe and fittings in accordance with the Department of Main Roads Guidelines for Excess Dimensions – Vehicles Carrying Indivisible Articles.

The project haulage and travel routes will be a combination of roads ranging from national (e.g. Bruce Highway), state-controlled collector roads and local government-controlled collector and local roads. Where possible, construction traffic will use the pipeline ROW rather than local roads to minimise temporary disturbance to road users, local residents and physical impacts to roads.


LinkWater Projects has indicated in the EIS that all worksites will have an individual traffic management plan to ensure proper mitigation measures for potential impacts. Each traffic management plan will need to be developed prior to the commencement of construction.

Access and haulage routes will be finalised during the final planning process, in conjunction with the relevant controlling authorities (the Department of Transport and Main Roads (DTMR) for state controlled roads or the local government authority for local roads). The transport access plan will consider the potential impact of site access routes and construction traffic on school bus routes and other community traffic.

The pipeline route has been designed to avoid major existing road infrastructure as far as practicable. However, the construction of the pipeline is likely to have an impact on road pavements, traffic flow, road safety performance and road access caused by heavy vehicle haulage, increased vehicle movements, and temporary access or road use restrictions.

LinkWater Projects has committed in the EIS that all state-controlled roads will be tunnel bored and will be maintained at 100 per cent traffic carrying capacity, to cause no disruption to 'normal' pre-construction traffic flows. Though I am mindful that even though the construction phase impacts are relatively short-term, it is important to ensure impacts to local residents are minimised as much as possible.

I note advice provided by LinkWater Projects that it has established a working group with the Sunshine Coast Regional Council (SCRC) and provided a bond to ensure the future reinstatement of council-managed roads is achieved to an agreed level. This is a positive measure to help manage project impacts.



Many submissions were received on the EIS relating to matters of traffic access due to construction impacts to local areas of the Yandina township (including Buckle Street sports ground and bowls club). In accordance with the Workplace Health and Safety Regulation 2008, all construction, implementation and maintenance works for the project that are on or near a road will be completed in accordance with the Traffic Management for Construction or Maintenance Works Code of Practice 2008. LinkWater Projects will need to ensure the development and implementation of site-specific traffic management plans for significant locations such as Buckle Street, Yandina Markets, sports ground, bowls club and Pringle Hill.

Eighteen public and community group submissions on the EIS raised concerns about the impacts experienced for the NPI stage 1 works and expressed concern that they would be repeated during the project.

In submissions received on the EIS, the DTMR raised concerns about standards for tunnelling under roads. Similarly, the then Department of Emergency Services was concerned that the emergency management plan include details on right of way access, road closures and traffic hazards. The Sunshine Coast Regional Council raised concern about the potential impacts on local roads and ensuring a traffic management plan is put in place.

Conclusions

I am satisfied that traffic impacts would be relatively minor in nature and that LinkWater Projects' commitment to implementing a traffic management plan in consultation with the relevant agencies will ensure that such impacts are minimised. LinkWater Projects will need to consult with the appropriate controlling authority in regard to remedial actions for affected road pavements, as committed to in the EIS. To ensure that all potential impacts associated with the transport task for the construction of the pipeline are properly managed, I have set the following conditions:

Condition 18

LinkWater Projects is to erect signs advising of the anticipated traffic delays, in advance of where congestion is anticipated, so that users have the opportunity to take alternative routes.

Condition 19

LinkWater Projects must complete a road impact assessment study and develop and implement a road use management plan in consultation with the relevant controlling authority (DTMR or the local government authority) to fully address any project-related impacts on roads at least one month before the commencement of heavy vehicle transport on affected roads. LinkWater Projects must consult with the Queensland Police Service and the relevant government authorities during the development and implementation of the traffic management plan.

Condition 20

LinkWater Projects must rehabilitate all temporary access roads and other areas of disturbance resulting from the construction of the pipeline to a state equivalent to or better than the pre-construction state, unless otherwise agreed with the relevant landowner or authority.

4.13 Cultural heritage

4.13.1 Indigenous cultural heritage

EIS findings and/or key points

Section 3.9 of the EIS refers to a registered native title claim in the name of the Gubbi Gubbi People #2, which extends south to the Pine River, north to the Burrum River and west as far as Kilkivan, in the Maroochy district. This group might also consist of a number of groups including the Nalbo, Kabi, Dallambara and Undanbi people.

I note from the EIS, that eighteen state registered Aboriginal cultural heritage sites were identified through the Aboriginal Cultural Heritage Register maintained by the then Department of Natural Resources and Water (now the DERM), though none of these sites will be directly impacted by the project.

The EIS indicated that a cultural heritage management plan (CHMP) has been agreed and approved for the NPI project which covers both stages of the project. The CHMP is an agreement between a land user ('the sponsor') and a traditional owner ('the endorsed party') under the *Aboriginal Cultural Heritage Act 2003* (ACH Act) and *Torres Strait Islander Heritage Protection Act 1984* (Commonwealth) to ensure cultural heritage duty of care.

LinkWater Projects has acknowledged that potential exists for cultural and archaeological sites to be uncovered during construction activities within the project area. The potential cultural heritage impacts of the project are associated with the construction phase. Clearing or excavation works for grading and trenching may uncover burial of or damage shallow artefacts, subsurface material and significant vegetation just beneath the surface that has not previously recorded. The CHMP is the primary mechanism to ensure impacts are mitigated and ensure compliance with the duty of care requirements.

Agreed measures for managing cultural heritage include:

- ongoing communications with the endorsed Aboriginal party under the CHMP and/or nominated representatives
- survey of the proposed corridor by the endorsed Aboriginal party to identify cultural heritage site/objects and to nominate particular sites for monitoring during construction
- cultural heritage clearance prior to clear and grade activities
- attendance of all construction personnel at cultural heritage inductions and briefings.

Conclusion

I am satisfied that the duty of care requirements under the ACH Act have been satisfied through the implementation of the CHMP. In addition, the CHMP will ensure adequate identification and management of cultural heritage places and objects between LinkWater Projects and the relevant aboriginal people as custodians of their cultural heritage.

4.13.2 Non-Indigenous cultural heritage

EIS findings and/or key points

LinkWater Projects found, as per section 3.10 of the EIS, that there are no sites of non-Indigenous cultural heritage within the project area listed on registers maintained by state and Commonwealth agencies. A number of registered heritage sites were identified in the proximity to the corridor, though none of these will be directly affected by the project. LinkWater Projects is aware that there is the potential for previously unknown sites or items of heritage significance to be discovered during construction.

Conclusions

On the basis of the investigations conducted, it is my view that it is unlikely that there will be any non-Indigenous cultural heritage impacts from the project. Further, I consider that LinkWater Projects' commitment to additional field assessment and further consideration of management strategies as necessary is sufficient to manage any potential unforeseen impacts on non-Indigenous cultural heritage.

I am satisfied that LinkWater Projects' commitments relating to Indigenous and non-Indigenous cultural heritage are satisfactory.

4.14 Waste

EIS findings and/or key points

The EIS confirms that most waste is likely to be generated during construction, with only minor amounts of waste being generated during the operational phase of the pipeline. Waste generated during construction will be from site offices (such as domestic waste and sanitary system waste), work sites (including green waste/mulched timber, concrete wastes) and maintenance areas (waste oil and chemical wastes).

LinkWater Projects has committed in the EIS and the project's waste management plan to implementing waste management practices for the project that are consistent with the waste management hierarchy outlined in the Environmental Protection (Waste Management) Policy 2000. For example, extracted material will be reused on or off-site and, where possible, cut and fill earthworks will be balanced to ensure maximum reuse of fill material on site, which will minimise the need for stockpiling, transport and importation of material. Similarly, all recycled materials will be considered for use in concrete and other construction materials, such as road base.

As detailed in the EIS, significant volumes of waste water will be generated during pressure hydro-testing of the pipeline. In its submission on the EIS, the then EPA highlighted the need for proper planning for water discharge to avoid less environmental harm and advised of appropriate treatment methods.

Conclusions

I find that the potential for adverse impacts caused by waste from the project is unlikely, however, there is a need for LinkWater Projects to ensure that the project follows best practice environmental management principles in relation to waste management. The implementation of the waste management plan, including the early planning of construction activities to maximise waste reuse opportunities and the training of employees in the waste hierarchy and waste management principles, is essential to achieving this outcome.

I find that the disposal of hydro-test water from the pipeline commissioning phase has the potential to cause environmental harm. I therefore set the following condition:

Condition 21

LinkWater Projects must ensure that no environmental harm occurs in relation to the disposal or reuse of water used in the commissioning of the pipeline. As with all project activities, LinkWater Projects must take all reasonable and practicable measures to ensure that the project complies with the general environmental duty, as defined under the *Environmental Protection Act 1994* (Qld).

4.15 Social and economic environment

EIS findings and/or key points

The project will be a component of the SEQ Water Grid that will provide for enhanced water supply security across the SEQ region by allowing water to be distributed throughout the region based on the availability of water from bulk water supply sources that have different characteristics of reliability and volume.

As previously discussed, the project will connect otherwise segmented water zones of the Sunshine Coast. Additionally, provision has been made in the pipeline's design for five future off-takes feeding into the Sunshine Coast region's reticulation system for connection to existing or future water distribution networks. The project will therefore facilitate significant economic benefits by ensuring a more secure water supply to service a growing population and future industrial and commercial development.

The EIS discussed potential adverse impacts on the social environment and public amenity of the area related to the construction and operation phase of the project. The possible impacts during construction are likely to be:

- loss or encumbrance of residential, commercial and agricultural uses
- potential indirect impacts on agricultural landholders resulting from a decline in surface water quality
- restricted access due to construction traffic and traffic diversions
- local traffic congestion
- impacts on visual amenity for businesses and residents
- vibration, dust and noise emissions.

These impacts have been considered and where required conditions or recommendation made to reduce the impacts to an acceptable level.

The project will generate beneficial socio-economic opportunities throughout the broader Sunshine Coast region as a result of the projects estimated expenditure of approximately \$450 million. Associated with this expenditure will be additional indirect flow-on effects. Economic activity will occur initially from first round impacts (or direct impacts), arising from expenditure of the capital budget for the development of the pipe and associated materials causing an expansion of output from industries. Second round, or indirect impacts, will arise as industries supplying inputs to the project increase their purchases to meet additional demand generated by the project. The economic stimulus generated by the project through inter-industry activity will occur due to both the construction and operation phases.

