

Water Resources Review Panel

Re: Controller's Decision to Grant Groundwater Extraction Licence WDPCC10000

Review Applicant 1:	Centrefarm Aboriginal Horticulture Pty Ltd
Review Applicant 2:	Central Land Council (on behalf of Mpwerempwer Aboriginal Corporation, Warrabri Aboriginal Land Trust, Iliyarne Aboriginal Land Trust, native title holders for Singleton Station NTP653, traditional Aboriginal owners of Warrabri Aboriginal Land Trust and Iliyarne Aboriginal Land Trust and residents of the affected Aboriginal community of Alekerange)
Review Applicant 3:	Arid Lands Environment Centre
Review Applicant 4:	Environment Centre NT Incorporated
Licence Holder:	Fortune Agribusiness Funds Management Pty Ltd
Property:	Singleton Station NT Portion 653 12125 Stuart Highway, Davenport
Water Resource:	Central Plains Aquifers Western Davenport Central Plains
Licensed Volume:	40 000 ML/year
Beneficial use category:	Agriculture (39 800 ML/year) Industry (100 ML/year) Public water supply (100 ML/year)

Advice to the Minister

1. Pursuant to section 30(3)(b) of the *Water Act 1992* (NT) (the '*Water Act*'), the Minister for Environment, the Hon Eva Lawler requested that the Water Resources Review Panel (the '*Panel*') advise her by 24 September 2021¹ on what action the Minister should take regarding applications for review of a decision of the Controller of Water Resources (the '*Controller*') to grant groundwater extraction licence WDPCC10000 (the '*Licence*'). The applications for review were made by Centrefarm Aboriginal Horticulture Pty Ltd ('*Centrefarm*'), the Central Land Council on behalf of Mpwerempwer Aboriginal Corporation, Warrabri Aboriginal Land Trust, Iliyarne Aboriginal Land Trust, native title holders for Singleton Station NTP653, traditional Aboriginal owners of Warrabri Aboriginal Land Trust and Iliyarne Aboriginal Land Trust and residents of the affected Aboriginal community of Alekerange (collectively referred to as '*CLC*'), the Arid Lands Environment Centre ('*ALEC*') and the Environment Centre NT Inc ('*ECNT*'). The Licence, which was granted to Fortune Agribusiness Funds Management Pty Ltd ('*Fortune*'), permits Fortune to extract

¹ The Minister granted an extension to 15 October following a request from the Panel.

40,000 ML/year from the Central Plains Aquifers in the Western Davenport Water Control District. The Licence term is for 30 years.

2. The Review Panel constituted to consider the decision consisted of Mr David George (Chair), Mr Neil Power and Mr Tom Harris. The Panel met on 7 occasions, including a meeting on 3 September 2021 at which representations were made by representatives from each of the applicants for review, the Department of Environment, Parks and Water Security ('DEPWS') and Fortune.
3. In order to afford procedural fairness, copies of submissions received by the Panel from each applicant, DEPWS and Fortune were provided to all entities and further opportunity was provided for response.
4. A list of submissions and documents relied on is provided as **Attachment A**.
5. The advice that the Panel may give to the Minister is stipulated in section 30 of the *Water Act*. Pursuant to section 30(4) the Minister, having received the advice of the Panel, can either uphold the decision of the Controller or substitute for the decision the decision that, in the opinion of the Minister, the Controller should have made in the first instance.

Background facts

6. On 18 August 2020 Fortune submitted an application to DEPWS to extract 40,000ML/year of groundwater on Singleton Station NT Portion 653 (the 'Project area') from aquifers in the Central Plains Management Zone in the Western Davenport Water Control District.
7. Fortune proposes to develop approximately 3,500 ha of irrigated horticulture using approximately 144 irrigation bores, developed in four stages over an eight-year period (the 'project').
8. The notice of intention to make a water licence decision was published in the *NT News* on 4 September 2020 and eight public submissions were made in response.
9. The Western Davenport Water Control District was declared in 2009 to enable water management in the Davenport region, which had been identified as having potential for commercial horticulture development. The first Water Allocation Plan was declared in 2011 for a period of 10 years.
10. The purpose of declaring a water allocation plan, in part, is to ensure that, in a water control district: water resource management is in accordance with the water allocation plan; water is allocated to beneficial uses within the Estimated Sustainable Yield ('ESY'); and the total water use for all beneficial uses is less than the sum of the allocations to each beneficial use.
11. The Water Allocation Plan was subject to a substantial review from 2016-2018 which led to the declaration of the current Western Davenport Water Allocation Plan 2018-2021 (the 'WAP') under section 22B of the *Water Act*.
12. Fortune first lodged an application for groundwater extraction in the Project area in December 2015. The applicant was advised that the application would not be considered until the review of the plan was complete and the revised WAP declared. The applicant provided an updated application on 31 July 2020 which was accepted as complete by DEPWS on 18 August 2020.

13. A soil and land suitability assessment in 2016² identified land suitable for a range of irrigated agricultural cropping uses with the findings described as being transferrable to the Project area.
14. The WAP establishes a framework to share water between consumptive and non-consumptive uses and is considered to be consistent with the NT Water Allocation Planning Framework by making allocations to non-consumptive users, for example support groundwater dependent ecosystems ('GDEs'), ahead of allocations to consumptive uses, such as for agriculture.
15. The WAP considers the groundwater ESY to be equal to the sum of modelled evapotranspiration, plus 100% of modelled recharge, plus the staged depletion of water stored in the regolith above 15 metres below ground level over 100 years.
16. One objective of the WAP is that detrimental impacts to water dependent ecosystems (i.e. GDEs) as a consequence of consumptive water use will be avoided as far as possible. It identifies a GDE protection area (Figure 11 in WAP) to provide a level of protection for GDEs and cultural water sites. Section 8.2.1 of the WAP establishes that, within the protection area, proposed groundwater extraction should not result in a change to groundwater conditions beyond certain limits.
17. The WAP acknowledges that it is based on limited information, describes the risks to non-consumptive and consumptive users and promotes a program of further research and investigation in order to improve confidence and reduce risk. It adopts an adaptive management framework with trigger values for groundwater levels and condition of GDEs and cultural values at which various management responses should be enacted. It also highlights that, due to data limitations, there is a significant risk that the consumptive pool could be reduced in future water allocation plans.
18. On 13 February 2020 DEPWS issued a document entitled *Guideline: Limits of acceptable change to groundwater dependent vegetation in the Western Davenport Water Control District*³ (the 'Guideline') with the purpose of providing guidance to applicants for water extraction licences in the Western Davenport Water Control District. The Guideline reflects advances in knowledge of GDEs since the WAP was declared, recognises that the purpose of the WAP is to provide for consumptive use of groundwater and that some impact on GDEs is unavoidable but must remain within carefully managed levels. It sets explicit thresholds for the limits of acceptable change to GDEs that 70% of the current GDEs should be protected from negative impact.
19. On 2 October 2020 DPEWS issued a policy document *Guideline: Special circumstances for water extraction licence terms of up to 30 years*. This policy describes the sections of the *Water Act* that refer to the granting of a groundwater extraction licence, including its term, and describes circumstances which may justify a longer licence term, for up to 30 years, such as for public water supply and for developed enterprises. It includes circumstances where the Minister may, on a case-by-case basis, justify a longer licence term.

