

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
							Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
A1	Air	Construction emission impact at a sensitive receptors	Exceedance of State Environment Protection Policy (Air Quality Management) within a small localised area		177C1	Dust generated from road construction activities shall not create a hazard or nuisance to the public, shall not disperse from the site or across roadways, nor interfere with crops, stock or dust sensitive receptors Material that may create a hazard or nuisance dust shall be covered during transport; Emissions of visible smoke to the atmosphere from construction plant and equipment shall not be for periods greater than 10 consecutive seconds.	Moderate	Rare	Low		Moderate	Rare	Low
A2	Air	Operation of the new road generates emissions from vehicular traffic	Exceedance of State Environment Protection Policy (Air Quality Management) within a small localised area			Air quality issues during operation determined through existing complaints procedure.	Moderate	Rare	Low		Moderate	Rare	Low
N1	Noise	Construction of the project may result in vibration levels beyond human comfort and building damage thresholds limits, particularly where activities (eg. pile driving for bridge piers at locations near the Campaspe River) occur closer than 50m to 100m from buildings (most other activities will generally be acceptable if greater than 15-30m from buildings).	Potential for human discomfort and building damage if vibration exceeds associated thresholds.	Social, Economic	177H1	Vibration to be managed to comply with the requirements of AS2187, DIN4150 & BS6472	Moderate	Possible	Medium	carry out an assessment of potential vibration impacts to buildings within 100m of works and where necessary implement strategies to ensure compliance with building damage vibration thresholds, such as modification of construction method / equipment or implementation of temporary structural support for sensitive receptors. Further consideration should be given to conducting Building Condition Inspections of structures within 200m of piling driving activities accompanied by monitoring of vibration levels.	Moderate	Rare	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
N2	Noise	Construction of the project may result temporarily increased ambient noise levels beyond those that may cause hearing damage at residential properties, recreational and non-recreational areas along the alignment, particularly where activities occur closer than 25m from receivers.	Damage to hearing of people affected by noise levels exceeding hearing damage thresholds	Social, Economic	177.H1	Noise to be managed in accordance with the VicRoads Noise Guidelines - Construction and Maintenance Works 2007.	Moderate	Unlikely	Medium	Prior to works the Contractor should carry out an assessment of noise impacts to potentially occupied buildings and land with respect to hearing damage thresholds and where necessary implement strategies to ensure compliance, such as modification of construction method / equipment or temporary evacuation of sensitive receptors.	Moderate	Rare	Low
N3	Noise	Construction of the project would result in temporarily increased ambient noise and vibration levels due to construction activities at residential properties, recreational and non-recreational areas along the alignment.	Temporarily degraded amenity at residential properties, recreational and non-recreational areas as construction activities move past properties.	Nil	177H1	Noise to be managed in accordance with the VicRoads Noise Guidelines - Construction and Maintenance Works 2007.	Minor	Possible	Low	NA	Minor	Possible	Low
N4	Noise	Operation of the project results in significantly increased traffic noise levels on recreational and non-recreational areas (particularly around Victoria Park).	Degraded amenity to users due to significantly increased noise levels.	Nil	NA	NA	Insightificant	Likely	Low	NA	Insightificant	Likely	Low
N5	Noise	Operation of the project results in significantly increased traffic noise levels in some residential areas, including those on Crofton Street, Henry Street, Warren Street, the Echuca Holiday and Caravan Park.	Degraded residential amenity due to significantly increased noise levels	Nil	N/A	Design to incorporate noise mitigation measures consistent with VicRoads Traffic Noise Reduction Policy 2005, including: Crofton Street, Echuca Holiday & Caravan Park, Adjacent Crofton Street: - 1.5m noise wall on the east side of the alignment having a length of approximately 525m (Ch 1190 –1715). Adjacent Echuca Holiday and Caravan Park: - 2.0m noise wall on the east side of the alignment having a length of approximately 620m (Ch 1830 – 2450). Stone mastic asphalt on bridge extending approximately 1.7km.	Insightificant	Unlikely	Negligible	NA	Insightificant	Unlikely	Negligible

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
N6	Noise	Operation of the project results in significantly increased traffic noise levels in some residential areas, including those on Boundary Road, Meninya Street and Francis Street	Degraded residential amenity due to significantly increased noise levels	Nil	N/A	NA	Insignificant	Unlikely	Negligible	Insignificant	Unlikely	Negligible
TT1	Traffic & Transp	Construction of the project would disrupt or sever local access routes	Increased travel time and disruption to traffic movements	Social, Economic		Construction traffic routes to be designated and managed as part of the transport management plan. Construction routes are to be designed to avoid, where possible, disruption or severing of local access routes. Construction would be scheduled to avoid major event periods and locations. Communication strategy to be implemented to inform stakeholders of project traffic impacts.	Minor	Almost Certain	Medium	Minor	Almost Certain	Medium
TT2	Traffic & Transp	Road safety impacts during operation	Potential for increased interaction with wildlife, new intersections, altered property access, pedestrian and bicycle interactions on bridge route.	Biodiversity & Habitat		Road safety audit to be completed on detailed design. Provision for off-road shared facilities for bicycles and pedestrians. Interactions with wildlife to be monitored and consideration given to additional warning signage for motorists in areas of high wildlife activity.	Moderate	Possible	Medium	Minor	Possible	Low
