Chief of Staff.....OK	
Senior Policy Advisor	
.....OK	
Approved Not Approved Noted	
Further information required	
Minister.....	
Dated ...../...../.....	

To: Andrew Cripps
Minister for Natural Resources and Mines

From: Dan Hunt
Director-General
Natural Resources and Mines

Endorsed: Andrew Buckley Executive Director, Service Delivery North Region
Paul Sanders Acting Executive Director, Water Policy

30 April 2013

Etheridge Tropical Bio-Processing Project - Gilbert River Catchment

Recommendation

1. It is recommended that the Minister:
   - **note** that Integrated Food and Energy Developments Pty Ltd (IFED) is liaising with various State Government departments regarding its proposed Etheridge Tropical Bio-Processing Project in the Gilbert River Catchment (refer **Attachment 1**);
   - **note** that the Department of Natural Resources and Mines (DNRM) has undertaken preliminary hydrologic modelling of large-scale water extraction along the Einasleigh River of the Gilbert River Catchment, indicative of the IFED proposal, and results raise some significant concerns regarding water availability and potential downstream impacts.

Timing

2. Consideration of this brief is required before 30 April 2013 as it is understood that IFED has scheduled a meeting with the Premier on 30 April 2013.

Background

3. IFED's Etheridge Tropical Bio-Processing Project aims to integrate farming and processing to deliver products across the region including sugarcane, guar bean, raw sugar, ethanol, guar gum, stock feed, electricity and meat. IFED estimates construction costs of $[redacted] (to be privately funded) with over 1100 job opportunities proposed to be generated.
4. The project centres on the irrigation of 50 000 hectares (ha) adjacent to the Gilbert River using water sourced from the Einasleigh River – a tributary of the Gilbert River that contributes more than 50 percent of the Gilbert River Catchment's end of system flows.
5. IFED estimates it will need to take an average of 450 000 megalitres (ML) per annum from the Einasleigh River to support an annual irrigation demand of 325 000 ML.
6. Water is proposed to be harvested into a storage near the Einasleigh River with a capacity of 1 342 000 ML. A channel and pipeline system will feed the harvested water to a further storage of 500 000 ML capacity adjacent to the Gilbert River for supply to the irrigation area.
7. The General Manager of IFED, Mr Stewart Peters, briefed the Minister's advisor, Mr Andrew Freeman, and the Deputy-Director General, Service Delivery, along with other DNRM officers about the proposal on 10 April 2013.

Land Tenure

8. Tenures that support use of land for irrigated agriculture are freehold, Grazing Homestead Perpetual Leases, Grazing Homestead Freeholding Leases and Pastoral Holdings such as term leases for agriculture or pastoral purposes.
9. The land identified by IFED is held as term leases for pastoral purposes issued under the *Land Act 1994* or Pastoral Holdings issued prior to the *Land Act 1994* which are administered as term leases for pastoral purposes. All the leases are in private ownership except Abingdon Downs and Ironhurst which are in Company names.
10. Non-freehold tenures enabling irrigated agriculture can be sub-leased where the uses are consistent with the purpose for which the land was allocated. Sub leases can be mortgaged and these interests along with any other encumbrances must be registered on title.

11. The corporation and aggregation restrictions under the *Land Act 1994* prevent corporations from holding perpetual leases for grazing or agriculture, grazing homestead perpetual leases and grazing homestead freeholding leases and from holding subleases over such tenures. In addition, individuals may not acquire two or more of these leases, if collectively they are substantially in excess of two living areas.
12. The corporation and aggregation restrictions do not prevent existing lessees from participating in the proposed project, however would limit who they could transfer or sublease the land to for participation in such projects. These limitations can be removed if the leases are converted to freehold tenure.
13. Existing legislation requires rural leasehold land such as term leases for pastoral purposes to be converted to perpetual leases prior to freehold tenure. Any offer for a new lease will be subject to conditions including requirement for a land management agreement and may include providing a plan of survey and addressing native title.
14. The lessee is responsible for addressing native title most likely through negotiation of an Indigenous Land Use Agreement (ILUA) with registered native title parties or traditional owners, or through a successful non-claimant application. Addressing native title through negotiation of an ILUA can take more than two years depending on the availability and willingness of participants.
15. A lessee can apply for conversion to a perpetual lease after 80 percent of the term of the lease has expired, unless special circumstances exist. An application for conversion to freehold tenure can be made once the perpetual lease has issued. Any offer for freehold tenure will also be subject to requirements including payment of a purchase price.
16. The State Valuation Service determines the purchase price based on the unimproved value of the land as if it was freehold land at the date of application. The price will include the market value of any commercial timber on the land that is the property of the State.
17. Decision making on land tenure applications includes considering all public interest and planning requirements, and the attributes and condition of the land. All tenures are subject to statutory requirements including, duty of care to maintain the land in good condition and protection of cultural heritage, management of weeds, maintenance of vegetation without clearing except where a tree-clearing permit has been issued, and payment of rents and or rates.
18. Another option to subleasing or conversion of existing leases, is for the lessees to apply to purchase as unallocated state land the areas of the leases that are required for the irrigation development. The State could sell the land as freehold to the lessees in priority to other persons or entities. Any offer to sell the land would be subject to conditions including surrender of part of the lease, addressing native title, and payment of a purchase price.

Vegetation Management

19. Implementation of the proposal would likely require the clearing of significant areas of remnant vegetation, which is currently prohibited under the *Vegetation Management Act 1999* (see **attachment**).
20. In March 2013 the Vegetation Management Framework Amendment Bill 2133 (the Bill) was introduced to parliament. The Bill proposes the introduction of additional clearing purposes including 'irrigated high value agriculture clearing', which may provide an avenue to facilitate vegetation clearing associated with this proposal.
21. Irrigated high value agriculture clearing means clearing carried out to grow horticultural or broadacre crops and pasture using water that will be supplied by artificial means.
22. Applicants will be required to provide evidence of land suitability, a business plan showing the economic viability of the development, and evidence of authorised access to water resources.
23. Authorised access to water resources may be a limiting factor for the proposal (see notes below on water availability). Additionally initial soil surveys throughout the Gulf catchments indicate that soil suitability for irrigated agriculture is generally confined to alluvial areas.
24. It is also proposed that applications for irrigated high value agriculture clearing will still be assessed against the requirements of Regional Vegetation Management Code.
25. The code will likely regulate clearing in and around watercourses and wetlands, areas with habitat and connectivity values, and in areas subject to land degradation risks such as salinity. As such it is uncertain whether the size and configuration of areas that could be approved for clearing would meet the requirements of the IFED proposal.

