

## 4. EES Assessment Framework and Approach to Investigation

### 4.1 Introduction

This EES documents the assessment framework for the Project and comprises of evaluation objectives and associated criteria that were developed for the assessment of alignment options.

The framework was based on an integrated assessment of environmental effects to assess alignment options and the risk and impact of the alignment options.

An iterative process was adopted that allowed for progressive refinement of the alignment options that incorporated the outcomes of specialist assessments. An overview of the approach adopted for these investigations is presented in this section, along with an explanation of the environmental risk assessment methodology. Chapter 5 (Project Alternatives) documents the approach to the options assessment.

### 4.2 EES Assessment Framework

Evaluation objectives included in the draft EES Scoping Requirements were developed by DPCD as a measure of the environmental performance of the Project.

VicRoads has developed Project objectives (refer Section 1.2 of Chapter 1 (Introduction)) that are more general and relate to the delivery of the Project.

Evaluation criteria were subsequently developed for the evaluation objectives of the final EES Scoping Requirements and VicRoads Project objectives. The evaluation criteria were used to assess the alignment options and inform the selection of the preferred and alternate alignment options.

As the options assessment progressed from a long list to the preferred and alternate options assessed in the EES, the evaluation criteria became more detailed. The criteria then informed the environmental risk and impact assessments through the development of Project specific consequence criteria.

The outcomes of risk and impact assessments therefore assess how the Project meets the EES evaluation objectives.

Further details of the EES evaluation objectives are provided in Section 4.3.

### 4.3 EES Evaluation Objectives

The principal purpose of the EES is to provide stakeholders and decision makers with a detailed description of the potential environmental effects of the Project.

This EES has been prepared to address the EES evaluation objectives, with each section of the EES highlighting the relevant objectives being considered.

The legislation and policies that are relevant to each evaluation objective are identified in Table 4-1 and are further discussed in the technical chapters and Appendices of this EES.

The relevant legislation, guidelines and policies have informed the evaluation criteria for options assessment and the Project specific consequence criteria developed for the risk assessment.

**Table 4-1 EES evaluation objectives and relevant legislation, guidelines and policies**

EES Evaluation Objective	Relevant Legislation	Relevant Guideline/Policy	Relevant EES Chapter
To provide for the duplication of the Western Highway between Beaufort and Ararat to address safety, efficiency and capacity issues.	<ul style="list-style-type: none"> <li>▪ <i>Road Management Act 2004</i></li> <li>▪ <i>Transport Integration Act 2010</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ Arrive Alive! 2008 – 2017 Victoria's Road Safety Strategy</li> <li>▪ VicRoads Access Management Policies (2006)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 9</li> <li>▪ Chapter 19</li> </ul>
To avoid or minimise effects flora and fauna species and ecological communities listed under the Flora and Fauna Guarantee Act 1988 or the Environment Protection and Biodiversity Conservation Act 1999, as well as to comply with requirements under <i>Victoria's Native Vegetation Management – A Framework for Action, 2002</i> .	<ul style="list-style-type: none"> <li>▪ <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)</li> <li>▪ <i>Flora and Fauna Guarantee Act 1988</i></li> <li>▪ <i>Wildlife Act 1975</i></li> <li>▪ <i>Catchment and Land Protection Act 1994</i></li> <li>▪ <i>Planning &amp; Environment Act 1987</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ Victoria's Native Vegetation Management – A Framework for Action</li> <li>▪ Glenelg Hopkins Regional Catchment Strategy (2003)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 13</li> </ul>

