1. **Significance analysis: Alternative 3 (corridor 3), PREFERRED ACTIVITY: PROPOSED AGGENEIS-PAULPUTS 400kV TRANSMISSION POWERLINE AND SUBSTATIONS UPGRADE, DEA REF: 14/12/16/3/3/2/1012**

***Without = Without Mitigation***

***With = With Mitigation***

**Table 4.1 Analysis of the significance of potential biodiversity and ecological processes impacts**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | |
|  | **Activity** | **Nature of potential impact** | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | **Resource loss** | **Reversibility** | | **Probability** | | **Significance scoring without mitigation** | **Significance scoring with mitigation** |
| **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| **Planning Phase** |  | **No significant impacts anticipated** | | | | | | | | | | | | | |
| **Construction Phase** | Clearance of Vegetation | Clearing of vegetation for tower erection – Loss of flora | 2 | 1 | 4 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | **9** | **6** |
| Clearing of vegetation for access roads – Loss of flora | 3 | 1 | 4 | 3 | 7 | 3 | 3 | 3 | 1 | 1 | 1 | **20** | **11** |
| Destruction of plants of conservation concern – construction of activity where these plants potentially occur | 3 | 1 | 6 | 4 | 7 | 3 | 5 | 7 | 1 | 0.9 | 0.6 | **25.2** | **8.4** |
| Disturbance to vegetation in drainage lines | 2 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0.6 | 0.2 | **4.2** | **1** |
| Soil Erosion | Exposure of the soil to erosion, destruction of soil crust | 3 | 1 | 3 | 1 | 3 | 1 | 3 | 1 | 1 | 0.6 | 0.2 | **7.8** | **1.4** |
| Soil Compaction | The movement of heavy vehicles / machinery may compact soil and inhibit re-vegetation – particularly quartz fields | 3 | 1 | 7 | 2 | 7 | 1 | 5 | 7 | 7 | 0.8 | 0.3 | **23.2** | **4.8** |
| Pollutants/waste | Materials and substances allowed to remain and impact on fauna | 2 | 1 | 2 | 1 | 3 | 1 | 1 | 3 | 1 | 0.3 | 0.1 | **2.7** | **0.5** |
| Disturbance and loss of Faunal Habitat | Fauna habitat within and immediately adjacent to the construction footprint will be disturbed and some loss will occur | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0.1 | 0.0 | **0.6** | **0** |
| Potential increase of invasive vegetation | Contaminated construction vehicles and tools can spread alien invasive species into disturbed soils, and  alien invasive species spread from current infestation into disturbed soils | 2 | 1 | 4 | 1 | 1 | 1 | 1 | 3 | 1 | 0.3 | 0.1 | **3.3** | **0.5** |
| General construction activities, earth works, including clearance of vegetation | Destruction of bird habitat | 1 | 1 | 4 | 4 | 3 | 3 | 3 | 3 | 3 | 1.0 | 1.0 | **14** | **14** |
| Disturbance of birds | 3 | 3 | 5 | 3 | 1 | 1 | 2 | 1 | 1 | 0.7 | 0.2 | **8.4** | **2.0** |
| Human and construction related disturbance – Increased risk of animal strikes due to increase volumes of construction vehicles and workers | 1 | 1 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0.1 | 0.1 | **0.6** | **0.5** |
| **Operational Phase** | Operation of power line | Collision of Birds with earth wires | 4 | 4 | 6 | 4 | 3 | 3 | 5 | 3 | 3 | 0.7 | 0.2 | **14.7** | **3.8** |
| Electrical faulting caused by birds – **impact on business not birds** | 4 | 4 | 5 | 3 | 3 | 3 | 1 | 1 | 1 | 0.4 | 0.1 | **5.6** | **1.2** |
| Disturbance of natural vegetation | Maintenance vehicles driving within natural vegetation / quartz fields | 3 | 1 | 5 | 2 | 3 | 1 | 4 | 3 | 1 | 0.3 | 0.2 | **5.4** | **1.8** |
| Erosion | Lack of failed rehabilitation | 2 | 1 | 3 | 1 | 3 | 1 | 3 | 3 | 1 | 0.4 | 0.2 | **5.6** | **1.4** |
| Possible invasion by exotic vegetation | Alien vegetation spreading into disturbed soil, especially in the absence of successful rehabilitation | 2 | 1 | 4 | 1 | 3 | 1 | 3 | 1 | 1 | 0.3 | 0.1 | **3.9** | **0.7** |
|  | **POSITIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | |
| **Construction and Operational Phase** | **Activity** | **Nature of impact** | | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | | | **Probability** | | **Significance scoring** | |
| Removal of Invasive plants | Removal of existing invasive alien vegetation in areas proposed for development and within servitudes | | 2 | | 3 | | 3 | | | | 0.5 | | **4** | |
| **Operational Phase** | Operation of power line | Nesting of birds on pylons/towers | | 3 | | 5 | | 3 | | | | 0.6 | | **6.6** | |

