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Dear Christie,

"Carbucky" Irrigation Development

1. Introduction

We act for the Nature Conservation Council of New South Wales Inc, the Inland Rivers Network and WWF Australia (**the Conservation Groups**).

North West Environmental Services (**the Proponent**), on behalf of Ross Marchant Investments Pty Ltd (**RMI**) has, pursuant to a direction from the Department of Infrastructure, Planning and Natural Resources (**DIPNR**), lodged an Environmental Impact Statement (**EIS**) for the construction of a large floodplain development.

The proposed development involves the construction of approximately 85 km of flood levee banks and 4 large water storages on land near the NSW town of Boggabilla on the Whalan floodplain (**the Proposed Development**). The Proposed Development is within the Moree Plains local government area. The levy banks and water storages are intended to protect and facilitate the cultivation of irrigated crops, in particular cotton. The proposed levy banks would capture and/or divert waters that would otherwise flow into Whalan Creek and the Macintyre River.

2. Concerns

The Conservation Groups are extremely concerned about the significant environmental impacts that are likely to occur should the Proposed Development be approved. In particular, the Conservation Groups seek to draw DIPNRs attention to the following matters:

2.1 Statutory considerations

It is the opinion of the Conservation Groups that the EIS has not fulfilled the necessary statutory requirements, in particular in addressing section 166C of the *Water Act 1912* and the requirements of the Director-General of the Department of Infrastructure, Planning and Natural Resources (**DIPNR**).

2.2 Adequacy of the EIS

It is the opinion of the Conservation Groups that the EIS is inadequate to allow a thorough and proper assessment of the potential environmental impacts of the proposed development. Important parts of the EIS, such as the impacts on fauna species, are lacking in detail and appear to have not been fully and properly considered. Furthermore, fundamental elements of the proposal as presented and considered in the EIS are preliminary, and subject to change. The possible impacts of the final design cannot therefore be assessed.

2.3 Impacts on the hydrological regime of the Whalan Floodplain

It is the opinion of the Conservation Groups that the EIS does not contain adequate modelling of the inevitable changes to the hydrological regime of the Whalan Flooplain. This is in large part due to the preliminary positioning of the levee banks. Alteration to the position of the levee banks will invalidate the current modelling.

2.4 Impacts upon Threatened Species

It is the opinion of the Conservation Groups that the potential impacts on listed Threatened Species have not been adequately considered in the EIS.

2.5 Pesticide and Pollution Control

It is the opinion of the Conservation Groups that the possibility for offsite pollution has not been adequately considered in the EIS.

Having regard to these concerns, which are elaborated in detail below, the Conservation Groups are of the opinion that consent for the Proposed Development should be refused.

3. Detailed concerns

3.1 Relevant statutory considerations

The proposed development involves the construction of earthworks, embankments and levees on land that is situated within a floodplain. Additionally, the proposed development is to be used for, and will have the effect of, preventing land from being flooded. Therefore, the proposed development constitutes a controlled work as defined by section 165A of the *Water Act 1912* (**Water Act**). The approval of the Ministerial Corporation under Division 3 of Part 8 of the Water Act is required for the carrying out of controlled works. Section 166C of the Water Act identifies the matters that are relevant when considering applications for controlled works as follows:

> *(a) the contents of any relevant floodplain management plan or any other relevant Government policy,*
>
> *(b) the need to maintain the natural flood regimes in wetlands and related ecosystems and the preservation of any habitat, animals (including fish) or plants that benefit from periodic flooding,*

(c) the effect or likely effect on water flows in downstream river sections,

(d) any geographical features, or other matters, of Aboriginal interest that may be affected by a controlled work,

(e) the effect or likely effect of a controlled work on the passage, flow and distribution of any flood waters,

(f) the effect or likely effect of a controlled work on existing dominant flood ways or exits from flood ways, rates of flow, flood water levels and the duration of inundation,

(g) the protection of the environment,

(h) any other matter relating to the desirability or otherwise of a controlled work.

In our opinion, it is imperative that an application for controlled works properly addresses each of the above listed criteria. However, the EIS has not adequately addressed the following:

Criterion (a): Some relevant and important Government policies have not been adequately considered. The *NSW Government Floodplain Management Manual (2001)* has not been referred to. The *NSW Wetlands Management Policy (1996)* has been referred to, but there is no evidence in the EIS that any of the aims of the policy have been incorporated into the proposal.