² Soil and Land Suitability Assessment for Irrigated Agriculture in the Ali Curung Area, Western Davenport District, November 2016.

³ Guideline available at https://depws.nt.gov.au/_data/assets/pdf_file/0006/904758/GDE-Guidance-document-Western-Davenport-2.pdf

20. On 22 March 2021 DEPWS issued a policy document *Staged Water Extraction Licence Guidelines* which describe a process in which tailored licence conditions release water for extraction incrementally in set stages matched to planned project milestones. Failure to meet project milestones or environment protection thresholds prevents the release of the next stage of water and may result in a reduction in the total maximum licenced entitlement for the duration of the licence. The Controller's approval is required before advancing from one stage to the next and the licence holder is required to demonstrate that: licence entitlements are being used for its intended use and matched to the project's planned milestones; the water resource is behaving as predicted; and the water resource is being managed within the environmental thresholds specified in the licence.
21. DEPWS has prepared an approvals map⁴ which outlines how the environmental approvals associated with the project intersect, including environmental impact assessment and approval under the *Environment Protection Act 2019*. The approvals map prioritises a water extraction licence decision and notes that Fortune will refer the project to the NT EPA after a water extraction licence decision is made and before a decision regarding any native vegetation clearing or non-pastoral use application. If the project requires assessment under the *Environment Protection Act 2019* (as determined by the NT EPA) the water extraction licence would cease to have effect until the completion of the environmental assessment and approval process and an environmental approval for the project would prevail over the water extraction licence to the extent that they are inconsistent.
22. On 8 April 2021 the Controller granted a Licence to take groundwater to Fortune. The Licence includes a number of Conditions that must be addressed, to the satisfaction of the Controller, prior to water entitlements taking effect.

Grounds of application for review

Centrefarm

23. In its application for review Centrefarm sets out the following concerns and recommends that the Decision is substituted for a decision that results in a licence that has reduced extraction volumes (up to 15 GL/year) and adjusted incremental stages:
 - Groundwater modelling and impacts on GDEs
 - Fortune's water resource and impact assessment is simplistic, based on inadequate investigations and very little site-specific data
 - There are substantial unknowns (such as the sustainable yield, recharge potential, salinity and aquifer storage)
 - The staging does not allow enough time to effectively monitor for impacts
 - There is no baseline field validation of GDEs in the impact area
 - The capacity to effectively monitor for impacts (both Fortune and Government)

⁴ Approvals Map available at <https://depws.nt.gov.au/land-resource-management/development-coordination/project/singleton-horticulture-project>

- Impact on future developments by Aboriginal landholders due to risk of over-allocation due to future climate or modelling inaccuracy.
- Impacts on regional development
- Limitations of AAPA certificate on protecting culturally significant sites
- Lack of indigenous employment strategy.

Central Land Council

24. In its application for review, and subsequent submissions, the CLC sets out grounds for review which it submits that the Controller should not have made the decision to grant the Licence and that the Minister should substitute the decision with a decision to refuse the licence application. The grounds are as follows:

- The estimated sustainable yield used by the Controller is not consistent with the *Water Act* or other definitions and allocation of water should not result in the depletion of aquifers.
- The Controller failed to take into account the uncertainties underlying the groundwater modelling and the conditions imposed on the Licence cannot address such deficiency.
- The Controller's decision fails to take into account the impact that the Licence will have on Aboriginal cultural values.
- The Guideline is inconsistent with the WAP and the Controller should not have relied upon it.
- The thresholds in the Guideline are arbitrary.
- The risks to aquatic GDEs have not been considered.
- There is a lack of understanding of region-specific GDEs.
- The Controller should not have granted the Licence for a term of more than 10 years given the uncertainty in the groundwater model and the potential impacts of granting the Licence.
- The Controller failed to address the concerns raised by the CLC about the biodiversity surveys conducted by NT Government.
- The licence conditions do not sufficiently address the soil salinity risks.

The CLC raised a number of additional concerns in further submissions to the Panel:

- That additional information is required before a licence decision can be made:
 - There must be an assessment of the water resource throughout the district, including hydrogeological investigations of GDEs at a local level, and a program of drilling and aquifer testing must be carried out to obtain spatially distributed data on aquifer properties.
 - The Minister should wait until a replacement Water Allocation Plan is in place (noting that the WAP expires in December 2021). The CLC provided information on what it considers the Minister should require before declaring a replacement WAP.
 - The content of any monitoring plan and adaptive management plan must be provided before any future application for large volumes over a long term is considered.
 - There must be a comprehensive map and assessment of cultural and biodiversity values of GDE's before any future application is

- considered. On 1 September 2021 CLC published and submitted to the Panel a report on the cultural values of Singleton Station⁵.
- The groundwater model should be peer reviewed and subject to spatial predictive uncertainty analysis before the WAP is declared.
 - The Guideline does not take into account Cultural Values.

Arid Lands Environment Centre

25. In its application for review ALEC set out the following grounds for review which it submits warrant the Minister setting aside the Controller's Decision and substituting with a decision to refuse the Licence:
- The Controller failed to appropriately assess the Licence in accordance with the WAP.
 - The Licence is inconsistent with the WAP and was therefore granted in breach of the *Water Act*.
 - The Controller should not have placed reliance on the Guideline because it is inconsistent with the WAP; is not a statutory document; was approved by the Controller herself as CEO; and allows for the destruction of up to 30% of GDEs.
 - The Controller should not have placed reliance on the document titled Singleton Horticulture Project Groundwater Dependent Ecosystem Mapping and Borefield Design⁶ (the 'Fortune Report') as it is a desktop review rather than fieldwork; and it does not assess the impact to GDEs against the criteria required under the WAP.
 - The Controller relied upon insufficient groundwater modelling.
 - The Controller failed to properly consider the possible deterioration of water quality as required under section 90(1)(h) of the *Water Act*.
 - The Controller's reliance on the implementation of an Adaptive Management Framework is unrealistic, gives rise to future uncertainty and compromises the health of GDEs.
 - The Controller did not appropriately consider impacts from the Licence on the Strategic Aboriginal Water Reserves (SWR).
 - The Controller should have assessed the impacts of the Licence on cultural values.

