



Appendix A

Environmental Management

Plan

Environmental Management Plan

Project factor	Predicted Impact	Management action	Monitoring/Maintenance program	Responsible person/body	Completion timeframe
Aboriginal Heritage	Potential for disturbance to site/s of Aboriginal heritage significance.	<p>Engagement with DAA and application under Section 18 of the <i>Aboriginal Heritage Act 1972</i> if required.</p> <p>Conduct ethnographic and archaeological surveys or project footprint.</p> <p>Clearly mark sites or no go zones during the construction phase.</p> <p>Stop work on discovery of artefacts or human remains and report to DAA.</p>	Monitoring during construction to ensure disturbance is within approved limits.	MRWA/Construction contractor	Construction
Acid sulphate soils	Potential disturbance of ASS may result in soil acidification and mobilisation of heavy metals and other contaminants.	A detailed ASS investigation and ASSMP should be undertaken prior to the commencement of ground disturbing activities, in accordance with WA DER guidelines.	Monitoring to ensure compliance with the ASSMP.	Construction contractor	Construction and dewatering
Air quality and dust	Possible dust emissions during vegetation clearing and ground disturbance for construction.	<p>Use of water carts to minimise dust emissions and prevent off-site dust impacts.</p> <p>Temporary site fencing is to be covered with shade cloth or similar material to act as a windbreak.</p>	<p>Visually monitor for dust during the construction phase to ensure no off-site dust emissions and effectiveness of dust management.</p> <p>All complaints are to be addressed within 24 hours of the complaint.</p>	Construction contractor	Construction

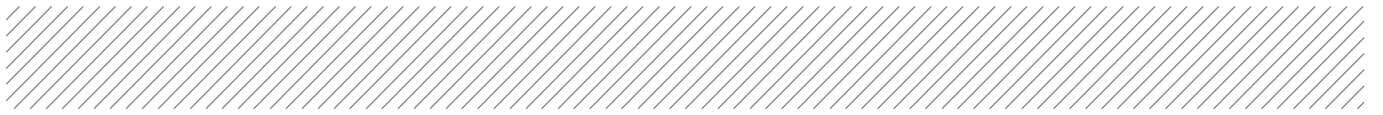
Project factor	Predicted Impact	Management action	Monitoring/Maintenance program	Responsible person/body	Completion timeframe
		Establish a complaints register for dust complaints to record dust events as environmental incidents.	Air quality monitoring at the site perimeter may be required if there are excessive dust complaints.		
Contamination	<p>Ground disturbance may uncover contaminated materials and may create preferential pathways for movement of a known groundwater plume.</p> <p>Dewatering for the construction of underpasses may draw contaminated groundwater towards the Gngara Mound and the GUWPCA.</p>	<p>Consult with DER to determine the requirement for further investigation.</p> <p>Construction contractor to characterise dewatering effluent and excavated fill prior to re-use.</p> <p>Removal and disposal of contaminated materials in accordance with DER guidelines.</p>	Monitoring to ensure no immediate or ongoing risk to workers or the public from the management of contaminated materials.	Construction contractor	Construction
Dieback	<p>No predicted impact to the project area; however movement of soil or vegetative material from the project footprint may impact Protectable areas outside of the project footprint.</p> <p>Potential poor survival of revegetation programs, due to pre-existing dieback within the project footprint.</p>	<p>Implementation of a Dieback Management Plan including vehicle and personnel hygiene procedures to ensure no movement of pathogen infested material from the project area to Protectable areas.</p> <p>Revegetation programs to use dieback resistant species to ensure success.</p>	Visually inspect vehicles and footwear upon entry and upon exit to ensure clean on entry and clean on exit from the project footprint.	Construction contractor	Clearing and construction