Criterion (b): The EIS fails to adequately address the impacts of the redistribution of floodwater resulting from the construction of the levees and capture of overland flows, the impacts from reduction in floodplain area, and the cumulative impacts of the development on the floodplain. All of these are relevant to the need to maintain natural flood regimes.

Criterion (c): The EIS does not clearly indicate what portion of the 30-35 GL to be extracted represents new extraction and what portion is currently extracted. Without this information it is impossible to adequately address the effect on flows downstream, including the effect on compliance with the Murray Darling Basin Cap.

Criteria (e) & (f): Detailed modelling of the distribution of floodwaters is included in the EIS, but it is based on a preliminary layout of the levee banks. Construction of the levee banks in a different position will alter the distribution of floodwaters, so the full impacts of the proposed development cannot be assessed without knowing the final position of the levee banks.

Criterion (g): As the EIS fails to address some relevant Government policies, as well as the importance of natural flood regimes, the effect on downstream flows and the distribution and duration of floodwaters, it cannot be said to adequately address the protection of the environment.

We believe that the Ministerial Corporation cannot approve the controlled works when six of the seven matters for consideration have been so poorly addressed.

3.2 Director-General's requirements

We note that DIPNR has required the preparation of an EIS for the Proposed Development. We understand that this is on the basis that the Proposed Development is likely to have a significant effect on the environment and therefore triggers the need for an EIS pursuant to section 112 of the *Environmental Planning and Assessment Act 1979* (**EP&A Act**). Clauses 71, 72 and 73 of the *Environmental Planning and Assessment Regulation 2000* (**EP&A Regulation**) set out requirements for the contents of an EIS, including the need to address requirements identified by the Director-General of DIPNR as being specifically relevant to the Proposed Development. In the case of *Schaffer Corporation Limited v Council of the City of Hawkesbury (*1992) 77 LGERA 21 Pearlman J identified principles for assessing the adequacy of an EIS. Those principles included the need for an EIS to be sufficiently specific to direct a reasonably intelligent and informed mind to the possible environmental consequences of the proposed development and to be comprehensive in its treatment of subject matter and objective in its approach.

For the reasons set out in Tables 1 and 2 below, the Conservation Groups are of the opinion that the EIS for the Proposed Development fails to address (or inadequately addresses) most of the requirements set by the Director-General[1]. We argue that the development cannot be approved when the EIS has failed to adequately address so many of the Director-General's requirements.

We note that the Commonwealth Minister for Environment and Heritage has declared the Proposed Development to be a controlled action pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (**EPBC Act**) as a result of the potential impacts of the development on *Anomalopus mackayi* (five-clawed worm-skink), a species listed as "threatened" under that Act. As explained below, neither the EIS nor the worm-skink report included within it contain an adequate assessment of the potential impacts on the species.

[1] Table 1 shows the Director-General's requirements that have not been properly satisfied by the EIS; Table 2 shows the unfulfilled requirements of the DIPNR Tamworth office, which the Director-General included as part of the requirements.

Table 1. DIPNR Director-General's requirements (17/07/03) that have not been fulfilled by the EIS

Requirement	Comments
Specific requirements	
Issues of key environmental planning importance for EIS preparation	
Details of potential impacts of the proposal on flood events and floodplain environment, including consideration of upstream and downstream properties	The EIS states that the final position and shape of the levees has not been decided. Flood modelling has been conducted on preliminary levee locations. The impacts cannot be properly assessed without knowing the final location of the levees.
Issues of environmental planning importance for EIS preparation	
Fauna and flora impacts	There is inadequate consideration of impacts on threatened species, aquatic species and an Endangered Ecological Community ("the aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River")
Impacts on river geomorphology	The EIS states that the final position and shape of the levees has not been decided. Flood modelling has been conducted on preliminary levee locations. The impacts cannot be properly assessed without knowing the final location of the levees.
Erosion and sediment impacts on any nearby watercourses during construction	Not considered in the EIS.
Other important issues	
Statutory planning instruments, including Moree Plains LEP, NSW Wetlands Management Policy (1996), SEPP 44 Koalas, and NSW Government Floodplain Management Manual March 2001	Moree Plains LEP not mentioned. NSW Wetlands Management Policy only used to justify why the floodplain is not a wetland. SEPP 44 has not been considered. Koalas are assessed in the eight-part test (appendix 7), but there is no discussion of potential or core koala habitat. Floodplain Management Manual not mentioned.
Indicate how environment performance will be monitored and managed during construction and operation	Inadequately considered. The EIS just mentions that RMI complies with best management practices.
Include, in a single clear and comprehensive list or table, all commitments made by the proponent in relation to environment impact mitigation, management and monitoring (including what measures will be implemented, scope of the measures, timing of implementation of measures)	The EIS contains a section on mitigation measures, but none relate to the construction. The eight-part test contains mitigation measures for reptiles, but these measures are not repeated in the body of the EIS. The EIS mentions mitigation measures for spray drift, erosion, retention of contaminated water etc, but these are not included in the final mitigation section.