EES Evaluation Objective	Relevant Legislation	Relevant Guideline/Policy	Relevant EES Chapter
To protect catchment values, surface water and groundwater quality, stream flows and floodway capacity, as well as to avoid impacts on protected beneficial uses.	<ul style="list-style-type: none"> <li>▪ <i>Planning and Environment Act 1987</i></li> <li>▪ <i>Catchment and Land Protection Act 1994</i></li> <li>▪ <i>Water Act 1989</i></li> <li>▪ <i>Environment Protection Act 1970</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ State Environment Protection Policy (Groundwaters of Victoria) 1997</li> <li>▪ State Environment Protection Policy (Waters of Victoria) 1988</li> <li>▪ Glenelg Hopkins Regional Catchment Strategy (2003)</li> <li>▪ Glenelg Hopkins River Health Strategy (2004)</li> <li>▪ State Environment Protection Policy (Prevention &amp; Management of Contamination of Land) 2002</li> <li>▪ National Environmental Protection (Assessment of Site Contamination) Measure 1999</li> <li>▪ EPA (Vic) Publications 668, 840, 669, 441, 440, 275, 347</li> <li>▪ Industrial Waste Management Policy (Waste Acid Sulfate Soils) 1999</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 10</li> <li>▪ Chapter 11</li> <li>▪ Chapter 12</li> </ul>
To avoid or minimise disruption and other adverse effects on infrastructure, land use (including agriculture) and households, as well as road users resulting from the construction and operation of the highway duplication.	<ul style="list-style-type: none"> <li>▪ <i>Planning and Environment Act 1987</i></li> <li>▪ <i>Environment Protection Act 1970</i></li> <li>▪ <i>Public Health &amp; Wellbeing Act 2008</i></li> <li>▪ <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)</li> <li>▪ <i>Transport Integration Act 2010</i></li> <li>▪ <i>Crown Land (Reserves) Act 1978</i></li> <li>▪ <i>Land Act 1958</i></li> <li>▪ <i>National Parks Act 1975</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ National Environment Protection (Air Quality and Air Toxics) Measures</li> <li>▪ Pyrenees Planning Scheme</li> <li>▪ Ararat Planning Scheme</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 8</li> <li>▪ Chapter 9</li> <li>▪ Chapter 18</li> <li>▪ Chapter 19</li> </ul>
To minimise air emissions, noise, visual, landscape and other adverse amenity effects, during the development and operation of the proposed duplicated highway to the extent practicable.	<ul style="list-style-type: none"> <li>▪ <i>Planning and Environment Act 1987</i></li> <li>▪ <i>Environment Protection Act 1970</i></li> <li>▪ <i>Public Health &amp; Wellbeing Act 2008</i></li> <li>▪ <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)</li> <li>▪ <i>Transport Integration Act 2010</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ State Environment Protection Policies (Air Quality Management 2001 and Ambient Air Quality 1999)</li> <li>▪ Traffic Noise Reduction Policy (VicRoads, February 2005)</li> <li>▪ Traffic Noise Measurement Requirements for Acoustic Consultants (VicRoads, November 2005)</li> <li>▪ AS 2702-1984: Acoustics-Methods for the Measurement of Road Traffic Noise</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 15</li> <li>▪ Chapter 16</li> <li>▪ Chapter 17</li> <li>▪ Chapter 18</li> </ul>

EES Evaluation Objective	Relevant Legislation	Relevant Guideline/Policy	Relevant EES Chapter
To protect residents' well-being and minimise any dislocation of residents or severance of communities, to the extent practicable.	<ul style="list-style-type: none"> <li>▪ <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth)</li> <li>▪ <i>Transport Integration Act 2010</i></li> <li>▪ <i>Public Health and Wellbeing Act 2008</i></li> <li>▪ <i>Planning &amp; Environment Act 1987</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ Ready for Tomorrow – a Blueprint for Regional and Rural Victoria (2010)</li> <li>▪ Central Highlands Regional Strategic Plan</li> <li>▪ Arrive Alive! 2008 – 2017 Victoria's Road Safety Strategy</li> <li>▪ Western Highway M8/A8 Corridor Strategy – Deer Park to South Australian Border, (1999)</li> <li>▪ National Transport Links – Growing Victoria's Economy (2007)</li> <li>▪ Melbourne-Adelaide Corridor Strategy – Building Our National Transport Future (2007)</li> <li>▪ State Planning Policy Framework</li> <li>▪ Ararat Planning Scheme</li> <li>▪ Ararat Council Plan (2009)</li> <li>▪ Ararat Municipal Public Health and Well-being Plan (2009-2013)</li> <li>▪ Pyrenees Planning Scheme</li> <li>▪ Pyrenees Council Plan</li> <li>▪ Pyrenees Municipal Public Health and Well-being Plan (2009)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 7</li> <li>▪ Chapter 18</li> </ul>
To protect Aboriginal and non-Aboriginal cultural heritage.	<ul style="list-style-type: none"> <li>▪ <i>Heritage Act 1995</i></li> <li>▪ <i>Aboriginal Heritage Act 2006</i></li> <li>▪ <i>Traditional Owner Settlement Act 2010</i></li> <li>▪ <i>Native Title Act 1993</i> (Commonwealth)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Aboriginal Heritage Regulations 2007</li> <li>▪ Ararat Planning Scheme</li> <li>▪ Pyrenees Planning Scheme</li> <li>▪ Victorian Heritage Register</li> <li>▪ Victorian Heritage Inventory</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 14</li> </ul>
To provide a transparent framework with clear accountabilities for managing environmental effects and hazards associated with the Project in order to achieve acceptable environmental outcomes.	<ul style="list-style-type: none"> <li>▪ <i>Environment Effects Act 1978</i></li> <li>▪ <i>Environment Protection Act 1970</i></li> <li>▪ <i>Planning and Environment Act 1987</i></li> </ul>		<ul style="list-style-type: none"> <li>▪ Chapter 21</li> <li>▪ Chapter 4.6</li> </ul>
Overall, to identify an alignment and conceptual design for the Western Highway Project from Beaufort to Ararat that would achieve a balance of economic, environmental and social outcomes.	<ul style="list-style-type: none"> <li>▪ <i>Road Management Act 2004</i></li> <li>▪ <i>Transport Integration Act 2010</i></li> </ul>	<ul style="list-style-type: none"> <li>▪ Arrive Alive! 2008 – 2017 Victoria's Road Safety Strategy</li> <li>▪ VicRoads Access Management Policies (2006)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Chapter 5</li> </ul>

