Ord River Irrigation Area

Knox Creek Plain

Environmental Management Program

August 2015

Limitations

This report is strictly limited to the matters stated in it and is not to be read as extending, by implication, to any other matter in connection with the matters addressed in it. The report and Environmental Management Program (EMP) are based on the Weaber Plain EMP approved by the Environmental Protection Authority in December 2013. The approved Weaber Plain EMP and its predecessors were prepared by Strategen Environmental Consultants Pty Ltd, LandCorp and the Department of State Development.

This Knox Plain EMP has been completed by Kimberley Boab Consulting, for Kimberley Agricultural Investment Pty Ltd.

Reliance on data

This report has relied upon data and other information provided by individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise expressly stated in the report, the accuracy or completeness of the data has not been verified. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. The report is based on conditions encountered and information received at the time of preparation of this report or the time that site investigations were carried out. This report and any legal issues arising from it are governed by and construed in accordance with the law of Western Australia as at the date of this report.

Environmental conclusions

Within the limitations imposed by the scope of services, the preparation of this report has been undertaken and performed in a professional manner, in accordance with generally accepted environmental consulting practices. No other warranty, whether express or implied, is made.

Acknowledgments

The contributions of Strategen Environmental Consultants to previous versions of the Weaber Plain EMP (on which this document is based) are acknowledged. A summary of previous iterations is provided below:

Version control

Report Version	**Revision No.**	**Purpose**	**Author / revision by**
Weaber Plain EMP - Final Report. *Approved by OEPA under Statement 830*	Rev 2 – July 2011	Client; for OEPA approval	Strategen
Revised Weaber Plain EMP	Rev G	For DSD/LandCorp review	Strategen
Weaber Plain EMP – *Approved by OEPA under Statement 938 23 December 2013*	Ver 3 – October 2013	For submission to OEPA	Landcorp, DSD
Knox Creek Plain EMP	Version Knox-1 – January 2014	Client; for OEPA approval	Kimberley Boab Consulting
Knox Creek Plain EMP	Version Knox-2 – May 2015	Client; for DotE approval	Kimberley Boab Consulting
Knox Creek Plain EMP	May 2015	Approved by DotE under EPBC 2014/7143.	Kimberley Boab Consulting
Knox Creek Plain EMP	August 2015	For OEPA review	Kimberley Boab Consulting

Contents

List of Acronyms

DAFWA	Department of Agriculture and Food Western Australia
DER	Department of Environmental Regulation
DFES	Department of Fire and Emergency Services
DotE	Department of the Environment
DoW	Department of Water
DPaW	Department of Parks and Wildlife
EMP	Environmental Management Program
EMS	Environmental Management System
EPBC Act	(Commonwealth) Environmental Protection and Biodiversity Conservation Act 1999
EPA	Environmental Protection Authority
EP Act	(State) Environmental Protection Act 1986
FMP	Fire Management Plan
IRG	Independent Review Group
KAI	Kimberley Agricultural Investment Pty Ltd
LAA	(State) Lands Administration Act (WA) 1987
MNES	Matters of National Environmental Significance
OEPA	Office of the Environmental Protection Authority
SWEK	Shire of Wyndham East Kimberley
WA	Western Australia

1.0 Introduction

1.1 Project Background

Kimberley Agricultural Investment Pty Ltd (KAI) has a licence under the Western Australian Lands Administration Act (1987) to develop land for irrigated agriculture across the Knox Creek Plain, located north-northeast of Kununurra in the eastern Kimberley region of WA. The Knox Creek Plain development (the 'Project area') forms part of the M2 Area, which comprises over 76 000 ha (including Buffer Areas) across the Weaber, Keep River and Knox Creek plains and extends to the Keep River estuary in the Northern Territory. The development is reliant upon on a new major irrigation channel (the 'M2 channel'), which has initially been extended from Stock Route Road in Kununurra, through to the end of the Weaber Plain or Goomig Farm Area. The M2 channel is proposed to eventually extend from Lake Kununurra alongside the M1 channel.

The land within and surrounding the Knox Creek Plain Development Area is of traditional and current significance to Aboriginal people, who continue to maintain a strong cultural identity and attachment to the land. The traditional owners of land within the Knox Creek Plain area are the Miriuwung and Gajerrong peoples.

1.1.1 Environmental approvals

State

A proposal to develop the M2 Area for irrigated agriculture was considered by the WA and NT governments in 2002 (the 'M2 proposal'). An *Environmental Review and Management Programme/Draft Environmental Impact Statement* (ERMP/Draft EIS; Kinhill 2000) was submitted for the M2 proposal in 2000 and assessed under the *Environmental Protection Act 1986* (WA) (EP Act). The M2 proposal was granted approval to be implemented by the WA Minister for the Environment in February 2002 by the issue of Statement 585 (subsequently superseded by Statement 830). In January 2007 this approval was extended to February 2012.

The current proponent Department of State Development (DSD) submitted an application to amend conditions of Statement 830 in June 2012 pursuant to Section 46 of the EP Act. The proposed amendments to conditions were to bring the Ord Irrigation Area Stage 2 in line with contemporary implementation conditions without reducing necessary environmental obligations under the original conditions and commitments. The Section 46 application was approved and an amended Statement (Statement 938) was issued on 12th June 2013.

At the time of the preparation of this document, the Minister for State Development was Proponent for the *Ord River Irrigation Area Stage 2 (M2 Supply Channel),* the subject of Statement 938. As a condition of the Development Agreement signed between the State of

Western Australia and KAI in December 2013, environmental proponency for the M2 area will be transferred to KAI in 2015.

The contents of this document align with the actions and commitments of the *Ord River Irrigation Area – Weaber Plain Development Project Environmental Management Program* (Weaber Plain EMP) approved on 23 December 2013.

Condition 5 of Statement 938 requires Proponent implementation of the Environmental Management Program (EMP) approved in June 2011 or subsequent revisions approved by the Chief Executive Officer of the Office of the Environmental Protection Authority (OEPA). An EMP for the Weaber Plain was approved by the OEPA in line with this condition on 23 December 2013. The Knox Creek Plain EMP (*this document*) includes the environmental management commitments associated with the Knox development, as required under Statement 938.

Australian Government

The development of the Knox Creek Plain was referred under the Environment Protection Biodiversity and Conservation Act 1999 (EPBC Act) to the Australian Government Minister for Environment Protection, Heritage and the Arts (the Minister) in February 2014. EPBC assessment 2014/7143 has been undertaken.

Matters of National Environmental Significance (Matters of NES) protected under Part 3 of the EPBC Act:

- Wetlands of international importance
- Listed Threatened species and communities
- Listed Migratory species.

The 2014 *Knox Creek Plain Public Environment Report* addresses these matters. This EMP includes management actions to meet obligations identified by KAI during the EPBC referral and subsequent assessment process.

The *May 2015 Knox Creek Plain Environmental Management Program* has been referenced in conditions issued by the Minister for the Environment under EPBC Approval 2014/7143, dated June 2015. Specific requirements under the EPBC approval relate to biodiversity, habitat and buffer management (Condition 12), weed and plant animal management (Condition 13), and stormwater, groundwater and discharge management (Condition 15).

1.2 Project description

This Environmental Management Program (EMP) addresses the environmental management associated with the development of the Knox Creek Plain (Figure 1) for irrigated agriculture. The land is currently utilised for pastoral grazing. The Knox Creek Plain development lies within

the original M2 proposal area (depicted in Figure 2) and is subject to the conditions of Statement 938 and any future advice received under the Commonwealth EPBC Act 1999 in relation to EPBC 2014/7143.

The Project includes:

- Subdivision and clearing of land for farming;
- Extension of the M2 channel from the Weaber Plain to the Knox Creek Plain;
- Construction of smaller distribution channels off the main supply channel to service agricultural land, including associated miscellaneous works;
- Construction of hillside drains to divert runoff from surrounding ranges and protect both irrigation land and new channel infrastructure from inundation;
- Construction of levee banks as required around the perimeter of agricultural land to prevent inundation of agricultural land;
- Construction of an internal drainage system to divert excess stormwater runoff from the developed area and protect irrigated land, channel and road infrastructure from long term inundation;
- Construction and operation of groundwater management and disposal infrastructure, including sub-surface drains, groundwater bores and pipelines;
- The construction of new minor (internal) roads servicing agricultural land;
- Extraction of road construction materials from one or more potentially suitable sites located within, or near the proposed development;
- Utilisation of water allocations from Lake Argyle, via the Ord River and Lake Kununurra, to irrigate crops throughout the Knox Creek Plain Development Area; and
- Provision and management of approximately 6415ha of land excluded from the farming areas as a buffer between farming areas and surrounding Conservation Areas.

Farm development involves clearing of vegetation by bulldozing and burning, removal of roots, laser levelling of the cleared area, and construction of 'on-farm' irrigation infrastructure.

Irrigation water for the development will be sourced from water released from Lake Argyle via the Ord River and Lake Kununurra. Irrigation water will be gravity-fed from Lake Kununurra to the proposed Development Area via the M2 channel.

The groundwater management strategy for the project includes dewatering from within the project area to manage groundwater levels (as outlined in the Groundwater Management Sub-plan). A Discharge Management Sub-plan has been prepared to address discharge of water into Keep River.

1.3 Location and setting

This EMP is for the area comprising the following:

- The Knox Creek Plain Buffer Area
- The Knox Creek Plain Development Area
- The M2 channel extension corridor.

The M2 channel extension corridor will extend from the existing M2 channel, constructed in 2010-2013 under the Weaber Plain development approvals. Internal farm channels will supply water south from the M2 channel extension.

The Knox Creek Plain is a predominantly flat alluvial plain with little topographical undulation and occasional rocky outcrops. The plain is predominantly covered in black soils comprised mainly of cracking clays, and is bounded to the west by the Pincombe (Goomig) Range. Pincombe (Goomig) Range is comprised of interbedded sandstone and siltstone. The Western Australian/Northern Territory border provides the eastern boundary.

The greater part of the Knox Creek Plain has no defined drainage lines. The eastern portion of the plain is drained by Knox Creek, an ephemeral watercourse draining to the east into the Keep River in the Northern Territory. Natural drainage from surrounding hills inundates the Knox Creek Plain during the wet season.

The majority of the Knox Plain is covered by tall perennial grasses with sparse emergent trees. These grasslands and very open low woodlands are the two primary habitats occurring on the Knox Creek Plain. The land has been subjected to approximately 100 years of cattle grazing.

To the north of the project area lays the Keep River, with the Keep River Plain to the north-east, within the adjacent Northern Territory.

The project area and its relativity to the Weaber Plain (Goomig) development area are depicted in Figure 1.

The environmental and socio-economic setting of the project area is described in detail in the Kinhill (2000) ERMP/Draft EIS, and the *Knox Creek Plain Public Environment Report* (2014).