Latest advice from LinkWater Projects is that at peak construction, the project will employ more than 450 workers. As per commitment provided by LinkWater Projects, construction workers will be employed locally where possible, and the EIS provides an estimate that about 140 workers are likely to be from the Sunshine Coast area.

Indirect employment opportunities are likely to be created as a result of increased demand on industry to supply goods and services to the project (that is, increasing work programs of small contractors generating the need for additional workers to cater for the increased demand to manufacture more pipe and associated materials).

The EIS provides that, for the more than 290 workers that are likely to be sourced from outside the Sunshine Coast region, short-term accommodation will be required for some of these workers. This accommodation would be required during the working week rather than the peak demand weekends when workers are likely to return to their principal place of residence.

Conclusions

I note that the project will create short-term employment opportunities and flow on economic benefits, through the provision of indirect employment opportunities and support services, for the pipeline activities from Eudlo up to Noosa. In addition, the construction workforce is unlikely, relative to the broader regional population, to be of a size to result in any noticeable impacts to the availability or affordability of accommodation in the region, or the availability of community and social services.

While I note the project's benefits to the economy, its impacts on residents in the vicinity due to construction activities is an issue that, as LinkWater Projects agrees, must be managed. I acknowledge that a key element of the project's design has been to minimise its impacts on the local community through, for example, locating the corridor in existing utilities easements and that construction methods, times and practices discussed and conditioned in this report will work towards reducing impacts.

Further, LinkWater Projects has agreed to work with the local community to ensure good understanding of the works and so individual requirements can be ascertained. However, in further acknowledgement of potential adverse impacts of the construction of the pipeline on the community, I have set the following conditions:

Condition 22

LinkWater Projects must develop and implement a community and stakeholder management plan. The plan is to include a detailed communication strategy to ensure that community members, including those in sensitive groups identified in the EIS, are informed of the project and its impacts in a timely and responsive manner.

All landowners or business owners directly or potentially affected by the construction activities are to be consulted at least one month before the commencement of such activities to identify potential issues, concerns and appropriate mitigation strategies.

Condition 23

LinkWater Projects must develop a complaints response management system and a complaints register to provide for the receipt, recording, timely investigation and response to complaints, including the implementation of preventative or corrective actions and the mechanisms to inform the person who made the complaint of actions being undertaken in response.

All complaints are to be responded to within 24 hours by a staff member with specific knowledge of the project. Complaints received are to be recorded in a register, which is to be provided to DIP on a three-monthly basis or as otherwise requested by DIP.

5. Matters of national environmental significance

5.1 Project assessment and approvals

On 24 October 2007, pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) the Commonwealth Minister for the Environment, Heritage and the Arts (Commonwealth Minister) determined the project to be a 'controlled action' due to its potential to impact on the following matters of national environmental significance (MNES):

- listed threatened species and communities (sections 18 and 18A)
- listed migratory species (sections 20 and 20A).

The Commonwealth Minister found that, based on the information available in the referral of the project to the Commonwealth in 2007, the proposed action is likely to have significant impact on the relevant MNES because:

- a number of listed threatened and migratory species are expected to use the habitat within and immediately adjacent to the proposed corridor for nesting, breeding and foraging
- the harvesting of water from the Mary River catchment may directly or indirectly impact upon listed threatened or migratory species that live in or rely on the riparian and aquatic environment.

As a result, the project requires assessment and approval under the EPBC Act.

The Commonwealth Government has accredited the general EIS process, as conducted under the SDPWO Act, under a bilateral agreement between the Australian and Queensland Governments. This enables the EIS to meet the impact assessment requirements under both Commonwealth and Queensland state legislation.

The controlled actions for a proposed project may be considered under section 133 of the EPBC Act by the Commonwealth Minister, who has regard to the Coordinator-General's EIS evaluation report arising from the EIS process prepared under section 35 of the SDPWO Act.

On 9 September 2009, LinkWater Projects sought the consideration of the Commonwealth Minister to a variation to the project. The variation arose as a result of:

- omitting the proposal to seek new water entitlements (additional take) from the Mary River
- removing the need to source supplies from the Wappa Dam and the Poona/Cooloolabin systems
- including a bi-directional function to provide water security to the Sunshine Coast region.

On 8 October 2009 the Commonwealth Minister decided to accept the variation to the project proposal.

This section of the report provides an interim evaluation of the potential impacts of the project on the 'controlling provisions', being the MNES.

5.2 The project

The project is the construction and operation of the Northern Pipeline Interconnector – Stage 2 (the project) as described in section 2.2 of this report.

The proponent for the project is the Southern Regional Water Pipeline Company Pty Ltd trading as LinkWater Projects, a wholly Queensland Government-owned company, incorporated under the *Corporations Act 2001*.

Impacts on matters of national environmental significance

Construction of the project will comprise four main components, proposed to be undertaken between late 2009 and December 2011:

- standard pipe-laying activities
- major tunnelling activities
- crossings (waterways, major road and rail infrastructure)
- structures such as pump stations and balance tanks.

Section 3.2 of the EIS provides the land use, topography and geomorphology of the project.

During consultation on the draft terms of reference (TOR) between the Department of Infrastructure and Planning (DIP), LinkWater Projects and the Commonwealth Department of Environment, Water, Heritage and the Arts (DEWHA), it was determined that the environmental impact assessment should address the potential impact of the project on listed threatened and migratory species:

- expected to use habitat within and immediately adjacent to the corridor for nesting, breeding and foraging
- that live in or rely upon riparian and aquatic environments that may be affected by waterway crossings and harvesting of water from the Mary River.


Section 3 of the TOR contained the MNES species that were, at a minimum, to be assessed within the EIS, based on information provided by DEWHA.

The assessment conducted by LinkWater Projects in the EIS and SEIS was prepared using the significant impact guidelines formulated by DEWHA, which outline criteria to assess whether a project action is likely to have a significant impact on MNES.

The EIS provides that existing environmental values in the project's study area were described based upon a combination of desktop and field surveys to determine the threatened and migratory species likely to occur in the project area.

Desktop investigations included a review of:

- aerial photography of the proposed corridor and surrounds
- RE mapping provided by the then Queensland Environmental Protection Agency (EPA)
- search results from the EPBC Online Protected Matters search tool, EPA Wildlife Online, the Queensland Herbarium, Birds Australia and Queensland Museum databases
- previous ecological studies in the local area
- discussions with state and local government personnel with specific knowledge of the species and environments in the project area
- relevant publications and literature.



The EIS further provided that field surveys were undertaken by a number of specialist consultants with knowledge of the project area. These include:

- Landscape Assessment Management and Rehabilitation Pty Ltd (terrestrial flora)
- Biodiversity Assessment and Management Pty Ltd (terrestrial fauna)
- Queensland Fauna Consultancy Pty Ltd (terrestrial and aquatic fauna)
- Hydrobiology Environmental Services Pty Ltd (aquatic fauna).

Water supply

The project's proposed water sourcing and supply strategy needs to be understood for its potential impacts on MNES. The EIS describes the previous water supply strategy for the project which involved the proposed abstraction of approximately 40 ML per day of water from the Mary River utilising new entitlements under the *Water Resource (Mary Basin) Plan 2006*.

Following the review of the previous water supply strategy for the project, a new strategy (now the current water supply strategy) was also proposed in the EIS. The factors influencing the new water supply strategy included:

- improvements in the regional water supply situation following good rainfall over the summer of 2007–2008 and in early June 2008, which resulted in spillway overflows at all Sunshine Coast dams
- recent short-term water balance modelling completed by the Queensland Water Commission (QWC), which showed that the transfer of 65 ML per day from Baroon Pocket Dam to the South East Queensland (SEQ) Water Grid was sustainable until the end of 2011
- enhancement of water supply security in SEQ through the completion of a number of key drought contingency projects by the end of 2008.

The current water supply strategy for the project proposes to transport water that is extracted from the Mary River under an existing allocation and treated at the Noosa Water Treatment Plant (WTP). The previous proposal to harvest water from the Mary River (by applying for a new water entitlement) has been omitted.


The existing entitlement comprises 6500 megalitres (ML) per annum (18 ML per day) (classified as 'high priority') held by the South East Queensland Water Grid Manager (SEQWGM) (within the Upper Mary River Water Supply Scheme). This allocation has been utilised by the (previous) Noosa Shire Council (now the Sunshine Coast Regional Council), to supply local urban demand since the allocation was authorised in 2000. Historically up to 55 per cent of this entitlement has been utilised.

This water will be used to supplement supply currently drawn from the Baroon Pocket Dam and being transferred to Brisbane via NPI stage 1. The Baroon Pocket Dam is the principal water supply source for the Caloundra and south Maroochy areas.

I note that the potential impacts on aquatic environments outlined in the EIS and SEIS are based on the previous water supply strategy. As described in the documents, impact assessment for the full use of the existing 6500 ML per annum allocation occurred during the establishment of the Mary Basin Water Resource Pplan (WRP) under the agreed WRP process.

Under this process an independent Technical Advisory Panel provide advice to the DERM on the potential flow-related environmental impacts of taking water from the Mary Basin. The environmental assessments undertaken by the Technical Advisory Panel are used to develop the environmental flow objectives (EFOs) of the WRP, and consists of three main phases:

- current condition assessment of the existing environment

- 
- development of an environmental flow assessment framework
 - assessment of the likely environmental implications of possible future water resource management scenarios.

The Technical Advisory Panel assessed the implications of full water resource development in the Mary Basin (the full development scenario) to the current use scenario. This advice was a key input into the formulation of the outcomes and objectives of the WRP, including the EFOs which are included in the WRP. These EFOs seek to protect environmental assets of the Mary Basin including the Lungfish, Mary River Cod and Mary River Turtle (and other MNES).

The Technical Advisory Panel recommended the suite of performance indicators to be used in the Mary Basin WRP 2006, as they were considered to best represent key attributes of the flow regime, including low, medium and high flows and flow seasonality. These EFOs established in the WRP seek to minimise changes to important characteristics of the flow regime, including flow variability and seasonality and have been set in accordance with precautionary principles.

In addition to the WRP impact assessment process, LinkWater Projects' project Alliance partner, the Northern Network Alliance, assessed the potential impacts on MNES in accordance with the significant impact guidelines formulated by DEWHA (see Appendix D of the EIS). A buffering capacity of 40 ML/d above the full resource development scenario for the Mary Basin (as established under the WRP) was included in the overall assessment of impacts.