### 4.4 Summary of Approach to EES Investigations

Development of the alignment options and environmental investigations for the Project has been undertaken in three phases:

- **Phase 1** involved developing a range of alignment options, followed by a rapid assessment to identify a shortlist.
- **Phase 2** involved the detailed assessment of the options shortlisted in Phase 1 to identify a recommended option in each zone.
- **Phase 3** involved an Environmental Risk Assessment of the recommended alignment options and completion of the specialist impact assessments. The Phase 2 assessment identified multiple recommended options, therefore the environmental risk assessment was utilised to identify preferred alignments for presentation in this EES.

As a result of this process, two options were considered feasible for adoption by VicRoads. These options were Option 1 and Option 2, which were subject to further refinement in order to mitigate potential areas of impact.

The specialist studies, completed to inform the EES, occurred in parallel with the selection of preferred and alternative alignment options for the duplication of the Western Highway. The outcomes of the specialist studies informed the selection of the preferred and alternative alignment and development of the environmental management framework.

Figure 4-1 shows a flowchart of the approach to the EES and the integration of the alignment selection process, the specialist studies and the preparation of the EES. Chapter 5 (Project Alternatives) provides further details on the options assessed in Phase 1 and Phase 2 of the Project.

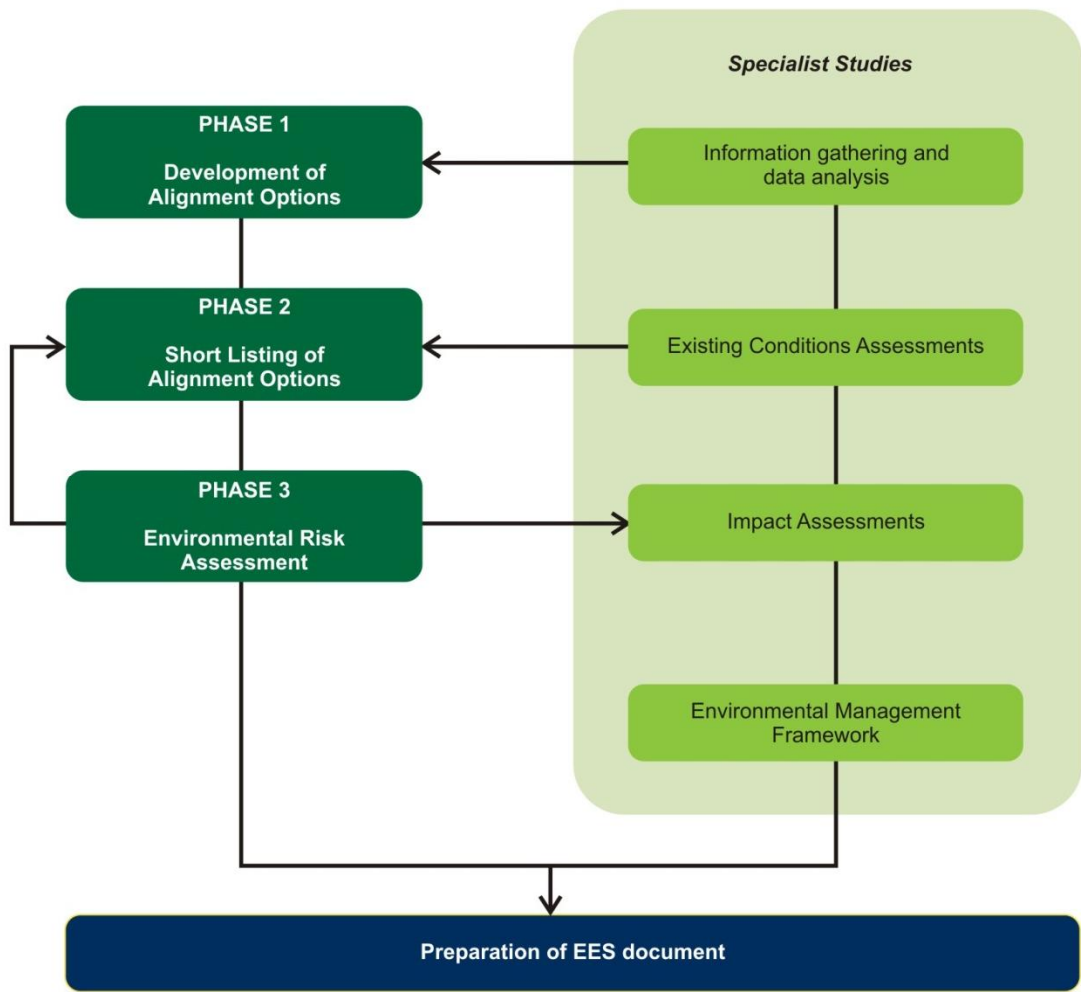


Figure 4-1 Approach to the EES

## 4.5 Environmental Risk Assessment

The objective of the environmental risk assessment was to identify key social and environmental risks from the Project and develop management and mitigation measures to reduce these risks.

