MEMORANDUM - SINGLETON WATER LICENCE APPROVAL REVIEW

PREPARED FOR | Central Land Council - Norther Territory

PREPARED BY | Hydro Geo Enviro Pty Ltd, Dr Ryan Vogwill, Director

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Fortune Agribusiness Pty Ltd (**Fortune Agribusiness**) have applied for and have been provisionally granted a licence of 40 GL/yr at Singleton Station which is to be released for use in 4 stages. The first stage is 12.788 GL/yr, second stage is an additional 10.057 GL/yr, third stage is an additional 8.934 GL/yr and the final stage an additional 8.221 GL/yr. The first stage of this licence is the largest of the proposal and is also the single largest allocation granted in the Central Plains area.

The water resource and impact assessment presented is simplistic, based on inadequate investigations and very little site-specific data. From a water resource/hydrogeological and environmental impact perspective the biggest issues are:

- Lack of drilling and aquifer testing in the Singleton Station area. Most of the previous groundwater investigations have been undertaken in the central and eastern parts of the Central Plains. Given the different aquifer in this area (which is less prospective for groundwater i.e. Hooker Creek Formation etc) groundwater investigation results from the other parts of the Central Plains area are not transferrable to the project area.
- Storage estimates are based on modelling alone (with no direct measurements of the aquifer's properties and ability to produce water at the site). If these estimates are too high then storage will be reduced substantially and impacts greater than predicted.
- Total storage is being quoted as a basis for an allocation limit but total storage (especially when so uncertain) is misleading as it's only the groundwater to 100-150m depth that is economically viable to abstract. Better to quote allocation in terms of accessible storage. This would reduce the storage to 15-20% of current estimates, from 138,000 GL to 20-27,000 GL.
- The regolith aquifer, which accounts for 30.7 GL/yr of the total of 112.7 GL/yr of sustainable yield, is based on little to no data as this has not been investigated directly. It is difficult to see how incorporating this in the available water resources for allocation is justified.
- Lack of understanding of region-specific vegetation groundwater dependent ecosystems (**GDEs**) drawdown impact criteria and the use of criteria that are not consistent with those used in other jurisdictions. In the WDWAP and Guidance Document: *Limits of acceptable change to groundwater dependent vegetation in the Western Davenport Water Control District*, all GDE areas with a depth to groundwater of 10m or less are lumped together with the same drawdown magnitude and rate impact criteria. Areas with considerably shallower depth to groundwater than 10m will be more highly groundwater dependant, hence impact criteria need to be more stringent. The Gnangara Mound GDE work from Western Australia done by Ray Froend and others, is seen as best practise and often applied in other areas. These management criteria have different drawdown rate and magnitude criteria for 10-6m, 6-3m and 3-0 m depth to groundwater areas with drawdown and rate of drawdown criteria becoming more stringent as the depth to groundwater decreases. There is no justification presented for all GDEs with a depth to groundwater of 10m or less having the same drawdown impact criteria .
- No assessment of risks to aquatic GDEs. A major gap in the allocation planning and impact assessment currently exists as aquatic GDEs have not been included and numerous sites with potential to contain aquatic GDEs exist. Aquatic GDEs are typically those with the greatest sensitivity to drawdown, particularly wetlands, springs, soaks etc which are often the sites of greatest biodiversity and highest cultural value. Impacts to Stygofauna also need consideration.

It is unclear why the proponent needs to have a licence for nearly 13 GL/yr prior to having completed what would be considered the basic work required in other jurisdictions.

It may be useful for context to compare the Northern Territory process with the Western Australia Department of Water and Environmental Regulation (DWER) process. Western Australia is seen as a world leader in groundwater management due to that jurisdiction's high degree of dependence on groundwater. The first stage of acquiring a licence from WA DWER would be obtaining a 26D licence to install a bore and undertake aquifer testing. This work is required to be done before any licence decision. The level of assessment required from a proponent depends on a number of factors covered in Table 1 from Operational policy no. 5.12- Hydrogeological reporting associated with a groundwater well licence, Department of Water, Perth, November 2009.

My assessment of this project against those criteria for Stage 1 alone is as follows:

- **Volume** for Stage 1 12.788 GL/yr any allocation larger than 2.5 GL/yr requires an H3 level of investigation. This equates to 20 points;
- Current **level of allocation** is near 0 which is 0 points;
- **Impacts to other bore** users likely is 5 points;
- **Impacts to GDEs** likely is 5 points; and
- **Salinity** is fresh (<500 mg/L) to marginal which is 4-3 points

This is a total 33-34 points and anything over 19 points requires an H3 level of investigation, which the current analysis competed by the proponent falls well short of.

H3 Tasks that are missing are the drilling, aquifer testing (hydraulic properties and water quality), GDE assessment (particularly aquatic GDEs) and more rigorous modelling than is currently presented. The WA DWER would also request that the model was peer reviewed as per Australian Groundwater Modelling Guidelines but this hasn't occurred in the Singleton case either.

It is only after all this work was provided to and approved by the regulator that a groundwater licence would be issued, even if that was for only 2.5 GL/yr, less than 20% of what has been licenced to Fortune Agribusiness in Stage 1 alone.

It is unclear if an Environmental Impacts Statement (EIS) is to be prepared for the Northern Territory Environmental Protection Authority but I would strongly encourage this to be the case given the state of the current analysis and values at risk. The EIS will need to be extensive and involve significant investigations to address current shortcomings.

Adaptive management is an over utilised framework to address project approval when insufficient understanding of impact risk exists. It is fraught with problems and there have been serious issues in this context in other jurisdictions. Adaptive management needs a really strong understanding of the water resource, biodiversity/cultural values and GDE impact potential to be successful, particularly in the long term. This project does not currently have this and it is unclear if investigations proposed as part of Stage 1 will provide an appropriate level of understanding as they haven't been publicly released as yet.

5-10 years of data will be required to understand groundwater-environment-cultural linkages in sufficient detail to develop strong management criteria. Impacts may take considerable time to manifest (10+ years) but by then it will be difficult to restrict/reduce the project's water allocation as approval for the full licence will occur in a similar timeframe.

Given the infrequent and small amount of groundwater recharge in the area, if impacts occur that are deemed unsuitable, groundwater recovery may take decades if it occurs at all. Given the high degree of uncertainty independent peer review of the adaptive management framework should be completed and distributed to stakeholders before it is accepted.

Key stakeholders such as traditional owners need to be kept informed of and involved in this process in my opinion. Relying on proponents to complete regional assessments of cultural and biodiversity values is in my opinion a mistake, this work is best done by government to preserve confidentiality for both proponents and key stakeholders such as the CLC. Traditional owners and conservation groups are unlikely to want to work with a private company in the context of biodiversity and cultural values.

The CLC is not opposed to additional groundwater use in the area but have concerns over how this project will impact the area and the rushed approval process in the context of such a large allocation, for even Stage 1 of the project. I share these concerns.