Figure 1 - The Project Area: Knox Creek Plain

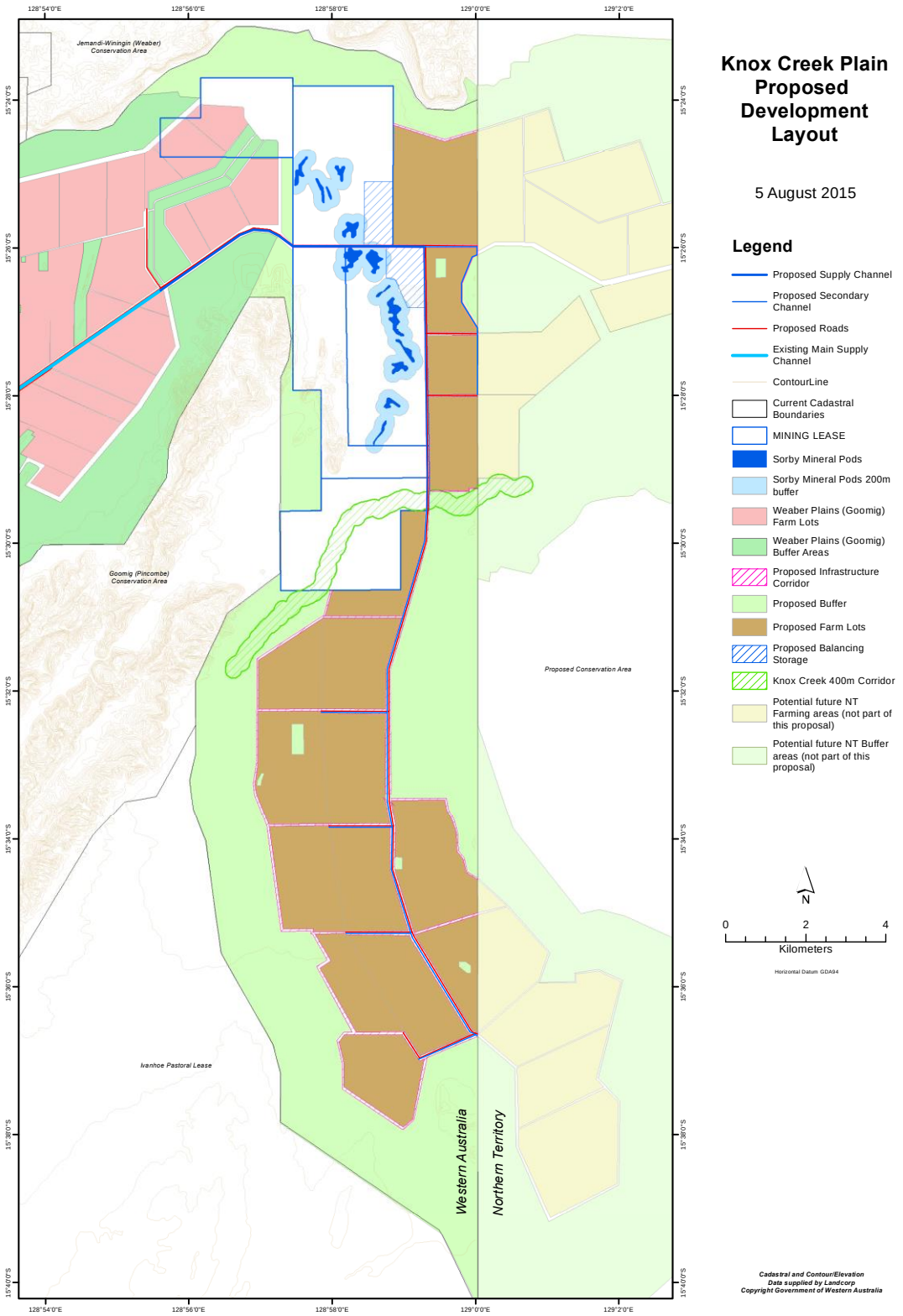
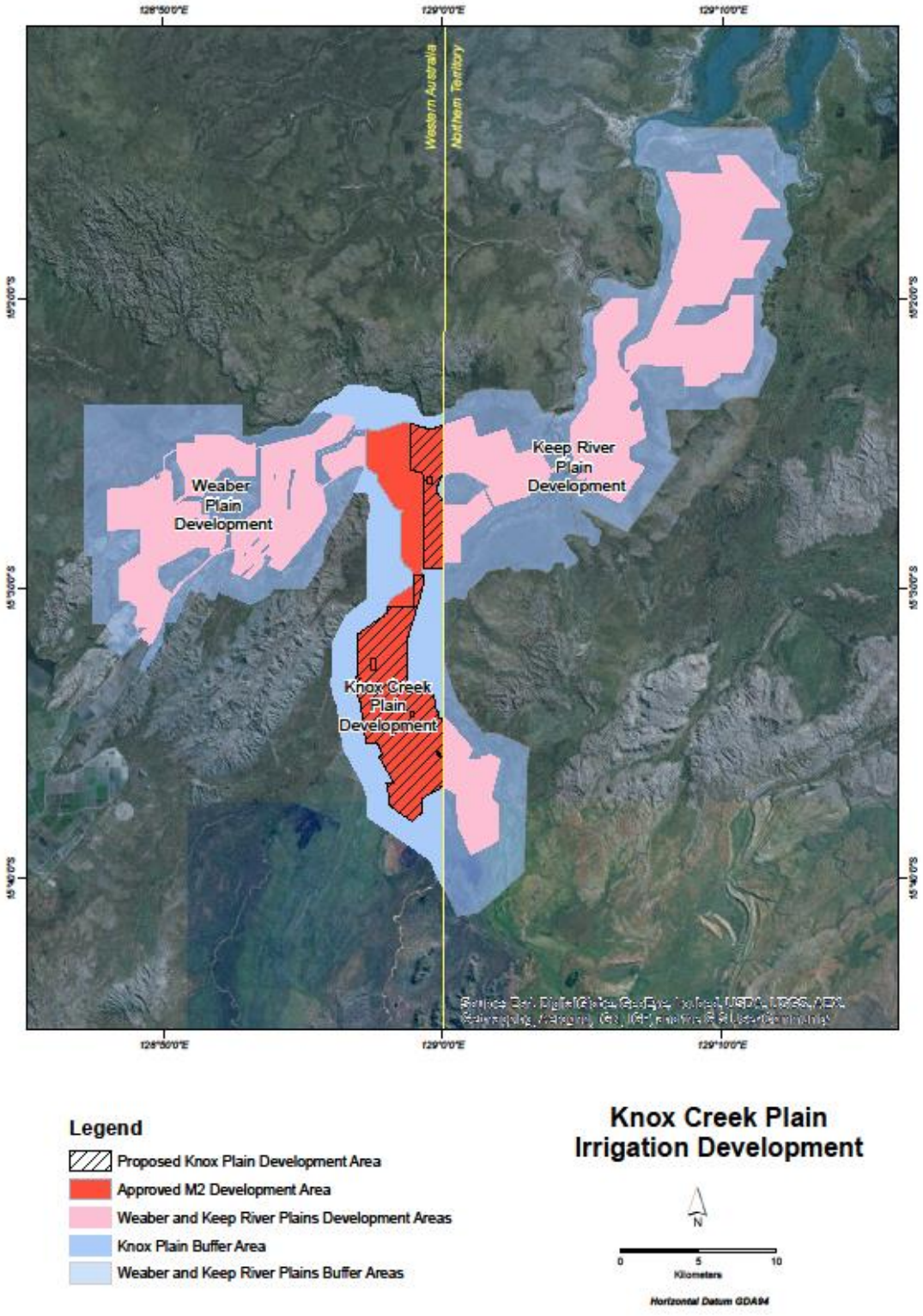


Figure 2 - The M2 Area: Weaber, Knox and Keep River Plains



1.4 Purpose and scope of EMP

This EMP has been prepared in accordance with Condition 5 of Statement 938. Its implementation is a requirement of EPBC Approval 2014/7143, issued in June 2015. The management sub-plans specify:

- environmental management measures, criteria and standards to be used to measure performance;
- remedial actions to be undertaken; and,
- performance monitoring requirements.

Any changes to the management action items and monitoring regimes outlined in this EMP must be approved by the relevant authority.

The delivery of the EMP will be within the framework established under KAI's environmental management system.

1.5 Development timeframe definitions

Management actions and monitoring regimes, including timeframes, are outlined in each management sub-plan. Table 1 provides definitions for timeframes used in this EMP.

Table 1 - Development timeframes and their definitions

#	Timeframe	Definition
1	Prior to ground disturbance	Action item/monitoring regime to commence before the start of any activity that involves clearing of vegetation, stripping/ripping of top soil, digging footings/trenches/services wells, or any other activity that alters the topography of the site.
2	Ongoing from commencement of ground disturbance	Action item/monitoring regime to start in conjunction with the first ground disturbance activities (as defined above) to occur for the Project, and will be ongoing throughout the duration of the Project.
3	Ongoing from commencement of irrigation	Action item/monitoring regime to start in conjunction with the first round of irrigation via the M2 channel undertaken in the Project area, and will be ongoing throughout the duration of the Project.
4	Prior to commencement of planting of crops	Action item/monitoring regime to commence before the start of seeding/planting of crops within the agricultural lots located within the Project area.
5	At time of sub-lease	Action item/monitoring regime to commence before any sub-lease of farm lots to a third party should this be undertaken.
6	Within one week of personnel commencing work on site	Training/induction requirement of personnel to commence within a week of commencing work.

2.0 Soil Management Sub-plan

2.1 Purpose and scope

This Soil Management Sub-plan addresses:

- sodic soil management ;
- soil erosion;
- soil conservation, repair and restoration; and
- soil chemical status.

The sub-plan relates to the Knox Creek Plain project area as depicted in Figure 1.

2.2 Environmental aspects to be managed

The following aspects of the development could potentially affect soils:

- disturbance of the soil will increase the risk of soil erosion thereby potentially affecting infrastructure and sediment loads in runoff; and,
- inadequate flushing of irrigated soils may alter the chemical status of the soil (specifically salinity and sodicity) thereby affecting crop yields.

The likely causes of disturbance that may accelerate the rate of erosion are:

- vehicular movement;
- construction activities;
- land cultivation ; and,
- operation of borrow areas.

The major control over the soil chemical status in the project area is the rate of flushing of the soil, which removes salt and excess sodium and will be managed primarily by appropriate irrigation practices.

Soil restoration will be undertaken as part of the rehabilitation process, which is described in the Rehabilitation Management Sub-plan.

2.3 Relationship to guidance material, legislation and other sub-plans

The Soil Management Sub-plan describes the actions for the prevention of erosion and monitoring of soil. Relevant monitoring programs are described in the Groundwater and Surface Water management sub-plans. The prevention of erosion from occurring within channels and from the clearing of vegetation is discussed in the Surface Water Management Sub-plan. The storage and application of chemicals (including hydrocarbons) is covered in the Chemicals Management Sub-plan. The rehabilitation of disturbed areas is covered in the Rehabilitation Management Sub-plan.

In the instance that targets specified in the Soil Management Sub-plan are exceeded, the prescribed corrective actions may, where relevant, involve verifying actions described in the Chemicals or Groundwater Management Sub-plans have been carried out in the appropriate manner.

2.4 Environmental objectives and management actions

The environmental objectives are to:

- contain disturbance of soils to construction areas;
- prevent runoff from disturbed areas causing erosion; and,
- detect any adverse changes to the soil chemical status of the soil, such as increases in sodicity or salinity.

Specific actions have been identified to assist in achieving these management objectives (see Table 2).

Note that while rehabilitation and topsoil management measures are contained within this EMP to ensure alignment with the Weaber Plain EMP and the intent of Statement 938, it is *not* intended that there will be disturbed areas outside of the Knox Creek Plain farm development areas which require topsoil management for rehabilitation.

Table 2 - Soil conservation management actions

Item	Action	Purpose	Timing
Education			
1.	Provide an Information Package to the leaseholder, which outlines: • the susceptibility of soil from disturbed areas to erosion from high intensity rainfall during the wet season • soil erosion prevention measures • irrigation strategies to reduce potential impacts of sodicity and salinity • procedures to monitor soil salinity and sodicity.	To reduce the potential for agricultural practices to result in erosion by ensuring prospective landowners are aware of the appropriate risks and management measures.	At sub-lease of lots
Induction			
2.	Induct construction personnel on soil erosion control management measures.	To reduce the potential for construction activities to result in erosion by ensuring construction personnel are aware of appropriate management measures.	Within one week of personnel commencing work on-site
Construction			
3.	Maintain records of ground disturbing activities that include the date that the boundary of clearing was delineated, the date of clearing and location of topsoil storage (if any).	To provide data to inform management.	Ongoing from the commencement of ground disturbance

Item	Action	Purpose	Timing
4.	Restrict ground-disturbing activities to the dry season wherever practicable.	To prevent ground-disturbing activities when the risk of erosion is high.	Ongoing from the commencement of ground disturbance
5.	Ensure a drainage management system that includes a sediment trap is in place around any borrow pits.	To reduce the potential for erosion of borrow pits to result in adverse environmental impacts.	Ongoing from the commencement of ground disturbance
6.	Delineate the boundaries of the vegetation to be cleared for construction in the field with flagging tape, signage or fencing.	To minimise erosion by preventing unauthorised ground disturbance.	Prior to ground disturbance
7.	Stage clearing of vegetation so that areas are cleared only as required.	To reduce the potential for erosion by minimising the area of ground surface exposed at any one time, to allow native animals the chance to move on.	Ongoing from the commencement of ground disturbance
8.	Restrict movement of construction machinery and equipment to designated tracks and roads.	To prevent unauthorised ground disturbance.	Ongoing from the commencement of ground disturbance
Topsoil			
9.	Maintain records of topsoil stockpiles that include the location of stockpile and location of where topsoil was removed from.	To ensure topsoil is utilised in the most appropriate locations.	Ongoing from the commencement of ground disturbance
10.	Remove topsoil from: • all areas to be excavated • all areas where spoil from excavation is to be stored.	To provide a natural source of seed, organic matter and microorganisms for areas to be rehabilitated.	Ongoing from the commencement of ground disturbance
11.	Stockpile cleared topsoil and subsoil separately, away from irrigation channels, for later use in rehabilitation in accordance with the Rehabilitation Management Sub-plan	To provide a natural source of seed, organic matter and microorganisms for areas to be rehabilitated.	Ongoing from the commencement of ground disturbance
12.	Install topsoil containment measures such as sediment fencing around stockpiles.	To reduce potential for erosion of topsoil stockpiles.	Ongoing from the commencement of ground disturbance
Buffer			
13.	Install signage to prevent unauthorised access to the buffer in accordance with the Buffer Management Sub-plan.	To prevent damage to the buffer from unauthorised access.	Prior to ground disturbance
Rehabilitation			
14.	Rehabilitate areas disturbed as a result of construction that are no longer required post-construction in accordance with the Rehabilitation Management Sub-plan.	To maximise the potential for successful rehabilitation.	As specified in the Rehabilitation Management Sub-plan

2.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 3) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 3 - Soil monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
Construction				
•	Soil erosion within 50 m of construction activities.	Weekly during construction	No soil erosion occurring as a result of construction activities.	1. Investigate cause of erosion. 2. Investigate ways to minimise erosion and increase landform stability. 3. Implement remedy. 4. Monitor success of remedy.
•	Management of top soil stockpiles.	Weekly during construction	Topsoil stockpiles are being managed appropriately, including no indication of erosion present.	1. Investigate cause of erosion. 2. Investigate ways to minimise erosion and increase landform stability. 3. Implement remedy. 4. Monitor success of remedy.
•	Extent of clearing and ground disturbance along pre-defined boundaries.	Weekly during construction	No clearing or disturbance outside of pre-defined farm boundaries.	5. Report as Environmental Incident and initiate Incident Procedure
Operation				
•	Soil erosion within 50 m of infrastructure (including roads, channels, sediment basins and hillside drains).	As required after construction, e.g. after significant rainfall events.	Landform is safe and stable with no soil erosion occurring as a result of runoff from infrastructure.	1. Investigate cause. 2. Identify ways reduce erosion produced as a result of infrastructure such as reducing runoff velocity, diverting runoff and application of hydromulch to areas identified as susceptible to erosion from runoff. 3. Implement remedy. 4. Monitor success of remedy.

Item	Activity and location	Frequency	Target	Corrective action
•	Surface and subsoil electrical conductivity within the project area, with a specific focus on areas with Aquitaine clay soils, including: • at least one sample from each lot • a representative spread of sites throughout the Buffer Area.	Twelve monthly, commencing prior to clearing and at the end of each dry season during operation of irrigation infrastructure.	Salinity levels do not exceed 400 mS/m in surface or subsurface soils.	1. Map the distribution of soil with salinity exceeding target levels. 2. Investigate cause (which could include determining if salinity is due to a rise in the groundwater or whether the soil chemical status is deteriorating as a result of insufficient irrigation). 3. Verify the adequacy of the estimated leaching rate (approximately 100 mm/a) in controlling sodicity in accordance with the Groundwater Management Sub-plan. 4. Identify whether remedial action is required, such as installation of field drains in accordance with the Groundwater Management Sub-plan. 5. Implement remedial action on a trial basis in areas identified from mapping. 6. Monitor success of remedy, increasing the frequency of soil monitoring if salinity exceeds target levels.