Requirement	Comments
Attachment 1 Statutory requirements. EIS must include:	
An analysis of any feasible alternatives, including consequences of not carrying out the development	Many of the arguments against the "no development" option are unconvincing and do not incorporate the principles of ESD (e.g. does not maximise returns from the land; does not maximise utilisation of current infrastructure)
An analysis of the development, including:	
(a) a full description of the development	The EIS states that the final position and shape of the levees, storages and fields has not been decided.
(b) a general description of the environment likely to be affected, together with a detailed description of those aspects of the environment likely to be significantly affected	There is no mention of possible impacts on the Endangered Ecological Community within which the development is proposed ("The aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River")
(c) the likely impact on the environment of the development	There is no mention of possible impacts on the Endangered Ecological Community within which the development is proposed. Furthermore, the final location of the levee banks has not been finalised, so changes to the flooding regime cannot be assessed.
(d) a full description of the measures proposed to mitigate any adverse effects of the development on the environment	The EIS contains a section on mitigation measures, but none relate to the construction. The eight-part test contains mitigation measures for reptiles, but these measures are not contained in the EIS. The EIS mentions mitigation measures for spray drift, erosion and retention of contaminated water, but these are not included in the final mitigation section.
a compilation in a single section of the measures referred to in 4(d) [mitigation measures].	Possible mitigation measures are mentioned in a few places throughout the EIS, but the section titled "Mitigation Measures" does not contain a comprehensive list.
The reasons justifying the carrying out of the development in the manner proposed, having regard to biophysical, economic and social considerations, including the following principles of ESD:	
(a) the precautionary principle	Not mentioned.
Attachment 2. Issues for consideration in the preparation of an EIS for levee banks and artificial waterbodies	
1. Description of proposal	
Location of proposed works	The final location of the levee banks has not been finalised.
Appropriate maps and plans	The final location of the levee banks has not been finalised.
Land tenure, boundaries, LEP zonings etc	Discussion of land tenure included, but no map is provided showing the different areas, and no discussion of LEP zoning included.

Requirement	Comments
Evaluation in terms of: any relevant floodplain management plan, TSC Act, Murray Darling Basin Salinity and Drainage Strategy	A floodplain management plan for the area has not been prepared. Eight-part test performed for threatened species listed under the TSC Act, but the impacts on an Endangered Ecological Community listed under the *Fisheries Management Act 1994* have not been considered. Salinity and Drainage Strategy not referred to.
Details of form and physical dimensions of the proposed levee system including route, design, heights and widths of embankments, and any associated works (borrow pits etc). Discussion of criteria used for determining selection of locations of these structures.	Some detail of the slope of the storage walls is included. No detail of the height or width of the levee embankments is included.
Details of the form and physical dimensions of the dams including alignment, design, heights and widths of levees, depth, total storage capacity and associate works. Discussion of criteria.	The locations of the storages have not been finalised.
Staging of construction	Very minimal detail is included. The EIS only says that construction would occur within the next 5 years, with each of the 5 levee sections being developed separately. It does not state the order of construction, or the length of time to construct each section.
Proposal for disposal of any excess extractive material	The EIS only states that no waste material from the construction phase would remain on site.
Operational regime (including timing, monitoring, maintenance, access, stability and risk of failure)	Very minimal details are included, such as the hours of operation. No details are included in relation to monitoring, stability or risk of failure.
2. Description of environment	
Describe environment in vicinity and any aspects likely to be affected by proposal. Consider:	
Flood regime	The final location of the levee banks is not known, so the changes to the flood regime cannot be calculated.
Meteorological conditions including rates of evaporation	Rates of evaporation are not adequately described (the EIS just states that evaporation is highest in summer)
Remnant vegetation and fauna	The EIS does not discuss possible impacts on vegetation remnants within the irrigation area. Not all impacts on fauna are properly assessed, particularly for aquatic species.
3. Analysis of environmental impacts	
Assess beneficial and adverse impacts. Describe any mitigation measures. Consider:	
Effect on river systems	Flood model not valid (levee bank locations not finalised); description of impacts completely inadequate