Project factor	Predicted Impact	Management action	Monitoring/Maintenance program	Responsible person/body	Completion timeframe
Flora and vegetation	Loss of 21.1ha of remnant vegetation plus 106 mature Eucalypt trees over predominantly cleared pasture. Of this amount, only 2.1ha is in 'Good' to 'Very Good' condition. No impact to threatened or priority flora species.	Avoid clearance of threatened or priority flora. Ensure clearing is restricted to within the project footprint. Survey 1.5ha of footprint which remains unsurveyed.	Monitoring during construction phase to record clearing as an ArcGIS shapefile.	Construction contractor	Construction
Groundwater	Potential for groundwater extraction to enable construction of underpasses, which would result in localised lowering of the groundwater table. Contamination of groundwater from vehicle hydrocarbon leaks.	Obtain appropriate licences to abstract groundwater, construct bores and dewater. Ensure road and carpark drainage is in accordance with WSUD guidelines. Groundwater investigations to be undertaken and a Groundwater Dewatering Management Plan to be developed and implemented by the construction contractor, as required. Hazardous substances management measures will address potential for contamination.	Monitoring during groundwater extraction to ensure drawdown is within acceptable limits.	MRWA/Construction contractor	Construction
Hazardous substances	Potential minor spills and leaks from vehicles.	Project design to incorporate Water Sensitive Urban Design Principles.	Visual inspection during construction to ensure no vehicle leaks.	Construction contractor.	Construction

Project factor	Predicted Impact	Management action	Monitoring/Maintenance program	Responsible person/body	Completion timeframe
		Appropriate containment of hydrocarbons during project construction.			
Heritage (non-Indigenous)	There will be no impacts to heritage (non-Indigenous)	NA	NA	NA	NA
Land tenure	The proposal intersects a number of freehold lots. Acquisition of these properties will be required for construction of the project.	Main Roads to engage with affected occupants and owners.	Main Roads to undertake appropriate stakeholder engagement during the process of property acquisition.	MRWA	Prior to construction
Noise and vibration - Construction	Potential change in traffic volumes and noise levels.	<p>A noise and vibration management plan to be developed to the satisfaction of the City of Swan.</p> <p>Comply with Noise Regulations</p> <p>Minimise out of hours works</p> <p>Use broad-band reversing beepers</p> <p>Establish a complaints register for noise and vibration</p> <p>Conduct dilapidation surveys of all structures within 100m of the works before and after construction.</p> <p>Ensure particle velocity remains below the level of</p>	<p>Respond to all noise and vibration complaints within 24 hours</p> <p>Conduct monitoring of vibration</p> <p>Conduct noise monitoring of noise complaints occur for out of hours works</p>	Construction contractor	Prior to construction and post-construction.

Project factor	Predicted Impact	Management action	Monitoring/Maintenance program	Responsible person/body	Completion timeframe
		damage to buildings and absolutely below 5mm/s			
Noise and vibration - Operation		Conduct detailed noise assessment in accordance with SPP 5.4 Conduct pre-construction noise monitoring	Conduct post-construction monitoring to verify noise modelling		
Surface water/drainage	Altered surface water runoff volumes. Altered water quality associated with road runoff and accidental spills and releases. Loss of 0.5ha of vegetated Resource Enhancement Wetland and 10.2ha of vegetated Multiple Use Wetland.	Utilise existing natural drainage networks where possible. Water sensitive urban design principles (including infiltration systems, grassed/vegetated swales and buffer strips and bioretention/biofilter systems) employed in drainage design. Water sensitive urban design principles to be employed in project design.	Monitoring of project to ensure EBRT is not subject to inundation.	MRWA/Construction contractor	Construction
Terrestrial fauna	Loss of 22.1 ha of fauna habitat native plus 106 mature Eucalypt trees with DBH of 500 mm or greater, including three which contain a hollow. This may impact six fauna species of conservation significance including three species of black cockatoo, Rainbow Bee-	Fauna specialist to conduct inspection of tree hollows prior to vegetation clearing to ensure no active breeding is occurring. Visually inspect project footprint for active Rainbow Bee-eater nests prior to clearing. Implement fauna encounter procedures to enable fauna the	Monitoring during construction to ensure fauna encounter procedures are implemented.	Construction contractor	Construction