Although exceeding the assessment required for the current water supply strategy (that is, 6500 ML per annum [18 ML per day]), LinkWater Projects is of the view that this level of assessment provided a greater level of confidence in determining the magnitude of impacts relative to unseasonal fluctuations and extreme events within the Mary Basin.

As discussed in subsequent sections of this chapter, LinkWater Projects has proposed in the EIS and SEIS to undertake a riparian monitoring program and an aquatic habitat monitoring program during the construction and operational phases of the project. The monitoring programs are being developed in order to monitor MNES species and/or suitable habitat and to identify any potential impacts on MNES as a result of construction and operation of the project.

In part, the data collected will provide credible mechanisms (for example, response levels) that trigger modification of mitigation measures or suspension of project-related activities, including providing information for potential altering the volume and timing of abstraction of water from the Mary River under the existing allocation.

The data gained from the programs will be provided to DERM for information and reference and may be useful within the future WRP processes for the region.

I am satisfied that due to matters including the process for consideration of EFOs within the WRP process, and the process for, and outcomes of, assessment of potential impacts as described in the EIS, that the provisions determining the significance of impacts on MNES under the EPBC Act have been addressed and that utilisation of the existing entitlement will not adversely impact environmental values.

I am satisfied that using the existing (partly utilised) entitlement has the following advantages:

- the allocation is authorised under the *Water Resource (Mary Basin) Plan 2006*
- no new water entitlements are being sought, with no resulting impacts
- no changes to the existing infrastructure on the Mary River, with no resulting impacts.

Given that no new water entitlements are being sought from the Mary River, I am satisfied that there will be no resulting impacts on endangered, vulnerable and rare (EVR) species or matters of national environmental significance (MNES) in the Mary River, beyond what has

already been assessed and approved for the existing water entitlement that is to be utilised by the project.

5.2.1 Listed threatened terrestrial flora

Listed threatened terrestrial flora species were identified through database searches, with assessment of part of the proposed corridor conducted by Landscape Assessment, Management and Rehabilitation Pty Ltd during October 2007 and February 2008. In some locations, where a number of corridor routes were being considered, only preliminary environmental investigations have been conducted. These and subsequent field investigations have identified regional ecosystems of conservation significance and significant flora species or potential habitat.

Field surveys recorded a number of vegetation communities within the preferred corridor, which can be broadly grouped into the following types:

- intact vine forest remnants (RE 12.3.1/12.3.2) known to provide habitat for a number of rare and threatened rainforest species. This RE often occurs near waterways, minor gullies and depressions.
- large tracts of tall open eucalypt forests persisting along coastal ridges, developing a vine forest understorey on lower slopes and in gullies
- isolated areas of Melaleuca wetland in riparian depressions around Eudlo Creek and tributaries.

Based on this information, and the habitat requirements of key plant species, an assessment of likelihood of occurrence was determined for each species of high environmental significance (see Appendix D of the EIS). Those species potentially impacted by the project are discussed in detail in the EIS.

In terms of endangered, vulnerable and rare (EVR) flora species, the EIS confirmed that the following were either confirmed as present, or being of high or moderate likelihood of being present in the project area:

Endangered

- Swamp lily — *Phaius tancarvilleae* (confirmed as present)

Vulnerable

- Small-fruited Queensland Nut — *Macadamia ternifolia* (moderate possibility of being present)
- Smooth-bark Rose Apple, Red Lilly Pilly — *Syzygium hodgkinsoniae* (moderate possibility of being present)
- Southern Penda — *Xanthostemon oppositifolius* (present). Recorded at a number of locations supporting riparian vine forest (RE 12.3.1) at Lake Macdonald and Six Mile Creek (main channel and left branch).

For those confirmed as present, the following mitigation measures were described in the EIS.

Swamp lily (*Phaius tancarvilleae*)

- map location of individual trees within and adjacent to the corridor prior to construction
- refine corridor route and width to avoid or limit the number of individual plants to be removed during construction at Paynter Creek
- use a constrained corridor (less than 30 metres) at northern crossings of Paynter Creek to avoid/minimise impacts on suitable habitat
- translocate and/or propagate individual trees for use in revegetation.

Southern Penda (*Xanthostemon oppositifolius*)

- map location of individual trees within and adjacent to the corridor prior to construction
- refine corridor route and width to avoid or limit the number of individual trees to be removed during construction
- constrain corridor (less than 30 metres) at crossing locations on Six Mile Creek to minimise clearing
- translocate and/or propagate individual trees for use in revegetation.

The small-fruited Queensland Nut — *Macadamia ternifolia* and the Smooth-bark Rose Apple, Red Lilly Pilly — *Syzygium hodgkinsoniae* were not identified within field investigations, but there was a moderate possibility that they were present in the project area. The EIS confirmed that for these species, further field investigations may be required for corridor refinements.

Commitment 3.4 listed in the EIS indicates that ‘construction in or adjacent to endangered vegetation communities, sensitive riparian communities, or threatened species habitats will be managed through the implementation of sensitive area plans (SAPs). The corridor width will be minimised where possible through these areas.’

Cognisant of the vulnerable flora species discussed above that have been either confirmed in the project area, or there being a likelihood that they will be encountered, 1 further condition that SAPs are to be utilised for these species if they are encountered.

Condition 24

Construction in or adjacent to endangered and vulnerable vegetation communities, sensitive riparian communities, or threatened species habitats will be managed through the implementation of sensitive area plans (SAPs). The SAPs are to be provided in draft form to DERM at least two months prior to construction activities in the vicinity of the communities for consideration.

To ensure that impacts are not likely to have a significant impact on listed threatened terrestrial flora, the following conditions have been prepared. The terms are in line with the significant impact guidelines formulated by DEWHA and mitigation measures suggested in the flora report prepared by Landscape Assessment, Management and Rehabilitation Pty Ltd as cited in the EIS.

Condition 25

LinkWater Projects must:

- **undertake a detailed pre-construction survey to map the location of listed threatened terrestrial flora within and adjacent to the project**
- **provide listed threatened terrestrial flora specimens, ecological information and GPS coordinates to the Queensland Herbarium for incorporation in the HERBRECS database**
- **temporarily fence all individuals and/or populations of listed threatened terrestrial flora that may be impacted by works associated with the project**
- **translocate and/or propagate individual listed threatened terrestrial flora for use in revegetation efforts where destruction of listed threatened terrestrial flora cannot be avoided.**

A translocation and propagation plan for these species is to be produced which indicates how a ‘no net loss outcome’ for these species will be achieved. The plan is to be submitted to DERM for consideration and input within four months from the date of the Commonwealth’s decision on the controlling provisions for the project.

I note and commend LinkWater Projects' overarching strategy of seeking to minimise impacts on landholders and native vegetation and habitat areas by locating the majority of the pipeline route within existing disturbed public utility power easements or road corridors.

I further note LinkWater Projects has clarified subsequent to the EIS that approximately 26.9 hectares of remnant vegetation will be required to be cleared as a result of the project's construction. As a result of conditions imposed in this report, this amount will likely be further reduced.

In acknowledging that impacts on MNES flora will be more likely at waterways, I have imposed the following conditions which seek to further avoid and minimise impacts that may result from the clearing of riparian vegetation and disturbance of the stream banks to trench across waterways. The imposing of conditions on these matters is in accordance with concerns raised within submissions from agencies and members of the public during the EIS process raising concerns with impacts of construction works in the area's waterways.

Condition 26

Where listed threatened terrestrial flora are identified as a result of pre-construction detailed surveys:

- **the corridor alignment must be refined to significantly ¹ minimise the impacts on listed threatened terrestrial flora impacted by the project**
- **in the case of riverine crossings, where the impact can not be significantly minimised, then the crossing must be tunnel bored or piled**
- **the corridor width is to be constrained to 10 metres, where necessary, to avoid the impact on listed threatened terrestrial flora.**

For the waterway crossings discussed above, before construction commences, LinkWater Projects is to demonstrate to and seek the approval of the Department of Infrastructure and Planning (DIP) for the preferred crossing method (that is, either tunnel bored or piled).

To inform DIP's consideration, a working group is to be convened involving independent experts on significant species and inviting participation from DEEDI (Queensland Primary Industry and Fisheries), DERM (Environment), SCRC and DIP. Minutes of the meeting are to be taken.

A waterway construction methodology selection process is to be undertaken. Of criteria considered within the process, the criteria of environment is not to receive a lower weighted rating relative to other criteria.

Following the process, a sensitive area plan (SAP) for the crossing is to be produced that will detail how the recommended construction method will be undertaken to minimise environmental impacts.

The results of the process, a copy of minutes of all working group meetings on the crossing and a copy of the proposed SAP is to be provided to DIP at least one month prior to construction activities for the waterway crossing.

This condition is further to Condition 5 which specifies a number of significant waterways, including Paynter Creek and Six Mile Creek where MNES flora has been confirmed, will be either tunnel bored or piled.

¹ When determining the significance of an impact the Significant Impact Guidelines formulated by DEWHA are to be used.

Condition 6 also imposes that construction works within 20 metres of the bed and banks of watercourses as defined in the *Water Act 2000* are not to exceed 10 metres in width, which seeks to minimise impacts in the riparian zone.

Further conditions on erosion management (Condition 8) and avoiding works during significant rainfall events (Condition 9) also seek to best manage works to minimise indirect impacts that may also occur from increased turbidity as a result of sediment release into waterways.

I am satisfied from the information provided in the EIS and with the imposing of the above conditions that the project is unlikely to have significant impact on listed threatened terrestrial flora and that any unavoidable impacts will be managed and minimised.

5.2.2 Listed threatened terrestrial fauna

The EIS confirms that listed threatened terrestrial fauna species were initially identified through database searches. Potential habitat areas were identified from aerial photography of the proposed route and then visited by qualified fauna consultants who conducted a series of fauna and habitat assessments in October and November 2007, and then during January and February 2008.

The sites surveyed during these investigations are shown in Figure D.4. of Appendix D of the EIS. In addition, preliminary environmental investigations on potential corridor routes identified potential suitable habitat areas for significant species. The results are included in the EIS and discussed in detail in Appendix D.