Water Availability Matters

26. The water resources in the Gilbert River Catchment, including the Einasleigh River are allocated and managed under the *Water Resource (Gulf) Plan 2007* (Gulf WRP).
27. The Gulf WRP sets aside 15 000 ML of unallocated water held in general reserve for the Gilbert River Catchment, which is currently the subject of a competitive tender process.
28. A proposal of this scale is not provided for under the current Gulf WRP and Gulf Resource Operations Plan (Gulf ROP). Amendments to both the Gulf WRP and Gulf ROP, particularly in terms of unallocated water volumes, would be required to provide for such a project.
29. The Minister has committed to consider a review of the Gulf WRP prior to its expiration in 2018 if there is a strong uptake of the unallocated water tender process and if CSIRO's North Queensland Irrigated Agriculture Strategy (NQIAS) research, due in December 2013, shows that more water can be sustainably allocated.
30. DNRM has prepared a project plan that combines a number of complementary water planning initiatives under the one strategic approach for meeting emerging agricultural demand in the Flinders and Gilbert River Catchments. Major milestones and indicative timeframes are provided in **Attachment 2**. A separate briefing note will be progressed to confirm the Minister's support for the proposed approach and timeframes, noting there are a number of interdependencies between the initiatives that affect the timeframes.
31. The rights of existing water users and the critical water needs of the environment would need to be considered in deciding whether additional water should be made available for development and if so, what conditions should be put in place to support existing users and environmental values. There are currently only stock and domestic water users downstream of the proposal, however it is possible that landholders may have tendered for unallocated water and new licences may emerge through this process.
32. Given the early stage of the project, assumptions were made in consultation with IFED in order to assess the effects of a scenario of the scale and intent of the project on downstream water users and streamflows. Model outputs are therefore indicative only.
33. Model outputs show that a development of this scale could result in a 39.5 percent reduction in mean annual flow and 50.8 percent reduction of median annual flow just downstream of the proposed waterharvesting location (refer **Attachment 3** for schematic of the proposal and **Attachment 4**, part B for a summary of model outputs at points). It should be noted that under the modelling assumptions made for this scenario, a mean annual extraction of only 255 570 ML could be achieved. This falls short of IFED's expectations of 450 000 ML.
34. Flow impacts are attenuated downstream by stream inflows with a 17.5 percent reduction in mean annual flow at the Minnies Dip Gauging Station. This location is on the Strathmore property with the Stanbroke Company owning the Miranda Downs property just downstream of Strathmore. There are significant development aspirations for both properties.
35. With potentially competing demands for water, it would be prudent for government to convey the message that the appropriate mechanism for addressing emerging irrigation water needs beyond that already provided for under the Gulf WRP is through a review of the Gulf WRP underpinned by community consultation and transparent science, including the outcomes of the NQIAS research due in December 2013. There are significant challenges with making these amounts of water available.

Attachments

36. **Attachment 1**: IFED's Etheridge Tropical Bio-Processing Project Proposal
Attachment 2: Indicative timeframes for water planning initiatives
Attachment 3: Gilbert River Catchment – Location of Etheridge Bioprocessing Project
Attachment 4: Preliminary model outputs

Clearance

37. This brief has been cleared by Water Policy, Policy and Program Support.

Next Steps

38. DNRM will progress a separate brief seeking the Minister's consideration of a proposed strategic approach for meeting emerging irrigated agriculture water demands in the Gilbert and Flinders River catchments.

Dan Hunt

Action Officer: Stephenie Hogan, Team Leader, Water Planning North and Central Queensland.
Telephone: (07) 3239 3267

Minister - Natural Resources and Mines

Comments:

To: Minister Cripps
Minister for Natural Resources and Mines

Copy: Dan Hunt
Director-General
Natural Resources and Mines

Chief of Staff.....	OK
Senior Policy Advisor.....	OK

Approved Not Approved Noted
Further information required

Minister.....

Dated ...../...../.....

Endorsed: Sue Ryan, DDG Service Delivery
Lyall Hinrichsen, Executive Director, Water Policy, Policy and Program Support
Andrew Buckley, Executive Director, North Region, Service Delivery

10 May 2013

CC: John Skinner
Deputy Director-General, PPS

Etheridge Tropical Bio-Processing Project – Gilbert River Catchment
Attendees for this meeting are: Minister Cripps, Susan McDonald, Andrew Freeman, Dan Hunt, and David Hassum and Stewart Peters from Integrated Food and Energy Developments Pty Ltd

Recommendation

1. The suggested approach the Minister should take for this meeting is
   - **note** that Integrated Food and Energy Developments Pty Ltd (IFED) is liaising with various State Government departments regarding its proposed Etheridge Tropical Bio-Processing Project in the Gilbert River Catchment;
   - **raise the issue of** long term water availability being an area requiring further consideration by both government and the proponent particularly given the climatic variability of the catchment; and
   - **note** that the scale and location of the proposal has the potential to compromise development opportunities for other proponents, in particular development aspirations on the Einasleigh River.

Timing

2. Consideration of this brief is recommended prior to the Minister's meeting with IFED currently scheduled for 21 May 2013.

Background

3. IFED has requested this meeting as a follow up meeting to discussions held with the Minister in 2012. IFED met with Mr Andrew Freeman and Ms Sue Ryan along with other departmental officers on 10 April and 6 May 2013 with discussions predominantly focussed on water availability matters.
4. IFED's Etheridge Tropical Bio-Processing Project aims to integrate farming and processing to deliver products across the region including sugarcane, guar bean, raw sugar, ethanol, guar gum, stock feed, electricity and meat. IFED estimates construction costs of s49 - Business Affairs to be privately funded) with over 1100 job opportunities proposed to be generated.
5. There have been iterations of the proposal, with the most recent change leading up to the 6 May 2013 meeting with the department. This change included a significant up-scaling of the project.
6. **Attachment 1** provides a schematic of the current proposed development, which includes:
   - two water storages with a total capacity of 3 800 000 megalitres (ML) (more than twice the storage capacity of Burdekin Falls Dam; and 7.5 times the capacity at Cubbie Station);
   - an irrigation area totalling 100 000 hectares (ha) adjacent to the Gilbert River; and
   - an average annual take of 1 150 000 ML per annum (ML/a) based on three water sources in the Einasleigh River subcatchment of the Gilbert River Catchment – the Einasleigh River (650 000 ML/a), the Etheridge River (400 000 ML/a) and various tributary flows and overland flows (100 000 ML/a).

Water Availability Matters

7. The water resources in the Gilbert River Catchment, including the Einasleigh River are allocated and managed under the Water Resource (Gulf) Plan 2007 (Gulf WRP). The Gulf WRP sets aside 15 000 ML of unallocated water held in general reserve for the Gilbert River Catchment, which is currently the subject of a competitive tender process.