Environment Centre of the Northern Territory

26. In its application for review the ECNT set out the following grounds for review which it submits warrant the Minister setting aside the Controller's Decision and substituting a decision to refuse the Licence:
- The Licence is inconsistent with the WAP and thus breaches the *Water Act*.
 - The Controller did not properly apply the factors in section 90(1) of the *Water Act*, namely:
 - There is insufficient water available.
 - The WAP does not support the grant of the Licence.

⁵ Singleton Water Licence Aboriginal Cultural Values Assessment, Susan Dale Donaldson, 1 September 2021

⁶ Singleton Horticulture Project, Groundwater Dependent Ecosystem Mapping and Borefield Design, GHD for Fortune Agribusiness, July 2020

- There are likely to be significant adverse effects to the supply of water to others.
 - The designated beneficial uses of the water and the quality criteria pertaining to the beneficial uses mean that the Licence should not be granted.
 - Additional factors should be considered by the Minister:
 - The Licence is likely to cause deleterious impacts on GDEs.
 - There would be a threat of serious and irreversible environmental harm.
 - There is considerable scientific uncertainty and lack of evidence regarding key matters that underpin the Licence.
 - There is insufficient information in the Application to form a rational basis for a decision (including with respect to adaptive management of impacts).
 - There is considerable uncertainty regarding the adaptive management plan.
 - The Controller should not have relied upon the Guideline.
 - There is insufficient basis to increase the Licence term to 30 years.
27. ALEC and ECNT submitted separate applications for review, but in subsequent submissions and meetings they were jointly represented by the Environmental Defenders Office ('EDO'). In submissions further to the original applications for review, the applicants add the following:
- *The Minister should excuse herself from the ultimate decision on the grounds of apprehended bias.*
 - *The relevant Minister acting as delegate should overturn the Controller's approval and substitute it with a refusal of the Licence.*
- This is in relation to the term of the Licence. Refer to paragraph 86 for further consideration of this matter.

Consideration

28. The Panel considers that the grounds for review fall into nine broad categories:

Failure to comply with the Water Allocation Planning Framework or the Water Act

29. ALEC and ECNT submitted grounds for review that the Licence is inconsistent with the WAP and that therefore it was granted in breach of section 22B(4) of the *Water Act* and also that the Controller's decision failed to properly take into account the WAP and therefore it was not made in accordance with section 90(1)(ab) of the *Water Act*. In making her decision, the Controller states that by issuing a licence with the strict terms and conditions proposed and taking into account all of the relevant statutory factors, water management will be in accordance with the WAP. The DEPWS submitted that the adaptive management conditions on the Licence mean that the Controller's decision to issue the Licence is consistent with the WAP⁷.
30. ALEC and ECNT submitted that the Controller did not correctly apply a number of factors in section 90(1), including that there is insufficient water available to grant

⁷ Submission in response to the applications for review, DEPWS 23 September 2021

the Licence (section 90(1)(a)) based on uncertainties around the ESY defined in the WAP, which are discussed below (reference). Grounds related to other section 90(1) factors are discussed in specific categories below.

31. The CLC submitted that the derivation of the ESY in the WAP, and allocation of water according to it, is not consistent with the definition of *estimated sustainable yield* as contemplated in the *Water Act* and as defined in other references. The CLC maintains that allocation of water in accordance with an *estimated sustainable yield* should result in no depletion of aquifers and no unacceptable impacts on the environment. The *Water Act* does not contain a definition of estimated sustainable yield, it is a term used in water allocation planning and it is defined through a WAP. The Panel's view is that the ESY considered by the Controller in s90(1)(a) has standing as it is defined in the WAP, a statutory document. In the Panel's opinion, in the case where an ESY has been derived through a WAP, the Controller is correct to apply that ESY to a licence decision made in that water management area. A licence decision is not the place for the ESY to be adjusted. The Panel notes that there needs to be an appropriate process to review and adjust the ESY used for allocation and licencing decisions as hydrogeological understanding improves over time, and this may result in a reduction in the ESY and therefore a licenced allocation. This includes but is not limited to periodic reviews of a WAP. In the Panel's view it is prudent for the Controller to consider uncertainty and risk in relation to the ESY when making a licence decision and this may result in a precautionary approach, for example through conditioning and/or staging licence entitlements. The WAP⁸ identifies that there are high to extreme risk ratings in relation to the determination of the ESY and its potential downwards revision. **In the Panel's opinion the staging of a large-scale water extraction licence should align with management strategies and activities that aim to reduce that risk.** Further consideration of this is provided below under *Modelling underpinning the Decision and Implementation Activities under the Water Allocation Plan*.
32. ALEC submits that the Controller failed to properly consider the possible deterioration of water quality in the groundwater system, in particular salinity, as is required under section 90(1)(h) and provided information on how the Controller should have considered the Water Quality Guidelines⁹ and the setting of evidence-based water quality triggers. In making the Decision the Controller acknowledges that there is uncertainty about water quality impacts and determines that the salinity risks can be addressed through licence conditions that require assessment to be undertaken before there is any water extraction allowed. ALEC submitted that sufficient investigations should have been carried out prior to the granting of consent to enable the adaptive management framework to be designed appropriately. The Panel is of the view that in order to quantify the salinity risks, to the project and the groundwater resource, a detailed assessment and investigation is required prior to extraction of groundwater under the Licence, consistent with that outlined in the Decision and conditioned in the Licence.

⁸ Western Davenport Water Allocation Plan 2018-2021 page 56 Table 15

⁹ *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (2000)

33. ECNT submits that there are likely to be significant adverse effects to the supply of water to others entitled to it (s.90(1)(c)) but provide no further clarification of this matter. (see also *Impact on Strategic Aboriginal Water Reserve*)
34. ECNT submits that the designated beneficial uses of the water and the water quality criteria pertaining to them mean that the Licence should not be granted (s.90(1)(e)) but provide no further clarification of this matter. This matter was not considered further by the Panel.