TT3	Traffic & Transp	Changed road environment during construction results in general reduction to road safety	Increased risk of crashes at localised construction zones	Social	1160, 1180	Prepare a traffic management plan to identify, assess and eliminate reduce or mitigate road safety hazards and to be reviewed by VicRoads prior to implementation.	Minor	Possible	Low	Minor	Rare	Negligible

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
CH1	Aboriginal Cultural Heritage	Road impacts on registered Aboriginal scarred tree 7825-0386 VAHR	Destruction of tree		177.A2	Approval of CHMP recommending relocation of tree.	Moderate	Almost Certain	High	Specific management measure relating to relocation of the tree to be agreed with Yorta Yorta Nations.	Moderate	Rare	Low
CH2	Aboriginal Cultural Heritage	Road impacts on registered Aboriginal scarred trees 7825-0371 VAHR, 7825-0396 VAHR, 7825-0398 VAHR and newly discovered Aboriginal scarred tree 7825-0482 VAHR	Destruction of trees		177.A2	Trees to be retained in road reserve/embankment. Methodology for retention would need to be defined in and approved as part of CHMP. Site 7825-0398 VAHR to be retained in a roundabout at the intersection of the Murray Valley Highway and Warren Street.	Minor	Unlikely	Low	Design road reserve or embankment to protect trees. Ensure road embankment does not impeded drainage to trees or impact on root system. Final design of protective measures subject to approval in CHMP.	Minor	Unlikely	Low
CH3	Aboriginal Cultural Heritage	Alignment impacts on registered Aboriginal scarred tree 7825-0372 VAHR. Tree impacted by lopping of tree branches when road is eventually duplicated	Destruction of tree		177.A2	Tree to be retained in road reserve/embankment. Tree to be lopped by qualified arborist. Methodology for retention would need to be defined in and approved as part of CHMP.	Minor	Unlikely	Low	Design road embankment to protect tree. Ensure road embankment does not impeded drainage to tree or impact to root system. Ensure tree is lopped by a qualified arborist and that branch lopping does not damage tree. Final design subject to approval in CHMP	Minor	Unlikely	Low
CH4	Aboriginal Cultural Heritage	Road impacts on registered Aboriginal scarred tree 7825-0399 VAHR when road is duplicated	Destruction of Aboriginal scarred tree		177.J1	Approval of CHMP recommending relocation of tree.	Moderate	Almost Certain	High	Specific management measure relating to relocation of the tree to be agreed with Yorta Yorta Nations.	Minor	Almost Certain	Medium
CH5	Aboriginal Cultural Heritage	Construction encounters previously unregistered ancestral remains.	Destruction of Aboriginal ancestral remains.		177.J1	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. The contractor shall undertake all works under the Contract consistent with the statutory contingency recommendations in an approved Cultural Heritage Management Plan in Victoria, including immediately stopping work and reporting if an Aboriginal cultural heritage burial/place is encountered.	Catastrophic	Unlikely	High	Additional negotiation and approval from Yorta Yorta Nations regarding protocol for protection of ancestral remains. Implement CHMP management measures and recommendations. All work must cease in the area where the remains are found and statutory procedures for reporting the discovery that are contained in the contingency recommendations for the CHMP must be followed.	Catastrophic	Unlikely	High

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
CH6	Aboriginal Cultural Heritage	Construction encounters previously unidentified Aboriginal cultural heritage place	Destruction of Aboriginal cultural heritage place		177.J1	The contractor shall undertake all works under the Contract consistent with the approved Cultural Heritage Management Plan.	Moderate	Likely	High	Additional negotiation and approval from Yorta Yorta Nations. Implement CHMP management measures and recommendations	Moderate	Rare	Low
CH7	Aboriginal Cultural Heritage	Construction encounters previously unidentified Aboriginal Cultural Heritage place in sensitive locations, including in the sandhill and river banks of the Murray and Campaspe Rivers.	Destruction of Aboriginal cultural heritage place and potential impacts on site 7825-0485 VAHR identified during sub-surface testing.		177.A2	A rigid pavement/concrete slab (or other treatment agreed with Yorta Yorta Nations) must be constructed over the section of sand hill to the north of the former Echuca College subject to approval in the CHMP. Bridge piers must be sunk into the north bank of the Campaspe River south of Scenic Drive and at the bridge abutment at the north end of the bridge. There must be no disturbance to the Aboriginal Heritage Place 7825-0485VAHR identified during sub-surface testing, other than any disturbance allowed by the CHMP in future. The contractor shall undertake all works under the Contract consistent with the statutory contingency recommendations in an approved Cultural Heritage Management Plan in Victoria, including immediately stopping work and reporting if an Aboriginal cultural heritage burial/place is encountered.	Moderate	Almost Certain	High	Additional negotiation and approval from Yorta Yorta Nations. Implement CHMP management measures and recommendations.	Moderate	Rare	Low
CH8	Aboriginal Cultural Heritage	Fill for the road construction is obtained from a source where excavation impacts on Aboriginal sites	Destruction of Aboriginal place		177.J1	Source fill from existing accredited quarry.	Minor	Unlikely	Low	Minimise impacts at known locations through detailed design or construction planning	Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
HH1	Historic Heritage	Construction encounters previously unregistered and unassessed historical heritage site	Damage / destruction to a previously unregistered or unassessed historic archaeological site.		177.J1e	The following procedure will apply in the event of the discovery of any uncovered cultural heritage during construction: i) immediate notification of the Superintendent; ii) work at the immediate location to be suspended, and the site isolated by a 'No-Go Zone', pending completion of an evaluation of the cultural heritage and the determination of an appropriate course of protective action; iii) the Contractor shall evaluate the nature and extent of the cultural heritage. A cultural heritage advisor shall be engaged to assist in this evaluation; iv) work greater than 50m away from the area in which the cultural heritage was uncovered and/or identified may recommence and continue.	Moderate	Unlikely	Medium	Minor	Unlikely	Low