Item	Activity and location	Frequency	Target	Corrective action
•	Surface and subsoil ESP and pH within the project area, with a specific focus on areas with Aquitaine clay soils, including: • at least one sample from each lot • a representative spread of sites throughout the Buffer Area.	Twelve monthly, commencing prior to clearing and at the end of each dry season during operation of irrigation infrastructure.	Sodicity levels five years after commencement of irrigation do not exceed an ESP of 6 in surface soils or 15 in subsurface soils.	1. Map the distribution of soil with sodicity exceeding target levels. 2. Investigate cause (which could include determining if changes are consistent with the anticipated initial response to land use change, or whether the soil chemical status is deteriorating as a result of insufficient irrigation). 3. Verify the adequacy of the estimated leaching rate (approximately 100 mm/a) in controlling sodicity in accordance with the Groundwater Management Sub-plan. 4. Identify whether remedial action is required, such as application of gypsum or sulphur. 5. Implement remedial action on a trial basis in areas identified by mapping. 6. Monitor success of remedy, increasing the frequency of soil monitoring if salinity exceeds target levels.

3.0 Chemicals Management Sub-plan

3.1 Purpose and scope

This Chemicals Management Sub-plan addresses:

- chemical and fertiliser types;
- usage, method and timing; and,
- management in accordance with relevant legislation.

The sub-plan relates to the project area as depicted in Figure 1.

3.2 Environmental aspects to be managed

The following environmental aspect associated with the use of chemicals at the proposed development has been identified as requiring management:

- storage, handling and application of chemicals (including herbicides, pesticides, fertilisers and hydrocarbons) may lead to contamination of off-site areas (including groundwater and watercourses).

3.3 Relationship between this management sub-plan and guidance, legislation and other sub-plans

Action items and monitoring regimes are informed by the following legislation:

- *Agricultural and Veterinary Chemicals Code Act 1994* (Cwth) (controls the manufacture, importation, formulation, packaging, labelling and retail sale of agricultural chemicals);
- the *Aerial Spraying Control Act 1966* (WA) (controls aerial application of agricultural chemicals);
- the *Agricultural Produce (Chemical Residues) Act 1983* (WA) (relates to the prevention of chemical residue affected produce from entering the food chain);
- the *Poisons Act 1964* (WA) (controls the supply and use of 1080 and strychnine animal pest poisons);
- the *Veterinary Preparations and Animal Feeding Stuffs Act 1976* (WA) (relates to the control of use of veterinary chemicals); and,
- the Agriculture and Related Resources (Spraying Restriction) Regulations 1979 (relates to spray drift on to susceptible crops).

Relevant Australian Standards will be followed in the storage, handling, use and disposal of chemicals and hydrocarbons which are outlined below:

- *AS1940-2004: The Storage and Handling of Flammable and Combustible Liquids; and,*
- *AS2507-1998: The Storage and Handling of Agricultural and Veterinary Chemicals.*

A number of other sub-plans required under Statement 938 contain management and/or monitoring actions related to chemicals. The key sub-plans relevant to the Chemicals Management Sub-plan are the:

- Soil Management Sub-plan;
- Surface Water Management Sub-plan; and,
- Groundwater Management Sub-plan.

The Chemicals Management Sub-plan describes the procedures for appropriate storage and application of chemicals. Monitoring of the transport of chemicals into the off-site environment is specified in the Soil, Surface Water and Groundwater Management Sub-plans.

Where monitoring by these Sub-plans determines that one or more environmental targets have been exceeded, then the prescribed corrective actions may, where relevant, involve verifying that chemicals were stored and applied in the appropriate manner.

3.4 Environmental objective and management actions

The environmental objective is to ensure that chemical use in the project area does not adversely affect the health, welfare or amenity of surrounding land users or the environment.

Specific actions have been identified to assist in achieving this management objective (Table 4).

Table 4 - Chemical management actions

Item	Action	Purpose	Timing
Education			
1.	Prospective land managers will be advised of the requirement to comply with procedures for chemical application, and chemical management legislation including: • Agricultural and Veterinary Chemicals Code Act 1994 (Cwth) and associated acts and regulations • Health (Pesticides) Regulations 2011 • Aerial Spraying Control Act 1966 (WA) • Agricultural Produce (Chemical Residues) Act 1983 (WA) • Poisons Act 1964 (WA) • Veterinary Preparations and Animal Feeding Stuffs Act 1976 (WA) • Agriculture and Related Resources (Spraying Restriction) Regulations 1979.	To reduce the potential for contamination of the environment by farm chemicals by ensuring that farm owners/managers are aware of the specified procedures for chemical application in the project area and informed of their rights and responsibilities under the relevant Acts and Regulations.	At sub-lease of lots.
Induction			

Item	Action	Purpose	Timing
2.	Induct personnel on safe use of chemicals and hydrocarbon management measures, including hydrocarbon handling, disposal and spill response procedures.	To reduce the risk of contamination of the environment.	Within one week of personnel commencing work on site
Storage and transport of chemicals			
3.	Ensure storage of farm chemicals complies with relevant Australian and Western Australian Standards, including AS 2507-1998 *"The storage and handling of agricultural and veterinary chemicals"* and Department of Water *Toxic and Hazardous Substances – Storage and Use WQPN No. 65.*	To prevent potential contamination of the environment and harm to individuals by ensuring appropriate storage and handling of chemicals.	Ongoing from commencement of ground disturbance
4.	All hydrocarbons will be stored in accordance with the following: • Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 (WA) • Australian Standard AS 1940-2004: The Storage and Handling of Flammable and Combustible Liquids.	To minimise the potential for hydrocarbon contamination of the environment.	Ongoing from commencement of ground disturbance
5.	Generators will be located on bunded platforms to contain any fuel leaks.	To minimise the potential for spills and leaks to contaminate the environment.	Ongoing from commencement of ground disturbance
6.	Maintain appropriate spill response equipment and Material Safety Data Sheet (MSDS) information in all hydrocarbon storage and re-fuelling areas and maintenance areas.	To minimise the potential for spills and leaks to contaminate the environment.	Ongoing from commencement of ground disturbance
7.	Persons designated as responsible for the storage and handling of fertiliser on farms be provided with appropriate training and instruction	To prevent potential contamination of the environment by ensuring appropriate storage and handling of fertilisers.	Ongoing from commencement of ground disturbance
8.	Transport dangerous goods in accordance with the Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007 (WA).	To ensure dangerous goods are stored appropriately during transport (e.g. on absorbent material, provision of spill kit, well-ventilated, appropriate documentation and provision of personnel protection equipment for safe handling).	Ongoing from commencement of ground disturbance
9.	Notify the DER of hydrocarbon spills in accordance with the Environmental Protection (Unauthorised Discharges) Regulations 2004.	To ensure potential spills are appropriately assessed and remediated according to the Environmental Protection (Unauthorised Discharges) Regulations 2004 as hydrocarbons are a Schedule 1 Material in these Regulations.	In accordance with Incident Response Procedure

Application of chemicals			
10.	Maintain registers of all chemicals applied on-site as required under applicable chemical usage legislation.	To provide data for review if monitoring indicates unacceptable impacts to the environment.	Ongoing from commencement of ground disturbance
11.	Restrict chemical and fertiliser use when the tailwater retention capacity is unavailable	To prevent the transporting of nutrients and chemicals downstream	Ongoing from commencement of ground disturbance
12.	Commercial pesticide and herbicide spraying will be undertaken only by operators with the appropriate level of ChemCert accreditation.	To minimise spray drift.	Ongoing from commencement of ground disturbance
13.	Ensure agricultural chemicals are not directly applied to dedicated on-farm access tracks.	To prevent off-site transportation of chemicals in dust lift-off from access tracks.	Ongoing from commencement of ground disturbance
14.	Chemicals will be applied in accordance with the product label.	To prevent potential contamination of the environment by ensuring appropriate application of chemicals.	Ongoing from commencement of ground disturbance
Aerial spraying			
15.	Maintain a register of all aerial spraying operations.	To minimise potential for environmental impacts by ensuring aerial spraying is carried out in an acceptable manner.	Ongoing from commencement of ground disturbance
16.	Use accredited operators (e.g. by operators and pilots accredited under the Aerial Agricultural Association of Australia (AAAA) "Spraysafe" program)	To minimise potential for environmental impacts by ensuring aerial spraying is carried out in an acceptable manner, to determine extent of required spray fall-out monitoring.	Ongoing from commencement of ground disturbance
17.	Notify neighbours within: • 1500 m of an area to be sprayed with ultra-low volume • 750 m of an area to be sprayed with emulsifiable concentrate by air. Consideration should be given to provide a range of dates in case conditions are not conducive to safely apply the pesticide and to minimise spray drift.	To minimise the risk of adverse health effects caused by spray fall-out.	Ongoing from commencement of ground disturbance
Mixing and washdown facilities			
18.	Design chemical washdown facilities in accordance with Department of Water, Water Quality Protection Notes on: • Mechanical Equipment Washdown (WQPN No. 68) • Chemical Blending (WQPN No. 7).	To minimise potential for environmental impacts by ensuring appropriate siting (location), design and construction of chemical wash down facilities.	Prior to commencement of planting of crops
19.	All chemical blending and decanting will be undertaken within a fully-contained area.	To minimise potential for environmental impacts by ensuring chemical spills are contained.	Ongoing from commencement of irrigation
Emergency response			

20.	Develop emergency response procedures in accordance with Department of Water, Water Quality Protection Note *Contaminant spills – emergency response (*WQPN No. 10).	For determining the appropriate level of response according to the degree (or classification) of the spill.	Prior to commencement of planting of crops
Disposal			
21.	Dispose empty chemical containers in accordance with the AgSafe guidelines for disposal of containers.	To minimise potential for environmental impacts by minimising chemical residue in disposed chemical containers.	Ongoing from commencement of irrigation

3.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 5) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 5 - Chemical use monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
1.	Inspection of permanent hydrocarbon storage facilities	Three monthly	All hydrocarbon storage devices comply with appropriate standards and/or regulations	1. Non-compliant hydrocarbon storage devices to be replaced/repaired as appropriate.
2.	Survey vegetation in the Buffer Area for symptoms of damage typical of chemicals being used in the ORIA	Annually	No detectable impact on the buffer	2. Investigate the cause. 3. Investigation opportunities to prevent re-occurrences. 4. Inform farm owners of outcomes of the survey. 5. In the event of chemical discharge contrary to *Environmental Protection (Unauthorised Discharges) Regulations 2004*, report to DPW AND/OR DER.

Item	Activity and location	Frequency	Target	Corrective action
3.	Inspect storage facilities and mixing and washdown areas, and surrounds for chemical spills	Daily during spray operations Monthly at other times	No chemical spills	6. Implement emergency response. 7. Classify appropriate response. 8. Notify authorities if High or Moderate incident impact classifications. 9. Review Emergency Response Plan (for High and Moderate incident impact classes). 10. Prepare and implement follow-up environmental monitoring (in consultation with DPW AND/OR DER and DoW as required).

4.0 Dust and Particulate Management Sub-plan

4.1 Purpose and scope

This Dust and Particulates Management Sub-plan addresses:

- dust monitoring;
- management of vegetation burning to direct smoke and ash away from residential areas.

The sub-plan relates to the Knox Creek Plain project area as depicted in Figure 1.

4.2 Environmental aspects to be managed

Aspects of the proposal requiring management to mitigate potential dust and particulate generation include:

- physical disturbance of the land surface, such as earthworks for construction of project infrastructure and land-levelling, will generate dust and create exposed areas susceptible to enhanced wind erosion;
- movement of traffic on unsealed roads will generate dust;
- vegetation clearing and burning will generate dust and smoke particles and create exposed areas susceptible to enhanced wind erosion; and,
- crop harvesting and burning will generate dust and smoke particles and create exposed areas susceptible to enhanced wind erosion.

4.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

The management action items and monitoring regimes are informed by those requirements outlined in the *Bush Fires Act 1954,* and all relevant Regulations, to ensure dust and particulate emissions do not adversely affect the surrounding environment, as well as residents within, and in close proximity to, the Project area.

4.4 Environmental objectives and management actions

The environmental objective is to ensure dust levels generated by the proposal do not adversely affect the welfare or amenity of nearby residents.

Specific actions have been identified to assist in achieving this management objective (Table 6):

Table 6 - Dust and particulate management actions

Item	Action	Purpose	Timing
1.	Burning of vegetation will occur only at times when prevailing winds will direct smoke and ash away from residential areas	To minimise the potential for smoke and ash to affect nearby residents	Ongoing from commencement of ground disturbance
2.	Provide prospective farm sub-lessees documentation on practices to prevent dust emissions	To reduce the potential for dust generation by minimising ground disturbance	At time of sub-lease
3.	Proponent shall notify the nearby residences of construction activities and the predicted nature and duration of proposed burning activities	To reduce the potential for community impact by ensuring effective communication	As required
4.	Cleared construction surfaces and stockpiles will be watered and/or stabilised where practicable to reduce dust lift-off	To reduce the potential for environmental and community impacts by reducing the potential for dust generation	Ongoing from the commencement of ground disturbance during construction
5.	Speed limits will be sign-posted and implemented in the project area and will reflect local conditions	To reduce the potential for environmental impacts by reducing the potential for dust generation	Ongoing from commencement of ground disturbance

4.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 7) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 7 - Dust and particulate monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
1.	Visual monitoring	Daily during construction of shared infrastructure	No off site impact on amenity	1. Investigate cause. 2. Implement additional dust control measures, as appropriate.
2.	Monitor community issues associated with dust/burning	During construction of shared infrastructure	No public complaints relating to dust generated by the project	Public complaints will be recorded and responded to in accordance with the Community Issues Management Sub-plan.

