EIS Volume 1 Chapter 8

Impact Assessment Methodology

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8. Impact Assessment Methodology

8.1. Purpose of Impact Assessment

The purpose of the impact assessment process is to determine whether ElectraNet can undertake the Project in a way that meets regulatory requirements and stakeholder expectations. Impact assessment addresses the questions of whether the biophysical, social and economic impacts (both positive and negative) of the Project will be acceptable to government regulators and community stakeholders, and what specific measures ElectraNet will need to take to ensure the Project is acceptable.

8.2. Relevant Environmental Matters

The assessment considered the following environmental and social matters:

- Land use and tenure
- Soil and landform
- Hydrology
- Terrestrial flora and fauna
- Cultural heritage (Aboriginal and non-Aboriginal)
- Visual amenity
- Air quality
- Noise and vibration
- Traffic and transport
- Socio-economic environment
- Hazard and risk
- Waste management.

These matters were either specified in the EIS guidelines or determined through preliminary environmental and social investigations by ElectraNet.

These matters are addressed in the relevant chapters of this EIS.

8.3. Overview of the Impact Assessment Process

The process of impact assessment incorporated the following for each environmental and social matter:

- Assessment of the baseline condition of the existing environment. This identified the environmental values for each matter that could be impacted by the Project, and their condition.
- Review of aspects of the Project design to determine the ways in which the Project could potentially affect the environmental values. These are called the 'potential impact events'.
- Description of the impacts that are expected to occur as part of the construction and operation of the Project. These are the impacts that are planned for, and a necessary consequence of carrying out the Project. These are described in conjunction with control and mitigation measures.

- Use of risk assessment tools to evaluate the uncertainty in the assessment of expected impacts, where appropriate.

These steps are discussed in more detail below.

8.4. Assessing Baseline Environmental Conditions and Identifying Environmental Values

Environmental values are the physical characteristics and qualities of the environment that contribute to biodiversity conservation, and the social, spiritual and economic health of individuals and society. Implicit in this definition is that an environmental value has some degree of significance. For example, a groundwater aquifer would not be considered a value if sufficient reliable data was available to conclude its water quality precluded any use, it did not support any groundwater dependent ecosystems or stygofauna, or it had no cultural significance. If data gaps meant the significance of a value was uncertain, the assessment used a precautionary approach and the value was included in the assessment.

Values that could be impacted by the Project were identified through desktop reviews of existing information, technical studies including field surveys, and as a result of stakeholder engagement. Views of affected stakeholders are described in Chapter 6 Stakeholder Engagement and Consultation. Legislative or regulatory criteria were also used to define environmental values where appropriate.

The values considered were those within the area of influence of the Project. The boundary for this varies for each environmental and social element depending on the type and severity of the impact being considered. It could for example, comprise the air shed, water catchment or bioregion.

8.5. Identifying Potential Impact Events

The Project may impact directly or indirectly on environmental values in many ways. These are called the potential impact events. They include both events that are expected and are certain to occur, and those that are not certain but may potentially occur.

Both direct and indirect impacts were considered. Direct impacts are those that are caused directly by the proposed activities (e.g. clearing of vegetation). Indirect impacts are those where a secondary event occurs that is substantially caused by activities associated with the Project (e.g. dust deposition from Project activities on agricultural land, which may result in reduced productivity).

Impact events were initially identified for the Project at a workshop which generated a broad range of potential impact events. These were subsequently refined into a list of credible and realistic potential impacts as Project detail was developed, and detailed investigations and stakeholder consultation were undertaken.

For an impact to occur there must be a connection between a source and a receptor:

- **Source** of the potential impact event means the source which alone or in combination has the potential to cause harm to an environmental or social receptor.
- **Receptor** is an environmental value that may reasonably be expected to be adversely impacted by the source.

Potential impact events were not considered further if the initial assessment demonstrated that an environmental receptor could not be adversely affected by a source. In the event that there remained a perceived link (or assigned value) from the perspective of stakeholders, an impact assessment was carried out.