The Phase 2 assessment identified multiple recommended options in three of the six zones therefore resulting in three complete alignment options. The environmental risk assessment considered the three alignments and was utilised to identify preferred alignments for presentation in this EES.

A summary of the risk assessment process is provided in Figure 4-2. This process was based upon AS/NZS ISO 31000:2009: Risk Management.

A Project Description was developed for the alignment options. This Project Description contains design details such as proposed construction methods, details of waterway crossings and road design information. The Project Description forms the basis for the impact assessments and environmental risk assessment and is presented in Chapter 6 (Project Description).

As a first step in the environmental risk assessment, each specialist reviewed the Project Description and identified potential risks to the environment.

Each of the risks identified by the specialists was then allocated a likelihood and consequence category, based on the descriptions in Table 4-2 and Table 4-3. The consequence category descriptions were developed by specialists with reference to the existing conditions of the Project area, from the

requirements of relevant legislation and guidelines, as well as the evaluation objectives for the EES.

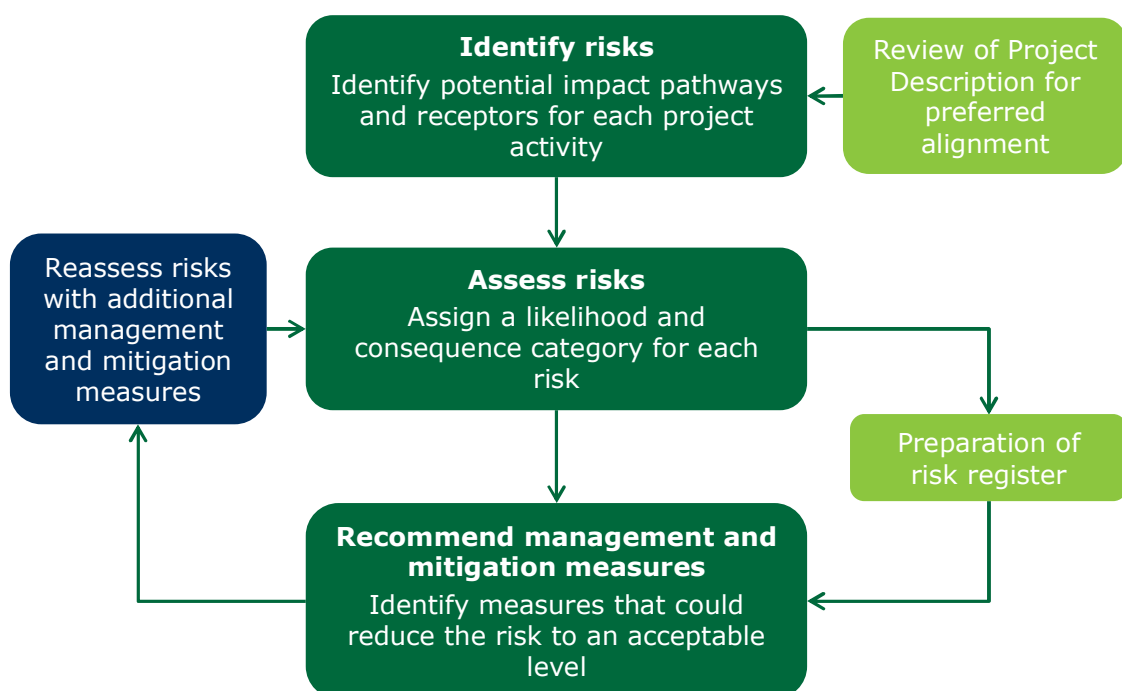
A risk rating was then assigned to each risk, based on the consequence and likelihood categories. Table 4-4 shows the matrix used to allocate the risk rating. Risk ratings were assigned to each risk, assuming implementation of standard VicRoads environmental management procedures and design measures, as detailed in the Project description. This was referred to as the inherent risks from the Project.