Field investigations recorded a range of habitat types in the project area. These are:

- narrow bands of vine forest along coastal waterways, sometimes with eucalypt emergents
- patches of lowland gallery rainforest of reasonable size
- contiguous areas of eucalypt forest along coastal ridges, with vine forest understorey on the lower slopes and in wetter gullies, providing habitat and movement corridors for a range of species
- dams with varying degrees of disturbance and fringing vegetation providing habitat for amphibians, semi-aquatic and migratory bird species
- hollow-bearing trees which provide suitable nesting habitat for birds, arboreal mammals and insectivorous bat species.

Based on this information, and the ecological requirements of the listed threatened terrestrial fauna species, a likelihood of their existence in the study area and potential impact due to project works was determined for each species (see Appendix D of the EIS).


The following listed threatened terrestrial fauna were confirmed as having either a moderate or high likelihood of being found in the project area:

Endangered

- Giant Barred Frog — *Mixophyes iteratus* (high likelihood of being present in project area)
- Pink Underwing Moth — *Phyllodes imperialis* (southern subspecies) (moderate likelihood)

Vulnerable

- Large-eared Pied Bat — *Chalinolobus dwyeri* (moderate)
- Grey-headed Flying-fox — *Pteropus poliocephalus* (moderate)



For the endangered species, the EIS notes that four locations in south east Queensland are confirmed breeding habitat for the southern subspecies of the Pink Underwing Moth. The closest location of these four sites to the project works is at Mary Cairncross Park which is approximately 10 kilometres west of the pipeline corridor.

The larval food plant of the Pink Underwing Moth, *Carronia multiseppalea*, may be present in gullies in close proximity to the proposed corridor. It was recorded during field survey in gullies near Nobels Road, and the EIS notes that additional work is required to determine the potential presence of *P. imperialis* at this site. However the EIS confirms that no direct impacts on potential habitat are expected to occur as no vegetation will be cleared from the gullies at Nobels Road.

Any potential impacts would occur indirectly as a result of earthworks and construction along the ridgeline. Potential for impacts may include excessive sediment washing into gullies with the potential to damage vines such as *C. multiseppalea* if present, however, this is best managed through the design of earthworks and the installation of suitable sediment and erosion control measures proposed by LinkWater Projects and further conditioned within this report.

Of the listed threatened terrestrial fauna species likely to be within or near the project, it is my view that only the endangered Giant Barred Frog (*Mixophyes iteratus*) could be directly impacted by the project.

Fauna surveys identified the presence of suitable riparian rainforest habitat (RE 12.3.1) for the Giant Barred Frog at six locations within the project area. The sites are Mount Combe Creek, Sandy Creek, the North Maroochy River and an unnamed creek to the north, Paynters Creek, Petrie Creek and Tuckers Creek.

At these locations, the greatest potential impacts would result from the clearing of riparian vegetation and disturbance of the stream banks to trench across waterways. Indirect impacts may also occur from increased turbidity as a result of sediment release into waterways.

To ensure that impacts are not likely to have a significant impact on the Giant Barred Frog the following condition has been prepared in line with the significant impact guidelines formulated by DEWHA and fauna reports by Queensland Fauna Consultancy Pty Ltd in and Biodiversity Assessment and Management Pty Ltd noted in the EIS.

Condition 27

Part A:

All riverine crossings where the Giant Barred Frog is located as a result of pre-construction detailed surveys must be re-aligned to minimise impacts.

Where this impact can not be significantly minimised, the waterway crossing must be either tunnel bored or piled.

For the waterway crossings discussed above, before construction commences, LinkWater Projects is to demonstrate to and seek the approval of the Department of Infrastructure and Planning (DIP) for the preferred crossing method.

To inform DIP's consideration, a working group is to be convened involving independent experts on significant species and inviting participation from DEEDI (Queensland Primary Industry and Fisheries), DERM (Environment), SCRC and DIP. Minutes of the meeting are to be taken.

A waterway construction methodology selection process is to be undertaken. Of criteria considered within the process, the criteria of environment is not to receive a lower weighted rating relative to other criteria.

Following the process, a sensitive area plan (SAP) for the crossing is to be produced that will detail how the recommended construction method will be undertaken to minimise environmental impacts.

The results of the process, a copy of minutes of all working group meetings on the crossing and a copy of the proposed SAP is to be provided to DIP at least one month prior to construction activities for the waterway crossing.

Part B:

Appropriate scheduling of waterway crossings and construction near important habitat areas is to occur to avoid breeding and high-flow periods.

Further on the matter of potential impacts to the Giant Barred Frog, LinkWater Projects has provided in the EIS that monitoring programs for the project are being developed to provide a basis for minimising impacts on matters of MNES. These programs are being developed as a result of previous investigations conducted for the EIS which confirmed MNES species or potential habitat along the alignment. The monitoring programs are being developed in order to monitor MNES species and/or suitable habitat and to identify any potential impacts on MNES as a result of construction and operation of the project.

There are two monitoring programs under development, one of which is a riparian monitoring program, which will monitor the potential impacts on the Giant Barred Frog and important habitat (for example, potential for introduction of disease, loss of habitat, restriction of movement through the corridor, riparian vegetation assessment and water quality parameters). I support LinkWater Projects' development of this program and have provided for this in the following condition:

Condition 28

LinkWater Projects is to develop a riparian monitoring program for the construction and operational phases of the project as detailed in the EIS.

The monitoring program is to:

- establish performance indicators within the EMPs against which environmental performance is measured/assessed
- provide credible mechanisms (eg response levels) that trigger modification of mitigation measures or suspension of project-related activities (including altering the volume and timing of abstraction of water from the Mary River under existing allocations)
- assist in the continuous improvement of the project's environmental management
- provide sufficient data for analyses and discussion – to be presented in regular reports
- provide additional information on local distribution, abundance and/or condition of protected species and important habitats and to inform species' databases kept by the Queensland Herbarium, the Queensland Museum and the DERM.

I nominate the DERM as the responsible agency for this condition.

Recommendation 3

Given the jurisdiction of the Commonwealth Environment Minister, I believe that there is substantial benefit in early consultation between the proponent and DEWHA in the development of documentation required by Conditions 24, 25, 26, 27, 28 and 32, Appendix 1.

I recommend that both the proponent and DEWHA engage during initial development of this documentation, and well prior to submission of this documentation for approval, in order to ensure that the Commonwealth's views can be considered at an early stage of development.

For listed vulnerable fauna species that may be impacted by construction of the project works, the Grey-headed Flying-fox is known to occur in a large camp adjacent to the Bruce Highway to the east of Nambour, approximately 1 km from the proposed corridor.

Appendix D of the EIS provides that the proposed works will have no impact on the camp itself, however, vegetation clearance within the local area has the potential to result in the temporary loss of local foraging resources, particularly flowering eucalypts and other nectar-producing species.

The use of existing cleared easements for the pipeline corridor significantly minimises the extent of vegetation clearing that would otherwise be required. While the extent of clearing proposed will not be significant in terms of the availability of foraging resources for this species, LinkWater Projects confirms that potential impacts associated with the removal of food trees may be mitigated in the following ways:

- refinements to the corridor that avoid or limit the number of individual trees removed from the work area
- use of a constrained corridor of 20 metres to minimise damage to foraging resources for this species
- propagation of flowering eucalypts for use in revegetation efforts where removal of trees cannot be avoided.

Mindful of the importance of flowering eucalypt and nectar trees to native fauna and threatened species such as the Grey-headed Flying fox, I provide the following condition, which builds on a commitment provided by LinkWater Projects at Appendix C of the EIS. The condition imposes a revegetation strategy for impacted food sources of threatened fauna species, with a replacement ratio of at least 1:3. This ratio seeks to offset for any loss of food sources while the replacement vegetation re-establishes.

Condition 29

All sites cleared of vegetation and/or ground cover will be rehabilitated and revegetated with appropriate species including plant species endemic to particular regions.

For species that are food sources for threatened fauna species, the vegetation is to be replaced as a 'like for like' in the vicinity. A replacement ratio of at least 1:3 is to be used for each individual lost.

While the EIS notes that for the Large-eared Pied Bat, recent records have recorded its existence in Queensland at the Border Ranges, the Main Range, Gambubal State Forest, Wivenhoe Dam and Moogerah Dam.

The ecology and habitat requirements of this species are uncertain. The Large-eared Pied Bat has previously been associated with roosting habitats in caves and cave-like structures. Potential habitat for this species has been identified near Nobels Road. However, there is some potential for this species to use tree hollows in the clearing area as roosting sites.

The major potential for impact therefore relates to the removal of hollow-bearing trees. LinkWater Projects states in the EIS that impacts may be mitigated by implementing the following measures, which I herein condition.

Condition 30

LinkWater Projects is to:

- **undertake detailed surveys to identify potential roosting habitats for the Large-eared Pied Bat (*Chalinolobus dwyeri*) in the clearance area**
- **minimise the extent of disturbance and retain hollow-bearing trees wherever possible**
- **conduct pre-start checks for arboreal fauna prior to removal of significant trees**
- **relocate tree hollows to other trees at the site to limit the loss of roosting habitat, or provide bat boxes within suitable habitat.**

Conclusion

I am satisfied that the measures provided in the EIS and further conditioned here will satisfactorily mitigate and reduce impacts on these species and feed vegetation in the project area.

5.2.3 Listed threatened aquatic fauna

The EIS confirms that the project will traverse waterways associated with both the Mary River and Maroochy River catchments. The great majority of the route and associated construction footprint will be located within the Maroochy River catchment with the pipeline crossing the following sub-catchments: Eudlo Creek, Petrie Creek, Paynters Creek, and the North and South Maroochy rivers. Within the south eastern corner of the Mary River catchment, the pipeline crosses Six Mile Creek. Potential impacts of the project on aquatic habitats and their associated fauna assemblages that could arise from the construction of waterway crossings would be related to direct physical changes to stream morphology and changes to water quality.

Listed threatened aquatic fauna species with the potential to occur in the project area were initially identified through database searches and literature reviews. Initial investigations by Hydrobiology Environmental Services Pty Ltd confirmed four EPBC-listed fish species and one listed reptile species. While in some cases populations are likely, field surveys did not confirm the presence of the species. The species are:

Endangered

- Mary River Turtle — *Elusor macrurus* (moderate likelihood of being present in project area)
- Mary River Cod — *Maccullochella peelii mariensis* (moderate likelihood)
- Oxleyan Pygmy Perch — *Nannoperca oxleyana* (moderate)

Vulnerable

- Australian Lungfish — *Neoceratodus forsteri* (moderate).