8. A project of the scale of IFED's proposal is not provided for under the current Gulf WRP and Gulf Resource Operations Plan (Gulf ROP). Amendments to both the Gulf WRP and Gulf ROP, particularly in terms of unallocated water volumes, would be required to provide for such a project.
9. The Minister has committed to consider a review of the Gulf WRP prior to its expiration in 2018 if there is a strong uptake of the unallocated water tender process and if CSIRO's North Queensland Irrigated Agriculture Strategy (NQIAS) research, due in December 2013, shows that more water can be sustainably allocated.
10. Based on the Gulf WRP model flows, the IFED proposal to take 1 150 000 ML from the Einasleigh River subcatchment would equate to nearly 50 per cent of flows at Minnies Dip, which is the most downstream flow gauging station on the Einasleigh River.
11. There are significant challenges with making this proportion of the average annual flow available in the context of protecting the rights of existing water users (including any new water licences granted through the unallocated water release process), providing future development opportunities for other parties and meeting environmental water needs.
12. Other development aspirations that would need to be considered at the catchment scale include:
    - large scale irrigation at Strathmore Station (Harris family) on the Einasleigh River at Minnies Dip;
    - large scale irrigation at Miranda Downs Station (Stanbroke Company) at the junction of the Gilbert River and the Einasleigh River just downstream of Minnies Dip;
    - Etheridge Shire Council is preparing a proposal for a new dam on a tributary of the Etheridge River for town water supply needs just upstream of the IFED proposed take of water from the Etheridge River (**CTS 04007/13**); and
    - Local governments, Gulf Savannah Development and irrigation proponents have previously held aspirations for the construction of Green Hills Dam on the Gilbert River.
13. With potentially competing demands for water, it would be prudent for government to convey the message that the appropriate mechanism for addressing emerging water needs beyond that already provided for under the Gulf WRP is through a review of the Gulf WRP underpinned by community consultation and transparent science, including the outcomes of the NQIAS research.
14. IFED's proposal is based on gauged information over an 18-year period (1971 to 1988), which was a significantly wet period for the catchment. This is consistent with the Gulf WRP hydrologic model, which is calibrated against these same recorded flows. However, the Gulf WRP model spans the period from 1890 to 2003 taking into account a much wider variability in climatic conditions. This model shows the longer-term average annual flow at Minnies Dip to be 2 346 000 ML, which is more reflective of the long-term prevailing catchment conditions.
15. **Attachment 2** shows the location of various features mentioned in the above points.

Land Tenure

16. IFED have indicated they wish to have freehold tenure on their proposal. To do this requires the following processes/actions:
    - Existing legislation requires rural leasehold land such as term leases for pastoral purposes to be converted to perpetual leases prior to freehold tenure. Any offer for a new lease will be subject to conditions, including requirement for a land management agreement and may include providing a plan of survey and addressing native title.
    - The lessee is responsible for addressing native title, most likely through negotiation of an Indigenous Land Use Agreement (ILUA) with registered native title parties or traditional owners, or through a successful non-claimant application. Addressing native title through negotiation of an ILUA can take more than two years depending on the availability and willingness of participants.
    - A lessee can apply for conversion to a perpetual lease after 80 percent of the term of the lease has expired, unless special circumstances exist. An application for conversion to freehold tenure can be made once the perpetual lease has issued. Any offer for freehold tenure will also be subject to requirements including payment of a purchase price.
    - The State Valuation Service determines the purchase price based on the unimproved value of the land as if it was freehold land at the date of application. The price will include the market value of any commercial timber on the land that is the property of the State.
    - Decision making on land tenure applications considers all public interest and planning requirements, and the attributes and condition of the land. All tenures are subject to statutory requirements, including duty of care to maintain the land in good condition, protection of cultural heritage, management of weeds, maintenance of vegetation without clearing (except where a tree-clearing permit has been issued), and payment of rents and or rates.

17. There are alternative options such as subleasing or conversion of existing leases, whereby the lessees apply to purchase unallocated state land for the areas of the leases that are required for the irrigation development. The State could sell the land as freehold to the lessees in priority to other persons or entities. Any offer to sell the land would be subject to conditions including surrender of part of the lease, addressing native title, and payment of a purchase price.

Vegetation Management

18. Implementation of the proposal would likely require the clearing of significant areas of remnant vegetation, which is currently prohibited under the *Vegetation Management Act 1999* (refer to **Attachment 3**).
19. In March 2013, the Vegetation Management Framework Amendment Bill 2013 (the Bill) was introduced to parliament. The Bill proposes the introduction of additional clearing purposes including 'irrigated high value agriculture clearing', which may provide an avenue to facilitate vegetation clearing associated with this proposal.
20. Irrigated high value agriculture clearing means clearing carried out to grow horticultural or broadacre crops and pasture using water that will be supplied by artificial means.
21. Applicants will be required to provide evidence of land suitability, a business plan showing the economic viability of the development and evidence of authorised access to water resources.
22. Additionally initial soil surveys throughout the Gulf catchments indicate that soil suitability for irrigated agriculture is generally confined to alluvial areas.
23. It is also proposed that applications for irrigated high value agriculture clearing will still be assessed against the requirements of Regional Vegetation Management Code.
24. The code will likely regulate clearing in and around watercourses and wetlands, areas with habitat and connectivity values, and in areas subject to land degradation risks such as salinity. As such it is uncertain whether the size and configuration of areas that could be approved for clearing would meet the requirements of the IFED proposal.

Attachments

25. Attachment 1: IFED's Etheridge Tropical Bio-Processing Project Proposal
    Attachment 2: Gilbert River Catchment – Key Features
    Attachment 3: Vegetation map

Clearance

26. Does this have a budget or financial impact? **NO**
    Does this have an impact for Service Delivery or any other area in DNRM? **YES** The water matters outlined in the brief have been cleared by Water Policy, Policy and Program Support.

Next steps

27. The department will continue to liaise with IFED to build their understanding of long term water availability issues in the Einasleigh River, including through continuing to encourage IFED to seek access to the Gulf WRP hydrologic model to inform the design of their proposal, taking into account the highly variable climatic conditions of the Gilbert River Catchment.
28. A separate brief is in development outlining possible timeframes for a WRP review.

Sue Ryan

Action Officer: Andrew Buckley
Telephone: 4222 5561

Minister for Natural Resources and Mines

Comments:

To: Sue Ryan
Deputy Director-General
Service Delivery

From: Lyall Hinrichsen
Executive Director, Water Policy

Approved / Not Approved / Noted
Further information required
s.49 - Signature
Director-General
Dated 5/8/13

5 August 2013

CC: DDG PPS

Etheridge Tropical Bio-processing Project –Terms of Reference for Water Resource Assessment

Recommendation

1. It is recommended that the Deputy Director-General:
   - **approve** the Water Resource Assessment for the Etheridge Tropical Bio-Processing Project Terms of Reference (ToR) (attachment 1); and
   - **sign** the letter to Mr Stewart Peters, General Manager of Integrated Food and Energy Development Pty Ltd (IFED) to provide the proponent with a copy of the Terms of Reference (ToR) to allow the assessment to commence.

Timing

2. It is recommended that this brief be considered by close of business 5 August 2013 to ensure IFED are provided with a copy of the ToR in advance of its planned meeting with the Premier on 6 August 2013.