After each risk was assigned a rating, additional management and mitigation measures were developed for risks. The risk rating was then re-evaluated, taking into account the additional management and mitigation measures, to identify the residual risk from the Project.

Once a preliminary risk register was completed by each specialist, risk workshops were held to discuss the key risks. These workshops allowed specialists from each area to discuss risks which were interrelated. Following the risk workshop the alignment options were refined to reduce high risks that could be addressed through design.

The risk assessment identified areas where micro alignment changes were required to reduce the impacts of the preferred and alternate alignments. This is further described in Chapter 5 (Project Alternatives).

The environmental risk assessment is presented in a report appended to the EES (refer Technical Appendix Q). An extract of the final risk register for each specialist area is included and discussed further in the relevant chapters of the EES.



**Figure 4-2 Environmental Risk Assessment process**

Table 4-2 Likelihood categories

Descriptor	Explanation
Almost certain	The event is expected to occur in most circumstances
Likely	The event will probably occur in most circumstances
Possible	The event could occur
Unlikely	The event could occur but not expected
Rare	The event may occur only in exceptional circumstances

Table 4-3 Consequence criteria

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Air</b>	Emissions (construction and operation)	Applicable air quality standards met at all sensitive receptors (e.g. dwellings), at all times.	Isolated temporary exceedance of air quality standards at a sensitive receptor.	Minor temporary exceedance of applicable air quality standards in a local area.	Exceedance of applicable air quality standards in a number of local areas.	Widespread exceedance of applicable air quality standards.
<b>Economic</b>	Economic impacts on businesses including agricultural enterprises	Loss of annual revenue less than \$100,000.	Loss of annual revenue less than \$1M, but greater than \$100,000.	Loss of revenue less than \$10M, but greater than \$1M.	Loss of revenues less than \$100M, but greater than \$10M.	Loss of revenues less than \$1B but greater than \$100M.
<b>Biodiversity &amp; Habitat</b>	Listed Threatened Fauna Species	Population change not detectable for any fauna species listed under the EPBC Act, FFG Act or DSE Advisory List	Removal of < 1% of the project area population for an EPBC listed species, OR  Removal of < 1% of the regional area population for an FFG or DSE Advisory-listed species	Removal of > 1% of the project area population BUT < 1% of the regional area population for an EPBC-listed species, OR  Removal of > 1% of the regional population BUT < 2% of the State population for an FFG- or DSE Advisory-listed species	Removal of > 1% of the regional population BUT < 1% of the State population for an EPBC-listed species, OR  Removal of > 2% of the State population for an FFG - or DSE Advisory-listed species	Removal of > 1% of the State population for an EPBC-listed species
<b>Biodiversity &amp; Habitat</b>	Listed Flora Species	Population change not detectable for any flora species listed under the EPBC Act, FFG Act or DSE Advisory List	Removal of < 1% of the project area population for an EPBC listed species, OR  Removal of < 1% of the regional area population for an FFG or DSE Advisory-listed species.	Removal of > 1% of the project area population BUT < 1% of the regional area population for an EPBC-listed species, OR  Removal of > 1% of the regional population BUT < 10% of the State population for an FFG- or DSE Advisory-listed species	Removal of > 1% of the regional population BUT < 10% of the national population for an EPBC-listed species, OR  Removal of > 10% of the State population for an FFG- or DSE Advisory-listed species	Removal of > 10% of the national population for an EPBC-listed species