5.0 Fire Management Sub-plan

5.1 Purpose and scope

This Fire Management Sub-plan addresses fire prevention and control in the Knox Creek Plain.

5.2 Summary of potential bush fire issues for management

Development of the irrigation farmland on the Knox Creek Plain will greatly assist the reduction in fire hazard and risk to the development footprint given the proposed change in land use from open grasslands to irrigated agriculture. The increase in the level of habitation and visitation to the site on a daily basis will reduce the time taken to initiate fire suppression activities. These factors, combined with the implementation of fire management in the Buffer Area will reduce the potential fire risk to the Project Area.

In addition, there is likely to be an increase in the number of fire fighting appliances in the area, as well as a reliable water supply, which will contribute to an increase in wildfire response efficiency.

Management for conservation of biodiversity requires a fire regime that includes appropriate intensity according to the species and communities present. Ellis et. al. (2004) concluded that the most effective management measure for protecting biodiversity is a mosaic of fire regimes that vary in time since fire, intensity, extent, and timing of fire (in terms of season). The EPA (2006) also recognised the importance of providing a fire mosaic for the conservation of biodiversity.

5.3 Environmental aspects to be managed

Aspects of the Knox Creek Plain Development requiring management, to mitigate potential impacts resulting from fire activities in the Project area, include:

- ignition of fuel or oil spills/leakages during re-fuelling of construction equipment, or ignition of other material during other construction activities with an ignition source;
- burning of vegetation as part of initial vegetation clearing activities; and,
- burning of crops as part of harvesting (e.g. sugar cane).

The likely causes of fires from fuel or oil spills/leakages are:

- inappropriate storage and handling of flammable material on-site during construction.

In addition to these aspects associated with the Project, the mitigation of the potential impact of wildfires (irrespective of the source of ignition) is addressed through the mitigation actions outlined below.

5.4 Relationship between this sub-plan and guidance, legislation and other sub-plans.

Management action items and monitoring regimes related to fire management within the Project area and surrounds have been informed by the following guidance material:

- EPA Bulletin 1243 – *Fire Management in the Kimberley and Other Rangeland regions of WA* (EPA 2006);
- *Visual Fuel Load Guide for the Kimberley Region (*DFES 2007); and,
- *Planning for Bush Fire Protection Guidelines* (WAPC & DFES 2010).

A fire break order for the Shire of Wyndham East Kimberley (SWEK) is issued annually to ensure compliance of landowners under s 33 of the *Bush Fires Act 1954*. Details are outlined in the fire break order issued by SWEK available at www.swek.wa.gov.au.

Relevant legislation that applies to fire management within the Project area includes the Bush Fires Protection Act 1954 and all relevant Regulations relating to this Act.

The main EMP sub-plan relevant to the Fire Management Sub-plan is the Buffer Management Sub-plan.

5.5 Fire management objectives and management actions

Objectives outlined in the Plan are to:

- implement key strategic low fuel buffers to prevent long, high intensity, wildfire runs;
- protect sites of cultural significance from damage by fire;
- protect infrastructure areas on the proposed development;
- minimise the extent of any wildfire entering or leaving irrigation development areas;
- discourage the fire facilitated domination of annual grass species;
- minimise the spread of exotic invasive species (e.g. buffel grass, grader grass) through inappropriate fire regimes; and,
- minimise the impact on high intensity fire vulnerable woodland tree species including tree hollows, nesting and resting sites, wetlands, and humus layer.

The implementation and management actions for fire prevention and control have been provided in Table 8. These actions form the basis of the overall fire management strategy for the proposed development and these actions can be reviewed on an annual basis as local conditions/ bylaws permit.

Table 8 - Fire prevention and control

Item	Action	Purpose	Timing
1.	Prepare Knox Creek Plain fire management plan in compliance with Shire of Wyndham East Kimberley (SWEK) and Department of Fire and Emergency Services (DFES) requirements.	To identify fire risk areas, prevention and control strategies.	Prior to ground disturbance

Item	Action	Purpose	Timing
2.	Firebreak and buffer management access construction and annual maintenance in compliance with SWEK and/or DFES requirements.	To assist in fire containment in the event of wildfire or controlled burns.	Ongoing from commencement of ground disturbance
3.	Inspect fuel hazards within various zones and implement fire hazard reduction.	To minimise risk of uncontrollable fire outbreak.	Annual
4.	Ensure correct storage and isolation of flammable substances.	To reduce risk of fire.	Ongoing
5.	Obtain fire permits for controlled burns.	To ensure compliance with local government requirements and to restrict burning to when climatic conditions are such that risk of wildfire is minimised.	Ongoing
6.	Investigate all fires originating in the Knox Creek Plain.	To prevent re-occurrence where possible.	Ongoing

6.0 Weed, Plant Pathogen and Pest Animal Sub-plan

6.1 Purpose and scope

This Sub-plan addresses Weed, Plant Pathogen and Pest Animal Management and meets the requirements of EPBC 2014/7143 Condition 13. Any changes to this sub-plan must be approved by both the WA Office of the Environmental Protection Authority and the Commonwealth Department of the Environment.

6.2 Environmental aspects to be managed

The following aspects of the Project could potentially introduce and/or encourage weeds, plant pathogens and pest animals, potentially affecting the natural environment:

- clearing during development may provide conditions more suitable for weeds and pest animals;
- vehicles/machinery and personnel movements could import and/or spread weeds and plant pathogens;
- construction of irrigation channels and infrastructure using imported materials (e.g. building materials, mulch or fill) could introduce and/or spread weeds and plant pathogens or facilitate the movement of introduced fauna ; and,
- human activity in the project area will increase the risks associated with weeds and will increase the risk of introducing feral species which may compete for habitat and food and prey on native species.

6.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

Relevant legislation relating to the management of weeds, pest animals and plant pathogens within the Project area are outlined below.

Table 9 outlines those priority levels/categories as listed under relevant legislation.

- *Biosecurity and Agricultural Management Act 2007 WA* (manages spread and controls pest plant and animal species, replaces *Agricultural and Related Resources Protection Act 1976*).
- *Plant Diseases Act 1914 WA*.

Table 9 - Priority levels/categories for weed, plant pathogen and pest animal species as listed under legislation

Priority level/ Category	Description	Relevant legislation
Plant species		
P1	Prevention of trade, sale or movement.	*Biosecurity and Agricultural Management Act 2007 WA*
P2	Eradicate - Serious weeds which are not yet widely established in WA.	
P3	Control - Serious weeds which cannot be eradicated in the short term, but must be kept under control.	
P4	Contain - Well-established plants where reducing the infestation is either impractical or uneconomical.	
P5	Weeds to be controlled on public land or land under the control of a local government.	
Prohibited	Plant species on the Permitted and Prohibited list not permitted entry into WA.	*Plant Diseases Act 1914* (WA)
Unassessed	Plant species declared in other States and Territories that are not on the Permitted and Prohibited list, are unassessed and are prohibited until accessed via a weed risk assessment.	
Pest animals		
A1	Entry prohibited.	*Biosecurity and Agricultural Management Act 2007 WA*
A2	Subject to eradication in the wild.	
A3	Keeping prohibited.	
A4	Entry subject to Department of Agriculture and Food permits and/or conditions.	
A5	Numbers will be reduced/ controlled.	
A6	Keeping subject to Department of Agriculture and Food permits and/or conditions.	
A7	A management program for each species outlines the area and conditions under which controls may be applied. Programs are for the whole of the State or as indicated for each species.	

Management action items and monitoring regimes have been formed by the following guidance material to ensure compliance to legislative requirements and ministerial conditions. Guidance material includes:

- *The Environmental Weed Strategy for Western Australia* (CALM 1999) outlines strategies for recording and controlling the spread of pest plant species;
- *National Weeds Strategy Executive Committee (NWSEC)*; and,
- *DAFWA Environmental Best Practice Guidelines 9.0 – Weed and Pest Management.*

This sub-plan has been prepared in conjunction with a number of other sub-plans that are also a requirement of Statement 938. The main Management Sub-plans considered relevant to the Weed, Plant Pathogen and Pest Animal Sub-plan are the:

- Buffer Management Sub-plan;

- Rehabilitation Management Sub-plan;
- Biodiversity and Habitat Management Sub-plan; and,
- Surface Water Management Sub-plan.

6.4 Environmental objective and management actions

The objectives of the Weed, Plant Pathogen and Pest Animal Management Sub-plan are to:

- prevent the introduction of new weed, plant pathogen and pest animal species to the project area;
- identify and implement quick control of new potential incursions for the containment of inadvertent quarantine breaches;
- minimise the risk of spreading weed species to the Knox Creek Plain Buffer Area; and,
- minimise the effect of pest animals on native fauna.

Specific actions have been identified to assist in achieving these management objectives (Table 10):

Table 10 - Weed, plant pathogen and pest animal management actions

Item	Action	Purpose	Timing
Baseline information			
•	Conduct a weed survey to establish baseline information (i.e. Declared weed species and density/cover/distribution of weeds) and identify Priority Areas for management and control. Priority Areas will be defined by: • weed infested areas (e.g. monocultures of Parkinsonia; weed density/cover greater than 50%) • areas that have declared noxious weed species and Weeds of National Significance (WONS) • areas declared as local priority in consultation with DPaW, DAFWA and Ord Land and Water Inc.	To provide data to inform management.	Prior to ground disturbance
•	Establish permanent weed survey transects within 100 m into the Knox Creek Plain Buffer Area.	To ensure repeatability of ongoing weed monitoring.	Prior to ground disturbance
•	Conduct weed surveys along permanent weed survey transects (and opportunistically between permanent weed survey transects) to establish baseline information (i.e. weed species and density/cover/distribution of weeds) and identify and update Priority Areas for management and control.	To provide data to inform management.	Annually, from commencement of ground disturbance

Item	Action	Purpose	Timing
•	Update the extent of Priority Areas which will be defined by: • weed infested areas (e.g. monocultures of neem trees, weed density/cover greater than 50%) • areas that have declared noxious weed species and Weeds of National Significance (WONS) • areas declared as local priority in consultation with DPaW, DAFWA and Ord Land and Water Inc.	To provide data to inform management.	Annually, from commencement of ground disturbance
•	Develop and undertake a weed control program in Priority Areas with the exception of roads.	To ensure effective control of weeds by the appropriate parties.	Prior to ground disturbance
Induction			
•	Implement an induction program for personnel which contains information on: • hygiene procedures for all vehicles, machinery and equipment upon entering and leaving the Knox Creek Plain Development Area and/or Priority Areas • specific soil management requirements in Priority Areas • requirement to remain within designated clearing areas.	To reduce the risk of construction activities introducing and/or spreading weeds and plant pathogens by ensuring construction personnel are aware of appropriate management measures and requirements.	Within one week of personnel commencing work on-site
Education			
•	Prepare guidelines for prospective farmers/lessees that contains information on: • vehicle hygiene measures (e.g. issues of using machinery from southern WA or interstate) • identification, control and reporting of weeds (e.g. weed control in tail water ditches, use of fire) • identification and reporting of pest animals, declared noxious weed species and signs of plant pathogens • obligations under the Agricultural and Related Resources Protection Act 1976 (WA) (including the requirement for the occupier of any private land to control declared plants and declared animals on and in relation to that land) • selection of pet animals (e.g. discourage cat ownership) • selection of crops (e.g. no declared noxious weed species) • irrigation and drainage of land (i.e. no water from farming allotments directed into the Knox Creek Plain Buffer Area).	To reduce the risk of agricultural activities introducing and/or spreading weeds, plant pathogens and pest animals by ensuring farm owners/managers are aware of appropriate management measures and requirements.	At time of sub-lease

Item	Action	Purpose	Timing
Irrigation channel			
•	Aquatic weed control shall be undertaken consistent with industry standards	To reduce the risk of aquatic weeds being introduced into/ spread throughout natural watercourses and wetlands near the project area.	Ongoing from commencement of irrigation
Hygiene			
•	Restrict movement of vehicles and machinery to the limits of the areas to be cleared (thus not affecting the Knox Creek Plain Buffer Area) by delineating the Knox Creek Plain Buffer Area (e.g. fence, flags and signs) prior to clearing.	To reduce the risk of weeds being introduced into/ spread throughout the Buffer Area by limiting access.	Ongoing from commencement of ground disturbance
•	Access into the Knox Creek Plain Buffer Area will be via designated access tracks only.	To reduce the risk of weeds being introduced into/ spread throughout the Buffer Area by limiting access.	Ongoing from commencement of ground disturbance
•	Clean down all large machinery entering the Knox Creek Plain Development Area for the first time, to remove vegetative matter, seeds and soil. Each vehicle will be given a 'hygiene sticker' indicating that they have been checked and assessed for hygiene performance.	To prevent the introduction/ spread of weeds and plant pathogens in the project area.	Ongoing from commencement of ground disturbance
Imported material			
•	Certify all soil and fill material sourced from outside the project area as disease and weed free in accordance with DAFWA and DPW AND/OR DER requirements. If certificates cannot be obtained a risk assessment will be carried out on the soil material and only material that is evaluated as a very low risk of having environmental or declared noxious weeds or plant pathogens will be permitted for use.	To prevent the introduction/ spread of weeds and plant pathogens in the project area.	Ongoing from commencement of ground disturbance
•	Inspect borrow pits and borrow pit access tracks prior to disturbance to ensure weed species are not present. If any weeds are present, they will be cleared and controlled (e.g. physical removal, spray, disposal off-site, burning) from the affected areas prior to commencement of borrow extraction.	To prevent the introduction/ spread of weeds and plant pathogens in the project area.	Prior to ground disturbance
Rehabilitation			
•	Rehabilitate disturbed areas that are not to be utilised post-construction in accordance with the Rehabilitation Management Sub-plan.	To re-establish native vegetation and reduce and control weed cover.	During construction
Pest animals			
•	Ensure that waste that may attract pest animals is properly disposed of as far as is practicable.	To prevent the encouragement of pest animals by ensuring effective waste disposal.	Ongoing from commencement of ground disturbance

Item	Action	Purpose	Timing
•	Undertake pest eradication program within Buffer Area.	To reduce the risk of pest animals becoming established within the Buffer Area.	Ongoing from commencement of ground disturbance
•	Install signs at the entry point to any access tracks in the Knox Creek Plain Buffer Area to discourage people from entering the area.	To reduce the risk of feral cats and dogs becoming established in the Buffer Area.	Prior to commencement of planting of crops
•	Ensure stock are removed from the Buffer Area.	To remove stock as an ongoing source of land degradation and a vector for introducing and spreading weeds throughout the Buffer Area.	Ongoing from commencement of ground disturbance

6.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 11) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 11 - Weed, plant pathogen and pest animal monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
1.	Weed species found along permanent weed survey transects in the buffer	Annually	No new plant pathogens or weed species observed or recorded in the mapped area during construction. No new Priority Areas during construction.	3. Map the extent of any new Priority Areas. 4. Map the distribution of the newly introduced species. 5. Identify activities that may have potentially introduced the species. 6. Plan and implement a monitoring or control treatment program. 7. Re-educate contractors/farm owners/managers of the importance of hygiene control measures.