Requirement	Comments
Impact on local hydrology, including redistribution of floodwaters	The final impacts cannot be calculated under the position of the levee banks is finalised.
Site drainage, dust, erosion etc and impacts on water quality especially during construction	The EIS contains only minimal discussion of impacts during construction.
Stability of embankments, and monitoring provisions	Mention is made of the gradient of the embankments, but not their height. No mention is made of monitoring.
Justify location of levees	The location of levees has not been finalised, so no justification can be provided.
4. Monitoring	
Provide outline of proposed monitoring procedures	Just mentions compliance with best management practices.
5. Contact with relevant authorities	
Provide results of consultations with: Environment Protection Authority *Murray Darling Basin Commission* *NSW Agriculture* *National Parks and Wildlife Service* *Environment Australia* *NSW Fisheries* *relevant Catchment Management Committee* *relevant Local Councils* *relevant Local Aboriginal Land Councils* *Department of Infrastructure, Planning and Natural Resources (Tamworth office)*	There is no evidence of consultation with NSW Agriculture, the Catchment Management Committee or the local Aboriginal Land Council.

Table 2. DIPNR Tamworth Office EIS requirements (23/06/03) that have not been fulfilled by the EIS (the Director-General included these as part of the requirements)

Requirement	Comments
Proposal description	
Full site description including proposal boundaries, topography, existing land use and drainage patterns	The planning of the development is incomplete. The location of the levees, fields and water storages has not been finalised.
Site plan and layout of the development	EIS only contains plans of proposed development from 1993; states this is likely to change.
Time line for development including staging of development	Only minimal detail is included. The EIS only states that construction would occur within the next 5 years, with each of the 5 levee sections being developed separately. The order of construction is not stated.
Floodplain impacts	
Floodplain impacts	Detailed modelling is contained in appendix 6, but it is based on preliminary levee positions.

Requirement	Comments
Flora and fauna	
Survey of vegetation inside and outside proposed levee banks, with vegetation map (also showing areas of vegetation impacted by development). Description of structure and floristics of vegetation communities.	A vegetation map has been prepared. However, it is unclear clear if vegetation will be cleared during construction — the text says not, but Plans 6 and 8 show that the preliminary positions of the levees are in areas that currently contain native vegetation.
Impacts on flora and fauna including threatened species etc (TSC, FM, EPBC)	Minimal assessment contained within the EIS. The eight-part tests are poorly done. The EEC "The aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River" is not mentioned, even though the development site is within the EEC.
Consider JAMBA and CAMBA species	These species are considered in the eight-part test (appendix 7). However, the eight-part test is a legislative test for species listed under the TSC Act; it is not a general study of all possible impacts for all species.
Consider draft RVMP. Address impacts on regionally significant vegetation communities mapped in draft plan	The RVMP is mentioned in the EIS, but the EIS does not state what zoning would be applicable to the land. The EIS does not state where the nearest areas of regionally significant vegetation are located.
Aquatic ecosystems	
Address impacts on ephemeral wetlands on site and downstream (hydrology of wetlands, frequency, magnitude and duration of inundation)	The impacts on ephemeral wetlands are not adequately considered. The EIS includes a quote describing the importance of ephemeral wetlands. However, even though it states that the development site on the floodplain can be considered to be an ephemeral wetland, the discussion of impacts is limited to permanent wetlands.
Impact on water quality entering wetlands, and whether degradation of wetlands likely	Not addressed in EIS.
Consider cumulative impacts on water sources and dependent ecosystems	Not addressed (EIS mentions other cumulative impacts, but not impacts on water sources and dependent ecosystems).
Address environmental impacts of installation of any new pumps on watercourses	The EIS states that pumps will need to be upgraded, and that development of the Trinkey pump site will require approval from DIPNR. However, there is no consideration of the environmental impacts of the pump upgrades or installation.
Address NSW Wetlands Management Policy 1996 and NSW Fisheries Policy and Guidelines for Aquatic Habitat Management and Fish Conservation 1999	The *NSW Wetlands Management Policy* is mentioned in order to argue that the floodplain is not a wetland, but it is not properly addressed. The *NSW Fisheries Policy* is incorrectly used to downplay the importance of the site for aquatic species. However, the *Policy* contains a section describing the importance of the floodplain during floods for the spawning of many aquatic species.