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Biodiversity &amp; Habitat</b>	Ecological Vegetation Classes	No measurable impacts on the extent of an EVC	Loss of < 0.1% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain achievable.	Loss of 0.1- 1% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain achievable.	Loss of > 1% BUT < 5% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain achievable.	Loss of > 5% of an EVC of High or Very High conservation significance from the region (based on the total area of an EVC from the bioregion). Net Gain not achievable.
<b>Biodiversity &amp; Habitat</b>	EPBC listed community - Grassy Eucalypt Woodland of the VVP, Natural Temperate Grassland of the VVP FFG listed community - Western (Basalt) Plains Grassland community	No measurable impacts on the extent of a community listed under the EPBC Act or FFG Act	Loss of <1 ha of an EPBC Act or FFG Act listed community.	Loss of 1-20 ha of an EPBC Act or FFG Act listed community.	Loss of 20-50 ha of an EPBC Act or FFG Act listed community.	Loss of > 50 ha of an EPBC Act or FFG Act listed community.
<b>Biodiversity &amp; Habitat</b>	Scattered trees / wildlife habitat	Loss of < 5 scattered trees (including MTs, LOTs and VLOTs).	Loss of 6-50 scattered trees (including MTs, LOTs and VLOTs).	Loss of 51-250 scattered trees (including MTs, LOTs and VLOTs).	Loss of 250-1000 scattered trees (including MTs, LOTs and VLOTs).	Loss of > 1000 scattered trees (including MTs, LOTs and VLOTs).
<b>Biodiversity &amp; Habitat</b>	Wildlife corridor	No measurable impact on the quantity and extent of wildlife corridors. Alignment does not intercept or reduce any existing wildlife corridors or habitat linkages.	Alignment reduces the width of the wildlife corridor by up to 10%. Alignment intercepts 1 - 2 habitat linkages.	Alignment reduces the width of the wildlife corridor by 10-50%. Alignment intercepts 3 - 4 habitat linkages.	Alignment reduces the width of the wildlife corridor by 50-75%. Alignment intercepts 5 habitat linkages.	Alignment reduces the width of the wildlife corridor by greater than 75%. Alignment intercepts 6 or more habitat linkages.



Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Soils &amp; Geology</b>	Erosion / sediment generation potential	Negligible potential	Potential for erosion and sediment mobilisation in small isolated locations along the alignment	Potential for erosion and sediment mobilisation in multiple locations along the alignment	Potential for erosion and sediment mobilisation along the majority of the alignment	Potential for significant erosion, sediment generation or land instability along the majority of the alignment
<b>Soils &amp; Geology</b>	Land Contamination (historic, construction or operation)	Insignificant risk of encountering historic land contamination during construction, or contaminating land through construction or operation	Potential for minor land contamination, but minimal risk to sensitive receivers	Potential for moderate land contamination, some risk to sensitive receivers	Potential for gross land contamination, confined to a localised area. Significant risk to sensitive receivers, health	Potential for gross and widespread land contamination . Significant risk to sensitive receivers, health
<b>Soils &amp; Geology</b>	Soil settlement due to poor (compressible ) ground conditions	No potential	Potential for significant soil settlement in small isolated locations along the alignment	Potential for significant soil settlement in multiple locations along the alignment	Potential for significant soil settlement along many sections of the alignment	Potential significant soil settlement along the majority of the alignment
<b>Ground-water</b>	Construction	Negligible change to groundwater regime, quality and availability	Temporary or slight changes to groundwater regime, quality and availability but no significant implications.	Changes to groundwater regime, quality and availability with minor groundwater implications (localised).	Groundwater regime, quality or availability significantly compromised.	Widespread groundwater resource depletion, contamination or subsidence
<b>Ground-water</b>	Operation	Negligible change to groundwater regime, quality and availability	Changes to groundwater regime, quality and availability but no significant implications.	Changes to groundwater regime, quality and availability with minor groundwater implications for a localised area.	Groundwater regime, quality or availability significantly compromised.	Widespread groundwater resource depletion, contamination or subsidence



Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Cultural Heritage</b>	Aboriginal cultural heritage	It is not possible to insignificantly affect cultural heritage values	Destruction of common occurrence Site containing: (a) a small number (e.g. 0-10 artefacts) or limited range of cultural materials with no evident stratification. Site destroyed or in a deteriorated condition with a high degree of disturbance; some cultural materials remaining.	Destruction of occasional occurrence Site containing: (a) a larger number, but limited range of cultural materials: and/or (b) some intact stratified deposit remains. Site in a fair to good condition, but with some disturbance. Occasional occurrence	Destruction of rare occurrence Site (e.g. burned mounds) containing: (a) a large number and diverse range of cultural materials; and/or (b) largely intact stratified deposit; and/or (c) surface spatial patterning of cultural materials that still reflect the way in which the cultural materials were laid down. Site in an excellent condition with little or no disturbance. For surface artefact scatters this may mean that the spatial patterning of cultural materials still reflects the way in which the cultural materials were laid down.	Destruction of Site containing: (a) a mortuary tree. (a response to AAV identifying that these sites types were of high cultural heritage significance and their presence could prevent construction of an alignment).
<b>Cultural Heritage</b>	Non-Aboriginal cultural heritage	No impact to heritage sites. Sites remain unaffected.	Disturbance to a locally significant heritage feature or site (HO or DSE local listing).	Complete removal of heritage site of local significance (HO); and/or Disturbance of a historical heritage inventory site (HI).	Disturbance of a heritage site of State or National significance (VHR).	Complete removal of a heritage site of State or National significance (VHR).
<b>Planning &amp; Land Use</b>	Land use change	Land use changes that would not result in inconsistency with planning policies	Land use changes that would result in minor inconsistency with local planning policies	Land use changes that would result in significant inconsistency with local planning policies	Land use changes that would result in significant inconsistency with local and State planning policies	Land use changes that would result in extensive conflict with planning policies