**Summary of significance scoring**

Activities that would cause marginal impact to the environment include:

* The clearance of vegetation for access roads or upgrade of existing roads;
* Clearing of vegetation for the tower footprint, construction camps and where structures are stored within natural veld;
* Disturbances to vegetation within drainage lines;
* Potential destruction or damage to threatened, endemic and protected plant species;
* The movement of heavy vehicles that may compact the soil and inhibit re-vegetation, particularly on quartz fields;
* The disturbance of natural vegetation during maintenance of the powerline, particularly on quartz fields; and
* Erosion and invasion of disturbed areas due to a lack of or failed rehabilitation.

Within the grasslands, particularly the gravelly grassland, calcrete and quartz patches are found and are localised, high sensitivities that must be investigated during a walk-down and spanned by any construction and related activities.

**Table 4.2 Analysis of the significance of potential water-related impacts**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | |
|  | **Activity** | **Nature of impact** | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | **Resource loss** | **Reversibility** | | **Probability** | | **Significance scoring without mitigation** | **Significance scoring with mitigation** |
| **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| **Planning Phase** | **No significant impacts anticipated** | | | | | | | | | | | | | | |
| **Construction Phase** | Driving through watercourses | Compaction of watercourse soils | 2 | 1 | 4 | 2 | 4 | 2 | 3 | 4 | 3 | 1 | 0.5 | **18.0** | **5.8** |
| Infrastructure construction | Flow changes, increased sedimentation and erosion in watercourses | 1 | 1 | 6 | 3 | 5 | 2 | 4 | 5 | 2 | 1 | 0.5 | **22.0** | **6.3** |
| Infrastructure construction | Loss of watercourse habitat | 1 | 1 | 6 | 3 | 5 | 3 | 5 | 5 | 3 | 1 | 0.5 | **23.0** | **7.8** |
| Refuelling and storage of materials | Contamination of water resources | 2 | 1 | 5 | 2 | 3 | 2 | 3 | 3 | 1 | 0.8 | 0.2 | **13.4** | **1.8** |
| Soil disturbances and vegetation clearing | Encroachment of alien species into watercourses | 2 | 1 | 5 | 2 | 6 | 1 | 4 | 3 | 1 | 1 | 0.2 | **21.0** | **1.8** |
| **Operational Phase** | Vehicles driving in / through watercourses | Compaction of watercourse soils | 2 | 1 | 4 | 2 | 4 | 2 | 3 | 4 | 3 | 1 | 0.5 | **18.0** | **5.8** |
| Soil disturbances and vegetation clearing | Contamination of water resources | 2 | 1 | 4 | 2 | 6 | 1 | 3 | 3 | 1 | 0.7 | 0.2 | **13.1** | **1.6** |

**Summary of significance scoring**

Activities that would cause marginal impact to the environment include:

* Increased erosion and off site sedimentation due to vegetation clearance;
* Changing the quantity and fluctuation properties of the watercourses due to vehicles driving through watercourses during construction and operational phases; and
* Application of pesticides and herbicides when clearing vegetation, causing contamination of water resources during construction and operational phases.

The impacts are of little importance but would require limited mitigation. The activities may be rendered acceptable in light of proposed mitigations.