Requirement	Comments
Potential for land and water degradation	
Include geotechnical description of the area and water storage sites to address potential for leakage. EM survey of storage sites.	It is stated on page 57 that the sites of the storages have not been finalised, so no firm conclusions can be made as to leakage rates. An EM survey was conducted, but not on the final storage sites.
Mitigation	
Include proposed measures to mitigate identified environmental or socioeconomic impacts	The mitigation measures included in the EIS are far from comprehensive: no mitigation measures are included for the construction phase; no mitigation is included for the impacts on an Endangered Ecological Community; there is inadequate mitigation for impacts on retained vegetation.

3.3 Adequacy of EIS

The EIS states that many aspects of the design of the development are not finalised. However, knowing the final position of the levee banks is particularly important because they will affect the distribution of floodwaters. Indeed, the impacts of the development cannot be assessed without detailed flood models based on the final proposed position of the levee banks. The Conservation Groups argue that consent cannot be granted when the impacts of the final design have not been assessed.

Examples of the non-complete nature of the proposal as presented in the EIS include:

- Page 11: "There are currently five areas of levee banks being proposed. This may be reduced to allow part of the proposal to proceed."
- Page 13: "Plan 4 presents a preliminary layout of the proposed development that was prepared in 1993 … The optimum run length to be established on the property will be determined after a more detailed field survey, design and cost analysis of the proposal has been completed."
- Page 18: "The final location and capacity of pump sites would be determined when the final field layout is resolved."
- Page 21: "The attached property plan (Plan 4) presents a preliminary irrigation layout for the development."
- Page 23: "The plan as presented on Plan 4 was originally prepared between 1993-1996. Amendments have been made to allow for the preservation of vegetation and the inclusion of the extended floodway areas within and around the development area … It is estimated that approximately 25-30% of this area would be retained for vegetation and buffer zones."
- Page 23: "… the current estimate of area to be developed for irrigation is 4600 – 4800 ha of irrigated fields and approximately 528 ha of above ground storage. If the storages were built with an average water depth of 4 m, the total storage capacity would be around 21 210 ML."

- Page 24: "At present the storages are located on the basis of a preliminary layout. Once the final layout is determined, further investigation and design would be undertaken to prepare a suitable specification and design for the storages."
- Page 24: "It should be noted that the preliminary plan is based on a preliminary survey of the proposed development area. The overall perimeter shape of the development is subject to this evaluation and DIPNR's review of the development."
- Page 25: "… the area of development would be set by the perimeter levee approval …"
- Page 47: "The preliminary development proposal includes a shallow channel … the location of this channel is not yet finalised …"
- Page 57: "Part of the site investigation and final design stage will include additional detailed EM-31 soil conductivity survey[s] and soil investigations to ensure that suitable foundations are available beneath the storage sites."
- Page 10 of the Lawson and Treloar flood impacts report (appendix 6) states "Other factors that will need to be considered at the detailed design stage of the levee works include:
  - preservation of low flow channels;
  - stream stability and erosion;
  - environmental considerations;
  - other local flooding and drainage issues."

All of these issues should have been considered in the report or the EIS. The EIS should have included the detailed design of the levees.

3.4 Impacts of the Proposed Development on the hydrological regime of the Whalan Floodplain

A critical aspect of the Proposed Development is the impact that it may have upon the hydrological regime of the Whalan floodplain. Our clients submit that the proposed development will capture waters that would otherwise flow over the floodplain and into the Macintyre River System. The levy banks will also divert overland flows from their natural floodpaths. The changes to the hydrological regime of the floodplain are likely to have a long-term adverse effect on the ecological communities and species present on the floodplain as the amount of water available and the flow patterns will be altered. However, the full impacts of the development have not been assessed, because the final location of the levee banks has not been determined.