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Planning &amp; Land Use</b>	Utility and infrastructure services	No impact on existing utilities	Temporary impediment to operation and/or maintenance of existing utilities during construction but still able to be adequately operated and maintained with mitigation measures	Impediment to operation and/or maintenance of existing utilities but still able to be adequately operated and maintained with mitigation measures	Significant disruption to the operation and/or maintenance of existing utilities but still able to be adequately operated and maintained with mitigation measures	Utilities of regional or State significance not able to be maintained and/or operated
<b>Planning &amp; Land Use</b>	Acquisition and fragmentation of existing land uses and landholdings	No or negligible fragmentation of land uses or land holdings (such as the acquisition of land within 10 m of the existing property boundary)	Some minor fragmentation / acquisition of land but properties still able to be used for existing purposes	Fragmentation of land results in 1-10 properties no longer being viable / accessible / useable for existing purpose. (assumes acquisition through the centre of existing parcels of land)	Fragmentation / acquisition of land results in 10-20 properties no longer being viable / accessible / useable for existing purpose. (assumes acquisition through the centre of existing parcels of land)	Fragmentation / acquisition of land results in 20+ properties no longer being viable / accessible / useable for existing purpose. (assumes acquisition through the centre of existing parcels of land)
<b>Noise &amp; Vibration</b>	Construction and Operation	Applicable standards met at all sensitive receptors (e.g. dwellings, schools, hospitals), at all times	Isolated and temporary exceedance of standards at a sensitive receptor	Exceedance of applicable standards in a local area	Exceedance of applicable standards in a number of local areas	Widespread exceedance of applicable standards across the region
<b>Social</b>	Displacement of residents	No displacement of residents	Displacement of one or two households	Displacement of three to six households	Displacement of households significantly affects a local area	Displacement of households significantly affects a number of local areas
<b>Social</b>	Displacement of businesses	No displacement of businesses	Displacement of businesses with social or economic impacts on a small number of individuals	Displacement of businesses with significant social or economic impacts on part of a local area	Displacement of businesses significantly affects a local area	Displacement of businesses significantly affects a number of local areas
<b>Social</b>	Severance of residents or businesses	No severance of local movement patterns	Severance of local movement patterns for less than 10 residents or businesses	Severance of local movement patterns of 10 to 20 residents or businesses	Severance of movement patterns significantly affects a local area	Severance of movement patterns significantly affects a number of local areas

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Social</b>	Community facilities and public open space	No noticeable effects	Effects on facilities with social or economic impacts on a small number of individuals	Effects on facilities with social or economic impacts on a local area	Effects on facilities with significant social or economic impacts on a local area	Effects on facilities with significant social or economic impacts on a number of local areas
<b>Social</b>	Amenity	No detrimental impacts on amenity	Detrimental impacts on amenity affect a small number of households	Detrimental impacts on amenity affect a local area	Detrimental impacts on amenity significantly affect a local area	Detrimental impacts on amenity significantly affect a number of local areas
<b>Surface Water</b>	Construction activities result in disturbance of channel planform, geometry and/or river health values.	Medium level impact to waterway, river health or floodplain function on minor waterway Low level impact to waterway, river health or floodplain function on significant waterway [Minor, Moderate and Major waterways as described in the impact assessment report]	High level impact to waterway, river health or floodplain function on minor waterway Medium level impact to waterway, river health or floodplain function on significant waterway Low level impact to waterway, river health or floodplain function on major waterway [Minor, Moderate and Major waterways as described in the impact assessment report]	Severe level impact to waterway, river health or floodplain function on minor waterway High level impact to waterway, river health or floodplain function on significant waterway Medium level impact to waterway, river health or floodplain function on major waterway [Minor, Moderate and Major waterways as described in the impact assessment report]	Severe level impact to waterway, river health or floodplain function on significant waterway High level impact to waterway, river health or floodplain function on major waterway [Moderate and Major waterways as described in the impact assessment report]	Severe level of impact to a major waterway [Major waterways as described in the impact assessment report]
<b>Surface Water</b>	Construction or operation activities result in increased stormwater runoff, sediment and contaminant loading to waterway	Minor increases to stormwater runoff, sediment and or contaminant loading to the waterway.	Significant increases to stormwater runoff, sediment and or contaminant loading to a minor waterway (defined in the impact assessment report).	Significant increases to stormwater runoff, sediment and or contaminant loading to a moderate waterway (defined in the impact assessment report).	Significant increases to stormwater runoff, sediment and or contaminant loading to a major waterway (defined in the impact assessment report).	An uncontained spill of contaminants directly to a major waterway (defined in the impact assessment report).