# Table 4.3 Analysis of the significance of potential social and socio-economic impacts

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | | | |
|  | **Activity** | | **Nature of impact** | **Spatial extent** | | | **Severity / intensity / magnitude** | | **Duration** | | **Resource loss** | **Reversibility** | | **Probability** | | **Significance scoring without mitigation** | **Significance scoring with mitigation** |
| **Without** | **With** | | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| **Planning Phase** | Planning activities. | | Social anxiety in respect of concerned IAPs | 2 | 1 | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0.2 | 0.1 | **1.4** | **0.5** |
| **Construction Phase** | General construction activities. | | Social anxiety in respect of concerned IAPs | 2 | 1 | | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0.2 | 0.1 | **1.4** | **0.5** |
| Disruption and inconvenience to property owners | 2 | 1 | | 3 | 2 | 1 | 1 | 2 | 1 | 1 | 0.2 | 0.1 | **1.8** | **0.7** |
| **Operational Phase** | Powerline proximate to residential property. | | Property values are impacted negatively due to the visual pollution caused by the presence of the towers | 2 | 1 | | 6 | 4 | 7 | 3 | 4 | 3 | 1 | 0.6 | 0.4 | **13.2** | **5.2** |
|  | **POSITIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | | | |
|  | **Activity** | **Nature of impact** | | | | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | | | **Probability** | | **Significance scoring** | |
| **Construction Phase** | General construction activities. | Temporary job opportunities and skills development for local communities | | | | 2 | | 4 | | 1 | | | | 0.6 | | **4.2** | |
| **Operational phase** | Operation of the 400kV Powerline and substations upgrades | Promotion of economic growth in the area for both IPPs and towns, through improved services and infrastructure | | | | 6 | | 7 | | 7 | | | | 0.8 | | **16** | |
| Job creation through increased economic growth in the area | | | | 4 | | 5 | | 3 | | | | 0.8 | | **9.6** | |

**Summary of significance scoring**

The powerline proximate to residential properties would negatively impact on the property values due to the visual pollution caused by the presence of the towers. The impact is of importance and is therefore considered to have a substantial impact. Mitigation is required to reduce the negative impacts and such impacts need to be evaluated carefully.

**Table 4.4 Analysis of the significance of potential aesthetic / sense of place impacts**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | |
|  | **Activity** | **Nature of impact** | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | **Resource loss** | **Reversibility** | | ***P*** | | **Significance scoring without mitigation** | **Significance scoring with mitigation** |
| **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| **Planning**  **Phase** | **No significant impacts anticipated** | | | | | | | | | | | | | | |
| **Construction Phase** | Construction related activities for example foundation preparation, tower erection and conductor stringing | **Observers:** Visual intrusion caused by construction activity and the presence of workforce and construction equipment that is unfamiliar to the status quo. | 2 | 2 | 3 | 3 | 3 | 1 | 1 | 3 | 1 | 0.5 | 0.4 | **6.0** | **3.2** |
| **Visual resource**: Negative impact on the sense of place and prevailing character due to the presence of machinery, material and workforce that is uncharacteristic to the visual resource. | 2 | 2 | 5 | 4 | 3 | 1 | 2 | 3 | 1 | 0.6 | 0.5 | **9.0** | **5.0** |
| **Operational Phase** | The presence of a new powerline | **Observers:** A new transmission line will be added to the baseline environment and will interfere with panoramic views and open vistas. It will intrude on the observer's visual experience. | 4 | 4 | 3 | 3 | 7 | 7 | 2 | 7 | 3 | 0.5 | 0.5 | **11.5** | **9.5** |
| **Visual resource**: A new transmission line will be a prominent addition to the baseline environment. The complex industrial character and enormous scale of the towers will contrast with the predominantly flat topography, desolate sense of place and natural landscape. It will negatively impact on the scenic quality of the visual resource. | 4 | 4 | 5 | 4 | 7 | 7 | 3 | 7 | 3 | 0.8 | 0.8 | **20.8** | **16.8** |

**Summary of significance scoring**

The potential aesthetic and sense of place impacts would be need to be investigated. The impact is of importance and is therefore considered to have a substantial impact. Mitigation is required to reduce the negative impacts and such impacts need to be evaluated carefully.