HH2	Historic Heritage	Construction encounters HO79 stand of Murray pine trees north of former Echuca College	Damage / destruction of a landscape feature listed in the Heritage Overlay of the Campaspe Planning Scheme.		177.J1d	If Amendment C101 is gazetted as proposed at the time of writing this report, then planning approval to impact on area of HO79 crossed by the alignment should be obtained from the Shire of Campaspe prior to works commencing. Works to be conducted in accordance with conditions in any planning approval.	Moderate	Almost Certain	High	Minor	Almost Certain	Medium
HH3	Historic Heritage	Alignment encounters heritage listed area of the Old Echuca township and Victoria Park (HO1)	Damage / destruction of a heritage place listed on the Shire of Campaspe Heritage Overlay.		177.J1	Alignment does not currently encounter Old Echuca Township and Victoria Park Heritage Overlay, and will not encounter it if Amendment C101 is passed in its current form.	Minor	Rare	Negligible	Minor	Rare	Negligible
HH4	Historic Heritage	Alignment encounters HO41 at 33 Crofton Street	Damage / destruction of a heritage place listed on the Shire of Campaspe Heritage Overlay.		177.J1	Alignment avoids HO41. Planning approval to impact on HO site should be obtained from the Shire of Campaspe in the event that Amendment C101, which extends the Heritage Overlay around 33 Crofton Street, is gazetted as proposed at the time of writing this report. Works to be conducted in accordance with conditions in any planning approval. A Consent to Disturb approval for impacts on any archaeological features should be obtained from Heritage Victoria pursuant to the Heritage Act 1995.	Minor	Rare	Negligible	Minor	Rare	Negligible
HH5	Historic Heritage	Alignment encounters HO 68 at 279-281 Campaspe Esplanade	Damage / destruction of a heritage place that is within a Campaspe Planning Scheme Heritage Overlay.		177.J1	Alignment to avoid HO. Planning approval to impact on HO site should be obtained from the Shire of Campaspe in the event of impacts. Works to be conducted in accordance with conditions in any planning approval. A Consent to Disturb approval for impacts on any archaeological features should be obtained from Heritage Victoria pursuant to the Heritage Act 1995.	Minor	Rare	Negligible	Minor	Rare	Negligible

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Additional Controls Recommended to Reduce Risk	Residual Risk		
							Consequence	Likelihood	Risk Rating		Consequence	Likelihood	Risk Rating
FF1	Biodiversity & Habitat	Construction encounters confirmed habitat for EPBC Listed species (Rainbow Bee-eater)	Removal of fauna habitat		177 A3, A4, A5, A6 17711 RMS Clauses:	<p>Selected alignment avoids fauna habitat where possible.</p> <p>The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site.</p> <p>The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions.</p> <p>The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction.</p> <p>All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.</p>	Insignificant	Almost Certain	Low	Refine the alignment through detailed design and/or construction planning to minimise the removal of known fauna habitat.	Insignificant	Almost Certain	Low
FF2	Biodiversity & Habitat	Construction encounters confirmed habitat for EPBC Listed species (Rainbow Bee-eater)	Possible injury or death to listed fauna species during construction		177 A3, A4, A5, A6 17711 RMS Clauses:	<p>Selected alignment avoids fauna habitat where possible.</p> <p>The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site.</p> <p>The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions.</p> <p>The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction.</p> <p>All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.</p>	Minor	Unlikely	Low		Minor	Possible	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
FF3	Biodiversity & Habitat	Construction encounters confirmed habitat for FFG listed species (Diamond Firetail, eastern Great Egret, Grey-crowned babbler, Hooded Robin, Intermediate Egret, Masked Owl, Speckled Warbler, Superb Parrot, Swift Parrot, Turquoise Parrot, White-bellied Sea-eagle, South-eastern long-eared Bat, Squirrel Glider, Growling Grass Frog and Yellow-bellied Sheath-tailed Bat) or impact outside of nominated construction footprint	Removal of fauna habitat		177 A3, A4, A5, A6 17711 RMS Clauses:	Selected alignment avoids fauna habitat where possible. The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions. The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction. All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.	Minor	Almost Certain	Medium	Refine the alignment through detailed design and/or construction planning to minimise impacts	Minor	Almost Certain	Medium
FF4	Biodiversity & Habitat	Construction encounters confirmed habitat for FFG Act listed species (Masked Owl, Squirrel Glider and Yellow-bellied Sheath-tailed Bat) or impact outside of nominated construction footprint	Possible injury or death to listed fauna species during construction		177 A3, A4, A5, A6 17711 RMS Clauses:	Selected alignment avoids flora habitat where possible. The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions. The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction. All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.	Moderate	Possible	Medium	Include a requirement in the EMP to undertake salvage and translocation of tree-dwelling fauna species	Minor	Possible	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
FF5	Biodiversity & Habitat	Construction encounters Scattered LoTs	Removal of scattered trees along the alignment		177 A3, A4, A5, A6 17711 RMS Clauses:	<p>The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions.</p> <p>The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction.</p> <p>All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.</p>	Moderate	Almost Certain	High	Refine the alignment through detailed design and/or construction planning to minimise impacts	Minor	Almost Certain	Medium