Background

3. The IFED project includes the proposed extraction of large volumes of water (approximately 1.1 million megalitres per annum) and the development of significant water resource infrastructure (approximately 4.6 million megalitres in storage), including instream weirs, dams, channels and irrigation works within the Einasleigh River Subcatchment of the Gilbert River Catchment within the *Water Resource (Gulf) Plan 2007* (Gulf WRP) area.
4. A development of this scale and significance within the catchment landscape warrants assessment of the long-term water resource sustainability of the project. To date, the proponent has not assessed matters relating to water availability and sustainability to support the project. This is critical information for the Queensland Government in understanding the nature of the proposal and its consistency with the policies of the Gulf WRP and ROP.
5. On 11 July 2013, IFED sent an email to the Deputy Director-General, Service Delivery identifying that a commitment from the Queensland Government about access to water for the project was one of its high priorities.
6. On 24 July 2013, the Deputy Director-General, Service Delivery advised Mr Peters that the Department of Natural Resources and Mines (DNRM) was preparing a ToR for an assessment that would provide enough information for DNRM to understand the sustainability of the project and its consistency with the Gulf WRP and ROP framework (**CTS 16945/13**).
7. The ToR has been developed in consultation with DNRM North Region Service Delivery, the Department of Energy and Water Supply, the Department of Agriculture, Fisheries and Forestry, and the Department of State Development, Infrastructure and Planning (DSDIP). These agencies support the ToR.
8. IFED advised DSDIP on 31 July 2013 that it has arranged a meeting with the Premier on 6 August 2013 and is contemplating discussing an in principle commitment of access to water at that meeting. The Department of the Premier and Cabinet (DPC) is aware of the development of this ToR and will be provided a copy once approved under this brief.

Overview of the ToR

9. The matters within the scope of these ToR relate only to matters of interest under the *Water Act 2000* (the Water Act) and within the policy context of the Gulf WRP and ROP. This is intended to keep the focus of this assessment on the matter of water availability.

10. A more detailed assessment of matters beyond those that concern the Water Act can be addressed in the future through an environmental impact assessment under the *State Development and Public Works Organisation Act 1971* in the event the Coordinator-General declares the project to be a coordinated project requiring such an assessment.
11. The assessment detailed in the ToR involves two phases. The first phase focuses on identifying whether there is potential within the natural hydrologic and climatic variability of the catchment to support a proposal of this scale, and an identification of the changes to water access for existing water users and changes in catchment hydrology based on hydrologic analysis. The second phase provides for a more detailed assessment of any water-related effects of the proposal, including any inconsistencies with the Gulf WRP and ROP, and an evaluation of mitigating strategies to address those effects and inconsistencies.

Attachments

12. **Attachment 1:** ToR.
13. **Attachment 2:** Letter to Mr Peters.

Clearance

14. Does this have a budget or financial impact? **NO**
15. Does this have an impact for Service Delivery or any other area in DNRM? **YES** Executive Director, Andrew Buckley, North Region Service Delivery has been consulted and supports.

Next Steps

16. Water Policy will be the primary DNRM contact to address IFED's enquiries throughout the assessment process, including liaising with other State Government agencies.

Lyall Hinrichsen

Action Officer: Steph Hogan, Team Leader, Water Planning North and Central Queensland
Telephone: 3406 2185

Deputy Director-General – Service Delivery

Comments:

Queensland Government

Department of
Natural Resources and Mines

Our Ref CTS 18356/13

5 August 2013

Mr Stewart Peters
General Manager – Integrated Food and Energy Development Pty Ltd
stewart.peters@i-fed.com.au

Dear Mr Peters

I refer to my letter of 24 July 2013 regarding the terms of reference (ToR) for the assessment that you will need to initiate to establish the sustainable level of water extraction associated with your proposed Etheridge Tropical Bio-processing Project in the Gilbert River Catchment.

I have enclosed a copy of the ToR focussed on matters of interest under the *Water Act 2000* and within the policy context of the Water Resource (Gulf) Plan 2007 and Gulf Resource Operations Plan 2010.

As previously advised, the Department of Natural Resources and Mines (DNRM) is not in a position to give certainty to IFED regarding access to water based on the information IFED has provided to date. The TOR is about establishing the availability of water and the long-term sustainability of the proposed level of water extraction from the Etheridge River system. This recognises that access to reliable supplies of sufficient volumes is a critical issue that needs to be resolved before the project can advance to a more detailed assessment of broader environmental considerations as well as land access and use issues.

I encourage you to arrange a time with Mr Lyall Hinrichsen, Executive Director Water Policy of DNRM to discuss the ToR and establish a way forward for our future discussions about water availability supported by this assessment-based approach.

Should you have any enquiries, please contact Mr Hinrichsen on telephone 3247 4582.

Yours sincerely

s.49 - Signature

Sue Ryan
DEPUTY DIRECTOR-GENERAL
SERVICE DELIVERY

Enc

Deputy Director-General
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Water Resource Assessment for the Etheridge Tropical Bio-processing Project

Terms of Reference

Contents

Synopsis

Overview

The Integrated Food and Energy Developments Pty Ltd is the proponent (the proponent) for the development of the Etheridge Tropical Bio-processing Project (the proponent). The project includes the proposed extraction of large volumes of water and the development of significant water resource infrastructure, such as instream weirs, dams, channels and irrigation works within the Einasleigh River Subcatchment of the Gilbert River Catchment within the *Water Resource (Gulf) Plan 2007* (Gulf WRP) area (refer map - Attachment 1).

The water resources in the Gilbert River Catchment, including the Einasleigh River are allocated and managed under the Gulf WRP, which is implemented through the Gulf Resource Operations Plan 2010 (Gulf ROP). A project of the scale proposed by the proponent is not provided for under the current Gulf WRP and ROP.

The proponent has been liaising with the Department of State Development, Infrastructure and Planning (DSDIP) and the Department of Natural Resources and Mines (DNRM) about the project and has identified to Government that one of its high priorities is to secure a commitment from Government of access to water.

DNRM is not in a position to give certainty to the proponent regarding access to water in the absence of information from the proponent about the potential impacts of the proposal on the water resources of the Gilbert River Catchment.

A water resource assessment (the assessment) that complies with these terms of reference (ToR) will assist the Queensland Government in understanding the water resource related elements of the project and the project's consistency with the Gulf WRP and ROP framework, noting that unallocated water has not been set aside in the Gulf WRP and ROP to support the proposal. The matters within the scope of these ToR relate only to matters of interest under the *Water Act 2000* (the Water Act) and within the policy context of the Gulf WRP and ROP.

These ToR have been prepared to facilitate the proponent with undertaking the assessment and preparing the associated report, and taking into consideration the possibility that this project may require an environmental impact assessment.

Relevance of the Assessment to the Proposal

To date, the proposal has not been declared by the Coordinator-General to be a "coordinated project" under section 26(1)(a) of the Queensland *State Development and Public Works Organisation Act 1971* (SDPWO Act).This means that a decision has not yet been made about requiring the proponent to undertake an environmental impact assessment under the SDPWO Act, including the preparation of an environmental impact statement.

DNRM understands that undertaking an environmental impact assessment requires a commitment and investment from the proponent. Therefore, while these ToR have been prepared to be consistent with the environmental impact assessment procedure, it has been restricted to only those matters of interest under the Water Act that relate to water availability. The work undertaken through the assessment can be used in a future environmental impact assessment for this proposal in the event one is required, noting that more in-depth and targeted assessments on environmental aspects and requirements for community consultation may be required under a environmental impact assessment.