While the fish species are known from streams elsewhere in south east Queensland, within the project area these species are only known to occur in streams of the Mary catchment.

For the purposes of assessment of MNES, Hydrobiology Environmental Services Pty Ltd focused investigations on Six Mile Creek and its tributaries (left branch and anabranch), in particular, the riparian and in-stream habitat features at waterway crossing points. Physical disturbance to riparian and aquatic habitat features was assessed using field survey data collected at proposed crossing points on Six Mile Creek. This included descriptions of hydraulic habitat type (i.e. pools, riffles), in-stream structural features such as snags, riparian vegetation and canopy cover and physico-chemical water quality parameters.

Based on the research by Hydrobiology Environmental Services Pty Ltd a likelihood of impact was determined for the threatened aquatic fauna species (see Appendix D of the EIS).

As previously discussed, the great majority of the pipeline route and construction footprint will be located within the Maroochy River catchment. Within the south eastern corner of the Mary River catchment, the project's pipeline crosses Six Mile Creek.

For the Mary River Turtle, field investigations were conducted to determine the habitat suitability at all potential crossings of Six Mile Creek and its tributaries, which are the only waterways within the Mary River catchment where pipeline crossings are proposed.

The EIS provides that the Mary River Turtle is unlikely to occur at the crossing of the main channel of Six Mile Creek due to an observed lack of connective habitat. Sub-optimal habitat for the species exists at the left branch crossing point, although this reach is not likely to support significant numbers of the turtle.

I have conditioned within this report that the waterway crossing at Six Mile Creek (left branch) is to be either piled or microtunnelled to avoid impacts to this species.

For the Mary River Cod, the Oxleyan Pygmy Perch and the Australian Lungfish, while not confirmed during field surveys, there is a moderate likelihood of their presence or suitable conditions at Six Mile Creek. I am satisfied that the construction method at this location, along with associated conditions on limiting clearing at the approach of riparian zones and management of indirect impacts from erosion and storm events, that impacts on these species will not occur due to project works.

However, further to mitigation measures provided in the EIS regarding these species, I condition the following measures:

Condition 31

LinkWater Projects is to:

- **ensure the undertaking of detailed surveys to ascertain the presence of threatened aquatic species in proximity to proposed crossings of Six Mile Creek**
- **ensure that storage and loading areas for fuels and chemicals are bunded and located away from waterways**
- **where the presence of Mary River cod is confirmed, if the preferred construction method is piling, crossing construction is to be undertaken outside the May–June and September–November periods when cod are most likely to be moving through the catchment waterways.**

Further to discussion previously in this section that LinkWater Projects has stated in the EIS that two monitoring programs will be established, the second of the monitoring programs proposed is an aquatic habitat monitoring program. I support this proposal, and provide for it in the following condition:

Condition 32

LinkWater Projects is to develop an aquatic habitat monitoring program for the construction and operational phases of the project as detailed in the EIS. The program is to monitor aquatic (instream) habitat features for the Mary River Turtle, Mary River Cod and the Australian Lungfish in the Mary River (downstream of the Coles Crossing offtake) and in Six Mile Creek.

The monitoring program is to:

- establish performance indicators within the EMPs against which environmental performance is measured/assessed
- provide credible mechanisms (eg response levels) that trigger modification of mitigation measures or suspension of project-related activities (including altering the volume and timing of abstraction of water from the Mary River under existing allocations)
- assist in the continuous improvement of the project's environmental management
- provide sufficient data for analyses and discussion – to be presented in regular reports
- provide additional information on local distribution, abundance and/or condition of protected species and important habitats and to inform species' databases kept by the Queensland Herbarium, the Queensland Museum and the DERM.

I nominate the DERM as the responsible agency for this condition.

Conclusion

I am satisfied from the information provided as a result of the EIS process, in consideration of the significant impact guidelines formulated by DEWHA, and as a result of conditions placed by me within this report, that the project is unlikely to have an impact on listed threatened aquatic fauna.

5.2.4 Listed migratory species

The EIS provides that listed migratory species were identified, in the first instance, through database searches. Potential habitat areas were identified from literature reviews, aerial photography of the proposed route followed up with limited field visits to key sites by the Queensland Fauna Consultancy Pty Ltd in March 2008 and Biodiversity Assessment and Management Pty Ltd in November 2007. Based on this research a likelihood of impact was determined for the listed migratory species (see Appendix D of the EIS).

The migratory species identified are all mobile bird species. These species are unlikely to be adversely impacted by construction of linear infrastructure, which typically results in disturbance of small areas of individual habitat types rather than destruction of large tracts of suitable habitat.

Coxen's Fig Parrot (*Cyclopsitta diophthalma coxeni*) is classified as both migratory and endangered under the EPBC Act. The species was not detected during field surveys. The species is extremely rare or extinct within the area and has a low likelihood of occurring within the project area.

The Australian Painted Snipe (*Rostratula benghalensis australis*) was initially identified in desktop surveys as potentially using habitat in the project area for breeding. However, field survey of the corridor did not record any suitable habitat and, the EIS confirms, there is a low likelihood of the species occurring within the project area.

I am satisfied from the information provided as a result of the EIS process that the project is unlikely to have an impact on listed migratory species.

5.3 Conclusion about matters of national environmental significance

The public and advisory agency comments received during the EIS process and the technical reports supplied with the EIS have shown that the areas of greatest sensitivity and of highest rank in MNES in the study area are those regional ecosystems associated with lowland riparian rainforests and vine forests. These ecosystems were once widespread but with settlement and population expansion in the region, have been reduced to generally narrow remnants along larger permanent waterways. Riverine crossing points therefore assume particular significance in terms of environmental management as these are areas of greatest species diversity and highest regional ecological value.

LinkWater Projects has minimised the extent of further disturbance to these high value areas through corridor route planning focused on using existing disturbed powerline and road corridors. In the few instances where these existing cleared passages were not available, the point of narrowest disturbance was selected as the preferred pipeline routing. Elsewhere the pipeline was aligned through cleared farmlands.

However, conditions in this chapter have been developed to ensure that if further detailed pre-construction environmental surveys identify MNES that may be significantly impacted as a result of the construction progress, that project impacts are mitigated to an acceptable level in line with the impact guidelines formulated by DEWHA. In particular the conditions focus on minimising impacts at riverine crossing as these areas have the greatest sensitivity and are of the highest rank in MNES. Further conditions seek to minimise indirect impacts to sensitive areas and species that may arise due to erosion, sedimentation and construction during breeding and storm events. I am satisfied that the impacts on significant species due to the project works will be minimal and manageable.

6. Conclusion

The NPI stage 2 is a drought response measure set down in Schedule 10B of the *Water Regulation 2002* (the Regulation) to be constructed by 31 December 2011.

The project will enable access to a partly utilised water entitlement of a total of 18 ML per day or 6500 ML per annum for use by the SEQ Water Grid.

The NPI will have a reverse flow capacity to the Sunshine Coast and has been designed to accommodate additional water from the Traveston Crossing Dam (should it be approved) or alternative water supply sources.

I confirm state policy describes the project as part of a key water supply strategy to meet both the short-term and long-term needs of the SEQ region due population growth and the impacts of climate change. As such, I note the project will contribute directly to the general economic and social well-being of the region, which would otherwise be seriously constrained without the security of essential water supply.

Having regard to the documentation and information provided during the EIS process for the project, I am satisfied that the requirements of the Queensland Government for impact assessment in accordance with the provisions of Part 4 of the SDPWO Act have been met.

I have found that the EIS process has provided sufficient information to all stakeholders to allow for an evaluation of the potential impacts that could be attributed to the project.

LinkWater Projects has presented a schedule of project commitments in Appendix C of the EIS. These commitments include actions beyond those required to meet statutory approvals and their implementation will enhance the mitigation of potential adverse environmental impacts of the project. Further, LinkWater Projects has developed detailed EMPs to address specific environmental issues identified during the EIS process associated with each element of the project.


In reaching a conclusion on the acceptability or otherwise of the management of potential impacts of the project I have considered these project commitments and EMPs. Where necessary, I have extended particular commitments or components of the EMP and set specific conditions and made recommendations that LinkWater Projects should implement in accordance with best practice environmental management.

I note that the NPI has evolved from predominately supplying 65 ML per day into the SEQ Water Grid to reverse flow providing water security to the Caloundra and Maroochy system and the Noosa and Gympie system. In addition, the project will allow for the future expansion of water supply sources to SEQ for urban and industrial use. Should TCD be constructed, there will be an obvious need to connect this project to the SEQ Water Grid via the NRP of which the NPI forms part.

On the basis of the information provided, including advice from advisory agencies, I am satisfied that the adverse environmental impacts associated with the project are able to be addressed through implementation of the:

- commitments in the EIS and SEIS
- construction EMPs
- specific conditions and recommendations set down in Appendix 1 of this report.

Despite the above, in the event of any inconsistency with the project as described in the EIS, SEIS and the Coordinator-General's conditions, the conditions shall prevail.



I have determined that on balance there is a significant positive net benefit to the community from the development of the project and that it can proceed, subject to a number of specific conditions and recommendations (detailed in Appendix 1 of this report) to manage its design, construction and operation. Therefore, I recommend that the project can proceed, subject to the conditions and recommendations contained in Appendix 1 of this report.

These conditions do not relieve LinkWater Projects of the obligation to obtain all other approvals and licences from relevant authorities required under any other Act. Under section 39(3) of the SDPWO Act the conditions resulting from the EIS process do not limit the assessment manager's powers under the IPA to impose additional conditions that are not inconsistent. Therefore, further conditions can be required by advisory agencies as a result of IPA approval processes. For example, DERM provided in the submission on the SEIS generic conditions that would be applied to any ERA approval, and which may need to be supplemented by additional conditions when site based information is provided with specific applications. These conditions were not incorporated in this report as it is likely that they will be revised when LinkWater Projects makes an IPA application to DERM that provides more specific site based information.

It shall be the ultimate responsibility of LinkWater Projects to ensure that the project is carried out in accordance with the EIS and as modified by the SEIS and that full compliance with all imposed conditions is achieved. In relation to those conditions that I have not allocated a responsible agency I have set the following condition requiring a third party audit:

Condition 33

LinkWater Projects shall ensure that a third party audit is undertaken in accordance with the provisions outlined in Appendix 2 of this report.