FF6	Biodiversity & Habitat	Construction encountered habitat for TSC Act listed species (Bitter Quandong, Chariot Wheels, Claypan Daisy, Narrow Doodenia, Red Swainson-pea, River Swamp Wallaby Grass, Round-leafed Wilsnia, Silky Swainson-pea, Slender Darling-pea, Small Scurf-pea, Spear grass, Turnip Cpperburr, Wester Water-starwort, Windged Pettercress, Yellow Gum)	Removal of flora habitat during construction	Aquatic Hydrology		<p>The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions.</p> <p>The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction.</p> <p>All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.</p>	Moderate	Possible	Medium	Refine the alignment through detailed design and/or construction planning to minimise impacts	Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
FF7	Biodiversity & Habitat	Construction encounters habitat for DELWP Advisory listed flora and fauna species	Removal of flora habitat during construction	Aquatic Hydrology	177 A3, A4, A5, A6 177I1 RMS Clauses:	The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions. The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction. All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.	Minor	Likely	Medium	Refine the alignment through detailed design and/or construction planning to minimise impacts. Include a requirement in the EMP to undertake salvage and translocation of Dianella and other similar flora species.	Insignificant	Likely	Low
FF8	Biodiversity & Habitat	Construction results in weeds and / or pathogens being spread	Invasion of native vegetation and/or fauna habitat and increased spread of weeds		177.12	The contractor shall prevent the spread of declared weeds, pests and diseases within the site and offsite through the implementation of controls that include: i) treatment of declared weeds prior to the commencement of any ground disturbing activities and in response to their identification through monitoring on the site; ii) the management of weed and soil pathogen potential within imported materials; iii) provisions for cleaning plant and equipment; iv) the location of cleaning areas; and v) the use of a vehicle and machinery hygiene log book. These measures will be included in the EMP.	Minor	Possible	Low		Minor	Possible	Low
FF9	Biodiversity & Habitat	Loss of habitat due to machinery sparking fire during construction	Impact to native vegetation within a wider area and possible loss of habitat		177 A3	The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The EMP shall include the process and responsibilities for operational control, comprising procedures to manage all identified impacts and environmental protection requirements, including the requirements where relevant in Section 177B-H, and any specific environmental requirements in Section 100.	Minor	Possible	Low	Construction not to occur on total fire ban days and diesel vehicles to be used. Keep vehicles to well designed haul roads and limit vehicle speeds.	Minor	Rare	Negligible

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
FF10	Biodiversity & Habitat	Light, noise, vibration disturbance to native fauna during construction and operation	Potential for stress on native fauna	Noise	177.H1	All work under the contract shall comply with the following requirements: i) hours of work shall be between 7am and 6pm weekdays and Saturday; ii) construction vehicles and equipment shall have appropriate measures fitted and be effectively maintained to minimise engine noise; iii) noisy equipment shall be enclosed where possible; iv) establishment of temporary noise attenuation barriers where possible; v) scheduling noisy work practices to minimise the likelihood of community annoyance; and vi) use of smart movement alarms for vehicles particularly when working in proximity to noise sensitive receptors or where working outside normal hours Minimal lighting adequate for public safety to be installed and used in operation of the road	Minor	Possible	Low	Minor	Possible	Low
FF11	Biodiversity & Habitat	Construction removes remnant native vegetation and habitat	Fragmentation of habitat either side of the Project alignment effectively reducing area of connected habitat resulting in reduction in resilience of retained vegetation/habitat/populations to ongoing impacts due to reduction in area/size			The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions. The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction. All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.	Moderate	Almost Certain	High	Minor	Almost Certain	Medium
FF12	Biodiversity & Habitat	Shading	Loss/adverse change of flora and vegetation due to a lack of sufficient sunlight (particularly adjacent to and south of the bridge).			The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction.	Insignificant	Likely	Low	Insignificant	Possible	Negligible
FF13	Biodiversity & Habitat	Operational collision with wildlife, particularly at dawn, dusk and night	Possible injury or death to listed fauna species			The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site.	Minor	Likely	Medium	Minor	Possible	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
FF14	Biodiversity & Habitat	Construction encounters habitat for DELWP Advisory listed species	Possible injury or death to listed fauna species during construction		177 A3, A4, A5, A6 17711 RMS Clauses:	The contractor shall be responsible for preparing an EMP, ensure that all personnel are informed of the environmental issues and specific risks and mitigation measures prior to undertaking any works on-site. The contractor shall be responsible for obtaining all necessary permits and approvals from relevant authorities, other than those already obtained by VicRoads and RMS and implementing the relevant conditions. The Contractor shall engage a suitably experienced and skilled environmental management professional to prepare the Environmental Management Plan and manage and monitor all environmental issues and environmental treatments implemented during construction. All works shall avoid, minimise and offset (where appropriate) the removal of native vegetation during construction; avoid injury to fauna or damage to protected vegetation or habitat; and management of any significant flora and fauna sites, species or habitat not previously identified.	Moderate	Likely	High	Insignificant	Likely	Low