Consideration of Cultural Values

35. ALEC and CLC submit that the Controller's approval of the Licence has failed to consider cultural values and does not protect them to the standard described in the WAP.
36. The Panel notes that the WAP includes the following objective: *to protect Aboriginal cultural values associated with water and provide access to water resources to support local Aboriginal economic development*. The WAP provides a non-consumptive water allocation to environment and cultural beneficial uses and in addition it identifies a GDE protection area to provide an additional level of protection for GDEs and cultural water sites. The WAP provides guidance on the activities to support the protection of cultural values in the region: *groundwater modelling, water extraction, mapping and documentation of water dependent cultural values, and monitoring and evaluation* and places an onus on proponents to demonstrate that groundwater extraction proposals can occur with the assessment criteria established to protect GDEs and cultural values. The WAP includes a list of implementation activities (8.4.1 Objective 2) that are aimed to protect Aboriginal cultural values associated with water and provide access to water resources to support Aboriginal economic development, to be carried out by the Department and the CLC. It is not clear to the Panel which if any of those activities identified have been progressed and were therefore available to the proponents in making their licence application, or the Controller in making her decision. See also the Panel's comments (paragraph 91) in relation to *Implementation activities under the Water Allocation Plan*.
37. In making her Decision, the Controller relies upon the submission from Fortune and advice from the Department about the expected impact on GDEs due to groundwater level decline from the project, in terms of a percentage impact to GDEs rather than any cultural significance that they may have. The Decision and the licence rely on the principles of adaptive management and licence conditions to address potential impacts on GDEs and cultural values. The Decision is largely otherwise silent on how the Controller has considered the protection of cultural values. The Licence conditions refer to the protection and health of GDEs only.
38. Following the grant of the Licence, the CLC engaged anthropologist Susan Donaldson to undertake an Aboriginal Cultural Values Assessment which was published and provided to the Panel on 1 September 2021. This report is not considered to have been done as an activity under the WAP but commenced, and was presented to the Panel, in response to this review process. It was not available at the time of the Controller's decision.
39. **The Panel** is not able to form a view on the significance of the information presented in that report but **is of the opinion that a comprehensive cultural impact**

assessment is required prior to the extraction of any significant volumes of water on Singleton Station.

40. Further consideration from the Panel in relation to cultural values is given below in relation to GDEs and also in paragraphs 87-89 in relation to *Environmental assessment*.

The Guideline (and impacts on GDEs)

41. Underlying the Controller's Decision in relation to the protection of GDEs is her reliance on the Guideline. The Purpose of the Guideline (Part 1) is to *provide guidance to applicants for water extraction licences in the Western Davenport Water Control District*. In addition, the Controller in her Decision refers to the Guideline as reflecting advances in the knowledge of GDEs since the WAP was declared and considers that she is able to take into account the Guideline as a relevant factor because it constitutes new scientific knowledge which was contemplated by the WAP. The Guideline introduces explicit thresholds for the limits of acceptable change that may impact on GDEs.
42. In their grounds for review, CLC, ECNT and ALEC submit that the Controller should not have relied upon the Guideline because it is inconsistent with the WAP and its objective to meet the environmental water requirements of water dependent ecosystems. The applicants for review submit that to set aside the provisions of the WAP and apply the Guideline for the purposes of determining the licence application was a legal error. In addition, ALEC submit that the Guideline should not be relied upon because it is not a statutory document, was approved by the Controller herself and is not based on published science.
43. In their grounds for review, the CLC submit that the authors (sic) of the Guideline has arbitrarily set the threshold for acceptable change without any reasonable grounds and dispute the Controller's statement that the Guideline constitutes new scientific information.
44. The DEPWS submit that it is open to the Controller, and the Minister, to take into account things that go beyond the WAP and that the WAP is not binding in any way¹⁰. Section 90(1) of the *Water Act* describes the factors that the Controller must take into account when making a decision and section 90(1)(k) enables the Controller to take into account any other factors.
45. At and following the meeting of 3 September DEPWS provided information and reports that demonstrate that the Guideline thresholds were based on detailed scientific investigations and assessments carried out since the WAP was declared and in the Panel's view it does constitute new scientific knowledge.
46. The Panel is not in a position to make any further recommendations on whether the reliance of the Controller on the Guideline was in accordance with the law but consider that it was appropriate for the Controller to take it into account, as a factor under section 90(1)(k).
47. The Panel does have concerns over the threshold for acceptable change provided in the Guideline. The Department submit¹¹ that the 70% threshold for GDE retention in the Guideline was informed by a body of research on thresholds for vegetation

¹⁰ Statement from lawyer representing DEPWS at the meeting of 3 September 2021

¹¹ Submission in response to the applications for review, DEPWS 23 September 2021, paragraph 93

retention to maintain biodiversity conservation values and/or ecosystem processes and that it is consistent with the cascade assessment process for vegetation clearing in the Daly Basin. Whilst the threshold is relevant in terms of biodiversity conservation and maintaining ecosystem processes, the Panel is concerned that the use of this threshold may not adequately protect GDEs in terms of their local significance. **This is particularly relevant in terms of the protection of water dependent cultural values as an objective of the WAP.**

48. The CLC submit that the WAP fails to assess the risks to aquatic GDEs in the Western Davenport District and that the risks to aquatic GDEs have not been considered in the Decision. The CLC submitted maps, extracted from online resources managed by the Bureau of Meteorology, which identifies numerous sites in proximity to Singleton Station with potential to contain aquatic GDEs. The Panel notes that the data utilised by the Atlas (in this region) is based on remote sensing and is predictive, in the sense that it provides a probability distribution for aquatic GDE presence rather than observed. The DEPWS submits that the springs and waterholes that occur in the region are thought to occur in and near rocky ranges and that it is unlikely that GDEs of this type would be impacted by licenced groundwater extraction. The Panel agrees with the Department's assessment.