LinkWater Projects and its agents, lessees, successors and assigns, as the case may be, must implement the conditions and recommendations in this report and all commitments presented in the EIS, SEIS and EMPs.

A copy of this report will be issued to LinkWater Projects pursuant to section 35(5)(a) of the SDPWO Act.

A copy of this report will be provided to all advisory agencies and will also be made available on the DIP website at: www.dip.qld.gov.au/projects.

Appendix 1: Schedule of Conditions

List of recommendations and conditions

Recommendation 1

LinkWater Projects will endeavour to purchase Lot 9 on SP201521 from the SCRC which would then be used for part of the vegetation offsets required for the project. Lot 9 on SP201521 must either be retained in perpetuity by LinkWater Projects or a local government, or state-owned entity or, that area that is not required for existing or future facilities, be incorporated into the adjoining Ferntree Creek National Park or otherwise protected.

Recommendation 2

LinkWater Projects are to engage directly with affected landowners to develop specific landowner construction and rehabilitation plans (LCRP). Each LCRP is to be property-specific and to be negotiated with the landowner prior to construction. The LCRP is to include detail on the rehabilitation commitments, timeframes and compensation entitlements.

Recommendation 3

Given the jurisdiction of the Commonwealth Environment Minister, I believe that there is substantial benefit in early consultation between the proponent and DEWHA in the development of documentation required by Conditions 24, 25, 26, 27, 28 and 32, Appendix 1.

I recommend that both the proponent and DEWHA engage during initial development of this documentation, and well prior to submission of this documentation for approval, in order to ensure that the Commonwealth's views can be considered at an early stage of development.

Condition 1

The location of the FFA facilities are to be constructed in accordance with Figure 10 Fertree Facility Area. Any variation to the layout is to be approved by DIP.

Condition 2

Before access for the construction of the FFA can occur across the north coast line, the approval of the head lessee for the corridor being the State of Queensland represented by the Department of Transport and Main Roads and the sublessee being QR must be obtained.

Condition 3

In relation to dwellings that are within 40 m of the horizontal alignment at Pringle Hill, LinkWater Projects must:

- engage an independent assessor to undertake structural inspections of buildings prior to the commencement of any potentially damaging construction activities (such as blasting, rock breaking, pile driving, or dynamic compaction)

- ensure that all project blasting operations are carried out in accordance with the Australian and New Zealand Environment and Conservation Council guideline 'Technical basis for guidelines to minimise annoyance due to blasting overpressure and ground vibration (ANZECC, 1990)'
- engage a vibration specialist to undertake daily monitoring at the Pringle Hill tunnel and to advise the Department of Infrastructure and Planning (DIP) on preventative and reactive measures required to mitigate impacts. If any impact, such as structural damage to buildings, is identified, then LinkWater Projects must undertake appropriate corrective action, which may include compensation to the owner for such impacts.

Condition 4

In addition to the normal reporting arrangements with LinkWater Projects, the vibration specialist referred to in condition 3 is to provide fortnightly reports to DIP directly with the information provided being at the discretion of DIP. At any time DIP may require LinkWater Projects to direct the vibration specialist to attend meetings with DIP, advisory agencies or the public.

To clarify any uncertainty, as with any conditions where it is not specified otherwise, the costs involved with this condition are the responsibility of LinkWater Projects. As the vibration information is provided, DIP can alter the frequency of these reports.

Condition 5

Part A:

The following waterway crossings are to be either tunnel bored or piled:

- Paynter Creek Northern
- Petrie Creek
- Tuckers Creek
- South Maroochy
- Mount Combe Creek
- North Maroochy River
- Six Mile Creek (left branch) 02
- Lake Macdonald Spillway.

For each of the waterway crossings listed above, prior to construction LinkWater Projects is to seek the approval from the Department of Infrastructure and Planning (DIP) on the crossing method to be undertaken.

To inform DIP's consideration, a working group is to be convened involving independent experts on significant species and inviting participation from DEEDI (Queensland Primary Industry and Fisheries), DERM (Environment), SCRC and DIP. Minutes of the meeting are to be taken.

A waterway construction methodology selection process is to be undertaken involving the working group. Of criteria considered within the process, the criteria of environment is not to receive a lower weighted rating relative to other criteria.

Following the process, a sensitive area plan (SAP) for each of the crossings indicated in the first list above is to be produced that will detail how the recommended construction method will be undertaken to minimise environmental impacts.

For each of the crossings, the results of the process, a copy of minutes of all working group meetings on the crossing and a copy of the proposed SAP is to be provided to DIP at least one month prior to construction at the waterway crossing.

Part B:

To understand the overall schedule of the listed waterway crossings, a program of consideration for each of the crossings, proposed construction timeframes and timeframes for the above assessment process is to be provided to DIP within two months of the release of this report.

Condition 6

The construction area within 20 metres of the bed and banks of a watercourse is not to exceed 10 metres in width. This applies to watercourses as defined in the *Water Act 2000*.

However, should LinkWater Projects demonstrate prior to construction to the satisfaction of DIP that unsatisfactory safety impacts could not be reasonably avoided, then the width can be increased, but to no greater than 15 metres in total.

Condition 7

Activities associated with the construction of the pipeline within watercourses are to be carried out in a way that does not impound water or otherwise unduly interfere with the flow of water without securing a Waterway Barrier Works approval from DEEDI.

For works in a watercourse as per the definition provided in the *Water Act 2000*, LinkWater Projects is to obtain advice from DERM to ensure best practice environmental management outcomes are achieved.

Condition 8

LinkWater Projects must ensure that all land disturbance construction activities comply with the requirements set out in the 'Soil Erosion and Sediment Control – Engineering Guidelines for Queensland Construction Sites (The Institution of Engineers, Australia (Qld), 1996, or later version)'. In addition LinkWater Projects must ensure that the project is constructed in accordance with the Maroochy Manual for Erosion and Sediment Control.

Condition 9

During the October to March period, LinkWater Projects must not undertake clearing or trenching work within the Q5 flood level of watercourses as defined in the *Water Act 2000* or on slopes that exceed 10 per cent if the Bureau of Meteorology forecasts a significant rainfall event in the vicinity of that location within the next 48 hours.

Predictions on the likelihood of the occurrence of a significant rainfall event (raindrops with a terminal velocity (8–9 m/s) or higher) are to be sought from the Special Services Unit of the Bureau of Meteorology on a daily basis during this period.

Condition 10

No additional clearing of vegetation is to occur where the existing cleared corridor width is 20 metres or greater. Note this condition does not pertain to regrowth of less than 3 metres in height.

However, should LinkWater Projects demonstrate to the satisfaction of DIP prior to clearing being undertaken that the restricted corridor width will generate unsatisfactory safety impacts that cannot be reasonably avoided, then the width can be increased, but to no greater than 30 metres in total.

Condition 11

To ensure compliance with the Regional Vegetation Management Code for Southeast Queensland Bioregion, 20 November 2006 all clearing of assessable vegetation must be undertaken in accordance with an environmental management plan that incorporates the following:

- clearing management plan
- rehabilitation/revegetation plan
- weed management plan.

Condition 12

LinkWater Projects is required to ensure that progressive rehabilitation, including re-contouring, topsoil replacement, and re-vegetation that is, for non-weed areas, consistent in species composition and density with the pre-construction state, occurs as soon as possible after construction activities are completed in each area disturbed. Rehabilitation is to be monitored for success against the design criteria and corrective actions taken if rehabilitation is not proving successful.

In sections of the Energex easement, LinkWater Projects is to consult with Energex at least six months prior to revegetation commencing on the proposed rehabilitation/revegetation plan, to ascertain if revegetation may present a future impairment to its powerline infrastructure. For certain areas, it is acknowledged the plan may then need to be adjusted accordingly.

Condition 13

Dust and particulate matter must not exceed the following levels when measured at any sensitive receptor:

- dust deposition of 120 milligrams per square metre per day, when monitored in accordance with Australian Standard AS 3580.10.1 of 2003 (or more recent editions); or
- a concentration of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere of 50 micrograms per cubic metre over a 24 hour averaging time, at a nuisance sensitive or commercial place downwind of the site, when monitoring in accordance with: Australian Standard AS 3580.9.6 of 2003 (or more recent editions) 'Ambient Air – Particulate matter – Determination of suspended particulate PM10 high-volume sampler with size-selective inlet – Gravimetric method'; or any alternative method of monitoring PM10 which may be permitted by the latest edition of the administering authority's 'Air Quality Sampling Manual'.

I have nominated the DERM as the responsible agency to ensure compliance with this condition.

Condition 14

When requested by DERM, dust and particulate monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter, and the results notified within 14 days to the administering authority following completion of monitoring. Monitoring must be carried out at a place(s) relevant to the potentially affected dust sensitive place and at upwind control sites and must include for a complaint alleging:

- dust nuisance, dust deposition
- adverse health effects caused by dust,

the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (μm) (PM10) suspended in the atmosphere over a 24 hr averaging time.

I have nominated the DERM as the responsible agency to ensure compliance with this condition.

Condition 15

From completion of the project's commissioning until 31 December 2019, the entity responsible for the infrastructure (the entity) must purchase at least 10 per cent of all the project's operational electrical energy requirements from accredited renewable energy ('green power') sources.

From 1 January 2020, LinkWater Projects must purchase at least 20 per cent of all the project's operational electrical energy requirements from accredited renewable energy ('green power') sources.

The entity must produce a greenhouse offset plan that, at a minimum, provides details of offsets commitments for greenhouse gas emissions generated directly from the construction and operation of the project's infrastructure. The greenhouse offset plan must be submitted to DIP for approval within three months of the release of this report. The greenhouse offset plan must detail the:

- greenhouse gas emissions to be offset associated with the construction of the project, supported by detailed greenhouse gas emission calculations
- greenhouse gas emissions to be offset associated with the proportion of the project's operational electrical energy requirements not purchased from accredited renewable energy ('green power') sources
- proposed offsets, which may include contributions to Ecofund Qld or another accredited offsets program acceptable to the Coordinator-General, and the methodologies for calculating the offsets
- proposed actions and associated timeframes to achieve the offsets within the whole of life operating timeframe for the project and an ongoing reporting regime relating to progress against subsequently approved timeframes.