AQ1	Aquatic	Construction has an adverse effect on the Lower Murray Endangered Ecological Community	Degradation of aquatic ecosystem of the Murray River through impacts on water quality, habitat quality, flora or fauna.		VicRoads Section 177 A3, A4, A5, A6, B1, D1, F1, G1, H, I1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, E, W, N, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,3,6,7,9,10	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to habitat for threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native aquatic flora and fauna, aquatic ecosystems and aquatic habitat. Pre-clearing of aquatic habitats shall be undertaken, and any snags encountered will be translocated under guidance of a qualified aquatic ecologist. Any impacts to the waterways resulting from erosion and sedimentation, water quality degradation and pollution, weeds and pests, construction noise and waterway and riparian zone disturbance will be avoided wherever possible. Aquatic habitat monitoring shall be undertaken for the duration of the construction, and environmental incidents will be reported.	Minor	Unlikely	Low	Minor	Unlikely	Low
AQ2	Aquatic	Construction encounters unexpected listed aquatic flora or fauna species	Injury or death to listed aquatic flora or fauna species during construction		VicRoads Section 177 A3, A4, A5, A6, I1, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,9,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any threatened species encountered will be translocated by a qualified aquatic ecologist. Aquatic habitat monitoring shall be undertaken.	Minor	Unlikely	Low	Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
AQ3	Aquatic	Construction encounters habitat for EPBC Listed species	Removal or degradation of aquatic fauna habitat		VicRoads Section177 A3, A4, A5, A6, B1, D1, F1, G1, H, I1, I2, K1, K2, L1. Roads & Maritime Services Standard Safeguards G, B. Roads & Maritime Services Biodiversity Guidelines: Guides 1,2,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to habitat for threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native aquatic flora and fauna and aquatic habitat. Pre-clearing of aquatic habitats shall be undertaken, and any snags encountered will be translocated under guidance of a qualified aquatic ecologist. Any impacts to the waterways resulting from erosion and sedimentation, water quality degradation and pollution, weeds and pests, construction noise and waterway and riparian zone disturbance will be avoided wherever possible. Aquatic habitat monitoring shall be undertaken for the duration of the construction, and environmental incidents will be reported	Minor	Possible	Low	Minor	Possible	Low
AQ4	Aquatic	Construction encounters EPBC listed species	Injury or death to listed aquatic fauna species during construction		VicRoads Section177 A3, A4, A5, A6, I1, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,9,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any threatened species encountered will be translocated by a qualified aquatic ecologist. Aquatic habitat monitoring shall be undertaken	Minor	Unlikely	Low	Minor	Unlikely	Low
AQ5	Aquatic	Construction encounters habitat for Victorian FFG listed species	Removal or degradation of aquatic fauna habitat during construction		VicRoads Section177 A3, A4, A5, A6, B1, D1, F1, G1, H, I1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to habitat for threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native aquatic flora and fauna and aquatic habitat. Pre-clearing of aquatic habitats shall be undertaken, and any snags encountered will be translocated under guidance of a qualified aquatic ecologist. Any impacts to the waterways resulting from erosion and sedimentation, water quality degradation and pollution, weeds and pests, construction noise and waterway and riparian zone disturbance will be avoided wherever possible. Aquatic habitat monitoring shall be undertaken for the duration of the construction, and environmental incidents will be reported.	Minor	Possible	Low	Minor	Possible	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
AQ6	Aquatic	Construction encounters Victorian FFG listed species	Injury or death to listed aquatic fauna species during construction		VicRoads Section177 A3, A4, A5, A6, I1, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,9,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any threatened species encountered will be translocated by a qualified aquatic ecologist. Aquatic habitat monitoring shall be undertaken.	Minor	Unlikely	Low	Minor	Unlikely	Low
AQ7	Aquatic	Construction encounters habitat for NSW Fisheries Management Act listed species	Removal or degradation of fauna habitat during construction		VicRoads Section177 A3, A4, A5, A6, B1, D1, F1, G1, H, I1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to habitat for threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any snags encountered will be translocated under guidance of a qualified aquatic ecologist. Impacts of sedimentation, water quality, construction noise and waterway and riparian zone disturbance will be avoided wherever possible. Aquatic habitat monitoring shall be undertaken for the duration of the construction.	Minor	Possible	Low	Minor	Possible	Low
AQ8	Aquatic	Construction encounters NSW Fisheries Management Act listed species	Injury or death to listed fauna species during construction		VicRoads Section177 A3, A4, A5, A6, I1, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,9,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any threatened species encountered will be translocated by a qualified aquatic ecologist. Aquatic habitat monitoring shall be undertaken.	Minor	Unlikely	Low	Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
AQ9	Aquatic	Construction encounters habitat for DELWP Advisory listed species	Removal or degradation of aquatic fauna habitat during construction		VicRoads Section177 A3, A4, A5, A6, B1, D1, F1, G1, H, I1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to habitat for threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any snags encountered will be translocated under guidance of a qualified aquatic ecologist. Impacts of sedimentation, water quality, construction noise and waterway and riparian zone disturbance will be avoided wherever possible. Aquatic habitat monitoring shall be undertaken for the duration of the construction.	Minor	Possible	Low	Minor	Possible	Low