Project factor	Predicted Impact	Management action	Monitoring/Maintenance program	Responsible person/body	Completion timeframe
	eater, Quenda and Western Brush Wallaby.	opportunity to move on prior to disturbance Engagement of fauna spotters during vegetation clearing			
Visual amenity	Potential visual impact to nearby residential areas from grade separations and bus stations.				
Reserves/conservation areas	No impact to conservation areas	NA	NA	NA	NA



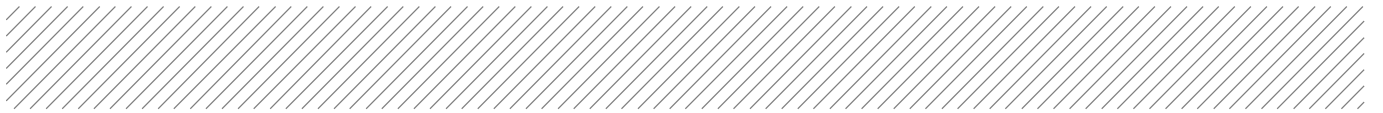
Appendix B

Conservation Categories

Conservation Categories

Conservation codes for Western Australian Flora and Fauna

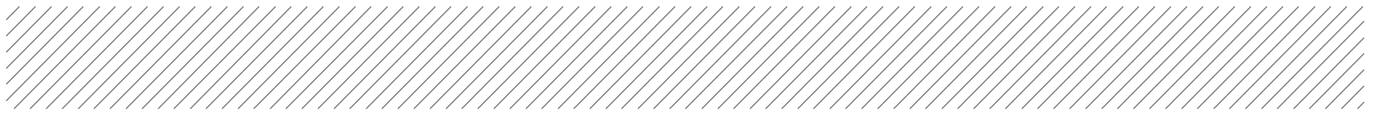
a) Conservation Category	b) Definition
c) Threatened T	d) Threatened fauna are 'Likely to become extinct' e) Threatened flora are 'likely to become extinct or is rare, or otherwise in need of special protection'
f) Critically Endangered CR	g) Threatened species considered to be facing an extremely high risk of extinction in the wild.
h) Endangered EN	i) Threatened species considered to be facing a very high risk of extinction in the wild.
j) Vulnerable VU	k) Threatened species considered to be facing a high risk of extinction in the wild.
l) Presumed extinct EX	m) Species which have been adequately searched for and there is no reasonable doubt that the last individual has died.
n) Migratory birds IA	o) Birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA), Republic of Korea (ROKAMBA) and the Bonn Convention, relating to the protection of migratory birds.
p) Conservation dependent fauna CH	q) Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
r) Other specially protected fauna OS	s) Fauna otherwise in need of special protection to ensure their conservation.
t) Priority species	u) Possibly threatened species that do not meet survey criteria or are otherwise data deficient.
v) Priority 1 Poorly known species	w) Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either very small or on lands not managed for conservation. Such species are in urgent need of further survey.)
x) Priority 2 Poorly known species	y) Species that are known from one or a few locations (generally five or less) some of which are on lands managed primarily for nature conservation. Such species are in urgent need of further survey.
z) Priority 3 Poorly known species	aa) Species that are known from several locations and the species does not appear to be under imminent threat, or from few but widespread locations with either large



a) Conservation Category	b) Definition
	population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Such species are in need of further survey.
bb) Priority 4 Rare, near Threatened and other species in need of monitoring	<p>cc) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.</p> <p>dd) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable, but are not listed as Conservation Dependent.</p> <p>ee) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.</p>

Conservation Codes for Listed species under the EPBC Act 1999

Conservation category	Definition
Extinct in the wild	It is known only to survive in cultivation, in captivity or as a naturalized population well outside its past range or it has not been recorded in its known range and/or expected habitat at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.
Critically endangered	It is facing an extremely high risk of extinction in the wild in the immediate future.
Endangered	It is not critically endangered and it is facing a very high risk of extinction in the wild in the near future.
Vulnerable	It is not critically endangered or endangered and it is facing a high risk of extinction in the wild in the medium term future.
Migratory	



Appendix C

Vegetation Condition Ratings

Vegetation Condition Ratings (Keighery 1994)

Descriptor	Explanation
Pristine	Pristine or nearly so, no signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure cause by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance of vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.