The proposal involves development that would require approvals under the Water Act, *Water Regulation 2002* (the Water Regulation), and the Gulf WRP and ROP, including to authorise the taking of water and the interference with the flow of water (e.g. instream structures such as dams and weirs). This assessment will assist in identifying the authorisations that would be required to support the proposal. Decisions about water authorisations rest with the chief executive administering the Water Act within DNRM.

The assessment involves two phases. The first phase focuses on identifying whether there is potential within the natural hydrologic and climatic variability of the catchment to support a proposal of this scale, and an identification of the changes to water access for existing water users and changes in catchment hydrology based on hydrologic analysis. The second phase provides for a more detailed assessment of any affects of the proposal, including any inconsistencies with the Gulf WRP and ROP, and an evaluation of mitigating strategies to address those affects and inconsistencies.

Key steps in this assessment process include:

- establish the ToR in consultation with the proponent and key state government agencies;
- proponent to submit to DNRM for review a draft report outlining the outcomes of the assessment for phase one;
- proponent to submit to DNRM for review a draft report that incorporates the outcomes of the assessment for phases one and two, including an address of any issues identified in the review of the draft report for phase one;
- proponent to submit a final report, including an address of any issues identified in the review of the consolidated draft report; and
- DNRM to respond to the outcomes of the assessment with a written position to the proponent on water availability matters, including the basis for that position.

Other State Government agencies will have an interest in reviewing the report, including:

- DSDIP;
- Department of Energy and Water Supply;
- Department of Agriculture, Fisheries and Forestry;
- Department of Environment and Heritage Protection;
- Department of Science, Information Technology, Innovation and the Arts,
- Department of the Premier and Cabinet; and
- Projects Queensland.

These ToR provide information in two broad categories:

- Part A – Information and advice on the preparation of the report;
- Part B –
    - (i) Specific requirements for the content of the report for phase one; and
    - (ii) Specific requirements for the content of the report for phase two.

Inquiries

For all inquiries regarding this terms of reference, please contact:

Steph Hogan, Team Leader, Water Planning North and Central Queensland, Water Policy
Department of Natural Resources and Mines
Telephone: 07 3406 2185
Email: stephenie.hogan@dnrm.qld.gov.au

Part A: Information and Advice for the Assessment

The Need for Assessment

Private investment in irrigated agricultural development is consistent with the Queensland Government's commitment to support a four pillar economy and to double agricultural production by 2040 supported by Queensland's Agricultural Strategy[1]. Private-sector projects, such as the Etheridge Tropical Bio-processing Project, are compatible with this agenda.

The TOR is about establishing the availability of water and the long-term sustainability of the proposed level of water extraction from the Etheridge River system. This recognises that access to reliable supplies of sufficient volumes is a critical issue that needs to be resolved before the project can advance to a more detailed assessment of other broader environmental considerations and a range of land access and use issues.

Having enough information to understand the sustainability of the project and its water-related implications for existing water rights (including downstream stock water uses and beneficial flooding), environmental values, aspirations of other developers and the commercial fisheries of the Gulf of Carpentaria is essential in giving certainty to access to water.

A development of this scale and significance within the catchment landscape warrants assessment of the long-term water resource sustainability of the project. To date, the proponent has not assessed matters relating to water availability and sustainability to support the project. This is critical information for the Queensland Government in understanding the nature of the proposal and its consistency with the policies of the Gulf WRP and ROP.

Purpose of the Terms of Reference

These ToR are for a water resource assessment and associated report (the report) for the Etheridge Tropical Bio-processing Project proposal. The objective of these ToR is to identify those matters that should be addressed in the assessment and the report.

The matters sought to be addressed under these ToR are consistent with the outcomes and purposes of the Gulf WRP and ROP to help establish the proposal's constancy with the water allocation and management framework under these plans.

These ToR also provide the framework for the assessment, including information on the purpose and role of the assessment and the factors considered significant for the proposal. It indicates the types of studies and the data that must be provided in the assessment report.

All potential water resource related impacts of the proposed development are to be investigated, and requirements for the mitigation of any adverse impacts are to be detailed in the report. The nature and level of investigations must be relative to the severity of potential consequences of possible events and the likelihood of those events occurring.

Confidential information should be marked as such and be included as a separate attachment to the main report.

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[1] A copy of *Queensland's Agricultural Strategy – A 2040 Vision to Double Agricultural Production* is available on the Department of Agriculture, Fisheries and Forestry website at www.daff.qld.gov.au

The report must address at least the requirements as set out in these ToR. DNRM, in consultation with the proponent and DSDIP, may require supplementary information to be provided by the proponent to address issues that emerge in undertaking the assessment.

Assessment and Reporting Guidelines

General Requirements

The objective of the assessment and report is to identify the water resource sustainability of the project and any potential water-related impacts associated with the proposal, in particular to establish the consistency of the proposal with the Gulf WRP and ROP. Potential impacts, including relating to areas of inconsistency with the water planning framework, must be examined fully and addressed, including identifying mitigating strategies. When considering the significance of the risk of an impact, the proponent must take account of both the intensity of the impact and the context in which it would occur.

Once finalised, the assessment report will be a publicly available document. Its purpose is not only to provide information to DNRM, as the regulatory agency for the allocation and management of water resource, but also to inform the public of the scope, impacts and mitigation strategies of the proposal prior to DNRM advising its position on water availability.

As such, the main text must be written in plain English avoiding jargon as much as possible. Additional technical detail may be provided in appendices. The main text must not assume that a reader will have a prior knowledge of the proposal site. It must not be necessary for the reader to have visited the site to understand the issues involved in the proposal.

In brief, the objectives of the report must be to provide public information on the need for and likely effects of the proposal, to set out acceptable standards and levels of water-related impacts (both beneficial and adverse), and demonstrate how these impacts can be managed through mitigating strategies. Discussion of options and alternatives and their likely relative impact outcomes are a key aspect of the assessment.

Requirements for hydrologic analysis

DNRM requires that the proponent use the Queensland Government's hydrologic model in assessing and reporting on the water-related impacts of the proposal in order to better reflect the long-term catchment conditions and associated water availability.

All water extraction/diversion points, dams/weirs/ storages (instream and offstream), and irrigation demands proposed under this project are to be represented in the model under full operation and this representation must be described in the assessment report. A comparison of pre-development and post-development must be described, including through the provision of model statistics and an analysis of those statistics. The statistics must also be provided to DNRM in an electronic format suitable to allow analysis (e.g. Microsoft® excel).

Statistics provided by the proponent using this model must at least provide the following statistics for the full model simulation period and an analysis of those statistics under phase one of the assessment. If the assessments under phase two lead to changes in the statistics, for example any reduction in flow related affects resulting from testing and evaluating the effectiveness of mitigating strategies, those changes must be explained in the report.

