

APPENDIX E1 - SIGNIFICANCE OF POTENTIAL IMPACTS

The following sections present the outcome of the significance rating exercise. The results suggest that almost none of the key issues identified as part of the scoping process had a negative high environmental significance after mitigation. Instead the overall score indicate a low environmental significance score. The results below are as per the impact assessments of Appendix D of the revised BA Report.

1. Impacts that may result from the construction phase

Direct impacts: During the construction phase minor negative impacts are foreseen over the short term. The latter refers to a period of 12 months. The installation of services may result in the loss or fragmentation of indigenous natural fauna and flora, impacts to riparian and wetland systems, loss or fragmentation of habitats, disturbance of soils and existing land use (soil compaction), disturbance and displacement of avifauna, water and soil pollution, temporary noise disturbance, generation of waste, impacts on heritage objects, visual intrusions, increase in construction vehicle traffic, impact of construction workers on local communities, influx of job seekers, risk to safety, livestock and farm infrastructure, and increased risk of grass fires. The construction phase will also have a direct positive impact through the provision of employment opportunities for its duration. The abovementioned impacts are discussed in more detail below:

- Direct habitat destruction – The construction phase of the development and associated infrastructure will result in loss of and damage to natural habitats if the vegetation is cleared for the development of the powerline. Rehabilitation of some areas would be possible but there is likely to be long-term damage in large areas. Most habitat destruction will be caused during the construction phase. However, re-growth of grass and dwarf shrubs under the powerline will take place. The areas below the powerline in grassland will have to be cleared (slashed) of excess vegetation at regular intervals to allow access to the area for maintenance, to prevent vegetation from intruding into the legally prescribed clearance gap between the ground and the power line conductors and to minimize the risk of fire which can result in electrical flashovers. These activities will have an impact on birds breeding, foraging and roosting in or in close proximity of the servitude through modification of habitat. The impact of power line and specific placement of the poles should be restricted to the proposed line and not over the larger area. Vegetation communities are likely to be impacted on a small spatial scale in comparison to the extent of the vegetation communities' total area in the region.

Direct habitat destruction	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Definite (5)	Definite (5)
Duration	Permanent (5)	Permanent (5)
Magnitude	Medium (8)	Low (6)
Reversibility	Irreversible (4)	Reversible
Irreplaceable loss of resources	May cause irreplaceable loss of resources	Marginal loss of resource
Cumulative impact	The loss of vegetation may have a low impact	
Significance	Negative High (70)	Negative Medium (60)
Can impacts be mitigated?	Yes, the impact can be mitigated	

	<ul style="list-style-type: none"> • The removal of indigenous flora should be kept to a minimum necessary. Trim, rather than fell of woody species along the edges of the development site where possible. The clearing and damage of plant growth in the riparian and wetland areas should be restricted to the actual crossing where possible, and not into the sensitive adjacent areas. Where protected flora will need to be cleared or pruned, permits should be obtained from the relevant authority. • Peripheral impacts around the development corridor on the surrounding vegetation of the area should be avoided and a monitoring programme should be implemented to ensure the impacts are kept to a minimum, while the rehabilitation of the power line route should be prioritized after construction has been completed. • During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • An avifauna specialist should be consulted to conduct a specialist study for the project area and monitoring of the potential impact of the powerline in the future. • All development activities should be restricted to specific recommended areas. The Environment Control Officer (ECO) should control these areas. Storage of equipment, fuel and other materials should be limited to demarcated areas. Layouts should be adapted to fit natural patterns rather than imposing rigid geometries. The entire development footprint should be clearly demarcated prior to initial site clearance and prevent construction personnel from leaving the demarcated area. This would only be applicable to the construction phase of the proposed development. • The ECO should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. • Where holes for poles pose a risk to animal safety, they should be adequately cordoned off to
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	<p>prevent animals falling in and getting trapped and/or injured. This could be prevented by the constant excavating and backfilling during planting of the poles along the lines.</p> <ul style="list-style-type: none"> • Poisons for the control of problem animals should rather be avoided since the wrong use thereof can have disastrous consequences for the raptors occurring in the area. The use of poisons for the control of rats, mice or other vermin should only be used after approval from an ecologist. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with label and application permit directions and stipulations for terrestrial and aquatic applications. • Monitoring should be implemented during the construction phase of the development to ensure that minimal impact is caused to the fauna and flora of the area. • Placement of pylons should be outside sensitive vegetation units, outcrops and drainage channels and wetlands (including the 32m buffer). • A detailed wetland assessment should be conducted to determine the exact edges of potential wetlands and drainage channels.
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- Habitat fragmentation – The construction of the power line development and associated infrastructure will result in natural movement patterns being disrupted for a limited period and, to a varying degree depending on how different species react to these barriers will result in the fragmentation of natural populations, although the impact will be minimal and restricted to the construction phase.