Item	Activity and location	Frequency	Target	Corrective action
2.	Density/cover/distribution of weed species in the permanent weed survey transects and common use infrastructure areas.	Annually	No more than a 10% statistical increase in weed species density/ cover/distribution compared to the results of initial weed survey. No new Priority Areas	8. Map the extent of any new Priority Areas. 9. Map the revised extent of the specific weed species within the site. 10. Identify activities that may have potentially spread the weed species. 11. Plan and implement a weed control treatment program. 12. Apply hygiene control and education measures.
3.	Presence of declared weeds in farm lots.	As required	No declared weed species present.	13. Notify DAFWA if required. 14. Investigate cause. 15. Undertake weed control in accordance with DAFWA requirements. 16. Monitor success of weed control.
4.	Feral animals (including stock) in the Knox Creek Plain Buffer Area	As required	No new pest animals or sightings of feral animals	17. Investigate cause. 18. Undertake eradication program as required. 19. Undertake intervention or remediation works (e.g. reduce bins, trapping, re-education).

7.0 Surface Water Management Sub-plan

7.1 Purpose and scope

This Surface Water Management Sub-plan relates to the Knox Creek Plain Project area as depicted in Figure 1.

7.2 Environmental aspects to be managed

The following aspects of the development could potentially affect surface water:

- increased rates of erosion or deposition will affect the stability and function of natural watercourses; and,
- contamination of drainage water will cause a loss of water quality in natural watercourses.

The likely causes of disturbance that may accelerate the rate of erosion/deposition are:

- increase in the volume of water flowing along Knox Creek from drainage discharge;
- exposure of erodible surfaces from construction activities; and,
- alteration of flood hydrography and increase in runoff from improved drainage network throughout the catchment.

Potential causes of drainage water contamination are primarily:

- hydrocarbon spills during construction; and,
- first flush runoff from farmland entering Knox Creek.

7.3 Relationship between this management sub-plan and guidance, legislation and other sub-plans

The main sub-plans considered relevant to the Surface Water Management Sub-plan are the:

- Chemicals Management Sub-plan
- Soil Management Sub-plan

The Surface Water Management Sub-plan addresses the monitoring and protection of aquatic fauna and water quality downstream of the project area. The primary risks to aquatic fauna and water quality downstream of the project area are contamination by chemicals and sedimentation. Management of these risks is addressed in the Soil and Chemicals management sub-plans. The Chemicals Management Sub-plan addresses the storage, handling and application of chemicals that will be used on farms and during construction, including herbicides, pesticides, fertilisers and hydrocarbons. The Soil Management Sub-plan contains procedures to prevent erosion and to minimise the potential for sediment-laden runoff to enter watercourses and wetlands downstream of the project area.

Where targets in the Surface Water Management Sub-plan are exceeded, the prescribed corrective actions may involve verifying actions described in the Chemicals Management Sub-plan (e.g. to determine whether application of chemicals was carried out in the appropriate manner) or the Soil Management Sub-plan (e.g. to ensure erosion prevention measures were implemented).

KAI will utilise the expertise of the Independent Review Group (IRG) required under EPBC 2014/7143 to review surface water management practices in relation to the impact on threatened species known to inhabit the Keep River.

7.4 Environmental objectives and management actions

The environmental objectives are to:

- minimise the potential for sedimentation of nearby waterways;
- minimise the potential for chemical contaminants to enter nearby waterways; and

- minimise the potential for deterioration to the biological health of downstream riverine environments.

Specific actions have been identified to assist in achieving these management objectives (Table 12).

Table 12 - Surface water management actions

Item	Action	Purpose	Timing
Induction			
1.	Induct personnel on surface water management measures.	To reduce the potential for activities to adversely affect surface water values by ensuring personnel are aware of appropriate management measures.	Within one week of personnel commencing work on-site
Flood protection			
2.	Construct levees at the perimeter of farmland adjacent to Knox Creek to protect them from 1 in 20 year ARI flooding.	To protect farmland, prevent sedimentation of farm soil in Border Creek or the Keep River system.	Prior to commencement of planting of crops
3.	Locate all drains on less permeable soils to minimise seepage to groundwater where possible. Where deeper drains are required, the excavated surface of the drain will be compacted to reduce seepage.	To reduce accessions to groundwater.	Prior to commencement of planting of crops

7.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 13) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 13 - Surface water monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
1.	Inspect areas along the banks of channels, watercourses and drainage devices downstream and adjacent to the project area for evidence of erosion.	Ongoing from commencement of ground disturbance	No exposed surfaces outside the channel from which erosion could occur	1. Investigate cause. 2. Implement erosion protection measures, such rock armouring or application of hydromulch to areas identified. 3. Monitor the effectiveness of remedy.

8.0 Groundwater Management Sub-plan

8.1 Purpose and scope

This Sub-plan addresses Knox Creek Plain groundwater management. This plan does not detail the methodology of monitoring programs or design characteristics; these will be continuously refined based on future monitoring and modelling results in consultation with an Independent Review Group (IRG) to be established under EPBC approval 2014/7143.

The Groundwater Management Sub-plan has been included in this EMP for the purpose of protecting Matters of National Environmental Significance in the Keep River. KAI will also monitor groundwater for practical and sustainable land management outcomes.

8.2 Relationship between this sub-plan and guidance, legislation and other sub-plans

Relevant management plans that contribute to protection of groundwater quantity and quality within the Project area and surrounding environment include:

- Chemicals Management Sub-plan - to ensure that chemical storage and application is being undertaken in the appropriate manner;
- Soil Management Sub-plan - describes procedures for the prevention of soil erosion and details soil monitoring and management measures;
- Discharge Management Plan – describes requirements for managing tailwater and stormwater as well as any future groundwater discharge;
- Buffer Management Sub-plan - outlines the requirement for vegetation condition monitoring, which may identify any potential vegetation health issues associated with groundwater accretion and salinity; and,
- Aquatic Fauna Management Plan (prepared separately under the requirements of EPBC 2014/7143) - outlines specific management and monitoring measures that will be implemented for the protection of the EPBC listed species.

8.3 Environmental aspects to be managed

An environmental aspect is an element of a proposal which has the potential to impact the environment. The following aspects of the Project could potentially affect groundwater:

- clearing and irrigation of agricultural lots will increase groundwater accession leading to a rise in groundwater levels, potentially resulting in waterlogging of soils and an increase in base flow into the K4 pool;
- application of agricultural fertilisers and agrochemicals may lead to a change and/or contamination of surface and groundwater; and,
- spills of hydrocarbons may lead to contamination of groundwater.

8.4 Environmental objectives

The environmental objective for the management of groundwater is to ensure changes to the groundwater regime (quantity and quality) resulting from the Proposal does not significantly adversely affect:

- vegetation (including crops) or fauna habitat within the Development area or adjacent Buffer areas;
- downstream riverine environment and its flora and fauna; and,
- EPBC listed threatened aquatic fauna species in the Keep River.

8.5 Management actions and monitoring regime

In order to build upon current knowledge and assist future management, the following actions/studies to manage, monitor and understand groundwater with respect to the Proposal have either commenced or already been undertaken:

- Assessment of Water Level and Water Quality Changes on the Knox Plain using the Weaber Knox Aquifer Model (CyMod, 2014)
- delineation Airborne Electromagnetic (AEM) surveys and drilling within the Proposal area to determine the position of the palaeochannel and related aquifers (Lawrie et al. 2010; George et al. 2011)
- determination of the hydraulic characteristics of the palaeochannel (Paul et al. 2011)
- a trial dewatering program to model the effects of dewatering within the palaeochannel (Paul et al. 2011)
- development of a refined groundwater model for the Weaber Plain and utilisation of the model to run a number of development and management scenarios determined with guidance and feedback from a Technical Review Group (TRG) (KBR 2011a)
- investigation of methods to reduce channel leakage (e.g. clay lining)
- expansion and intensification of the monitoring bore network, including baseline sampling
- detailed water quality and aquatic fauna sampling of the downstream receiving environment (Border Creek and Keep River).

8.5.1 Management measures/strategy

In addition to the above, a number of design and Best Management Practice measures will be implemented to mitigate potential impacts to groundwater, potentially including:

- deferment of clearing in some areas where salinity, bedrock or groundwater conditions are considered a higher risk. Interim vegetation retention areas may be implemented until it can be demonstrated that there will be no groundwater and soil salinity impacts after applying the above measures;

- cropping with deep-rooted perennial species or revegetating the areas with commercial tree crops (e.g. mahogany), or similar, to manage recharge, if required;
- minimising seepage rates from the supply channel;
- recycling irrigation tailwater on farm;
- designing tailwater systems to capture runoff events ;
- managing water delivery and allocation standards as required by relevant Department of Water (DoW) licensing; and,
- implementation of pumping in the event that groundwater level and quality risks cannot be appropriately managed through the application of the above measures.

8.5.2 Management and monitoring actions

The management and monitoring actions required to meet the environmental objectives are described in Table 14.

Table 14 - Groundwater management and monitoring actions

Item	Action	Purpose	Timing
Groundwater levels and quality (as it relates to salinity management)			
1.	Expand the groundwater monitoring bore network to include: • 'high intensity' regional bores (ie, auto loggers installed) • 'low intensity' regional bores (ie, no auto loggers but monitored manually).	To allow the collection of baseline and ongoing groundwater data to guide management.	Install prior to commencement of clearing of farm lots, a minimum of 18 months prior to irrigation.
2.	Undertake monitoring of the parameters below for bores established under Item 1. High intensity bores: • groundwater levels and temperature (automatic, daily) • EC, pH, TDS, nutrients and pesticides seasonally Low intensity bores: • groundwater levels, EC, pH, TDS, nutrients and pesticides seasonally.	To collect baseline and ongoing groundwater data to determine any adverse effects to the receiving environment as a result of the Proposal.	Commencing 18 months prior to commencement of irrigation.
3.	Expand the groundwater monitoring bore network with the establishment of at least one 'on-farm' bore per farm.	To allow the collection of baseline and ongoing groundwater data to inform management.	Install after clearing of farm lots but prior to commencement of irrigation.
4.	Determine sampling parameters for 'on farm' bores in including: • groundwater levels • EC • pH.	To inform management.	Prior to commencement of irrigation and annually after the commencement of irrigation.

Item	Action	Purpose	Timing
5.	Undertake monitoring of the bores established under Item 3 for physical, chemical and nutrient parameters as determined by any DoW licence conditions if regional bore ground water quality exceeds triggers.	To increase the monitoring spatial intensity to help determine location and reasons for exceedance. To assist with development of appropriate contingency action.	Annually at commencement of dry season once trigger has been exceeded.
6.	Maintain a database of groundwater levels and groundwater quality data based on monitoring results.	To provide data to inform management. To be used in combination with high and low intensity bores where exceedances of triggers are defined.	Ongoing – database to be updated at least every six months with the database to be established prior to clearing.
7.	Establish and maintain a database of groundwater chemical and nutrient parameters.	To provide data to inform management.	Ongoing – database to be updated annually.
8.	Update groundwater model and operation of groundwater management system with monitoring data	To assist in determining an optimal dewatering strategy and to forecast potential breaches of trigger values within a ten year period.	Prior to commencement of irrigation and subsequently every 2–4 years depending on monitoring trends. If worst case scenario indicated a breach in trigger levels, modelling must be updated every two years.
9.	Define the conditions at which various irrigation methods can be utilised for Knox Creek Plain farms, based on the outcomes of modelling undertaken.	To maximise water use efficiency and minimise potential environmental impacts of shallow groundwater levels by managing irrigated agriculture and/or cropping systems where required, e.g. on leased farms.	Review every five years in association with modelling from the commencement of irrigation.
10.	Adopt water quality trigger values established under the requirements of EPBC Approval 2010/5491.	To ensure monitoring and management responses relate to appropriate trigger levels.	Ongoing.

† 'High intensity' bores – equipped with automatic data loggers which record groundwater levels and temperature; 'Low intensity bores' – not equipped with data loggers- sampled manually. * IRG – Independent Review Group; DoW – Department of Water, WSP – Water Service Provider. #EC – electrical conductivity, Pesticides – indicator of multiple herbicides, insecticides, fungicides, Chemicals – includes hydrocarbons. [5] '

Table 15 - Contingency actions

Item	Trigger	Corrective action	Timing
1	Groundwater levels, soil salinity and quality exceed or are likely to exceed trigger levels	1. Investigate cause. 2. Implement actions consistent with the Weaber Plain Groundwater Management Plan (e.g. modify land use/irrigation strategies, groundwater extraction). 3. Document changes in Annual Environmental Report (AER).	Refer Weaber Plain Groundwater Management Plan

Item	Trigger	Corrective action	Timing
2	Levels of chemicals and nutrients exceed scenarios that show: • an increasing trend in the concentration of any chemical (at statistical confidence levels) • an exceedance of the site-specific triggers for a particular chemical over two consecutive years.	1. Implement Item 6 (Table 14) to better map the distribution of groundwater exceeding target levels. 2. Investigate cause. 3. In consultation with the IRG, identify remedial action required, which could include the modification of irrigation and agricultural practices, reducing or ceasing the use of fertiliser and/or chemicals, groundwater abstraction or a combination of these measures. 4. Implement remedial action immediately after trigger levels are exceeded or, in consultation with the IRG, at an appropriate time. 5. Monitor success of remedy quarterly for 12 months or, following consultation with the IRG and in accordance with the advice from the IRG, in relation to the impacts of MNES in the Keep River. 6. Document changes in Annual Environmental Report (AER).	Refer Weaber Plain Groundwater Management Plan

9.0 Discharge Management Sub-plan

9.1 Purpose and scope

This Discharge Management Sub-plan (DMP) addresses stormwater and groundwater discharge. The expertise of the IRG will be adopted to review discharge management decision-making in relation to impacts on the Knox Creek Plain aquatic MNES.