The diversion statistics provided in the report must include:

- mean, 30th percentile, 50th percentile, 70th percentile and maximum annual diversions for each diversion/extraction point of the proposal to show the potential water access for the proposal;
- mean, 30th percentile, 50th percentile, 70th percentile and maximum annual diversions for each existing water licence downstream of the proposed extraction points through to the end of system to show any changes in potential water access for existing users as a results of the proposal; and
- if there are potential changes to town water supply diversions, further information relating to the changes in security of town water supplies (e.g. occurrence of supply failures, critical water supply shortage periods etc).

The streamflow statistics provided in the report must include:

- mean and median annual flows to provide a broad indication of changes in annual flows;
- daily flow duration curve and dataset to provide an indication of potential flow regime changes; and
- number of 30, 90, 180 and 270 day zero flow spells[2] to provide an indication of potential changes in the number and extent of dry spells.

These streamflow statistics must be provided for the following locations:

- immediately downstream of each of the proposal's extraction/diversion and instream interference points;
- immediately upstream of the Etheridge River confluence with the Einasleigh River;
- immediately downstream of the Etheridge River confluence with the Einasleigh River;
- at the node representing the Minnies Dip gauging station location on the Einasleigh River;
- immediately upstream of the Einasleigh River confluence with the Gilbert River;
- at the node representing the Miranda Downs gauging station location on the Gilbert River; and
- the Gilbert River at the end of system.

All specifications about the proposal, as well as assumptions and methodologies used in the hydrologic analysis of the proposal, including a rationale for the assumptions and methodologies, must be documented in an appendix to the report. The report should be sufficiently detailed to enable data, assumptions and methodologies to be verified.

Assessment Aim, Objectives and Key Issues

Aim

The assessment aims to assist in developing an understanding of the sustainability of the project and its water-related impacts on and implications for existing water rights (including downstream stock water uses and beneficial flooding), environmental values and the commercial fisheries of the Gulf of Carpentaria.

[2] Calculation of no-flow periods should be consistent with those applied by the Department of Science, Information Technology, Innovation and the Arts.

Objectives

The specific objectives of the assessment are as follows:

- to provide information on the proposal to the Queensland Government to assist DNRM in forming a position on the proposal about water availability over the life of the project;
- to identify and comprehensively evaluate water-related issues associated with the proposal of relevance to the Water Act;
- to determine water and supply reliability requirements for the project;
- to identify all necessary licences and authorisations required under the Water Act to support the proposal;
- to identify all potential impacts of the proposal, and recommend mitigating strategies to minimise adverse impacts.

Key Issues

The issues to be addressed in the draft report as part of the phase one assessment are:

- For matters relating to the proposal in general:
  - a description of the development proposal, including the specific (water resource requirements (including irrigation water demands for the proposed crop/s) and development components (e.g. water diversion, storage, distribution and irrigation infrastructure) of the proposal;
  - the objectives of the development; and
  - the means of achieving the development objectives;
- For matters relating to general water storage, supply and demand:
  - the basis for the volume of water proposed to be diverted from watercourses and overland flows within the Gilbert River Catchment;
  - the water efficiency strategies that are proposed to be adopted to minimise the volume of water being sought for allocation to support the project including strategies to reduce irrigation application rates, as well as storage and channel seepage and evaporation losses;
  - the potential to support the volume of water proposed to be diverted within the longterm natural hydrologic and climatic variability of the Einasleigh River Subcatchment and the broader Gilbert River Catchment;
  - the potential to support the volume of water proposed to be allocated within the context of current and project water demands (e.g. population growth and aspirations of other proponents) in the area; and
  - any impacts on existing infrastructure and populated areas (e.g. inundation of roads, river crossings, local government assets etc) and proposals to minimise these physical impacts (e.g. alterations to storage location or design, and how that affects storage capacity and diversion volumes);

The issues to be incorporated into the draft report as part of the phase two assessment are:

- For matters relating to the consistency of the proposal with the Gulf WRP and ROP, including the outcomes of the Gulf WRP (sections 13 to 16 inclusive of the Gulf WRP), any adverse effects of the proposed water diversion and instream interference on:
  - water access under existing water rights;
  - other development proposals and aspirations within the catchment community, including the aspirations of downstream landholders and future town water supplies for Etheridge Shire Council;
  - catchment hydrology, including:
    - the natural seasonality and variability of streamflows;
    - the instream connectivity of river reaches;

        - the natural permanence of water in instream features such as waterholes and river bed sands;
        - the magnitude and frequency of floodplain and wetland inundation; and
        - the magnitude and frequency of floodflows at the Gilbert River mouth, including those flows that stimulate breeding, growth and migration of native aquatic animals, including those of importance to commercial fisheries in the Gulf of Carpentaria, such as prawns, crabs and fish;
    - flow-related cultural values, including cultural values of local Aboriginal or Torres Strait Islander communities; and
    - the potential for groundwater levels to rise due to water storage and irrigation;
- For addressing any adverse water-related impacts and areas of inconsistency with the Gulf WRP and ROP:
    - propose mitigating strategies to minimise these impacts and inconsistencies, including through the design, location and operation of infrastructure, and the timing, location, conditions and volumes of water proposed to be taken;
    - the effectiveness of mitigating strategies in minimising adverse impacts and inconsistencies with the Gulf WRP and ROP; and
    - proposed monitoring and reporting arrangements for surface water and groundwater to detect any emerging water-related issues associated with the construction and operation of the proposal.

The report will be required to consider in detail relevant issues under each of these categories and all other impacts on the water resources. The information required is described further in part B of these ToR.

Reference Documents and Information

DNRM has a range of documents and information available online that may be of assistance to the proponent in undertaking this assessment. DNRM is prepared to make reports and data available to the proponent, and provide clarification on these ToR as required, to support this assessment.

Copies of the Gulf WRP and ROP can be downloaded from the DNRM website as below:

http://www.nrm.qld.gov.au/wrp/gulf.html

Supporting documents for these plans are available to be downloaded from the DNRM library catalogue at:

http://qldgov.softlinkhosting.com.au/liberty/libraryHome.do

Part B (i): Contents of the Report for Phase One

The report must include the following components for phase one of the assessment.

1 Introduction

The introduction should clearly explain the background and purpose of the assessment and report, to whom it is directed and contain an overview of the structure of the document.

The purpose of the report is to:

- provide information on the need for the project, alternatives to it and options for its implementation;
- discuss the potential water-related impacts of the project and areas of consistency or inconsistency with the Gulf WRP and ROP; and
- demonstrate how these impacts and inconsistencies can be avoided or mitigated.

1.1 Project Proponent

This section should name the project proponent and describe their experience including the nature and extent of business activities, experience, qualifications and environmental record.

1.2 Proposal Description

A brief description of the key elements of the project should be provided and illustrated. Any major associated infrastructure requirements should also be summarised. Detailed descriptions of the project should follow in Section 2 (Description of the project).

1.3 Proposal Objectives, Scope and Rationale

A statement of the objectives which have led to the development of the proposal and a brief outline of the events leading up to the proposal's formulation, including alternatives, envisaged time scale for implementation and the envisaged life of the project.