8.6. Control and Mitigation Measures

Control measures are used to prevent or minimise adverse environmental or social impacts. They can include physical controls (design measures) and procedural controls (management controls). ElectraNet has considered both in the assessment process.

The impact assessment was an iterative process that considered each identified impact event and determined how it would affect environmental values. Where an impact on an environmental value was expected, the assessment considered whether there was an opportunity to redesign the Project to avoid the impact or use control measures to prevent or minimise the impact.

The route selection process is detailed in Chapter 4 Route Selection. The transmission line corridor, proposed alignment, access track alignment and transmission structure placement are the principal design controls used to reduce environmental impacts. They have wherever possible been selected to follow existing infrastructure corridors; avoid areas of high cultural significance, high value conservation areas, and important habitat for threatened species. As discussed in Chapter 7 Project Description, the exact placement of each tower will be confirmed closer to construction as towers are micro-sited to further mitigate impacts and risks associated with land access, species habitat and cultural heritage-related matters. The uncertainty around tower location has been conservatively addressed by nominating a 500 m wide buffer on a nominal transmission line alignment (1 km corridor) as the 'transmission line corridor' for the purposes of the impact assessment.

Specific design measures for each aspect are detailed in the chapters of this report, together with management controls to further reduce the potential for impact as a result of Project activities. Controls are also collated in the attached draft Construction Environmental Management Plan (Volume 3 Appendix P).

8.7. Assessing Expected Impacts

An environmental impact is any change, positive or negative, to environmental, social and economic values expected as part of planned activities associated with the construction and operation of the Project. Unlike environmental risks, environmental impacts are certain to occur if the Project proceeds.

The impact assessment considered the scale, intensity, duration and frequency of impacts and the sensitivity of the receptor. Impacts were assessed with reference to the descriptors in Table 8-1 and Table 8-2.

Predicted impacts were reviewed to identify whether they were acceptable for the relevant environmental matters, taking into account the proposed control measures. Impacts were considered to be acceptable if they were in the 'Negligible' category as set out in in Table 8-1 and Table 8-2, while impacts that were in the 'Minor' category were generally considered acceptable if they were as low as reasonably practicable. This process was iterative and additional controls were considered, as necessary, to ensure impacts were as low as reasonably practicable.

In carrying out the assessment, realistic worst-case assumptions were made in order to provide a conservative assessment.

Table 8-1: Categorisation of impact consequence – physical environment

Category	Air quality	Listed flora and fauna species	Other flora and fauna	Habitat	Contamination	Soil quality and quantity	Ground and surface water	Landform
Physical Environment								
Negligible	Air quality standards met at all times	Insignificant effect	Local short-term decrease in abundance of some species without reduction in local community viability	Insignificant effect	Insignificant effect	Minor soil disturbance with low erosion potential.	Minimal change with no significant loss of water quality or quantity	Insignificant effect
Minor	Isolated and localised exceedance of air quality standards. Complaints received about air quality that are resolved within days	Local short-term decrease in abundance with no lasting effects on local population	Local long-term decrease in abundance of some species resulting in little or no change to community structure	Disturbance of well-represented landforms / habitats	Local contamination that can be immediately remediated	Some soil disturbance with minor implications for offsite erosion which can be readily rectified with no significant loss of land capability	Local minor short-term reduction in water quality or quantity.	Minor change in geomorphology within localised portions of landform
Moderate	Local minor ongoing exceedance of air quality standards. Widespread minor short-term exceedance of air quality standards Ongoing air quality complaints	Local long-term decrease in abundance without reduction in regional population viability	Regional long-term decrease in abundance of some species and / or local loss of some species diversity resulting in some change to the community structure	Local loss of well-represented landforms / habitats.	Local contamination that can be remediated in less than 12 months. Widespread contamination that can be remediated in short-term	Soil disturbance with a high risk of offsite erosion potentially requiring months of remediation with short-term loss of land capability	Local minor long term or widespread short-term reduction in water quality or quantity.	Widespread minor changes in geomorphology Localised major changes in geomorphology
Major	Widespread major short-term exceedance of air quality standards resulting in hospitalisation of	Regional long-term decrease in abundance and / or local loss resulting in	Regional long-term decrease in abundance of numerous species and / or some loss of species	Local loss of a unique or critical landform / habitat.	Widespread contamination that requires a regional incident response and more than 12	Soil disturbance with a high risk of erosion potentially requiring years of remediation with	Widespread (regional) major short-term reduction in water quality or quantity	Major changes in geomorphology resulting in effects beyond footprint.