AQ10	Aquatic	Construction encounters DELWP Advisory listed species	Injury or death to listed aquatic fauna species during construction		VicRoads Section177 A3, A4, A5, A6, I1, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,9,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native flora and fauna and habitat. Pre-clearing of aquatic habitats shall be undertaken, and any threatened fauna species encountered will be translocated by a qualified aquatic ecologist. Aquatic habitat monitoring shall be undertaken.	Minor	Unlikely	Low	Minor	Unlikely	Low
AQ11	Aquatic	Construction works impact on downstream aquatic habitat water quality	Degraded river health, reduced aquatic habitat		VicRoads Section177 A3, A4, A5, A6, B1, D1, G1, I1, K1, K2, L1. Standard Specification Sections 3030. Roads & Maritime Standard Safeguards G, W, B. Roads & Maritime Biodiversity Guidelines: Guide 10.	The contractor shall develop and implement an EMP that specifically includes the prevention of water quality impacts in the receiving waterways. The quality of water in waterways shall not be detrimentally impacted by runoff from the site. Water quality in the receiving waterways shall be monitored during all stages of construction. Works shall avoid work in waters wherever possible. Any leakage or spillage of fuels or chemicals shall not have a detrimental environmental impact. Drainage design shall be sufficient capacity to prevent flow of pollutants in stormwater to waterway.	Minor	Possible	Low	Minor	Possible	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
AQ12	Aquatic	Construction works result in sediment smothering aquatic habitat	Degraded aquatic habitat quality, reduced river health condition and suitability for aquatic fauna.		VicRoads Section177 A3, A4, A5, A6, D1, I1, K1, K2, L1. Standard Specification Sections 3030. Roads & Maritime Standard Safeguards G, E, B. Roads & Maritime Biodiversity Guidelines: Guides 2,3,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of erosion and minimisation of sediment runoff. All exposed surfaces shall be managed to minimise erosion and sediment generation. Works shall avoid work in waters wherever possible. Suitably scaled sedimentation basin shall be used to control sediment. Stockpiles shall located and managed to avoid sediment from entering waterways. The contractor shall regularly inspect for and rectify soil erosion and scour. Establishment of no-go zones to limit soil disturbance. Drainage design shall be sufficient to prevent scour and capacity to prevent flow of sediment in stormwater to waterway.	Minor	Unlikely	Low	Minor	Unlikely	Low
AQ13	Aquatic	Construction noise (e.g. pile driving) degrades aquatic habitat quality.	Aquatic fauna behaviours affected, leave study area or are deterred from moving through the study area by extreme construction noise.	Noise	VicRoads Section177 A3, A4, A5, A6, H, I1, K1, K2, L1. Roads & Maritime Standard Safeguards G, N. Roads & Maritime Biodiversity Guidelines: Guide 10.	The contractor shall develop and implement an EMP that specifically includes the minimisation of construction noise impacts on aquatic ecosystem receptors. Works to be carried out to minimise noise impacts. Avoid activities in waterway as much as possible. Noisy construction activities shall be limited to standard working hours.	Minor	Possible	Low	Minor	Possible	Low
AQ14	Aquatic	Operational impacts to water quality from spills and runoff	Water quality impacts results in degraded aquatic habitat quality or death or injury to aquatic flora and fauna	Hydrology, Traffic	Standard Specification Sections 3010, 3030, 3080, 3090.	Runoff from all pavement areas will be collected and treated to quality suitable for discharge to the environment. Drainage design shall be modelled and sized to manage rainfall intensities and soil characteristics specific to the region. Road and bridge designed to safely achieve specified traffic volumes travelling at the minimum operating / design speeds. Roads safety audit to be completed on detailed design. Traffic incident device and signage to manage safety of hazardous load transport. Traffic barrier systems shall provide sufficient protection for hazardous load transport.	Major	Rare	Medium	Major	Rare	Medium
AQ15	Aquatic	Construction and operation results in listed aquatic weeds and / or pathogens being spread in aquatic habitats	Invasion of aquatic habitat and increased spread of weeds or disease, affecting aquatic habitat quality	Soils & Geology, Biodiversity & Habitat	VicRoads Section177 A3, A4, A6, F1, I1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, E, B. Roads & Maritime Biodiversity Guidelines: Guides 2,3,6,7,10	The contractor shall develop and implement an EMP that specifically includes the prevention of the pests, weeds and pathogens. Riparian habitat to be marked and protected as no-go zones. Revegetation required for soil control and limit weed establishment. Declared weeds, pests and diseases shall not be introduced through the site, spread through or removed from the site.	Minor	Unlikely	Low	Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
AQ16	Aquatic	Impedance to passage of aquatic fauna	Construction works and bridge design may provide a barrier or deterrent to aquatic fauna movement	Noise, Hydrology	VicRoads Section177 A3, A4, A6, B1, H, I1, K1, K2, L1. Standard Specification Sections 3030, 3060. Roads & Maritime Standard Safeguards G, W, N, B. Roads & Maritime Biodiversity Guidelines: Guides 2,10.	Bridge design does not include piles or other structures within the river channel. Structures to be built outside of the permanent waterway and water flow maintained. Drainage design shall be sufficient to prevent water quality impacts that may affect fauna movement. Waterway treatments shall minimise impact to waterways, and provide free passage for fish. Severe construction noise (e.g. pile driving) impacts on aquatic ecosystem limited to standard hours. Water quality impacts minimised to avoid deterrent to fish passage.	Minor	Unlikely	Low	Minor	Unlikely	Low