3.4.1 Water Management

Much of the information in the EIS regarding the impacts of extraction on river flows is misleading or inadequate (pages 15-18). For example, the statement "From the Darling River catchment, the reduction in natural flows due to extraction by all users is 25%" does not identify whether this impact is upon average or median flows – a key distinction in river management. Critically, this section fails to mention and discuss the ecological impacts of this level of flow reduction. The ecology of dryland rivers such as the Macintyre is dependent upon the highly variable flow regime, with low to medium sized flows being essential for river ecosystem processes to continue. Even rises in river level of 10 to 20 cm can induce native fish to commence breeding and to migrate.

The Macintyre River supports an Endangered Ecological Community listed under the *Fisheries Management Act 1994* ("The aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River"). Additional impacts upon the flow regime of the

Macintyre River are likely to deleteriously affect this community, but no analysis of the possible impacts is contained in the EIS.

The adverse impacts of excessive water extraction upon the biota and ecosystem processes of dryland rivers have been investigated by numerous researchers and scientific organisations. For example, Associate Professor Martin Thoms (University of Canberra, Cooperative Research Centre for Freshwater Ecology) has determined that water extraction in the Darling River has reduced the frequency of ecologically important low to medium sized flows by approximately 49% (presentation to Barwon-Darling River Management Committee, 2000). This ecological impact is substantially larger than the gross impact on hydrology, quoted in the EIS as being a 25% reduction in flows.

The EIS claims that "Cotton production is extremely efficient, using around 85% of applied water, due to the heavy clay soil types in the region, resulting in the highest value crop per ML usage (Source: Cotton Australia, 2003)". This claim appears to be in direct contrast to figures contained in the Australian Bureau of Statistics Report Water Account for Australia 1993-94 to 1996-97 which concluded that cotton returned a gross value of only $612 per megalitre compared to higher returns for grapevines (approximately $950 per ML), fruit (approximately $1450 per ML), and vegetables (approximately $1750 per ML). Additionally, the quoted figure of 85% water use fails to mention the substantial evaporative and seepage losses in irrigation areas that exist prior to water even reaching the paddock.

3.4.2 Pumping Stations

The predicted maximum extraction rate at Trinkey of 1000 ML/day (page 18) equates to a substantial proportion of rivers flows during summer when cotton production is at its peak. The effects on the flow regime are likely to be highly significant, but no analysis is provided.

3.4.3 Tail-water return systems

This section of the EIS has several deficiencies (pages 18-19). It fails to quantify what severity of storm event the proposed water storages or supply canals could hold, such as how many millimetres of rain in a 24-hour period, prior to the storage volume being exceeded and contaminated water potentially being discharged. This figure needs to be compared against the known frequency and severity of storms in the area, and the resultant risk of water escaping from the storages should be expressed as a probability. Secondly, the decision-making processes and safeguards relating to blowing out a wall to avoid an uncontrolled collapse are inadequately described. Too much discretion is conferred on the farm manager during a period of very high rainfall, such as determining whether the water contains contaminants.

3.4.4 Effects of the development on floodplain health

Construction of the proposed system of levees and associated irrigation and water storage infrastructure will alienate approximately 4850 ha of floodplain country from the river-floodplain environment (page 23). This is likely to have significant impacts upon the floodplain of the Macintyre system that remains, but the EIS claims any impacts will be minor. The EIS does not deal adequately with the issue, given the substantial volume of scientific research published in recent years on the effects of floodplain development on river health. It does not refer to any reports or published scientific articles regarding these issues, such as for the Lowbidgee floodplain, Gwydir, and Murray. Significantly, the EIS fails to address the cumulative impacts of the proposed development upon floodplain and river health. This is particularly significant given the existing

floodplain developments on the Macintyre floodplain. It is a principle in section 5 of the *Water Management Act 2000* that cumulative impacts be considered and minimised.