Category	Air quality	Listed flora and fauna species	Other flora and fauna	Habitat	Contamination	Soil quality and quantity	Ground and surface water	Landform
	members of the public	reduction in regional viability	diversity resulting in significant changes to community structure		months to remediate	long-term loss of land capability		
Catastrophic	Public exposed to a major exceedance of air quality standards that results in severely debilitating chronic health impacts or life-threatening hazards	Regional extinction of the species	Regional long-term loss of numerous species resulting in the dominance of only a few species	Regional loss of unique or critical landforms / habitats	Widespread contamination that requires a State-level incident response with rehabilitation expected to take several years or more	Extensive impacts to surface soils with irreversible soil erosion and significant and widespread permanent decline in land capability	Regional major long-term reduction in water quality or quantity	Widespread and ongoing major changes in geomorphology, resulting in effects beyond footprint of landform and flow on instabilities

Table 8-2: Categorisation of impact consequence – socio-economic environment

Category	Public health and safety	Heritage	Socio-economic	Land use
Socio-economic environment				
Negligible	No injury or illness	No impact to items of cultural significance	No impact or minor reparable socio-economic impacts on local population	No measurable impact to current or future land uses
Minor	An injury or illness that does not require first aid or medical treatment	Isolated damage to locally significant natural, cultural or historic heritage that is readily rectified	Short-term impacts on local businesses and / or wellbeing of local communities	Minor repairable damage to land or disruption to land use with no compromise to ongoing or future land use
Moderate	Injury or illness requiring first aid or medical treatment	Damage to State or national listed / significant natural, cultural or historic heritage that does not alter its heritage significance	Ongoing impacts on a limited number of local businesses and / or wellbeing of a limited number of local community members	Damage to land and infrastructure that results in remediation costs and / or loss of income of up to $1 million.
Major	Injury or illness that results in hospitalisation or disablement	Permanent damage to State or nationally listed / significant natural, cultural or historic heritage that results in a loss of heritage significance	Ongoing impacts on the wellbeing of regional communities that results in a significant proportion of the community leaving the	Damage to land and infrastructure that results in remediation costs and / or loss of income of up to $10 million.

Category	Public health and safety	Heritage	Socio-economic	Land use
			area and / or serious mental health issues across the affected communities. Ongoing impacts to regional businesses that result in closures and (direct and indirect) loss of employment for up to 100 people. Suspension of important community services (e.g. transport, telecommunications, energy) for several days or more.	
Catastrophic	Injury or illness that results in fatality	Permanent damage to State or nationally listed / highly significant natural, cultural or historic heritage site resulting in the site no longer meeting the listing criteria where applicable	Ongoing impacts to regional businesses that result in closures and (direct and indirect) loss of employment for more than 100 employees and / or towns in the region becoming unviable. Suspension of important community services (e.g. transport, telecommunications, energy) for several weeks or more.	Extensive damage to land or disruption to land use that results in remediation costs and / or loss of income of over $10 million

8.8. Addressing Uncertainty

Risk assessment tools were used to evaluate the uncertainty in the assessment of expected impacts.

Sources of uncertainty create a risk that the impacts on environmental values may be greater than expected. Uncertainties in the impact assessment can derive from:

- quality of site-specific data available
- the reliability of any modelling undertaken in the impact assessment
- control measures not being as effective as expected.

Table 8-3 describes the factors that can affect the level of certainty in relation to each of these sources.