This Sub-plan describes the processes for monitoring and management of discharge into the Keep River. This plan sets out the framework and foundation for monitoring and design characteristics which will be continuously refined based on future monitoring and modelling results.

9.2 Environmental Aspects to be managed

The following broad environmental aspects of the development could potentially affect Knox Creek and Keep River water quality:

- Discharge of stormwater from the Project area to Knox Creek; and,
- Discharge of surplus groundwater from the Project area to the Keep River.

9.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

This Sub-plan addresses the management and monitoring of stormwater runoff and, if necessary, the discharge of surplus groundwater, to protect water quality which may potentially affect EBPC listed species in the Keep River and Knox Creek downstream of the Project Area.

The main sub-plans considered relevant to the discharge management plan are:

- Groundwater Management Sub-plan - describes the procedures for monitoring and management of groundwater levels and quality within the Project Area (including groundwater accretion and salinity issues) and possible changes to groundwater baseflow into the K4 Pool;
- Surface Water Management Sub-plan - addresses the management of surface water within the Project Area as well as the effects of flood protection infrastructure and stormwater management infrastructure surrounding the Project Area;
- Chemicals Management Sub-plan to ensure that chemical storage and application is being undertaken in the appropriate manner.
- Soil Management Sub-plan - describes procedures for the prevention of soil erosion and details soil monitoring and management measures; and,
- Aquatic Fauna Management Plan, approved by the Commonwealth Minister for the Environment under EPBC Approval 2014/7143 - outlines specific management

and monitoring measures that will be implemented for the protection of the EPBC listed species.

Where targets in the discharge management plan are exceeded, the prescribed corrective actions may, where relevant, involve verifying actions contained in the Groundwater Management Sub-plan, Surface Water Management Sub-plan, Chemicals Management Sub-plan, Aquatic Fauna Management Plan or the Soil Management Sub-plan.

9.4 Environmental Objectives

The environmental objective of this plan and the implementation of other related plans is to ensure changes to the water quantity and quality regime within the Border Creek–Keep River system does not adversely affect the downstream environment, which supports EPBC listed species.

Specific monitoring and mitigation measures have been developed to ensure the achievement of this management objective.

9.5 Management actions

The following management actions have commenced and/or have already been completed, contributing to the current knowledge of the Keep River and potential management of discharge:

- Assessment of Water Level and Water Quality Changes on the Knox Plain using the Weaber Knox Aquifer Model (CyMod, 2014)
- Development of a refined groundwater model for the Weaber Plain and utilisation of the model to run a number of development and management scenarios determined with guidance and feedback from a Technical Review Group (TRG) (KBR 2011b)
- Detailed water quality and aquatic fauna sampling of the downstream receiving environment (Border Creek and Keep River) (Bennett & George 2011; WRM 2011)
- Keep River Catchment: River and Hydrodynamic modelling (GHD 2011a)
- Hydrological regime of the Border Creek and Keep River System (GHD 2011b)
- Ord Stage 2 M2 Area Hydrodynamic Studies (KBR 2006).

Additional and ongoing groundwater management actions that will be implemented are outlined in Table 16.

Table 16 - Discharge management actions

Item	Action	Purpose	Timing
1.	Construct a tailwater retention area on each farm lot sufficient to retain stormwater runoff during the periods most critical (low flow periods) to the Keep River system.	Capacity to manage runoff to avoid transporting chemicals downstream.	Prior to commencement of irrigation
2.	No usage of chemicals and fertilisers when the tailwater retention capacity is unavailable.	To prevent the transporting of nutrients and chemicals downstream.	Ongoing from commencement of farming
3.	Provide an Information Package to prospective landowners/lessees, which: • outlines the susceptibility of soil to erosion from high intensity rainfall during the wet season • encourages maintenance of crop cover during the wet season to reduce soil erosion • outlines optimal irrigation strategies to reduce potential impacts of sodicity and salinity • includes information regarding identification of salinity and sodicity and mechanisms to report this to the Proponent.	To minimise the potential for agricultural practices to result in erosion by ensuring prospective landowners are aware of the risks and appropriate management measures.	At sublease of farm lots
4.	Adopt water quality trigger levels, as developed in consultation with the IRG under EPBC Approval 2010/5491 and EPBC 2014/7143.	To manage the discharge of stormwater and surplus groundwater to protect the downstream environment and EPBC listed species.	Prior to commencement of irrigation
5.	Establish and update annually, a list of key analytes (chemicals and nutrients) to be sampled, based on-farm practices as part of ongoing water quality monitoring.	To ensure key chemicals and nutrients are included in water quality monitoring.	Prior to commencement of planting of crops, then ongoing annually
6.	Install a water quality and flow gauging station at the stormwater outlet from the Development Area.	To determine flow rate from the Project Area to inform management.	Prior to commencement of planting of crops
7.	Monitor water quality at the stormwater outlet from the Development Area.	To determine salinity and nutrient contribution from the Project Area to inform management.	On a flow proportional basis (with the ability to sample sub-daily as required)
8.	Monitor water flow at the stormwater outlet from the Development Area and the Keep River.	To preserve and protect the water quality of the Keep river and EPBC listed species, prevent erosion of the banks of the Keep River and provide maximum mixing potential.	Ongoing from commencement of irrigation

Item	Action	Purpose	Timing
9.	Develop and implement an adaptive groundwater and stormwater discharge program that addresses: • design and location of dewatering infrastructure • design and location of discharge infrastructure • discharge rates, rules and contingency actions • monitoring locations and requirements including infrastructure and setup • written evidence of any Northern Territory Government permits that are required for discharge of groundwater • management measures that ensure discharge of water will not impact on water quality in Border Creek/Keep River; this includes erosion protection measures.	To provide information for adaptive management of the discharge of stormwater and surplus groundwater.	Ongoing and prior to the commencement of stormwater and groundwater discharge from operational farms
10.	Refine the discharge dilution model/relationship based on river flow and water quality monitoring data	To determine when flow rates at the Keep River fall below a minimum flow rate to enable flushing.	Prior to the commencement of irrigation
11.	Refine the discharge dilution model/relationship based on flow monitoring data from the development area and the Keep River system and water quality characteristics of stormwater from the development area	To determine when flow rates at the Keep River fall below a minimum flow rate to enable flushing.	On a seasonal basis, commencing 12 months after the commencement of irrigation
12.	Review/refine trigger values for the Keep River pools.	To update discharge model.	Annually

9.6 Monitoring regime, targets and corrective actions

The proposed monitoring regime includes activities to be performed throughout the life of the project; should water quality triggers be exceeded at the pools or estuary, corrective action/s will be undertaken (Table 17). The monitoring regime will be further refined in the years prior to commencement of farming operations to ensure discharge from the Proposal does not adversely affect native flora and native fauna habitat (particularly EPBC listed species).

Table 17 - Discharge monitoring regime and corrective actions

Item	Activity and location	Frequency	Target	Corrective action
1.	Telemetered flow monitoring at the development gauge, and the existing gauging station on the Keep River and in groundwater discharge pipe.	Continuous (hourly) flow monitoring when stormwater or groundwater discharge occurs.	No discharge of surplus groundwater to the Keep River unless there is sufficient threshold natural flow. No significant impact on the health of aquatic ecosystems from stormwater and surplus groundwater.	7. Investigate cause. This could include examining management practices and identifying instances where water may have been unnecessarily discharged during low flow periods. 8. Conduct an intensive water quality sampling program upstream and downstream of the discharge point. 9. Immediately initiate processes to identify whether remedial action is required, in consultation with the IRG. Remedial actions could include: • releasing irrigation water from the M2 channel into Knox Creek • increasing groundwater pumping into the Ord Stage 1 or 2 supply channel during periods of low river flow • installing additional erosion protection • educating farm owners/managers • revision of management practices (including groundwater discharge rules). 10. Implement remedial action/s. 11. Monitor success of remedial action/s quarterly for a period of 12 months 12. Report on any findings as a result of monitoring.

Item	Activity and location	Frequency	Target	Corrective action
2.	Utilise the aquatic ecology monitoring conducted under EPBC Approval 2010/5491 as an indicator of the outcomes of the combined Weaber and Knox management.	Ongoing	No detrimental change in the AUSRIVAS macroinvertebrate category and in fish assemblage composition that is caused by the action. This can be resulting from stormwater, surplus groundwater and groundwater seepage increases, as compared against reference sites that reflect natural variability in ecosystem health.	13. Immediately investigate cause over a period of at least 12 months through reviewing management practices and determining whether ecological health of aquatic fauna has deteriorated. 14. Identify remedial action required. Remedial actions could include: • releasing irrigation water from the M2 channel into Border Creek to flush fresh water to the Keep River • increasing the pumping rates of the eastern bores to reduce groundwater seepage • increasing groundwater pumping into the Ord Stage 1 or 2 supply channel during periods of low river flow • potentially, pending analysis, discharging groundwater into the lower Keep River estuary • installing additional erosion protection • educating farm owners/managers • revision of management practices (including groundwater discharge rules) • review flow monitoring data. 15. Implement remedial action/s, as required, immediately or at a time determined with the IRG to be appropriate. 16. Monitor success of remedial action/s at least quarterly for 12 months. 17. Report on any findings in Annual Environmental Report (AER) as a result of monitoring.

10.0 Biodiversity and Habitat Management Sub-plan

10.1 Purpose and scope

This sub-plan relates to biodiversity and habitat management in the Knox Creek Plain Project area as depicted in Figure 1.

10.2 Environmental aspects to be managed

The following aspects of the development could potentially affect biodiversity and habitat values:

- disturbance within the project area and Buffer Area will cause a loss of available habitat, which has the potential to affect biodiversity; and,
- inappropriate clearing, handling and storage of topsoil will affect the outcome of rehabilitation within the project area.

Soil restoration will be undertaken as part of farm management and/or the rehabilitation processes, as described in the Rehabilitation Management Sub-plan.

Potential causes of inappropriate clearing and disturbance are:

- incorrect delineation of clearing boundaries
- movement of vehicles off authorised tracks.

10.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

A number of other sub-plans required under Statement 938 contain management and/or monitoring actions related to biodiversity and habitat. The key sub-plans relevant to the Biodiversity and Habitat Management Sub-plan are the:

- Soil Management Sub-plan;
- Rehabilitation Management Sub-plan;
- Surface Water Management Sub-plan ;
- Discharge Management Sub-plan; and,
- Buffer Management Sub-plan.

10.4 Environmental objectives and management actions

The environmental objectives are to:

- minimise disturbance within the Buffer Area;
- prevent disturbance occurring outside the project area specified in Figure 1; and,
- appropriately handle and stockpile cleared vegetation and topsoil so that it may be used in rehabilitation.

Specific actions have been identified to assist in achieving these management objectives (Table 18).

Table 18 - Biodiversity and habitat management actions

Item	Action	Purpose	Timing
Induction			
1.	Induct personnel on biodiversity and habitat management measures	To minimise potential for adverse environmental impacts by ensuring personnel are informed of appropriate environmental management procedures.	Within one week of personnel commencing work on-site
Construction			
2.	Ensure development maps clearly delineate the Buffer Area and Development Area.	To prevent unauthorised clearing by ensuring clearing boundaries are appropriately documented.	Prior to ground disturbance
3.	Delineate the boundaries of the vegetation to be cleared for construction in the field with flagging tape, signage or fencing.	To prevent unauthorised clearing by ensuring clearing boundaries are appropriately marked in the field.	Prior to ground disturbance
4.	Stage clearing of vegetation so that areas are cleared only as required.	To minimise the area of exposed surfaces at any one time and to allow native animals the chance to move on.	During construction of shared infrastructure
5.	Manage topsoil in accordance with the Soil Management Sub-plan	To provide a natural source of seed, organic matter and microorganisms for areas to be rehabilitated.	During construction of infrastructure
Native fauna encounter			
6.	Give native animals encountered on-site the opportunity to move on if there is no threat to personnel safety in doing so.	To prevent injury or death to native animals.	Ongoing from commencement of ground disturbance
7.	Call the nominated carer or Wildlife Hotline to rescue sick or injured native animals if they are encountered.	To prevent loss of native animals.	Ongoing from commencement of ground disturbance

10.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 19) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 19 - Biodiversity and habitat monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
1.	Compliance of marked clearing boundary with development maps.	Daily	No clearing adjacent to areas where clearing boundaries are not defined.	Report as Environmental Incident and initiate Incident Procedure which shall include: • investigating the cause of the incident • redefining boundaries.
2.	Extent of clearing and ground disturbance along pre-defined boundaries.	Daily	No clearing or disturbance outside of pre-defined boundaries (Figure 1)	Report as Environmental Incident and initiate Incident Procedure which shall include: • investigating the cause of the incident • redefining boundaries if due to inadequate boundary marking • rehabilitating affected area as required in accordance with the Rehabilitation Management Sub-plan. • monitoring the success of remedial action.

11.0 Buffer Management Sub-plan

11.1 Purpose and scope

This Sub-plan addresses Buffer Management for the Knox Creek Plain Buffer area.