Describe the current status of the proposal, including actions taken to develop the proposal.

This section should also describe how the project relates to any other actions or proposals (if it does), of which the proponent should reasonably be aware (e.g. development aspirations and proposals of other landholders and local governments).

The status of the proposal must be discussed in a regional, state and national context. The consequences of not proceeding with the proposal must also be discussed.

1.4 Alternatives to the project

This section should describe feasible development scenarios and alternatives to the project, including the option of taking no action (i.e. of not building the storages and diversions). 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 and social aspects, as well as the water resource availability aspects appropriate to the Water Act, Gulf WRP and Gulf ROP.

The process and criteria used for the selection of the specific water storage and infrastructure sites and design must be described. Demand reduction techniques and water use efficiency measures should be discussed along with alternative supply sources.

1.5 The Assessment Process

This section should provide a statement of the objectives of the assessment process, a description of the assessment process steps and timing of key water resource decisions points of relevance to the stages of the proposal. This section may also indicate the role of public consultation in the assessment (if any was undertaken) noting the opportunities for consultation under an environmental impact assessment.

1.6 Legislative Requirements for the Allocation and Management of Water Resources

This section must identify and explain the legislation and policies regulating the allocation and management of water resources in the Gilbert River Catchment, including any approvals and authorisations required under the Water Act, Water Regulation, Gulf WRP and ROP that are relevant to the proposal.

A copy of the Gulf WRP and ROP can be downloaded from the DNRM website as below:

http://www.nrm.qld.gov.au/wrp/gulf.html

A copy of the Water Act and Water Regulation can be downloaded from the Queensland Government's legislation site at:

http://www.legislation.qld.gov.au/Acts_SLs/Acts_SL_W.htm

2 Description of the Proposal

The objective of this section is to describe the proposal through its lifetime. This information is required to allow assessment of all aspects of the proposal, including all phases of the proposal from planning, construction, ramping up of the operation to full capacity (if relevant).

It also allows further assessment of the Water Act approvals that may be required and how they may be managed through the life of the proposal.

2.1 Overview of Proposal

Provide an overview of the proposal to put the proposal into context.

This section should include:

- a description of the key components of the project, including:
  - nature and purpose of development;
  - purpose of water use, including crop types;
  - sources of water supply;
  - water storage infrastructure (e.g. dams and weirs both onstream and offstream) ;
  - water distribution infrastructure (e.g. pipes, pumps, channels etc.) ;
  - irrigation areas; and
  - annual water and supply reliability requirements;
- a summary of the overall duration and timing of the project, including any staging of components of the project and projected expansions; and

Where possible, these components should be support by diagram/s and map/s showing their key features and connections between components to demonstrate how they would operate together as a water supply system.

2.2 Location

The regional and local context of the project and associated infrastructure should be described and illustrated on maps at suitable scales and reference points. These features should be overlayed on a rectified aerial photo enlargement. Real property descriptions of the project should be provided.

Maps should show the precise location of the project area and in particular:

- the location and boundaries of land tenures, in place or proposed, to which the project area is, or will be subject;
- the location and boundaries of the project footprint showing all key aspects of the water storage, water distribution infrastructure and other infrastructure, including full supply levels, dam walls, intake points, pipeline and channel routes (if applicable) and points where water is intended to be diverted/extracted;
- the location of proposed irrigated lands; and
- the location of any inundated areas, including their position relative to other infrastructure (e.g. roads and river crossings) and populated areas.

The process and criteria used for the selection of the specific project and infrastructure sites, including relocated infrastructure should be described. If there are impacts on other infrastructure and populated areas, the assessment must include considerations to avoid or minimise these impacts (e.g. changing the location, size of the inundation) and identify how these changes would affect the water-related elements of the proposal (e.g. reduced water diversion, reduced irrigation area).

2.3 Water Demand

This section of the report quantifies the total water requirements, including irrigation water demands at the point of on-farm applications. The water resource requirements of the proposal must be critically determined including the amount that can be obtained through:

- precipitation at the storage/s;
- local catchment runoff/inflows to storages;
- watercourse diversion/extraction;
- capturing overland flow water; and
- groundwater extraction.

The annual volume of all water sources at each extraction location must be identified and described, including for the all relevant proposal scenarios. Estimated rates of supply from each source (average and maximum rates) must also be provided. Factors such as potential on-farm efficiencies, water conservation and re-use strategies must be evaluated.

As irrigation water requirement will differ for different crops, the crop types and the associated water demands sought by the proposal and the proposed irrigation methods will need to be discussed briefly.

Details on aspects of the proposed water demand, including but not limited to the following:

- annual irrigation water volumes required to meet supply needs;
- water reliability/security requirements;
- proposed water-use efficiency initiatives to minimise the volumes of water required (e.g. demand management, irrigation efficiency, re-use strategies, evaporation reduction) ;
- timing of irrigation water requirements;

- any other factors which may have a bearing on irrigation water demands, such as other catchment water demands (where appropriate); and
- the expected location for the demand of agricultural water and the proportion of demand upstream at the different locations (if applicable).

In summary, this section should clearly outline:

- the basis for the volume of water proposed to be diverted from watercourses and overland flows within the Gilbert River Catchment; and
- the water efficiency strategies proposed to be adopted to minimise the volume of water being sought for allocation to support the project including strategies to reduce irrigation application rates, as well as storage and channel seepage and evaporation losses;

2.4 Water storage infrastructure

The process and criteria used for the selection of the preferred design and preferred

- full supply level/s for all instream and offstream storages associated with the proposal;
- details of any staging or prospects for future expansion of these storage/s;
- storage capacity, maximum depth, average depth, area of inundation at FSL, dead storage level;
- length of river bed (and tributaries) inundated;
- estimated water yields (with appropriate allowances for environmental requirements) ;
- general design of outlet works including capacity, off-take level and ability to regulate flows (e.g. capacity to allow water to be released or pass through the infrastructure;
- the design and effectiveness of any proposed fishway or other fish transfer mechanisms, drawing on examples used on other dams or similar proposals;
- measures to minimise water storage evaporation and seepage losses; and
- the physical form of the streambed within 200m of the downstream foot of the barriers.

2.5 Pipelines, Channels, and Associated Infrastructure

Provide details on the following aspects of any pipelines, channels and associated infrastructure (e.g. pump stations) components of the proposal, including any infrastructure associated with delivery of water for irrigation purposes:

- a map of the preferred route using cadastral and topographical maps at a suitable scale;
- design parameters covering length, width/diameter, water supply capacity;
- the expected use of existing water storage and distribution infrastructure;
- the method of extracting and/or releasing water from storage/s, including the maximum rate at which water would be extracted or released;
- the method of extracting water from watercourses including the maximum rate at which water would be extracted;
- the method of extracting overland flow water, including the maximum rate at which water would be extracted and any control features that would allow water to pass through these extractions; and
- measures to minimise water distribution losses.