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Surface Water</b>	Construction of the road results in changes to the floodplain characteristics	No additional floodplain impacts to any houses, outbuildings or infrastructure.	Slight increase in flooding at a rural scale.	Medium increase in flooding at a rural scale or slight increase in flooding at a township scale.	Significant increase in flooding at a rural scale or medium increase in flooding at a township scale.	Significant increase in flooding at a township scale.
<b>Traffic &amp; Transport</b>	Road safety (construction)	Occurrence of road accidents resulting in less than 10 property damage only road accidents during construction period	Occurrence of road accidents resulting in more than 10 property damage only road accidents or minor injury to less than 20 individuals during construction period	Occurrence of road accidents causing minor injury to between 20 and 100 individuals or major injury to less than 5 individuals during construction period	Occurrence of road accidents causing minor injury to more than 100 individuals or major injury to between 5 and 50 individuals during construction period	Occurrence of road accidents resulting in major injury to more than 50 individuals or one or more fatalities during construction period
<b>Traffic &amp; Transport</b>	Traffic and transport operations (construction and operation)	Negligible adverse impact on traffic and transport conditions	Detectable adverse changes in traffic and transport condition (decrease in Level of Service) at one or two locations at any one point in time during the construction period or at a single location during duplicated highway operation	Detectable adverse change in traffic and transport conditions (decrease in Level of Service) at multiple locations	Traffic and transport congestion and delays exceed acceptable levels at multiple locations	Traffic and transport congestion or events lead to the closure of the Western Highway with no suitable alternative
<b>Traffic &amp; Transport</b>	Traffic access (construction & operation)	Negligible impact on access routes during construction/operation	Less than 5 routes with direct access removed	Greater than 5 and less than 10 routes with direct access removed	Greater than 10 and less than 30 routes with direct access removed	Greater than 30 routes with direct access removed
<b>Traffic &amp; Transport</b>	Road safety (operation)	Occurrence of road accidents resulting in less than 10 property damage only road accidents during a five-year period	Occurrence of road accidents resulting in more than 10 property damage only road accidents or minor injury to less than 20 individuals during a five-year period or major injury to less than 5 individuals during a five-year period	Occurrence of road accidents causing minor injury to between 20 and 100 individuals or major injury to less than 10 individuals during a five-year period	Occurrence of road accidents causing minor injury to more than 100 individuals or major injury to between 5 and 50 individuals during a five-year period	Occurrence of road accidents resulting in major injury to more than 50 individuals or one or more fatalities during a five-year period

Category	Aspect	Insignificant	Minor	Moderate	Major	Catastrophic
<b>Visual &amp; Landscape</b>	Amenity of adjacent residents	Moderate impact upon low number of households. Minor impact upon medium number of households. Insignificant impact upon high number of households.	Significant visual impact upon low number of households. Moderate impact upon medium number of households. Minor impact upon large number of households.	Significant visual impact upon medium number of households. Moderate impact upon high number of households.	Significant visual impact upon high number of households.	Significant visual impact upon households across the entire region
<b>Visual &amp; Landscape</b>	Impact upon townships and places of landscape and cultural value	Negligible visual change from townships and places of cultural and natural value	Minor visual change from townships and places of cultural and natural value	Moderate visual change from townships and places of cultural and natural value	Significant visual change from townships and places of cultural and natural value	Catastrophic visual change from townships and places of cultural and natural value
<b>Visual &amp; Landscape</b>	Impact upon existing landscape character	Moderate impact upon landscape character types of low landscape sensitivity. Minor impact landscape character types of medium to medium-high landscape sensitivity. Negligible impact upon landscape character types of high landscape sensitivity	Significant impact upon landscape character types of low landscape sensitivity. Moderate impact landscape character types of medium to medium-high landscape sensitivity. Minor impact upon landscape character types of high landscape sensitivity	Significant impact upon landscape character types of medium to medium-high landscape sensitivity. Moderate impact upon landscape character types of high landscape sensitivity	Significant impact upon landscape character types of high landscape sensitivity	Catastrophic visual impact upon landscape character types of significant landscape sensitivity.

**Table 4-4 Risk rating matrix**

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Catastrophic
Almost certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	High	Extreme
Possible	Negligible	Low	Medium	High	High
Unlikely	Negligible	Low	Medium	Medium	High
Rare	Negligible	Negligible	Low	Medium	Medium