The entity must implement the greenhouse offset plan following DIP's approval of the plan.

DIP may have regard to subsequent advice provided by the entity on seeking approval for amendment to the terms and requirements of the plan should the requirements of this condition be superseded by future state and Commonwealth policy and legislation requirements regarding management of carbon emissions.

Condition 16

Part A:

Construction hours within private properties (including access to private properties) are to be limited from 7:00 am to 5:00 pm Monday to Friday. Except in the case of an emergency, access to private properties is not to occur outside these times. No work is acceptable on Saturdays, Sundays or public holidays.

Construction hours outside private properties are to be limited from 7:00 am to 6:00 pm Monday to Friday and 8:00 am to 1:00 pm on Saturdays. No work is acceptable on Sundays or public holidays.

This condition does not limit construction activities involving underground activities where surface access to private properties is not required, however for tunnelling



locations, in order to limit the amount of construction traffic the removal of spoil is not permitted outside of the hours specified above.

For tunnelling works, should surface access to private properties where the nearest occupancy is less than 50 metres in distance from the surface access point or above ground works be required, then construction activities can occur if the resident consents in writing to surface access outside these hours.

Part B:

LinkWater Projects is to engage an acoustic expert to advise on managing potential impacts arising from construction activities. The results of acoustic monitoring will be considered when developing plans to mitigate impacts on sensitive noise receptors.

Part C:

On the matter of facilities required for northern flow direction, LinkWater Projects is to consult with members of the local community on the facilities as design details are progressed. Input from the community on the facilities is to be invited and considered by LinkWater Projects.

During final design assessments for these facilities, LinkWater Projects is to engage an air and noise specialist to undertake an air, noise and vibration assessment of the NFD facility areas and several sensitive receptors in the vicinity.

These air, noise and vibration assessments will include information on the current ambient air conditions and background noise monitoring. The results of the background monitoring will be incorporated into the design considerations for facilities to minimise potential impacts on adjacent areas.

Once completed, the results of these assessments and design recommendations are to be made available to the DERM and affected landowners in a report format.

Condition 17

When requested by DERM, noise monitoring must be undertaken to investigate any complaint of noise nuisance, and the results notified within 14 days to the administering authority. Monitoring must include:

- LA 10, adj, 10 mins
- LA 1, adj, 10 mins
- the level and frequency of occurrence of impulsive or tonal noise
- atmospheric conditions including wind speed and direction
- effects due to extraneous factors such as traffic noise
- location, date and time of recording.

The method of measurement and reporting of noise levels must comply with the latest edition of the administering authority's noise measurement manual.

Condition 18

LinkWater Projects is to erect signs advising of the anticipated traffic delays, in advance of where congestion is anticipated, so that users have the opportunity to take alternative routes.

Condition 19

LinkWater Projects must complete a road impact assessment study and develop and implement a road use management plan in consultation with the relevant controlling



authority (DTMR or the local government authority) to fully address any project-related impacts on roads at least one month before the commencement of heavy vehicle transport on affected roads. LinkWater Projects must consult with the Queensland Police Service and the relevant government authorities during the development and implementation of the traffic management plan.

Condition 20

LinkWater Projects must rehabilitate all temporary access roads and other areas of disturbance resulting from the construction of the pipeline to a state equivalent to or better than the pre-construction state, unless otherwise agreed with the relevant landowner or authority.

Condition 21

LinkWater Projects must ensure that no environmental harm occurs in relation to the disposal or reuse of water used in the commissioning of the pipeline. As with all project activities, LinkWater Projects must take all reasonable and practicable measures to ensure that the project complies with the general environmental duty, as defined under the *Environmental Protection Act 1994* (Qld).

Condition 22

LinkWater Projects must develop and implement a community and stakeholder management plan. The plan is to include a detailed communication strategy to ensure that community members, including those in sensitive groups identified in the EIS, are informed of the project and its impacts in a timely and responsive manner.

All landowners or business owners directly or potentially affected by the construction activities are to be consulted at least one month before the commencement of such activities to identify potential issues, concerns and appropriate mitigation strategies.

Condition 23

LinkWater Projects must develop a complaints response management system and a complaints register to provide for the receipt, recording, timely investigation and response to complaints, including the implementation of preventative or corrective actions and the mechanisms to inform the person who made the complaint of actions being undertaken in response.

All complaints are to be responded to within 24 hours by a staff member with specific knowledge of the project. Complaints received are to be recorded in a register, which is to be provided to DIP on a three-monthly basis or as otherwise requested by DIP.

Condition 24

Construction in or adjacent to endangered and vulnerable vegetation communities, sensitive riparian communities, or threatened species habitats will be managed through the implementation of sensitive area plans (SAPs). The SAPs are to be provided in draft form to DERM at least two months prior to construction activities in the vicinity of the communities for consideration.

Condition 25

LinkWater Projects must:

- undertake a detailed pre-construction survey to map the location of listed threatened terrestrial flora within and adjacent to the project

- provide listed threatened terrestrial flora specimens, ecological information and GPS coordinates to the Queensland Herbarium for incorporation in the HERBRECS database
- temporarily fence all individuals and/or populations of listed threatened terrestrial flora that may be impacted by works associated with the project
- translocate and/or propagate individual listed threatened terrestrial flora for use in revegetation efforts where destruction of listed threatened terrestrial flora cannot be avoided.

A translocation and propagation plan for these species is to be produced which indicates how a 'no net loss outcome' for these species will be achieved. The plan is to be submitted to DERM for consideration and input within four months from the date of the Commonwealth's decision on the controlling provisions for the project.

Condition 26

Where listed threatened terrestrial flora are identified as a result of pre-construction detailed surveys:

- the corridor alignment must be refined to significantly² minimise the impacts on listed threatened terrestrial flora impacted by the project
- in the case of riverine crossings, where the impact can not be significantly minimised, then the crossing must be tunnel bored or piled
- the corridor width is to be constrained to 10 metres, where necessary, to avoid the impact on listed threatened terrestrial flora.

For the waterway crossings discussed above, before construction commences, LinkWater Projects is to demonstrate to and seek the approval of the Department of Infrastructure and Planning (DIP) for the preferred crossing method (that is, either tunnel bored or piled).

To inform DIP's consideration, a working group is to be convened involving independent experts on significant species and inviting participation from DEEDI (Queensland Primary Industry and Fisheries), DERM (Environment), SCRC and DIP. Minutes of the meeting are to be taken.

A waterway construction methodology selection process is to be undertaken. Of criteria considered within the process, the criteria of environment is not to receive a lower weighted rating relative to other criteria.

Following the process, a sensitive area plan (SAP) for the crossing is to be produced that will detail how the recommended construction method will be undertaken to minimise environmental impacts.

The results of the process, a copy of minutes of all working group meetings on the crossing and a copy of the proposed SAP, is to be provided to DIP at least one month prior to construction activities for the waterway crossing.

Condition 27

Part A:

All riverine crossings where the Giant Barred Frog is located as a result of pre-construction detailed surveys must be re-aligned to minimise impacts.

² When determining the significance of an impact the Significant Impact Guidelines formulated by DEWHA are to be used.

Where this impact can not be significantly minimised, the waterway crossing must be either tunnel bored or piled.

For the waterway crossings discussed above, before construction commences, LinkWater Projects is to demonstrate to and seek the approval of the Department of Infrastructure and Planning (DIP) for the preferred crossing method.

To inform DIP's consideration, a working group is to be convened involving independent experts on significant species and inviting participation from DEEDI (Queensland Primary Industry and Fisheries), DERM (Environment), SCRC and DIP. Minutes of the meeting are to be taken.

A waterway construction methodology selection process is to be undertaken. Of criteria considered within the process, the criteria of environment is not to receive a lower weighted rating relative to other criteria.

Following the process, a sensitive area plan (SAP) for the crossing is to be produced that will detail how the recommended construction method will be undertaken to minimise environmental impacts.

The results of the process, a copy of minutes of all working group meetings on the crossing and a copy of the proposed SAP is to be provided to DIP at least one month prior to construction activities for the waterway crossing.

Part B:

Appropriate scheduling of waterway crossings and construction near important habitat areas is to occur to avoid breeding and high-flow periods.

Condition 28

LinkWater Projects is to develop a riparian monitoring program for the construction and operational phases of the project as detailed in the EIS.


The monitoring program is to:

- establish performance indicators within the EMPs against which environmental performance is measured/assessed;
- provide credible mechanisms (eg response levels) that trigger modification of mitigation measures or suspension of project-related activities (including altering the volume and timing of abstraction of water from the Mary River under existing allocations);
- assist in the continuous improvement of the project's environmental management;
- provide sufficient data for analyses and discussion – to be presented in regular reports; and
- provide additional information on local distribution, abundance and/or condition of protected species and important habitats and to inform species' databases kept by the Queensland Herbarium, the Queensland Museum and the DERM.

I nominate the DERM as the responsible agency for this condition.

Condition 29

All sites cleared of vegetation and/or ground cover will be rehabilitated and revegetated with appropriate species including plant species endemic to particular regions.



For species that are food sources for threatened fauna species, the vegetation is to be replaced as a 'like for like' in the vicinity. A replacement ratio of at least 1:3 is to be used for each individual lost.

Condition 30

LinkWater Projects is to:

- undertake detailed surveys to identify potential roosting habitats for the Large-eared Pied Bat (*Chalinolobus dwyeri*) in the clearance area
- minimise the extent of disturbance and retain hollow-bearing trees wherever possible
- conduct pre-start checks for arboreal fauna prior to removal of significant trees
- relocate tree hollows to other trees at the site to limit the loss of roosting habitat, or provide bat boxes within suitable habitat.

Condition 31

LinkWater Projects is to:

- ensure the undertaking of detailed surveys to ascertain the presence of threatened aquatic species in proximity to proposed crossings of Six Mile Creek
- ensure that storage and loading areas for fuels and chemicals are bunded and located away from waterways
- where the presence of Mary River cod is confirmed, if the preferred construction method is piling, crossing construction is to be undertaken outside the May–June and September–November periods when cod are most likely to be moving through the catchment waterways.

Condition 32

LinkWater Projects is to develop an aquatic habitat monitoring program for the construction and operational phases of the project as detailed in the EIS. The program is to monitor aquatic (instream) habitat features for the Mary River Turtle, Mary River Cod and the Australian Lungfish in the Mary River (downstream of the Coles Crossing offtake) and in Six Mile Creek.