2.6 Operation

This section should describe:

- the proposed system of extraction, storage and distribution of water, including details of the likely extraction regime (e.g. when water will be sourced) and likely release timings by

each extraction mechanism (downstream release, pipeline, channel, levee, storage or pump, operation of multi-celled storages if applicable) based on water demands;
- the location, design and ownership of any water distribution infrastructure (pump stations, pipelines etc); and
- the capacity of any existing water infrastructure to accept additional loading resulting from any new or increased allocations of water.

3 Climate and Catchment Hydrology

The objective of this section is to describe the climatic and hydrologic conditions of the project area to provide a perspective on the capacity to support the proposed water demands of the project within the natural catchment hydrology of the Gilbert River Catchment.

This section must describe the rainfall patterns (including magnitude and seasonal variability of rainfall) and evaporation rates that may affect water availability for and the water demands of the proposal. An assessment of historic rainfall patterns including geographic distribution within the project area must also be provided.

This section must also describe the existing hydrologic regime of the Einasleigh River, its tributary streams, and the part of the Gilbert River downstream of its confluence with the Einasleigh River.

This section must include a map that shows the waterways or water features, including drainage channels, wetlands, floodplains relative tothe position of the proposed water infrastructure, extraction/diversion points and irrigation area.

This section must include:
- a description of existing surface drainage patterns;
- a description of the flow characteristics of major streams based on pre-development (without the proposal) flow statistics from the hydrologic model using indicators relevant to the WRP and others as appropriate to this project (refer to hydrologic requirements in chapter 1 of this ToR);
- a discussion of the changes in the flow statistics for those indicators from the pre-development scenario to the scenario representing the proposal in full operation;
- a description of the current water entitlements of relevance to the proposal (i.e. those near or downstream of the proposal through to the end of system and their modelled diversions (refer to hydrologic requirements in chapter 1 of this ToR);
- a discussion of changes to these modelled diversions under the scenario representing the proposal in full operation; and
- based on the above, a discussion about the potential to support the volume of water proposed to be diverted under the project, including in full operation of the proposal, within the longterm natural hydrologic and climatic variability of the Einasleigh River Subcatchment and the broader Gilbert River Catchment.

While this section is required to be addressed under phase one of the assessment, if the assessments under phase two lead to changes in the hydrologic analysis, then this section must be updated to reflect and explain those changes.

Part B(ii): Contents of the Report for Phase Two

The report must incorporate the following components for phase two of the assessment to produce one consolidated assessment report. Changes made to the phase one reporting components after its submission to DNRM must be identifiable (e.g. in tracked changes).

Executive Summary

The function of the executive summary is to concisely convey the most important aspects of the proposal, and focus on key issues and conclusions. It should include:

- the title of the project;
- the proponent's name and contact details, a discussion of their previous projects (if applicable) and their commitment to effective water resource management;
- a concise statement of the aims, objectives and need for the project, including the consequence of not proceeding with the project;
- the legal framework for the allocation and management of water resources - particularly the authorisations required under the Water Act to support the proposal;
- a description of the project's water requirements and water infrastructure elements;
- a description of the existing levels of water development downstream of the proposal;
- an outline of the principal water-related impacts predicted;
- an outline of any project inconsistencies with the Gulf WRP and ROP; and
- an outline of the proposed mitigating strategies to minimise the significance of the water-related impacts and address any inconsistencies with the Gulf WRP and ROP.

4 Groundwater Resources

This section should describe the groundwater resources that may be affected by the project and the possible significance of the project to groundwater depletion or recharge. This section should also discuss the potential for groundwater levels to rise under the infiltration of surface waters through water storage seepage and the irrigation application.

This section should include reference to:

- the current use of groundwater within any potential area of impact;
- known nature of the aquifers at and near the sites, geology/stratigraphy, aquifer type, depth to and thickness of the aquifer, hydrology of the aquifers, depth to water level and seasonal changes in levels, groundwater flow directions;
- interaction with surface water and possible sources of recharge;
- basic water quality of the aquifer, vulnerability to irrigation salinity;
- groundwater resources proposed to be used by the project (if applicable), including a description of the quality, quantity, use rate and required location of those resources; and
- the characteristics of target aquifers (if applicable), including capacity to support the proposed volumes of demand and rates of extraction, recharge potential and current use.

5 Potential Impacts and Mitigation Measures

The functions of this section are to:

- describe the potential adverse and beneficial water-related impacts of the project;
- describe the project's consistency with the Gulf WRP and ROP for both the proposed taking of water and interference with the flow of water, noting that unallocated water has not been set aside in the Gulf WRP and ROP to support the proposal;

- describe measures taken to avoid, or where avoidance is not possible, measures to minimise and mitigate impacts, or to ensure consistency with the Gulf WRP and ROP;
- describe any cumulative impacts caused by the project, either in isolation or by combination with other known existing or planned projects; and
- examine and compare viable alternative strategies for managing impacts.

Matters to be addressed in this section must include the following:

- a discussion of the potential water-related impacts of the proposal, including if potential impacts on other infrastructure and populated areas have been identified,
- an evaluation of the proposal's consistency with the Gulf WRP and ROP, including outcomes and considerations for environmental management and instream interference;
- identification of any adverse effects of the proposed water diversion and instream interference on the following as substantiated through hydrologic analysis:
    - water access under existing water rights;
    - other development proposals that the proponent should be reasonably aware of, including for irrigation and future town water supplies for Etheridge Shire Council;
    - catchment hydrology, including:
        - the natural seasonality and variability of streamflows;
        - the instream connectivity of river reaches;
        - the natural permanence of water in instream features such as waterholes and river bed sands;
        - the magnitude and frequency of floodplain and wetland inundation; and
        - the magnitude and frequency of floodflows at the Gilbert River mouth, including those flows that stimulate breeding, growth and migration of native aquatic animals, including those of importance to commercial fisheries in the Gulf of Carpentaria, such as prawns, crabs and fish;
    - the potential for groundwater levels to rise due to water storage and irrigation; and
    - flow-related cultural values, including cultural values of local Aboriginal or Torres Strait Islander communities.

This section must also identify measures for addressing any adverse water-related impacts and areas of inconsistency with the Gulf WRP and ROP. In particularly, it should:

- propose mitigating strategies to minimise these impacts and inconsistencies, including through the design, location and operation of infrastructure, and the timing, location, conditions and volumes of water proposed to be taken;
- the effectiveness of mitigating strategies in minimising adverse impacts and inconsistencies with the Gulf WRP and ROP; and
- proposed monitoring and reporting arrangements for surface water and groundwater to detect any emerging water-related issues associated with the operation of the proposal.

6 Glossary and References

A glossary of technical terms, acronyms and abbreviations must be provided, along with all references presented in a recognised format.

7 Recommended Appendices

The following must be included in separate appendices to this report:

- the final ToR;
- the qualifications and experience of the study team, consultants and expert reviewers;
- all reports generated on specialist studies undertaken as part of the assessment; and
- a summary of the hydrologic analysis as described in Chapter 1 of this ToR.

Attachment 1- Map of the Gulf WRP Area