Water Modelling underpinning the Decision

49. The CLC submitted substantial material on their concerns in relation to the hydrogeological conceptual and numerical modelling¹² that was used in the WAP, the assessment of the project and in the Decision. CLC submissions included representation and advice from consultant hydrogeologist Dr Vogwill. The primary concern raised is the level of hydrogeological uncertainty and its impact on the applicability of the groundwater model when used for developing the WAP and in assessing the licence application. The CLC maintain that, given the large volumes sought by Fortune, and the long term of the Licence, information and data essential to the grant of the Licence is missing and must be supplied before a licence decision can be made. The CLC identified a number of matters about information and data relating to the hydrogeology and model, that should be addressed before significant decisions are made, including the following:
- *There must be an assessment of the water resource throughout the district, including hydrogeological investigations of GDEs at a local level, and a program of drilling and aquifer testing must be carried out to obtain spatially distributed data on aquifer geometry, lithology, hydraulic properties, water levels and water quality.*
 - *The model should be independently peer reviewed.*
50. Similarly, ALEC, ECNT and Centrefarm raise concerns about scientific uncertainty and the lack of hydrogeological data used to inform the groundwater model and submit that the modelling was deficient for the purposes of assessing the licence application.
51. The groundwater model was designed specifically to examine the groundwater resources of the central management zone of the Western Davenport Water Control

¹² Development of a Groundwater Model for the Western Davenport Plains, CloudGMS, Version 1.1, 2018 (WRD Technical Report 27/2017)

District and included a comprehensive analysis of all hydrogeological data available at that time. In the Panel's view it was the best available science at the time of the declaration of the WAP and therefore the determination of the ESY. The CLC submits that *the Panel should assess the nature and extent of uncertainty in the model and the ESY and advise the Minister of its assessment. If this cannot be done, the Panel should advise the Minister accordingly and advise the Minister cannot be satisfied of the section 90 matters until the nature and extent of uncertainty in the model is assessed.* In the Panel's view, these concerns are primarily in relation to the deficiency of the model in its use in the development of the WAP. The current WAP, as a statutory document, has been in place since 2018 and determines the ESY and therefore the availability of water for the assessment of this licence application (s.90(1)(a)). Grounds for review around the adequacy of the model for determining the ESY are not supported by the Panel.

52. Underlying the Controller's decision was Technical Report 5/2021¹³ which utilised the groundwater model to model various pumping scenarios proposed in the licence application, with model outputs analysed to assess groundwater extraction impacts in the surrounding area. The Technical Report includes discussion on model uncertainty, expected drawdown impacts on GDEs, water quality issues, expected impact on other users and limitations in the assessment. It makes recommendations for monitoring and additional scientific studies and the Panel agrees with the following recommendations from that report:

- *Groundwater level monitoring is spatially limited in the Western Davenport region. Under the Western Davenport Water Allocation Plan 2018-2021 a network of bores are required to be installed and monitored.*
- *The licence applicant should be required to undertake water level monitoring in proximity to the development. This will enable the evaluation of modelled data against observed data to map the propagation of impact at a local scale.*
- *Borefield water quality monitoring as recommended in Section 4 should be undertaken.*
- *Additional studies focused on examination of site-specific soil/unsaturated zone properties (lithology, hydraulic conductivity, vertical salt loads, etc.), environmental factors (evapotranspiration rates, rainfall, etc.), and analysis of irrigated crops in similar settings should be undertaken to determine the risk and potential impacts on the underlying aquifer from unsaturated zone salt movement caused by the proposed development.*

53. In the Panel's opinion, the following is also necessary to reduce model uncertainty **prior to the extraction of water** for horticulture under this Licence:

- **A detailed assessment of the water resource on Singleton Station, including hydrogeological investigations at a local level, with a program of drilling and aquifer testing to obtain specific data on aquifer properties.**

54. In their submissions the CLC and EDO highlight the uncertainties described in the WAP in relation to the contribution of the 'regolith' to the ESY. The Panel notes that the WAP introduces the term 'regolith' and assigns a significant proportion of the ESY to it. The WAP describes how uncertainty in the nature and behaviour of the 'regolith' means that there is a significant risk that the ESY will be downgraded in

¹³ Technical Report 5/2021 - Groundwater extraction licence resource assessment, DEPWS 22 March 2021

future water allocation plans. The CLC maintain that without a peer-reviewed basis to include the 'regolith' it should be excluded from calculations for the ESY. The Panel notes that the nature of the 'regolith' is not well documented in the WAP and that DEPWS provided inconsistent descriptions of it in their submissions to the Panel. DEPWS has acknowledged¹⁴ that the conceptualisation of the 'regolith' has created confusion and that the department is considering how this may be addressed in a future review of the WAP. **In the Panel's opinion**, notwithstanding any confusion over the term 'regolith', **there is a risk that the ESY will be downgraded in future WAPs and licence decisions should take this risk into account through conditioning and staging**. See also *Implementation activities under the Water Allocation Plan*.

55. A further concern raised by the CLC is the need for peer review of the groundwater model used by DEPWS. This model, which underpins the WAP and the decision, does not appear to have been subject to independent review but has been reviewed internally by the Department. The Panel supports the view of the CLC that an independent peer review of the model is required and should be done before a new WAP is declared.
56. In further submissions, the CLC identifies that the WAP is due for review in December 2021 and maintains that a licence decision should not be made until the review has been completed and a new WAP has been declared. CLC submits that those matters raised (in paragraph 49) should be addressed before a new WAP is declared, and that in addition there should be other matters addressed, including consideration of subjecting the model to spatial predictive uncertainty analysis. The Panel agrees with the CLC submission that those matters raised should be addressed during the review of the WAP and incorporated into a new WAP. In the Panel's view there are also other matters or investigations that need to be completed, for example the implementation activities¹⁵ that are detailed in the WAP (see also paragraph 91 of this document). The Panel does not support the submission that the Minister should not make a licence decision until a new WAP is declared.

Impact on Strategic Aboriginal Water Reserve

57. ALEC submitted grounds for review that the Controller failed to consider the increased risk to the SWR if a licence of this scale is approved. ALEC refers to the WAP which describes the uncertainties around the ESY, the risk of the ESY being downgraded and the corresponding risk being the reduction of water available to provide entitlements under the SWR¹⁶. ALEC submits that, until the certainty around the ESY is resolved with scientific rigour, the Controller should give significant weight to the impacts upon the SWR and seek to minimise those impacts through appropriate licence conditions.
58. Underlying the Controller's decision was that there is an allocation to the SWR under the WAP which is separate from the consumptive pool from which the licence allocation is made. The Department has submitted¹⁷ that the decision to grant the Licence does not impact on the volume of water allocated to the SWR under the

¹⁴ DEPWS response to written questions from the Panel following meeting of 3 September 2021, Item 2

¹⁵ WAP, Section 8.4.1 WAP implementation activities

¹⁶ WAP, Section 9 Risk identification and mitigation strategies

¹⁷ Submission in response to the applications for review, DEPWS 23 September 2021

WAP. This is not contested by ALEC; it is the risk to the SWR from potential future reduction in the ESY that creates the risk to the availability of water under the SWR to Aboriginal landholders. In the Panel's opinion, the Decision itself does not change this risk, it is a risk that will continue to be managed through the water allocation planning process and future WAPs as the SWR has a separate allocation under the WAP.