Table 8-3: Factors affecting level of certainty

Level of certainty	Quality of data	Extent to which modelling has been validated	Effectiveness of design measures	Effectiveness of management measures
High	Comprehensive data. Further studies are unlikely to generate additional information that would change the conclusions reached in the impact assessment.	Excellent baseline data available. Model has been run and provides accurate predictions over different seasons. Model has been extensively used and is regarded by discipline experts as leading practice and/or the impact assessment does not rely to any significant extent on the use of a model.	Widely used and demonstrated to be effective at a range of infrastructure sites including sites with similar topographical / climatic conditions. Requires minimal checking and failure risk has been shown to be low.	Management measures are considered routine and used effectively throughout industry. Reduction in the level of impact from an unmitigated level does not rely primarily on the management measures.
Medium	Some site-specific information available to provide ground-truthing of regional desktop information. Further studies could change some of the conclusions reached in the impact assessment.	Some baseline data available. Model shows a reasonable approximation of real conditions but relies on a number of assumptions and sufficient data not available to demonstrate the model accurately portrays seasonal conditions.	Has been used at sites with similar conditions but requires regular checking or maintenance to ensure performance. Has only been used at limited sites. OR Effectiveness has not been established in the long term or at sites similar to the Project site.	Management measures have been effectively used at a limited number of sites and have not been demonstrated at similar sites or in the long term and / or reduction in the level of impact from an unmitigated level relies primarily on the management measures.
Low	Minimal site-specific data available. Reliance on regional desktop studies that may not accurately reflect site conditions. Low level of confidence in the impact assessment.	Minimal baseline data. Model is unable to be validated with current data.	Measures are novel and have not been demonstrated in the field.	Management measures are novel and / or heavily reliant on specialised technical expertise.

The level of certainty for each impact event was classified using the factors outlined in Table 8-3. Risk assessment tools were then used to evaluate impact events with a 'Low' or 'Medium' level of certainty, and in all cases where there was no expected impact but a material impact could potentially occur.

The risk assessment considered the credible worst-case consequence (as defined in Table 8-1 and Table 8-2) that could occur if assumptions made in the impact assessment were found to be incorrect, as well as the likelihood of such a consequence occurring (as described in Table 8-4). The level of risk was then categorised using the matrix in Table 8-5.

This process was also iterative. 'Low' risks were generally accepted, and 'medium' and 'high' risks were reviewed to determine if each risk was as low as reasonably practicable. Where necessary, changes were made to the Project design and control measures or further studies undertaken to ensure risks were adequately minimised. 'Extreme' risks were regarded as unacceptable; however, no such risks were identified.

The evaluation of uncertainty (using the risk assessment tools) is discussed for each impact event (where relevant) in the impact assessment chapters (chapters 9 – 17) in this EIS. A summary of the evaluation of uncertainty for all impact events is contained in Volume 2 Appendix O.

In addition, a number of potential impact events that have no expected impact but have a perceived or material level of risk (e.g. fire, electromagnetic fields) have been specifically addressed in Chapter 18 Hazard Management, with cross-referenced discussion in the relevant impact assessment chapter where appropriate.

Table 8-4: Description of likelihood

Descriptor	General description	Probability per year
Almost certain	This event is expected to occur in most circumstances.	> 80%
	Expected to occur at least once each year.	
Likely	This event may occur in some given circumstances.	50 – 80%
	May occur during any given year.	
Possible	This event might occur at some time.	10 – 50%
	Not likely to occur in any given year but is possible.	
Unlikely	This event could occur at some time.	0.5 – 10%
	Very unlikely to occur in any given year.	
Rare	This event may only occur in very exceptional circumstances.	< 0.5%
	Examples of this have occurred historically but are not anticipated.	

Table 8-5: Risk rating matrix

Likelihood	Consequences				
	Negligible	Minor	Moderate	Major	Catastrophic
Almost Certain	Low	Medium	High	Extreme	Extreme
Likely	Low	Medium	High	Extreme	Extreme
Possible	Low	Low	Medium	High	Extreme
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High