AQ17	Aquatic	Loss of riparian vegetation	Impacts aquatic fauna and flora dependant on riparian vegetation inputs for food/nutrient source or habitat quality (shading, structure)	Biodiversity & Habitat, Soils & Geology	VicRoads Section177 A3, A4, A5, A6, D1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 2,7,10.	The contractor shall develop and implement an EMP that specifically includes the protection and monitoring of riparian vegetation. All work shall avoid impacts to native flora. Riparian habitat to be marked and protected as no-go zones. Clearing of riparian vegetation undertaken to minimise impacts to aquatic habitats.	Insignificant	Almost Certain	Low	Insignificant	Almost Certain	Low
AQ18	Aquatic	Construction has an adverse effect on Wetlands of International Importance (Ramsar)	Degradation of aquatic ecosystem of the Murray River through impacts on water quality, habitat quality, flora or fauna.		VicRoads Section177 A3, A4, A5, A6, B1, D1, F1, G1, H, I1, I2, K1, K2, L1. Roads & Maritime Standard Safeguards G, E, W, N, B. Roads & Maritime Biodiversity Guidelines: Guides 1,2,3,6,7,9,10.	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to aquatic ecosystems habitat for threatened aquatic fauna and flora species. The Contractor shall be responsible for obtaining all necessary permits and approvals. All work shall avoid impacts and protect native aquatic flora and fauna, aquatic ecosystems and aquatic habitat. Any impacts to the waterways resulting from erosion and sedimentation, water quality degradation and pollution, weeds and pests, construction noise and waterway and riparian zone disturbance will be avoided wherever possible. Aquatic habitat monitoring shall be undertaken for the duration of the construction, and environmental incidents will be reported.	Minor	Unlikely	Low	Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
AQ19	Aquatic	Construction and operation impacts aquatic ecological function of floodplain	Loss of lateral and longitudinal connectivity of river with floodplain, loss of aquatic habitat on floodplain, interruption to nutrient cycling and flood event aquatic species movement.	Hydrology	VicRoads Section 177 A3, A4, A5, A6, B1, D1, G1, I1, I2, K1, K2. Standard Specification Sections 3030, 3060. Roads & Maritime Standard Safeguards G, B. Roads & Maritime Biodiversity Guidelines: Guides 2,3,10	The contractor shall develop and implement an EMP that specifically includes the prevention of impacts to aquatic ecosystems habitat. Project design includes sufficient clearance, allowing floodwater onto floodplain. Existing flood relief structures under the carriageway to be upgraded, and bridges and culverts incorporated in the design to allow movement of floodwaters across floodplain. The contractor shall develop and implement an EMP that specifically includes the protection and monitoring of riparian and aquatic habitat. All work shall avoid impacts to native flora. Riparian habitat to be marked and protected as no-go zones. Clearing of riparian vegetation undertaken to minimise impacts to aquatic habitats	Minor	Unlikely	Low	Minor	Unlikely	Low	
SG1	Soils & Geology	Waste material uncovered during works	Exposure of potentially contaminated soils.	Hydrology, Biodiversity & Habitat	177E1.	The discovery of contaminated material on the site during works shall be managed in accordance with VicRoads and EPA Guidelines. Undertake Phase 1 Environmental Site Assessment (ESA) and indicative soil contamination testing as part of the geotechnical investigation during the pre-construction works.	Moderate	Unlikely	Medium	Phase 2 environmental site assessment to delineate any contamination if contamination encountered. Design to minimise excavation / ground disturbance within the corridor.	Minor	Unlikely	Low
SG2	Soils & Geology	Soil settlement due to poor / soft ground conditions	Ground settlement, potential impacts to structures, pavement design life and maintenance issues	Social		Undertake adequate geotechnical investigations including Cone penetration testing and consolidation testing of undisturbed soil samples obtained from borehole drilling. If soft ground encountered, undertake additional investigations to allow design to minimise settlement	Moderate	Likely	High	Ground stabilisation/improvement techniques if required prior to construction. Contractor to utilise best practice techniques for batter construction.	Minor	Unlikely	Low
SG3	Soils & Geology	Potential for erosion / sediment generation during construction from localised rainfall.	Batter instability, maintenance issues and sediment impacts within drainage paths and waterways	Hydrology, Biodiversity & Habitat	Clause 177D	Sediment control measures (e.g. sedimentation basins) to be setback from banks of waterways where possible. Where construction activities are undertaken in, near or over waters, EMPs shall be prepared to protect beneficial users in accordance with any permit, the State Environmental Planning Policy (Waters of Victoria) its schedules and best practice guidelines.	Minor	Possible	Low		Minor	Possible	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk			
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating	
SG4	Soils & Geology	Potential for erosion / sediment generation post construction	Batter instability, maintenance issues and sediment impacts within drainage paths and waterways	Hydrology, Biodiversity & Habitat	Clause 177D	Regular maintenance and established management measures, such as sedimentation basins, silt fences, batter protection (appropriate vegetation, geofabric matting, etc)	Minor	Possible	Low	Additional erosion management measures if pre-existing measures implemented not performing to requirements. Measures may include remulching, inserted erosion control mats or seeding with grass (hydroseeding). Undertake surveillance to monitor.	Minor	Unlikely	Low
SG5	Soils & Geology	Potential for uncontained spills or leaks during construction or operation	Groundwater, soil and/or surface water contamination impacts on water resources, flora, fauna, and/or human health.	Hydrology, Biodiversity & Habitat	Clause 177.G1	Environmental Management Plan (EMP) shall include specific procedures to minimise spillage of any fuels or chemicals and mitigate the effect in the event that leakages and spillages occur. Fuel, chemical and equipment storage areas shall be visually monitored at intervals of not more than 7 days to mitigate contamination in a timely manner	Moderate	Rare	Low	CEMP to include: - Appropriate procedures for containing spills and leaks - Appropriate methods for cleaning up spills and leaks where safe to do so.	Insignificant	rare	Negligible