59. Centrefarm submitted an additional concern that the project may render the SWR unusable if there is over-allocation of the resource that causes significant drawdown. Centrefarm maintain that modelling inaccuracy, future climatic conditions and impacts on regional GDEs may impact on the SWR and therefore hinder or exclude Aboriginal landholders from accessing water under the SWR.
60. Underlying the Controller's decision in relation to drawdown risks on the SWR was the DEPWS Technical Report (5/2021) and the Fortune Report which relied upon modelling that included full allocations to the SWR and assessed the level of groundwater drawdown that may impact on GDEs. The reports conclude that groundwater drawdown will extend under land trust that is eligible to access the SWR, but that it will not limit access to SWR entitlements as cumulative impacts associated with SWR extraction on the land trust would be negligible.
61. **The Panel shares the applicants concerns about the risk to potential future developments that wish to access the SWR and is of the opinion that this risk could be mitigated through the issuing of licence entitlements with staging that is aligned with the uncertainties around the ESY and aquifer response.**

Use of Conditions Precedent to manage uncertainty

62. A strong theme in the grounds for review is scientific uncertainty and how this is managed in the Decision process. The EDO submits that the nature of the uncertainties (for example the type and location of GDEs) is such that they must be thoroughly investigated prior to the grant of the approval and that deferring their investigation and the resolution of associated uncertainties to licence conditions is arguably unlawful¹⁸.
63. The EDO argues that the key mechanisms provided in the WAP to mitigate uncertainty, for example regarding water resources and their dependent ecosystems, have not been followed, as a number of activities identified in the WAP appear not to have been carried out.
64. Underlying the Controllers decision is the ability to use licence conditions to manage risk and uncertainty and that the WAP (section 10.1) discusses the merits of using adaptive management where there is uncertainty. The Licence contains a number of Conditions Precedent that must be addressed prior to the extraction of water under the Licence.
65. The grounds for review submit that certain activities, investigations, assessments and plans that are included as Conditions Precedent on the Licence should be done prior to the grant of a licence.

¹⁸ Outline of Submissions prepared for the review applicants (Environmental Defenders Office) 3 September 2021

66. The Panel does not have a view on the lawfulness of using Conditions Precedent on the Licence but in the Panel's view it is appropriate that those activities are completed prior to the significant extraction of water under a licence.

Use of Adaptive Management Framework to manage uncertainty and risk

67. Each applicant submitted grounds for review around concerns about the use of an adaptive management framework in the Licence.
68. The CLC submits that an adaptive management framework is ineffective or inappropriate when there is insufficient understanding of the risks that the water Licence poses.
69. ECNT submits that there is too much uncertainty, with respect to the consumptive pool availability and likely environmental impacts, to grant a licence in the absence of an approved and peer-reviewed adaptive management plan. ECNT submit that "drawdown triggers" are a misguided strategy for protecting GDEs and provided the Panel with published scientific papers to support their point (the Panel notes the paper provided is primarily in reference to the impact on groundwater fed springs and streams rather than the groundwater dependent vegetation communities and processes that occur in the Project area). ECNT also provide published references in relation to management of groundwater resources and impacts of extraction and maintain that this research suggests that adaptive management may not be effective for groundwater resources. They submit that the Licence should not be granted until the effectiveness of the proposed adaptive management approach can be objectively ascertained and peer reviewed.
70. ALEC submits that while adaptive management has an important role to play in ensuring long term sustainable use of natural resources, there are concerns about the role of adaptive management in relation to groundwater and its ability to overcome problems with uncertainty in understanding environmental responses to groundwater extraction. ALEC submits that the Controller's reliance on the implementation of an adaptive management framework by Fortune to address future issues is unrealistic, gives rise to future uncertainty and compromises the health of GDEs. They also refer to role of adaptive management under the NT's environmental assessment and approval process and dispute the submission from the Department¹⁹ that the requirements for an adaptive management plan (in the Licence) are consistent with the NT EPA's document *Guidance on Adaptive Management*.
71. The Panel's opinion is that the Controller's approach to dealing with these aspects as Conditions Precedent is reasonable. The risks that the applicants point to are risks that are associated with water extraction, and water extraction cannot occur under this Licence until the Conditions Precedent have been dealt with and approval is granted to proceed.
72. Centrefarm's concerns over adaptive management relate to the capacity of the proponent and government's capacity to effectively monitor water levels and vegetation in the substantial impact zone. **The Panel shares these concerns, given the long timeframes associated with this development and the reliance of adaptive management framework on monitoring activities, in particular the ongoing**

¹⁹ Submission in response to the applications for review, DEPWS 23 September 2021 paragraph 118

requirement for monitoring programs on a regional basis outside of Singleton Station (and therefore not a task required of Fortune under the Licence) to inform adaptive management and licence regulation.

73. CLC also submit that dealing with some of the most significant aspects of the decision through imposing licence conditions (*relegating such important matters to programs and plans which do not yet exist and have not been approved*²⁰) is inconsistent with the WAP and the *Water Act*, because the relevant section 90 factors must be taken into account before making the decision and that some of those matters cannot be understood, and therefore taken into account, without the content of the plan and program. The Panel is not in a position to comment on whether dealing with this matter through licence conditions is consistent with the *Water Act*.
74. Adaptive Management, informed by mapping of the type, extent of GDEs and a monitoring plan to detect potential impacts of groundwater extraction, is the cornerstone of regulating groundwater extraction (and therefore project development) under this Licence. The key aspect of an adaptive management plan is that it must be able to respond to triggers of potential impact, not just triggers of observed impact, and that management actions must be able to respond such that unacceptable impacts are avoided. The Licence deals with this matter by requiring that the proponent has an approved monitoring plan and adaptive management plan in place before any water extraction occurs under the Licence. The adaptive management plan must include clear and measurable objectives and quantitative triggers and limits. Regulation of the Licence relies on a comparison of actual groundwater response to the modelled predicted response (a lead indicator) and monitoring of GDE health (a lag indicator). Any deviation from predicted response or observed impact results in implementation of management actions such that environmental objectives are met.
75. The WAP discusses the merits of adaptive management where there is uncertainty and enables the use of an adaptive management framework for the regulation of water extraction. In the Panel's opinion, incorporating an adaptive management framework into licence conditions is consistent with the WAP and appropriate for achieving the objectives of enabling water extraction for consumptive use whilst meeting the environmental water requirements of non-consumptive uses. Having limited information on the proposed objectives, triggers and management actions of an adaptive management framework, and therefore confidence in the long-term protection of water management objectives, is problematic. In granting the Licence, the Controller deals with this by requiring an adaptive management plan to be developed prior to any take of water.
76. Section 9 of the WAP describes the risks associated with the implementation of the WAP and their mitigation and Section 10 describes the adaptive management approach and the uncertainties associated with the WAP. The WAP states that to adequately implement an adaptive management approach it is necessary to monitor and evaluate the WAP. The challenge here is that the adaptive management plan will rely on information that will only become available once extraction commences, and so it follows that **the volume of water available for extraction, and the period of**