11.2 Environmental aspects to be managed

The following aspects of the development could potentially affect the values of the Buffer Area:

- clearing, both temporary and permanent, may increase erosion, lead to sedimentation of surface water and rising of the groundwater table, and provide favourable conditions for establishment of weeds, plant pathogens and pest animals;
- ground disturbance may generate dust, increase risk of erosion, sedimentation of surface water, alter soil characteristics/profile, and create favourable conditions for weeds;
- application of chemicals within farming areas may contaminate the Buffer Area (through transportation by wind or water) and groundwater;
- storage and use of fuels and oils within the farming areas and use of fuels within the Buffer Area increases the risk of fire, and leakages may result in contamination of soil, surface water and groundwater;
- increase in number of people in the area increases the potential for unauthorised access to the Buffer Area;
- vehicle movements may result in erosion, introduce or spread weeds or plant pathogens, facilitate the movement of introduced fauna, and impact on native fauna;
- vegetation burning as part of initial vegetation clearing in farm areas and/or burning of crops as part of the harvesting activities may increase the risk of fire outbreaks in the Buffer Area, and may affect vegetation and fauna habitat through deposition of ash; and,
- irrigation of agricultural lots will increase accessions to groundwater and may lead to a rise in groundwater levels beneath the Buffer Area, potentially resulting in waterlogging and salinisation of portions of the buffer.

11.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

Many management actions for the Buffer Area are covered under other management sub-plans required under Condition 5 of Statement 938. Where this is the case, the actions are summarised (Table 20), with a reference to the appropriate Sub-plan.

The specific actions identified to assist in achieving the management objectives for the Buffer Area are fully detailed and numbered in Table 20.

Table 20 - Buffer management covered under other sub-plans

Sub-plan	Key aspects addressed
Biodiversity and Habitat Management Sub-plan	• flagging, fencing or pegging the boundaries of farm lots to ensure activities do not intrude into the buffer • personnel induction and education • procedures for native animal encounters • destocking the Buffer Area • restricting movement of machinery and equipment to designated tracks and roads.
Fire Management Sub-plan	• development of fire management procedures
Chemicals Management Sub-plan	• aerial spraying procedures. • storage, handling and application/use of chemicals.
Groundwater Management Sub-plan	• groundwater management measures to protect the Buffer Area from groundwater accretion impacts.
Rehabilitation Management Sub-plan	• methods for rehabilitating disturbed portions of the Buffer Area after works have finished. • temporary disturbance through installation of infrastructure (including clearing and earthworks) and material extraction.
Soil Management Sub-plan	• measures to minimise erosion and sedimentation. • protocols for vegetation clearing and ground disturbance to minimise detrimental effects on the Buffer Area. • restriction of machinery, equipment and vehicle movements to designated tracks and roads. • topsoil management procedures.
Weed, Plant Pathogen and Pest Animal Management Sub-plan	• weed survey and management. • hygiene procedures. • pest animal management strategies within the Buffer Area. • Removal of stock from the Buffer Area • information provision. • inspection of borrow pits and borrow pit access tracks . • controlling the spread of weeds.

11.4 Environmental objectives

The environmental objectives for the Buffer Area are:

- to protect the environmental values of the buffer, including the protection of heritage sites, vegetation communities, watercourses, wetlands, native fauna and flora.
- to improve the condition of the Buffer Area in the long term, to reduce weeds and feral animals, and to increase vegetation cover and density.
- to minimise impacts to the buffer resulting from construction activities.

11.5 Management actions

Table 21 outlines the management actions that will be implemented within the Buffer Area to achieve the management objectives.

Table 21 - Buffer management actions

Item	Action	Purpose	Timing
Access			
1.	Control vehicle access to the buffer through designated tracks, and provision of signage to inform of restrictions to areas.	To minimise impacts to the buffer by consolidating and restricting access	At all times
Infrastructure			
2.	Induct all personnel constructing or utilising infrastructure within the Buffer Area, including roads and groundwater bores.	To minimise potential for adverse environmental impacts by ensuring personnel are informed of environmental management procedures	Within one week of commencing work on-site
Vegetation improvement			
3.	Assess and map vegetation condition within the buffer according to the Keighery (1994) Vegetation Condition rating scale.	To provide data to inform management.	Prior to ground disturbance
4.	Stabilise and spread topsoil (if available) in areas identified as containing vegetation below a rating of 'Very Good' in accordance with species lists and planting procedures determined in consultation with DPW.	To better enable the Buffer Area to fulfil its intended role and purpose by restoring ecological integrity and function to degraded areas.	Within 12 months of completion of construction of infrastructure
5.	If required for degraded areas, revegetate areas within the buffer with species selected specifically for their ability to lower the groundwater table, given the local soil, water and solute settings.	To improve the ability of the buffer to reduce the potential impacts of elevated groundwater levels and minimise diffuse groundwater discharge (including salts) to downstream watercourses.	Within 12 months of completion of construction of infrastructure and as determined to be required in consultation with DPW.
6.	Undertake weed control in areas identified as containing vegetation below a rating of 'Very Good', focusing on the most degraded areas first and in accordance with procedures detailed in the Weed, Plant Pathogen and Pest Animal Management Sub-plan.	To better enable the Buffer Area to fulfil its intended role and purpose by restoring ecological integrity and function to degraded areas.	Within 12 months of completion of construction of infrastructure and ongoing
Ongoing buffer maintenance and monitoring			
7.	Investigate the possibility of extending the Traditional Owner ranger programs (Kununurra based) into the Buffer Area, or incorporating other Indigenous management initiatives – consult with MG Corporation regarding shared responsibilities for maintenance of the Buffer Area.	To maximise opportunities for involvement of Traditional Owners in ongoing management of the Buffer Area	Ongoing
8.	Maintain the Buffer Area to minimise stock invasion, remove introduced livestock, and continue to remove any subsequent invading livestock, as required, to protect native vegetation condition	To ensure species and habitats within the Buffer Area are not adversely affected by stock grazing	Ongoing
Fire Management			
9.	Implement the Fire Management Sub-plan.	To reduce the potential for impacts of fire on the buffer, infrastructure, MNES populations and habitats	Ongoing

11.6 Monitoring regime, targets and corrective actions

Many monitoring actions directly or indirectly related to impacts within the Buffer Area are covered under other environmental sub-plans. Full details of these monitoring actions, such as frequency, target, corrective action and responsibility, can be found in the appropriate sub-plans. The Buffer area monitoring regime is summarised and outlined in Table 22 below.

Table 22 - Buffer monitoring regime

Item	Activity and location	Frequency	Target	Corrective action
1.	Assess vegetation condition using the Keighery (1994) rating scale and update vegetation condition map.	Annually commencing within 12 months of the commencement of the action.	All areas within buffer to be in 'Very Good' or better condition.	Investigate cause, e.g. cattle intrusion, loss of seed through heavy rains. Take appropriate remedial actions, e.g. feral animal eradication programs, stabilise and revegetate area. Monitor success of remedy (annually at time of regular monitoring).

12.0 Rehabilitation Management Sub-plan

12.1 Purpose and scope

This Sub-plan addresses methods for rehabilitating any areas in the Knox Creek Plain Project area that will be temporarily disturbed during construction, areas in the Buffer Area that may be accidentally disturbed during, or after construction, as well as areas inside and/or outside the Project area that will be used for material extraction for construction of roads and other infrastructure.

Extraction of material for construction and ongoing maintenance of roads may be sourced from outside the Project area. Materials extraction and clearing permits will be obtained where required.

12.2 Environmental aspects to be managed

Effective rehabilitation is required to ensure that disturbed areas not required for access or infrastructure following construction are returned to a condition that reduces adverse impacts to the human and natural environment.

Rehabilitation of temporarily disturbed areas will minimise the disturbance from construction and project operations through restoring natural biodiversity as well as stabilising soils and reinstating fauna habitat.

The rehabilitation strategy focuses on ensuring that residual impacts of vegetation clearing and ground disturbance are mitigated to the greatest possible extent and that the ecological function of retained areas is reinstated by addressing:

- new disturbance from vegetation clearing and ground disturbance, including for borrow pits and construction and installation of infrastructure; and,
- indirect or direct accidental disturbance to the Buffer Area.

12.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

Management action items and monitoring regimes have been informed by guidance material to ensure appropriate rehabilitation procedures are implemented and complied with. Specific guidance material includes:

- *Florabank Guidelines and Codes of Practice* – Greening Australia; and,
- Environmental Protection Authority, *Guidance for the Assessment of Environmental Factors – Rehabilitation of Terrestrial Ecosystems.*

A number of other sub-plans required under Statement 938 contain management and/or monitoring actions related to rehabilitation. The key sub-plans relevant to the Rehabilitation Management Sub-plan are the:

- Weed, Plant Pathogen and Pest Animal Sub-plan;
- Buffer Management Sub-plan; and,
- Biodiversity and Habitat Management Sub-plan.

12.4 Environmental objectives and management actions

The environmental objectives of the Rehabilitation Management Sub-plan are to:

- effectively rehabilitate disturbed sites not required for maintenance and operation of the development;
- minimise soil erosion; and,
- enhance the ecological function and value of retained vegetation through re-establishment of indigenous species.

Specific actions have been identified to assist in achieving these management objectives (Table 23):

Table 23 - Rehabilitation management actions

Item	Action	Purpose	Timing
Baseline information			
1.	Select reference sites in buffer and conservation areas containing landforms and vegetation comparable (or likely to have been comparable) to those of planned disturbance areas not required post-construction.	To locate suitable sites against which to compare rehabilitation success.	Prior to ground disturbance
2.	Survey reference sites identified in Item 1 to determine indicator species, density of native species, % cover of native species, native species richness and % weed cover as outlined in the monitoring procedures.	To provide data against which rehabilitation success can be measured.	Prior to ground disturbance and quarterly throughout the rehabilitation process
3.	Determine parameters and targets for each indicator species as appropriate. e.g. density of indicator species, % cover of indicator species, etc.	To enable specific aspects of rehabilitation success to be measured.	Prior to ground disturbance
4.	Undertake a weed survey of the project area to establish baseline information in accordance with the Weed, Plant Pathogen and Pest Animal Management Sub-plan.	To provide data to inform management.	As specified in the Weed, Plant Pathogen and Pest Animal Management Sub-plan

Seed collection			
5.	Develop a species list for seed collection based on species known to germinate from seed and/or that can be propagated by nurseries (may require consultation with nurseries and rehabilitation specialists in the area).	To maximise potential for rehabilitation success by ensuring appropriate species are used in seeding/planting.	As required for rehabilitation
6.	Contract experienced seed collector licensed by the DER to undertake a seed collection program of plant species endemic to the project area following *Florabank Guidelines* (Greening Australia 2009) including: • gathering information and targeting certain species • undertaking seed collection in the optimum season for the species • collecting only mature seed • determining seed collection method (e.g. natural seed fall, collection by hand, mechanical harvesting, etc. • maintaining detailed record sheets to provide evidence that the seed is local provenance, e.g. date of collection, time of collection, person undertaking collection etc. • preparing material for transportation.	To maximise potential for rehabilitation success by ensuring seed collection is undertaken in accordance with appropriate guidelines and procedures.	As required for rehabilitation
7.	Ensure all seed to be used in rehabilitation is sourced from species that are endemic to the area/local provenance.	To ensure species used in rehabilitation have adaptations to suit local conditions.	As required for rehabilitation
8.	Monitor the progress of seed collection and store and process seed in accordance with the seed collection and direct seeding procedure.	To maximise potential for rehabilitation success by ensuring seed collection is undertaken appropriately.	As required for rehabilitation
Hygiene			
9.	Implement hygiene management actions as outlined in the Weed, Plant Pathogen and Pest Animal Management Sub-plan.	To maximise potential for rehabilitation success by preventing the introduction and/or spread of weeds and plant pathogens into rehabilitation areas.	As specified in the Weed, Plant Pathogen and Pest Animal Management Sub-plan
Pest Control			
10.	Control stock within buffer area in accordance with the Weed, Plant Pathogen and Pest Management Sub-plan.	To maximise potential for rehabilitation success by preventing stock from entering rehabilitation areas.	As specified in the Weed, Plant Pathogen and Pest Animal Management Sub-plan
Construction sites			
11.	Ensure all foreign material is removed from the site to be recycled or reused where practicable, or disposed of off-site before rehabilitation is carried out.	To enable rehabilitation to commence.	Prior to rehabilitation
12.	Areas suspected to be contaminated by spills or leaks of hydrocarbons and/or inappropriate disposal of wastes will be investigated to determine the presence and/or level of contamination.	To determine whether rehabilitation areas are required to be remediated.	Prior to rehabilitation

13.	Remediate any soils that are determined to be contaminated.	To maximise potential for rehabilitation success by ensuring rehabilitation areas are not contaminated.	Prior to rehabilitation
Erosion/Landform stability			
14.	Disturbed areas will be stabilised through a combination of contouring and slope stabilisation as required.	To minimise erosion of rehabilitated landforms.	Progressively as disturbed areas are no longer required
15.	All rehabilitation areas will be reshaped and contoured to blend with adjacent relief and drainage as far as practicable. This will include: • the removal of impediments to run-off • diversion of surface run-off around borrow pits to prevent flooding and potential instability of pit walls • where necessary filling of borrow pits with subsoil to level of natural ground surface.	To minimise erosion of rehabilitated landforms.	During the rehabilitation process
16.	All tracks to be rehabilitated will be ripped or scarified to minimise compaction.	To maximise potential for rehabilitation success by allowing roots and water to penetrate the soil profile.	During the rehabilitation process
Topsoil management			
17.	Remove topsoil from cleared areas and manage in accordance with the Biodiversity and Habitat Management Sub-plan.	To provide a natural source of seed, organic matter and microorganisms for areas to be rehabilitated.	During construction of shared infrastructure
18.	Ensure material to be used for rehabilitation (e.g. topsoil, cleared vegetation, etc.) does not contain declared weeds.	To maximise potential for rehabilitation success by preventing the introduction and/or spread of declared weeds into rehabilitation areas.	Prior to rehabilitation
19.	Relocate stripped topsoil and (if applicable) cleared vegetation directly to areas required to be rehabilitated, where possible.	To maximise the benefits of using topsoil and mulch by minimising storage time.	During construction of shared infrastructure
20.	Spread stripped topsoil evenly across areas to be rehabilitated (to a nominal depth of approximately 100–150 mm). Work parallel with the contours as far as practicable, to minimise the creation of preferential drainage pathways.	To provide a natural source of seed, organic matter and microorganisms for areas to be rehabilitated.	During rehabilitation process
21.	Rake rehabilitation areas to minimise potential impacts from compaction.	To maximise potential for rehabilitation success by allowing roots and water to penetrate the soil profile.	After spreading of topsoil and prior to placement of cleared vegetation
22.	Where direct replacement of rehabilitation material (e.g. topsoil, cleared vegetation, etc.) is not possible, stockpile material for later use in rehabilitation activities.	To provide a natural source of seed, organic matter and microorganisms for areas to be rehabilitated.	During construction of shared infrastructure
23.	Locate stockpiles of rehabilitation material (e.g. topsoil, cleared vegetation, etc.) within already disturbed areas wherever possible.	To minimise disturbance.	Ongoing from commencement of ground disturbance