H1	Surface Water	Construction at Murray River impacts on bank form, habitat or waterway health	Localised bank destabilisation and scour at waterway crossings and detrimental impact on riparian habitat	Aquatic	177 B1 177 D1	Coffer dams to be implemented and significant vegetation to be cut to ground level. The quality of water in waterways shall not be detrimentally impacted by runoff from the site. Works shall be programmed and managed to avoid works in waters. Where work in waters is unavoidable, procedures shall be developed and implemented to satisfy the requirements of the specification and as required by any permits from the responsible authority(s). Where construction activities are undertaken in, near or over waters, EMPs shall be prepared to protect beneficial use in accordance with any permit, the SEPP (waters of Victoria) its schedules and best practice guidelines.	Minor	Almost Certain	Medium	NA	Minor	Almost Certain	Medium
H1	Surface Water	Proposed works result in change to hydraulic conditions above acceptable levels	Potential for local disturbance to waterway banks, channels and flow. Potential for reduced aquatic habitat	Aquatic Biodiversity & Habitat		Structures within waterways to be sized and sited to minimise any afflux consistent with NCCMA & MDB Authority requirements Undertake waterway improvements / bank stabilisation works to allow for any changes to flow characteristics	Minor	Unlikely	Low		Minor	Unlikely	Low

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
H3	Surface Water	Construction at Campaspe River impacts on bank form, habitat or waterway health	Localised bank destabilisation and waterway crossings and detrimental impact on existing habitat	Aquatic	177 B1 177 D1	The quality of water in waterways shall not be detrimentally impacted by runoff from the site. Works shall be programmed and managed to avoid works in waters. Where work in waters is unavoidable, procedures shall be developed and implemented to satisfy the requirements of the specification and as required by any permits from the responsible authority(s). Where construction activities are undertaken in, near or over waters, EMPs shall be prepared to protect beneficial use in accordance with any permit, the SEPP (waters of Victoria) its schedules and best practice guidelines. To manage disturbance of the banks and river no piers are being placed within the main river channel.	Minor	Unlikely	Low	Minor	Unlikely	Low
H4	Surface Water	Construction risk of sediment from disturbed areas may impact the waterways	Accumulation of sediment in the waterways during construction	Aquatic	177 B1 177 D1	Prompt temporary and/or permanent progressive revegetation of the site as work proceeds. Prompt covering of exposed surfaces (including batters and stockpiles) that would otherwise remain bare for more than 28 days. Installation, stabilisation and maintenance of catch and diversion drains that segregate water runoff from catchments outside of the construction site from water exposed to the construction site.	Minor	Possible	Low	Minor	Possible	Low
H5	Surface Water	Operational risk of pollutants in stormwater runoff may affect the water quality in the local waterways	Increase of sediment / pollutants in the waterways over time, reducing in water quality and potential impacts on waterway health	Biodiversity & Habitat	Clause 177D1	Drainage design shall be modelled and sized to manage rainfall intensities and soil characteristics specific to the region. This risk is an operational risk following construction of the system.	Minor	Unlikely	Low	Minor	Rare	Negligible

Risk No.	Discipline	Impact pathway	Description of consequences	Linkages	VicRoads Contract Specification Section 177, Roads & Maritime Standard Safeguards or Roads & Maritime Biodiversity Guide Reference	Planned Controls to Manage Risk (as per VicRoads Section 177, Roads & Maritime standard safeguards and Project Description)	Initial Risk			Residual Risk		
							Consequence	Likelihood	Risk Rating	Consequence	Likelihood	Risk Rating
H6	Surface Water	Construction risk of impact on the floodplain function during a flood event.	Modification of the behaviour of the floodplain during construction	Biodiversity & Habitat		Monitor weather and flood warnings and establish plans at each stage of construction to minimise damage and impact to the waterway. If flood warnings arise clear equipment and blockages within the floodplain as much as possible.	Minor	Rare	Negligible	Minor	Rare	Negligible
GW1	Groundwater	Construction and/or operation impacts on existing groundwater levels	Potential for localised reduction in groundwater levels resulting in either land subsidence or impact to beneficial users	Social / Landuse	177B2	The Contractor shall consider the beneficial uses, quality and quantity of groundwater when determining the ongoing management of groundwater. Such consideration shall be completed prior to the completion of related design and prior to commencement / continuation of related construction activities. Incorporate management practices or design solutions in consultation with the NCCMA	Minor	Unlikely	Low	Minor	Unlikely	Low
GW2	Groundwater	Intersected groundwater discharges into waterways and impacts on surface water quality	Potential discharge of groundwater into Campaspe or Murray Rivers	Aquatic Hydrology	177B1, B2	The quality of water in waterways shall not be detrimentally impacted by runoff from the site. Where groundwater is unexpectedly encountered, a management plan shall be developed and implemented to manage the groundwater and protect beneficial uses in accordance with the requirements of the EPA and/or relevant authority. Groundwater encountered on site shall be assessed for the opportunity for reuse as a non-potable water source for the duration of the Contract if no higher fit for purpose use can be identified. Incorporate management practices or design solutions in consultation with the NCCMA.	Minor	Unlikely	Low	Minor	Unlikely	Low