²⁰ CLC Submission to the WWRP 23 September 2021 paragraph 23

the entitlement, should be commensurate with those risks and uncertainties around aquifer response and GDE impact that are regulated through the adaptive management framework. It is the Panel's view that these risks and uncertainties need to be better defined before there can be confidence in the decision to provide the volumes of water that the Licence makes available to the proponent. **The Panel's view is that that the monitoring plan and adaptive management plan could be informed through an environmental assessment process as anticipated under the Environment Protection Act 2019.**

Staging of the Licence

77. Centrefarm submitted that given the uncertainties, such as those in relation to aquifer response that cannot be reduced until pumping begins, there should be a more incremental approach to groundwater extraction. They submit that the proposed volumes and staging of the Licence do not allow enough time to effectively monitor aquifer and environmental response and propose that a licence of a lesser volume, with different staging, would be appropriate to ensure accurate monitoring and minimal deleterious effects.
78. In granting the Licence, the Controller included staging conditions which require approval to move from one stage to the next, based on monitoring results and of meeting the objectives of the adaptive management plan.
79. The Panel's view is that it is primarily the scale of the proposed water extraction and the staging of development that is problematic, as it requires an assessment of risk that can only be adequately informed with additional data. **The Panel agrees with the concerns raised by Centrefarm that the current staging of the Licence may not allow enough time to effectively monitor groundwater and environmental response associated with each stage,** in particular Stage 1 to 2, given the current lack of site specific data on aquifer and unsaturated zone properties, lack of current groundwater monitoring bores and time series monitoring data and the associated groundwater model uncertainty.
80. The Panel's opinion is that in order to better manage the risk and uncertainty associated with this project, **entitlements beyond Stage 1 should be withheld until sufficient data has been gathered and analysed to enable more confidence in the understanding of long-term aquifer behaviour and GDE response.** Indeed, DEPWS in their submission to the Panel suggest that drilling investigations, geophysical surveys and monitoring conducted under extraction licences will deliver significant information over the next 4 to 5 years that will be used to improve the groundwater model and therefore reduce scientific uncertainty. **The Panel recommends that the period for Stage 1 be extended from 2 years to 5 years.**

Licence period

81. In making her decision to grant the Licence for 30-years, the Controller sought the opinion of the Minister, in accordance with section 60(4) of the *Water Act*. The Minister affirmed that in her opinion there are special circumstances that justify a 30-year term licence.
82. ECNT submit that the Controller should not have applied her discretion to grant the Licence for a period of 30-years given the scientific uncertainty underpinning the WAP and the risk of serious and irreversible harm.

83. CLC submits that the Controller should not have granted the Licence for a period greater than 10 years and maintains that the special circumstances referred to by the Minister do not exist in this case and refer to the circumstances included in section 5.2.1 of the *Guideline: Special Circumstances for water extraction terms of up to 30 years*.
84. The Panel is of the view that a licence term of greater than 10 years, with suitable conditions precedent and staged entitlements, is appropriate for a large-scale development such as that proposed.
85. The EDO (on behalf of ECNT) also submit²¹ that the Minister's express involvement in informing the Controller's decision around licence term raises concerns about the current matter of the Licence review and submit that the Minister should therefore disqualify herself from the ultimate decision on the ground of apprehended bias. The Panel is not in a position to comment on this matter.

Other matters

Environmental assessment

86. The Panel has considered whether the Controller adequately considered the broader requirements for environmental protection, given that the project requires approval under the *Environment Protection Act 2019* prior to water being available for extraction.
87. The Panel is of the opinion that assessment of the project under the *Environment Protection Act 2019* is a key step in quantifying and managing the risks and uncertainties in relation to this project and it is appropriate that securing an approval under the *Environment Protection Act 2019* is a condition precedent in the Licence.
88. In the Decision, the Controller states that the NT EPA advised that the original notice of intention for the project to the NT EPA was withdrawn, partly to allow more detailed consideration of the project under the water extraction licence assessment process and that the granting of a licence will enable Fortune to define the project to a greater degree of certainty. This process is outlined in an approval map prepared by DEPWS. The Panel is not in a position to comment on the specifics of the approvals map or process.

Economic modelling

89. In their submission of 23 September 2021, the EDO (on behalf of ALEC and ECNT) submit that the Review Panel indicated that it was in possession of economic modelling which cannot be made public as it is commercial-in-confidence and provided advice and recommendations to the Panel on how they should consider economic modelling. The EDO is referring to the Property Development Plan²² provided to the Controller by Fortune as part of the licence application. The Panel did have access to this report but does not consider it to contain economic modelling to any significant extent and in any case the Panel was not and is not in a position to comprehensively assess the project on its economic and social benefits.

²¹ EDO Outline of Submissions 3 September 2021

²² Singleton Horticulture Project Property Development Plan, 31 July 2020

Implementation activities under the Water Allocation Plan

90. The WAP in section 8.4.1 includes a large number of implementation activities that were proposed in order to meet the objectives of the plan. The Panel notes that many of these activities are related to the risks and uncertainties that are highlighted in this advice, but it is not clear to the Panel which activities have been progressed to any great degree. Of particular note are those activities under objectives 2 and 4 that relate to the protection of water dependent cultural values and improved groundwater model information as these are factors that relate directly to the Decision. **In the Panel's opinion, the Decision would be better informed and subject to less uncertainty had activities been implemented in accordance with the WAP.**

Conclusion

91. The Review Panel has considered the Controller's decision to grant a water extraction licence to Fortune. It is the Panel's view that due to the level of uncertainty, primarily around hydrogeological parameters and the cultural values associated with GDEs that may be impacted by this project, the Licence should have been conditioned differently.
92. The Review Panel recommends that the Minister set aside the groundwater extraction licence WDPCC10000 and substitute a decision to grant a new licence that includes the following additional conditions:
- Additional Conditions Precedent:
 - *a detailed assessment of the water resources on Singleton Station, with a program of drilling and aquifer testing to obtain specific data on aquifer properties and yields*
 - *A cultural values impact assessment.*
 - An adjustment to CP5 to include:
 - *a requirement to demonstrate that the modelled spatial extent of predicted impact on groundwater levels and groundwater dependent ecosystems does not result in unacceptable predicted impact on water dependent cultural values.*
 - An adjustment to Staging Conditions such that:
 - *the period of Stage 1 is increased to 5 years to enable adequate assessment of aquifer behaviour and GDE condition.*
93. Alternatively, the Minister may determine that these factors would be better informed by a comprehensive assessment processes that is enabled through referral under the *Environment Protection Act 2019* and therefore set aside the groundwater extraction licence WDPCC10000 and substitute a decision refusing the Licence.