24.	Restrict topsoil stockpile height to less than 2 m.	To conserve native seed banks for direct propagule return, reduce the risk of self-composting and provide opportunities for the roots of temporary vegetation growing on the topsoil stockpile to reach the deepest parts of the stockpile, thereby sustaining many micro-organisms.	Ongoing from commencement of ground disturbance
Fencing			
25.	Provide temporary fencing and signage around rehabilitation areas.	To minimise disturbance to rehabilitation areas by restricting access.	During rehabilitation process
Inspection			
26.	Inspect borrow pits no longer required following construction to ensure all pits are backfilled and rehabilitated such that they are free draining.	To ensure timely and appropriate rehabilitation of borrow pits.	As required

12.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 24 - Rehabilitation monitoring regime

Item	Activity and location	Frequency/ timing	Target	Corrective action
1.	Native species richness, density and % cover within rehabilitation sites as outlined in the monitoring procedures.	Twice annually (in May and October).	Mean native species richness, plant density and % cover in the rehabilitation site after five years (including at least two wet seasons where >75% of the long-term average rainfall has fallen) is greater than: • 70% of the mean % cover of natives in the reference sites • 70% of the mean native species richness in the reference sites.	18. Identify cause. 19. Implement approach to remedy cause, which could include: • application of fertilisers or wetting agents etc. if applicable • implement supplementary direct seeding or seedling planting program in accordance with procedures • review rehabilitation process and amend if appropriate. 20. Monitor success of approach.

Item	Activity and location	Frequency/ timing	Target	Corrective action
2.	Indicator species in rehabilitation sites.	Twice annually (in May and October).	As determined in accordance with Table 23.	1. Identify cause. 2. Implement approach to remedy cause, which could include: • application of fertilisers or wetting agents etc. if applicable • implement supplementary direct seeding or seedling planting program in accordance with procedures • review rehabilitation process and amend if appropriate. 3. Monitor success of approach.
3.	Exotic species richness and % cover within rehabilitation sites as outlined in the monitoring procedures.	Twice annually (in May and October).	Exotic flora species: • no greater than 10% increase in weed species density/cover/distribution compared to reference sites • no Declared Plants present on-site six months following completion of construction. • no infested areas as defined in the Weed, Plant Pathogen and Pest Animal Management Sub-plan • no local priority areas as defined in the Weed, Plant Pathogen and Pest Animal Management Sub-plan • no new weed species present.	1. Identify cause. 2. Identify the weeds, their location and coverage. 3. Implement remedy which could include: • implementing a weed control program • reinforcing management actions in the Weed, Plant Pathogen and Pest Animal Management Sub-plan and Rehabilitation Management Sub-plan. 4. Monitor success of control.
4.	Erosion within and adjacent to rehabilitation sites.	Opportunistically following heavy rainfall events.	Ensure landform is safe and stable with no erosion occurring 18 months after rehabilitation. Reconstructed landform can withstand exceedance of average rainfall occurrences for a period of 10 years.	1. Identify cause of erosion. 2. Consult expert to determine appropriate remedy which may include • Installing culverts • Installing stormwater diversion structures. 3. Implement remedy. 4. Monitor success of remedy.

13.0 Aboriginal Cultural Heritage Management Sub-plan

13.1 Purpose and scope

This Aboriginal Cultural Heritage Management Sub-plan, addresses Indigenous heritage and cultural responsibilities of the Proponent in the Project area .

Archaeological and ethnographic assessments have been completed and reported in Priority Inspection Area Reports (Archae-aus 2005; Pointnorth 2005).

13.2 Aspects to be managed

Cultural heritage sites within the Project area were identified and protected in the planning stages through the Priority Inspection process, which considered ethnographic and archaeological areas of importance. Aboriginal sites have been excluded from the farming Development Area and incorporated into the Weaber Plain Buffer Area. Management measures focus on ensuring the delineation and requirements of protection of these areas is provided for and well known respectively. Contingency measures for the uncovering of previously unknown artefacts, burials etc. are also proposed.

The potential impacts of the Project on Aboriginal heritage values and the causal aspects of the project requiring management are listed below. These aspects have the potential to disturb known and/or unknown heritage sites and affect ethnographic values, and relate primarily to physical disturbance of the land surface from project activities, including:

- clearing of land for farms;
- construction of on-farm irrigation infrastructure; and,
- construction of common-use infrastructure, including irrigation channels, roads, power lines, hillside drains and levee banks.

As the proposed farm area has been previously surveyed and/or disturbed, the likelihood of discovering Aboriginal artefacts on the surface is minimal; however, earthworks and excavation activities may uncover buried artefacts or other significant material.

13.3 Relationship between this sub-plan and guidance, legislation and other sub-plans

This management sub-plan is not related to any other management sub-plans within this EMP.

13.4 Objectives and management actions

Specific actions have been identified to assist in achieving this management objective (Table 25).

Table 25 - Aboriginal heritage management actions

Item	Action	Purpose	Timing
Cultural heritage			
1.	Implement an induction program for personnel and contractors/consultants, and an information package for farm owners/managers, both of which containing information on: • significance of Aboriginal heritage and the potential impacts of the project • procedures to report potential new sites • obligations under the *Aboriginal Heritage Act 1972* (WA) • requirements for the protection of known Aboriginal sites.	To ensure protection of known sites of Aboriginal heritage significance in accordance with the requirements of the *Aboriginal Heritage Act 1972* (WA), to improve knowledge of Aboriginal cultural heritage in non-indigenous people associated with the project.	Within one week of personnel commencing work on-site
2.	Document the location of protected areas on development design plans and make available to planners, agents, contractors, and relevant personnel.	To ensure protection of known sites of Aboriginal heritage significance in accordance with the requirements of the *Aboriginal Heritage Act 1972* (WA), to improve knowledge of Aboriginal cultural heritage in non-indigenous people associated with the project.	Prior to ground disturbance
3.	Flag the boundaries of project areas to ensure activities do not intrude into areas where Aboriginal sites are present.		Prior to ground disturbance
4.	Place 'No Go' signage along boundaries immediately adjacent to Buffer Areas around protected Aboriginal sites.		Prior to ground disturbance
5.	If a suspected heritage site is detected follow procedures as outlined in the Heritage Site Detection Procedure. Potential heritage sites include stone/shell scatters (middens), stone tools, rock paintings and engravings, grinding patches, scar trees, ochre sites/quarries, and skeletal remains.	To ensure protection of previously unrecorded Aboriginal heritage sites detected during construction/clearing activities in accordance with the *Aboriginal Heritage Act 1972* (WA).	Ongoing from commencement of ground disturbance
6.	The MG Corporation will be briefed on proposed works and work schedules and informed of detailed aspects of the project.	Ensure regular ongoing involvement of the Miriuwung and Gajerrong people in heritage management throughout the life of the project, in accordance with the OFA and OES.	Prior to ground disturbance
7.	The MG Corporation will be involved in inspections of the Project Area throughout construction (with supporting briefing).		Quarterly and as required
8.	Meet with MG Corporation to discuss broader issues of Aboriginal cultural heritage and heritage protection in and around the buffer, and associated social impact.		Annually and as required
9.	Establish cultural heritage database with GIS records of site locations in the project area.	Establish and maintain up-to-date records on Aboriginal heritage sites within the project area.	Prior to ground disturbance

13.5 Monitoring regime, targets and corrective actions

The proposed monitoring regime (Table 26) includes activities to be performed throughout the life of the project and which, if the target is not achieved, will result in corrective action.

Table 26 - Aboriginal heritage monitoring regime and corrective actions

Item	Activity and location	Frequency	Target	Corrective action
1.	Signage or temporary fencing/ tape showing heritage site locations.	Daily during clearing and construction.	No disturbance to sites not approved to be disturbed under Section 18 of the *Aboriginal Heritage Act 1972* (WA).	1. Report as Environmental Incident and initiate Incident Procedure, including: • stopping work in the vicinity of the boundary • investigating the cause of the disturbance • redefining boundaries if due to inadequate boundary marking • rehabilitating vegetation in the area as required in accordance with the Rehabilitation Management Sub-plan • restore the 'site' (e.g. scatters or middens could have been buried, rock art altered, skeletal remains exposed) – develop a remedial plan in consultation with appointed archaeologist and MG Corporation • monitoring the success of remedial action. 2. Consult with the Department of Aboriginal Affairs and MG Corporation to determine actions required to restore the site to its original condition.

14.0 Implementation of the EMP

In accordance with Condition 5 of Statement 938, and EPBC 2014/7143, the KAI has committed to the implementation of this EMP for the Project.

14.1 Reporting and revision of plans required under Statement 938

14.1.1 Compliance reporting

Consistent with Condition 4 of Statement 938, the Proponent will maintain a Compliance Assessment Plan. A compliance assessment report will be submitted to the OEPA annually to assess compliance with conditions in accordance with the Compliance Assessment Plan, including the reporting of non-compliances and corrective actions taken.

Consistent with Condition 3 of EPBC 2014/7143, KAI will publish an Annual Environmental Report (AER) addressing compliance with the environmental conditions attached to the Knox Creek Plain.

14.1.2 Review and revision

The EMP will be reviewed by the Proponent as part of the annual compliance assessment and reporting process.

The EMP will be revised as required based on assessment of monitoring results and assessment of performance. The proponent will ensure that adaptive improvement of the plan occurs in response to environmental incident resolutions, audit findings, monitoring results, and changes in regulatory requirements.

14.2 Environmental incident reporting

Environmental incidents are events or occurrences that result in, or have the potential to result in, unacceptable impacts to the environment. In the event of an environmental incident, the person responsible (or first on the scene) will implement the Environmental Incident Reporting Procedure. The steps involved in the Environmental Incident Reporting Procedure include:

1. The person responsible (or first on the scene) will record the incident in the Environmental Incident Report Form and will notify the Project Manager.

2. The Project Manager will determine the level of incident severity as follows:

   LEVEL 1: Minor non-adherence to procedure, and/or negligible environmental impact (e.g. spill occurring within a bunded area).

LEVEL 2 Minor non-adherence to procedure and minor environmental impact that requires little management to be rectified (e.g. minor chemical spill onto ground outside a bunded area)

LEVEL 3: Moderate breach of procedure and/or environmental impact that requires management/mitigation to be rectified (e.g. major chemical spill onto ground outside a bunded area)

LEVEL 4: Extreme breach of procedure and/or environmental impact that could lead to a breach of environmental approval conditions (e.g. clearing outside clearing permit boundary).

3. The Project Manager will investigate the cause of the incident and record relevant information, including meteorological conditions.

4. The Project Manager will implement actions to mitigate environmental harm or potential harm.
5. Depending on the severity of the incident, the Project Manager will report the incident to regulatory authorities and relevant stakeholders as required. As a minimum, all Level 3 and 4 incidents will be reported to the appropriate regulatory authorities.

6. The Project Manager will review and revise management measures as appropriate to prevent reoccurrence.

14.3 Public complaint resolution

A Complaint Handling and Response Procedure has been developed to provide a process to receive, consider and resolve all complaints and any other expression of dissatisfaction by third parties located in proximity of the Project Area.

KAI will establish and maintain a system of records (Public Complaints Register) to fully document complaint handling. For those community issues that are relevant to operations within the Project area, the person receiving a complaint will record the details of the complaint and complainant's information in the Public Complaints Register including:

- date and time of the complaint
- name of the person who received/recorded the complaint
- method by which the complaint was made, e.g. phone, letter, etc.
- details of the complainant (name, address and location of area affected if relevant)—if information not provided, include note to that effect in register
- nature of the complaint
- meteorological conditions occurring at the time of the complaint/event, if relevant to the complaint, and any project-related activities.

The Project Manager will be responsible for:

- Determining whether the complaint constitutes an environmental incident, and if so, implementing the requirements outlined in the Environmental Incident Reporting Procedure.
- Initiating investigations and/or responsive actions as appropriate according to the nature of the complaint.
- Reporting back to the complainant on the investigations and responsive actions taken (including supplementary monitoring and corrective actions) as well as the nature and outcome of the complaint/incident.
- Requesting complainant to provide brief comment on level of satisfaction with handling of complaint and outcome.

The Proponent will be responsible for recording the following in the Public Complaints Register:

- investigations undertaken in relation to the complaint
- action taken in relation to the complaint (including supplementary monitoring and corrective actions)
- reasons for taking no action in relation to the complaint (if such a decision was made)
- time and date of follow-up contact with the complainant
- nature of and outcomes from the follow-up contact with the complainant.

This Procedure will be reviewed in response to changes in legislative requirements, changes in regulatory requirements, environmental initiatives and improvements in farm technology and rehabilitation requirements.

Continuous improvement of environmental management will occur in response to environmental incident resolutions, monitoring results and audit findings.

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