**Table 4.5 Analysis of the significance of potential aesthetic / sense of place impacts**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE IMPACTS / EFFECTS FOR DEVIATION 3A** | | | | | | | | | | | | | | |
|  | **Activity** | **Nature of impact** | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | **Resource loss** | **Reversibility** | | ***P*** | | **Significance scoring without mitigation** | **Significance scoring with mitigation** |
| **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| **Planning**  **Phase** | **No significant impacts anticipated** | | | | | | | | | | | | | | |
| **Construction Phase** | Construction related activities for example foundation preparation, tower erection and conductor stringing | **Observers:** Visual intrusion caused by construction activity and the presence of workforce and construction equipment that is unfamiliar to the status quo. | 2 | 2 | 4 | 3 | 3 | 1 | 2 | 3 | 1 | 0.8 | 0.6 | **11.20** | **5.40** |
| **Visual resource**: Negative impact on the sense of place and prevailing character due to the presence of machinery, material and workforce that is uncharacteristic to the visual resource. | 2 | 2 | 5 | 4 | 3 | 1 | 2 | 3 | 1 | 0.6 | 0.6 | **9.00** | **6.00** |
| **Operational Phase** | The presence of a new powerline | **Observers:** A new transmission line will be added to the baseline environment and will interfere with panoramic views and open vistas. It will intrude on the observer's visual experience. | 4 | 4 | 5 | 4 | 7 | 7 | 4 | 7 | 3 | 0.8 | 0.7 | **21.60** | **15.40** |
| **Visual resource**: A new transmission line will be a prominent addition to the baseline environment. The complex industrial character and enormous scale of the towers will contrast with the predominantly flat topography, desolate sense of place and natural landscape. It will negatively impact on the scenic quality of the visual resource. | 4 | 4 | 6 | 5 | 7 | 7 | 4 | 7 | 3 | 0.8 | 0.7 | **22.40** | **16.10** |

**Table 4.6 Analysis of the significance of potential cultural impacts**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **NEGATIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | |
|  | **Activity** | **Nature of potential impact** | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | **Resource loss** | **Reversibility** | | **Probability** | | **Significance scoring without mitigation** | **Significance scoring with mitigation** |
| **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** | **Without** | **With** |
| **Planning Phase** |  | **No significant impacts anticipated** | | | | | | | | | | | | | |
| **Construction Phase** | Construction on heritage sites including disturbance of land surfaces and subsurface features | Disturbance of graves/cemeteries | 1 | 1 | 4 | 1 | 7 | 1 | 4 | 7 | 1 | 0.1 | 0 | **2.3** | **0** |
| Disturbance of archaeological heritage resources (this assessment does not evaluate palaeontological resources) | 1 | 1 | 4 | 1 | 7 | 1 | 4 | 7 | 1 | 0.2 | 0.1 | **4.6** | **0.8** |
| General Construction Activities | Human and construction related disturbance of surfaces or heritage features beyond the immediate footprint of the development | 1 | 1 | 4 | 1 | 7 | 1 | 4 | 7 | 1 | 0.2 | 0.1 | **4.6** | **0.8** |
| **Operational Phase** | Disturbance of heritage resources beyond the immediate footprint of the development | Maintenance vehicles driving or other surface-disturbing activity beyond the immediate footprint of the development. | 1 | 1 | 4 | 1 | 7 | 1 | 4 | 7 | 1 | 0.2 | 0.1 | **4.6** | **0.8** |
|  | **POSITIVE IMPACTS / EFFECTS** | | | | | | | | | | | | | | |
| **Construction and Phase** | **Activity** | **Nature of impact** | | **Spatial extent** | | **Severity / intensity / magnitude** | | **Duration** | | | | **Probability** | | **Significance scoring** | |
| Disturbance of surfaces and sub-surfaces revealing unsuspected heritage resources to be mitigated | Identification of heritage resources for salvage (mitigation) leading to new knowledge production | | 1 | | 3 | | 7 | | | | 0.2 | | **2.2** | |

**Summary of significance scoring**

Activities that would cause marginal impact to the environment include:

* Disturbance of land surfaces that potentially contain (surface or sub-surface) heritage resources – artefacts, graves, features.
* The disturbance of surfaces beyond the immediate footprint during maintenance.

However, the significance would be inconsequential due to the proposed 400kV powerline being alongside the existing 220kV powerline and may be rendered acceptable in light of the proposed mitigations.