The monitoring program is to:

- establish performance indicators within the EMPs against which environmental performance is measured/assessed;
- provide credible mechanisms (eg response levels) that trigger modification of mitigation measures or suspension of project-related activities (including altering the volume and timing of abstraction of water from the Mary River under existing allocations);
- assist in the continuous improvement of the project's environmental management;
- provide sufficient data for analyses and discussion – to be presented in regular reports; and
- provide additional information on local distribution, abundance and/or condition of protected species and important habitats and to inform species' databases kept by the Queensland Herbarium, the Queensland Museum and the DERM.



I nominate the DERM as the responsible agency for this condition.

Condition 33

LinkWater Projects shall ensure that a third party audit is undertaken in accordance with the provisions outlined in Appendix 2 of this report.

Appendix 2: Third party audit requirements

1. Half-yearly audit reports

- 1.1. The proponent must procure the following:
 - a. audits to be undertaken on a six monthly basis during the audit period by an independent and suitably qualified expert (auditor), engaged by and at the expense of the proponent, to determine whether the proponent has complied with the conditions and recommendations (**Appendix 1**) of this report; and
 - b. submission by the proponent to the Coordinator-General of the auditor(s)' written report of the audit (audit report) together with an audit certification statement (audit certification statement), not later than 42 days after the end of the relevant six month period.
- 1.2. The audit period will:
 - a. commence on construction of the project; and
 - b. end once all conditions or recommendations have been complied with to the satisfaction of the Coordinator-General and a final audit report together with an audit certification statement has been submitted by the proponent confirming that all conditions or recommendations in [Appendix 1] [the approval] have been satisfactorily complied with.
- 1.3. The auditor must be a reputable expert with not less than [10] years experience practising in the discipline which is the subject of the relevant condition or recommendation and who is otherwise acceptable to the Coordinator-General, acting reasonably. Where the audit of conditions or recommendations needs to be undertaken by experts in different disciplines it is expected that, in order to satisfy this condition, the proponent will engage several experts for these purposes to undertake the audits and provide the audit report together with an audit certification statement in respect of the relevant condition or recommendation.
- 1.4. The proponent must promptly provide the auditor(s) with all such information and site access as may be reasonably required to enable the auditor(s) to undertake the audit and prepare the audit report.

The audit report must include:

- details of the project including the name and location of the project, members of the audit team (including brief details of each member's qualifications and years of experience), and employees of the proponent interviewed for the audit
- a summary of what conditions or recommendations were activated during the reporting period
- a summary of any non-compliances identified during the current audit period with conditions or recommendations at the front end of the report, with reference to where further information can be found in the body of the report
- a summary of any non-compliances that were identified during the previous audit period with details of site remediation activities, corrective actions taken or to be taken and revised practices implemented or to be implemented (as relevant)
- a compliance evaluation table detailing the relevant condition in [Appendix 1 of the report] [the approval], whether compliance with this condition was achieved and how compliance was evaluated (for example, the lists of documents, site inspection or employee interview relied upon by the auditor to evaluate the

condition)

- a site plan showing the project activities (for example work areas, road infrastructure and any significant features such as waterways etc.)
- a list of the evidence used to support the findings of the audit. The list should detail the title, date and holder of any documents reviewed, the date and locations of any site inspections conducted and the name and position details of any person interviewed for the purpose of conducting an audit (the Coordinator-General may request copies of documents used as evidence at a later date, if required)
- any further attachments which the auditor(s) consider are relevant to the audit report.

The audit report must otherwise be in such form as may be required by the Coordinator-General and notified to the proponent.

A suggested format for the audit report can be found at [insert reference]. Note that this is not a prescribed form.

1.5. The audit report must be accompanied by an audit certification statement which is to be completed and signed by the auditor(s). The audit certification statement must be attached to the audit report and include:

- name of project, project proponent and details of Coordinator-General's report(s) or approval to which the audit relates
- date, place, methods and evidence used to assess compliance
- summary of any non-compliances identified
- auditor's details:
 - auditor's name, position, company and contact details
 - auditor's qualifications and/or experience
- auditor's declaration whereby the auditor:
 - certifies the conditions contained in [Appendix 1 of the Coordinator-General's report] [approval] have been satisfactorily complied with, subject to any qualifications which the auditor has outlined in the audit certification statement
 - certifies that to the best of the auditor's knowledge, all information provided in the audit report is true, correct and complete
 - certifies that the auditor and to the best of the auditor's knowledge all members of the audit team are independent from the proponent to the extent that the outcome of the audit will not be influenced by any relationship with the proponent or potential benefits to the auditor or members of the audit team
 - acknowledges that it is an offence under section 157O of the *State Development and Public Works Organisation Act 1971*, to give the Coordinator-General a document containing information that the auditor knows is false or misleading in any material particular.

A suggested format for the audit certification statement is available on the Department of Infrastructure and Planning's website.

1.6. The proponent must promptly provide (and must procure that the auditor(s) also promptly provide at the cost of the proponent) the Coordinator-General with such further information and/ or site access as may be required by the Coordinator-General in respect of any audit report or concerning compliance with the conditions and recommendations in [**Appendix 1** of this report] [or the approval].

Appendix 3: Abbreviations and definitions

The following acronyms have been used in this report:

ACH Act	Aboriginal Cultural Heritage Act 2003
Adj	Adjusted
AHD	Australian Height Datum
ASS	Acid sulfate soils (under SPP 2/02)
BOM	Bureau of Meteorology
CDF	Chemical dosing facility
CEMP	Construction environmental management plan
CG	The Coordinator-General of the State of Queensland
CHMP	Cultural heritage management plan (under the ACH Act)
CLR	Contaminated Land Register
CO	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ -e	CO ₂ equivalent
COB	Close of business
DCC	Department of Climate Change
dba	Decibels frequency A-weighted
DEEDI	QLD Department of Employment, Economic Development and Innovation
DERM	QLD Department of Environment and Resource Management
DEWHA	(Commonwealth) Department of Environment, Water, Heritage and the Arts
DIP	QLD Department of Infrastructure and Planning
DMR	Department of Main Roads (now DTMR)
DPI&F	Department of Primary Industries and Fisheries (the then)

DTMR	QLD Department of Transport and Main Roads
EIS	Environmental impact statement for the Northern Pipeline Interconnector-Stage 2 project
EMP	Environmental management plan
EMR	Environmental management register
EPA	Former QLD Environmental Protection Agency (now incorporated within DERM)
EP Act	Environmental Protection Act 1994
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)
EPP	Environmental protection policy (water, air, waste, noise)
ERA	Environmentally relevant activity
EVR	Endangered, Vulnerable, Rare
FFA	Ferntree Facility Area
FTE	Full-time equivalent
GHG	Green house gas
GQAL	Good quality agricultural land
GWh/a	Gigawatt hour per annum
ha	Hectares
HAT	Highest astronomical tide
IAS	Initial advice statement
IDAS	Integrated Development Application System
ILUA	Indigenous land use agreement
IMP	Integrated movement plan
IPA	Integrated Planning Act 1997
IROL	Interim Resource Operations Licence
JWP 2006	John Wilson & Partners
KBR 2006	Kellogg Brown & Root Pty Ltd
KRA	Key resource area

L _A	A-weighted sound pressure level
LAT	Lowest Astronomical Tide
LCRP	Landowner construction and rehabilitation plan
m	Metres
MCA	Multi criteria analysis
ML	Megalitres
ML/d	Megalitres per day
MNES	Matters of National Environmental Significance
NO _x	Nitrogen Oxide
NFD	Northern Flow Direction
NIR	Notice of Intention to Resume
NPI	Northern Pipeline Interconnector
NRWP	Northern Regional Water Pipeline
NSA	North south arterial
PEMP	Planning environmental management plan
PPT	Public passenger transport
Project	The Northern Pipeline Interconnector-Stage 2 project as described by the environmental impact statement
QGEOP	Queensland Government Environmental Offsets Policy
QPIF	Queensland Primary Industries and Fisheries
QR	Queensland Rail
QWC	Queensland Water Commission
RAA	Resource allocation approval
RE	Regional ecosystem
RIA	Road impact assessment
RLRP	Regional landscape and rural production
ROP	Resource operations plan
ROW	Right of way

SBSMP	Site based storm water management plan
SCMP	State Coastal Management Plan (under the CPMA)
SDPWO Act	State Development and Public Works Organisation Act 1971
SEIS	Supplementary environmental impact statement
SEQ	South East Queensland
SEQIPP	South East Queensland Infrastructure Plan and Program
SEQRP	South East Queensland Regional Plan 2009 - 2031
SQMP	Stormwater quality management plan
SCRC	Sunshine Coast Regional Council
SDPWO Act	State Development and Public Works Organisation Act 1971 (Qld)
SEQ	South East Queensland
SEQWGM	South East Queensland Water Grid Manager
SEQRWSS	South East Queensland Regional Water Supply Strategy
SEIS	Supplementary environmental impact statement
SFD	Southern flow direction
SRWP Co	Southern Regional Water Pipeline Company Pty Ltd trading as LinkWater Projects ('the proponent')
TCD	Traveston Crossing Dam
TIA	Traffic impact assessment
TOR	Terms of reference
µm	Micrometre
VMA	Vegetation Management Act 1999
WAR	Water Amendment Regulation (No.6) 2006
Water Act	Water Act 2000 (Qld)
WCRWS	Western Corridor Recycled Water Scheme
WGM	Water Grid Manager
WQBF	Water quality boosting facility

WQMF	Water quality management facility
WRP	Water resource plan
WSUD	Water sensitive urban design
WTP	Water treatment plant

As a result of machinery of government changes from 26 March 2009 (see Public Service Department Arrangements Notice (No.2) 2009), the following changes to Queensland Government departments referred to in this report occurred (in summary):

New department (as of 26 March 2009)	Previous department/s
Department of Employment, Economic Development and Innovation – DEEDI	Department of Tourism, Regional Development and Industry - DTRDI Department of Mines and Energy – DME Department of Primary Industries and Fisheries – DPI&F
Department of Environment and Resource Management – DERM	Environmental Protection Agency – EPA (including QPWS) Department of Natural Resources and Water – NRW
Department of Transport and Main Roads – DTMR	Department of Main Roads – DMR Queensland Transport – QT
Department of Community Safety	Department of Emergency Services – DES