Given the extremely low relief of the floodplain, even small changes in flood level are likely to alter flooding patterns. The extent of these impacts are indicated in Figure 7 of the EIS (amongst others), and Figures 1 and 2 of Appendix 2. These figures show that the effects of the levees will extend well beyond the perimeter of the irrigation development due to the substantial changes that the levees will have on flooding patterns and depths. In general, the levees will increase the depth (and probably duration) of flooding by impeding the passage of flood flows on the upstream side, and reduce flooding depth (and probably duration) on the downstream side. The modelled changes in depth are not insubstantial — increases of 0.20 to 0.75 m over an area of approximately 5 km long by 1 km wide (commencing between blocks A and B, and continuing downstream to blocks E and D; Figure 7), and a reduction in depth of between 0.05 and 0.20 m over an area of approximately 25 km^2 (estimated from Figure 7). These changes in flooding represent very significant changes in flooding patterns and will substantially alter the vegetation communities and hence habitat for fauna. These conclusions are at significant odds with the conclusions drawn on page 51, which appear to underestimate the effects of changes in flooding as shown in Figures 7 and Appendix 2. These impacts do not appear to conform with the statutory floodplain management principles contained in the *Water Management Act 2000*.

3.4.5 Reductions in downstream water

The EIS does not indicate what proportion of the existing licensed allocations of 30-35 GL are presently extracted (page 52). Should the proposed development proceed and unused components of the licensed allocation are extracted, then there is likely to be additional pressure on the Murray Darling Basin Cap figure for the Border Rivers. Given the variable flow patterns, inadequate stream flow gauging and complex channel patterns, it is reasonable to conclude that DIPNR would have difficulty in maintaining extractions across the valley below Cap levels (220 GL). Additional extractions will affect both downstream water users and river health.

3.4.7 Biodiversity

This section of the EIS contains many unsupported assumptions regarding the potential impact of changes in flows on biodiversity (pages 53-55). For example, "The impact from the levee banks would increase the height of inundation and possibly also slightly increase the longevity of inundation. This would not be expected to have any effect on the vegetative community". No data is provided to support this, or similar, statements.

3.5 Impacts upon Threatened Species

The proposed developed will be constructed within and will impact on an Endangered Ecological Community, but the neither the EIS nor the eight-part test acknowledge or consider this. "The aquatic ecological community in the natural drainage system of the lowland catchment of the Darling River" is listed under the *Fisheries Management Act 1994* (**FM Act**). The floodplain areas of the subject site are part of this Endangered Ecological Community.

Furthermore, the eight-part test acknowledges that the development involves two listed Key Threatening Processes: "Alteration to the natural flow regimes of rivers and streams and their floodplains and wetlands", listed under the *Threatened Species Conservation Act 1995* (**TSC Act**), and "The installation and operation of instream structures and other mechanisms that alter natural flow regimes of rivers and streams", listed under the FM Act. The impacts of these Key Threatening Processes on the Endangered Ecological Community have not been considered in the EIS or eight-

part test. There is therefore a real risk that significant harm to an Endangered Ecological Community will occur, with no prior assessment of the consequences.

There are a number of further errors and short-comings in the eight-part test report (appendix 7):