Mr David George (Chair)

Mr Tom Harris

Mr Neil Power



14 October 2021

Attachment A

Water Resources Review Panel - Documents relied upon

Review: Groundwater Extraction Licence - WDPCC10000

Document reference number	Licence application, decision and technical documents:
1	Memorandum to Controller from Director Water Licencing and Regulation - re Licence approval, 8 April 2021
1a	Attachment A. Application for a licence to take water from a bore under s.60 of the Water Act 1992
1a1	Attachment A1 Application Commercially Confidential Information (in relation to Property Development Plan)
1a2	Attachment A2 Fortune - Project Summary Report, July 2020
1b	Attachment B Australian Securities and Investment Commission Search
1c	Attachment C Land Titles Search - NT Portion 653 (Singleton Station)
1d	Attachment D Ministerial Briefing (licence period), Jan/Feb 2021
1e	Attachment E Divisional advice on application - Rangelands, 30 September 2020
1f	Attachment F Applicant response to public submissions on Notice of Intention 19 October 2020
1g	Attachment G Water Extraction Licence Decision, 8 April 2021
1h	Attachment H Licence to Take Water WDPCC10000
1i	Attachment I Letter to applicant providing decision, 8 April 2021
1j	Attachment J Letters to all 8 commenters providing decision, 8 April 2021
2	Public submissions on Notice of Intention, September/October 2020
3	Singleton Horticulture Project GDE Mapping and Borefield Design, GHD for Fortune, July 2020
4	Technical Report 5/2021 - Groundwater extraction licence resource assessment, DEPWS, 22 March 2021
5	Singleton Horticulture Project Property Development Plan, Fortune Agribusiness July 2020 - Commercial in Confidence
6	Western Davenport Water Allocation Plan, 2018-2021
7	Report on Community Engagement: Western Davenport Water Allocation Plan review 2017, DENR Report Np. 31/2018A
8	Development of a Groundwater Model for the Western Davenports (Knapton/CloudGMS) WRD Technical Report 27/2017
9	The Potential for Groundwater use by vegetation in the Australian Arid Zone, Cook and Eamus, 2018
10	Guideline: Special circumstances for extraction licence terms of up to 30 years, DEPWS, 2 October 2020
11	Staged Water Extraction Licence Guidelines, DEPWS, 22 March 2021
12	Guideline: Limits of acceptable change to groundwater dependent vegetation in the Western Davenport Water Control District, DENR, 13 February 2020

Applications for review:

- 13 Arid Lands Environment Centre
- 14 Centrefarm
- 15 Central Land Council
- 16 Environment Centre NT

Further submissions from CLC:

- 17 Letter to Minister Lawler - Process for Ministerial review, 7 June 2021
- 18 Western Davenport Plan, Associated Documents and Groundwater Model Review, Dr Ryan Vogwill for CLC 16 July 2021
- 19 Letter to EO DEPWS - Correspondence to Review Panel, 29 July 2021
- 20 Letter to EO DEPWS - Correspondence to Review Panel, 4 August 2021
- 21 Singleton Water Licence Aboriginal Cultural Values Assessment PRELIM OVERVIEW REPORT, Susan Donaldson for CLC, 10 August 2021
- 22 Letter to EO DEPWS - Correspondence to Review Panel, 18 August 2021
- 23 Singleton Water Licence Aboriginal Cultural Values Assessment FINAL - Susan Donaldson for CLC, 1 September 2021
- 24 CLC Submission to the Panel for meeting of 3 September 2021
- 25 CLC response to Panel question (at meeting) on Cultural Values Assessment Report, 10 September 2021
- 26 Outline of submissions in reply to materials produced by Fortune and the Department, 23 September 2021
- 27 Letter to the Chair WRRP Fresh evidence obtained by CLC, 28 September 2021
- 27a attachment Document 1 - Letter from CE DEPWS to Peter Wood (Fortune Agribusiness)
- 27b attachment document 2 - Draft letter from CE DEPWS to Peter Wood
- 27c attachment document 3 - Email correspondence between Tim Bond DEPWS and Peter Wood (Fortune Agribusiness)

Further submissions from Environmental Defenders Office:

- 28a Letter to Chair Water Resources Review Panel, 18 August 2021
- 28b Annexure B to letter to Chair, 18 August 2021
- 29 EDO Outline of Submission, 3 September 2021
- 29a Annexure A (ALEC Application for review)
- 29b Annexure B (ECNT Grounds for Review)
- 29c Annexure C (Flowchart - concerns with process)
- 30 EDOs Response to Panel question (at meeting of 3 September) on Water Quality Objectives, 3 September 2021
- 31 EDO submission in response, 23 September 2021
- 31a Attachment 1 - DPMC Guidance note
- 31b Attachment 2 – UniSA Fitzroy River

Further submissions from Fortune:

- 32** Submission to Panel, 24 August 2021
- 32a** Letter to Review Panel, 22 September 2021

Further submissions from Centrefarm:

- 33** Centrefarm Submission provided during meeting of 3 September 2021

Further submissions from DEPWS:

- 34** Submission from Water Resources Division (DEPWS) in response to Applications for Review, 27 August 2021
- 35** Submission from DEPWS - Detailed Review of Submissions from R. Vogwill CLC, 2 September 2021
- 36** DEPWS response to written questions from Panel following meeting of 3 September
- 36a** Attachment - Mapping terrestrial GDEs in arid Australia using Landsat-8 time-series data and singular value decomposition, Brim Box et al (in prep)
- 36b** Attachment - Ecological Characteristics of Potential groundwater dependent vegetation in the Western Davenport WCD, Nano et al, DEPWS 2021
- 36c** Attachment - GDE 2017 (Figure)
- 36d** Attachment - GDE 2021 (Figure)