- Species listed under the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) are included. The eight-part test is a statutory requirement under section 5A of the *Environmental Planning and Assessment Act 1979*. It is only applicable to species, populations or communities listed in the schedules of the TSC Act and the FM Act. Impacts on species listed under the EPBC Act must be assessed using criteria specified by the Commonwealth Department of the Environment and Heritage. Species listed under the EPBC Act should have been considered separately in the EIS, not in the eight-part test report. The Conservation Groups do no believe that the assessment of impacts on listed EPBC species has met the requirements of the Department of Environment and Heritage.
- The five-clawed worm-skink is listed as an endangered species under the TSC Act, not a vulnerable species (error on pages 12 and 26).
- When considering factor (b), the author confuses endangered populations with endangered species. This error occurs on pages 20, 22, 24, 25, 28 and 29.
- In relation to factor (d) for reptiles (page 26), the author states that no interconnecting areas of habitat would be isolated as a result of the development. This is contradicted in the next paragraph which states that reptiles within the irrigation area will become isolated when surrounded by irrigation. It is further stated that the small patches of vegetation within the irrigation area are unlikely to remain viable habitat, necessitating the trapping and relocation of reptiles. If the proponents believe the impacts on threatened reptiles will be significant enough to warrant relocation, then an SIS should be prepared.
- The assessment of factor (d) has not been adequately conducted. The report is misleading when it states (as on page 24) that because there will only be minimal clearing of vegetation, as well as "preservation of extensive areas of remnant vegetation", there is likely to be no impacts on threatened species. Many of the areas of remnant vegetation to be retained will be within the levee banks, isolating this habitat from areas outside the levees for species unable or unwilling to cross irrigated cotton fields and levee banks.
- The long-term viability of the vegetation patches retained within the levee banks is also questionable, given that they will be surrounded by irrigated cotton and exposed to spray-drift of chemicals. It is claimed on page 30 that the patches will "constitute sustainable ecosystems with only limited "edge effects" from the surrounding agriculture". However, the EIS states on page that 59 that "death or deformation commonly occurs to vegetation within or nearby crops as a result of herbicides, defoliants and occasionally adverse reactions to surfactants and/or emulsifiers in insecticides." The EIS mentions that the remnants will be protected by "sacrificial native vegetation" buffers, but no detail is included of the size or location of these buffers, nor of the species that will form the buffers.
- There is no evidence that targetted surveys were undertaken for any of the threatened species that may occur onsite. A targetted survey should certainly have been undertaken to look for five-clawed worm-skinks on the property. The worm-skink report (appendix 8) states that Carbuncky provides suitable habitat, but that report also did not actually sample on site.

3.6 Pesticide and Pollution Control

Regardless of the size of the embankments surrounding cotton farms, there is a risk that the earthen walls may fail during heavy rainfall or be over-topped during large floods. Such cases are well

known in cotton growing areas. In such instances, water and sediments may be discharged into waterways and wetlands where nutrients and pesticides may harm plants and animals.

The EIS states that the principal pesticide to be used on the irrigated cotton will be endosulfan. The EIS also states that "Endosulfan is extremely dangerous to fish … and other aquatic organisms …". However, there is no assessment of the possible impacts on the environment should one of the levee banks fail during a flood.

The EIS contains no information on the height or width of the levee embankments, nor of the size of the flood required to overtop the levees. Furthermore, the EIS contains no information as to whether monitoring of the integrity and strength of the levee banks will be conducted. Indeed, no mention is made of the possibility of failure of the levees.

3.7 Other Issues

3.7.1 Assessment of Alternatives

The EIS deals only superficially with alternatives to the proposed development (pages 10-13), and arguably fails the threshold test of a comprehensive and objective examination of the subject matter (see principles for assessing the adequacy of an EIS as laid down by Pearlman J in *Schaffer* cited above). The justification used to support the development is spurious, such as arguing that RMI must irrigate cotton or forfeit the use of its water licences when permanent or temporary trading on the water market is possible. Furthermore, RMI could capture tail-water and associated run-off from its present cropping rather than argue that such activities are only an option for irrigated cotton. Additionally, the rationale for irrigating cotton at Carbucky to "help support the national cotton industry" is circular in nature and not a reasonable justification for the proposal.

3.7.2 Lack of understanding of the term sustainability in respect of floodplain management

The phrase "ensure long-term sustainability across their present and proposed irrigation areas" on page 3 erroneously assumes that sustainability relates solely to agricultural production. Similarly, it is claimed that the "No Development" scenario would "not allow rotation of irrigated crops within the RMI group and thereby does not maximise sustainability" (page 12). This statement indicates a failure to understand that sustainability also addresses ecological sustainability.

4. Conclusions

The EIS is inadequate in that it:

- does not fulfill the necessary statutory requirements (including s 166C of the *Water Act 1912* and the Director-General of DIPNR's requirements under the *Environmental Planning and Assessment Act 1979*);
- presents a preliminary version of the proposed development;
- contains an inadequate assessment of the potential impacts on flora and fauna, including threatened species;
- contains no assessment of the impacts on an Endangered Ecological Community that occurs on site;
- contains an inadequate assessment of the impacts on hydrology in the local area, including changes to flooding patterns and potential changes to flows in the MacIntyre River; and
- contains inadequate detail on mitigation and monitoring measures to be undertaken during construction and operation of the development.

The Conservation Groups believe that, because of the inadequacy of the EIS, consent for the development should not be granted.

Yours faithfully
Environmental Defender's Office Ltd

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