Habitat fragmentation	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Definite (5)	Definite (5)
Duration	Permanent (5)	Permanent (5)
Magnitude	Medium (8)	Low (6)
Reversibility	Irreversible (4)	Reversible
Irreplaceable loss of resources	May cause irreplaceable loss of resources	Marginal loss of resource
Cumulative impact	Habitat fragmentation may have a low impact	
Significance	Negative High (70)	Negative Medium (60)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated</p> <ul style="list-style-type: none"> • Use existing facilities (e.g., impacted areas) to the extent possible to minimize the amount of new disturbance. • Ensure protection of important resources by establishing protective buffers to exclude unintentional disturbance. All possible efforts must be made to ensure as little disturbance as possible 	

	<p>to the sensitive features such as surrounding woodland and riparian woodland outside the project area during construction.</p> <ul style="list-style-type: none"> • During construction, sensitive habitats must be avoided by construction vehicles and equipment, wherever possible, to reduce potential impacts. Only necessary damage must be caused and, for example, unnecessary driving around in the veld or bulldozing natural habitat must not take place. • Construction activities must remain within defined construction areas. No construction / disturbance will occur outside these areas.
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- Increased soil erosion and sedimentation – The construction activities associated with the development may result in widespread soil disturbance and is usually associated with accelerated soil erosion. Soil erosion promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous flora.

Increased soil erosion and sedimentation	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Regional (3)	Site (2)
Probability	Definite (4)	Definite (4)
Duration	Permanent (5)	Medium term (3)
Magnitude	High (8)	Medium (6)
Reversibility	Completely reversible	Completely reversible
Irreplaceable loss of resources	Marginal loss of resource	No loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative High (80)	Negative Medium (44)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated</p> <ul style="list-style-type: none"> • The project should be divided into as many phases as possible, to ensure that the exposed areas prone to erosion are minimal at any specific time. • Cover disturbed soils as completely as possible, using vegetation or other materials. • Minimize the amount of land disturbance and develop and implement stringent erosion and dust control practices. • Protect sloping areas and drainage channel banks that are susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. • Repair all erosion damage as soon as possible to allow for sufficient rehabilitation growth. • Gravel roads to the construction sites must be well drained to limit soil erosion. • Control the flow of runoff to move the water safely off the site without destructive gully formation. 	

	<ul style="list-style-type: none"> • Protect all areas susceptible to erosion and ensure that there is no undue soil erosion resultant from activities within and adjacent to the construction camp and Work Areas. • Placement of pylons should be outside sensitive soil types and drainage channels.
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- Soil and water pollution - Construction work for the proposed development will always carry a risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface or ground water, leading to potential medium/long-term impacts on fauna and flora. During the constructional phase heavy machinery and vehicles would be the main contributors to potential pollution problems.

Soil and water pollution	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Regional (3)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (52)	Negative Low (16) - negligible
Can impacts be mitigated?	Yes, the impact can be mitigated <ul style="list-style-type: none"> • Any excess or waste material or chemicals should be removed from the site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously. • Hazardous chemicals to be stored on an impervious surface protected from rainfall and storm water run-off. • Spill kits should be on-hand to deal with spills immediately. • All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays that will be used to capture any spills. Drip trays should be emptied into a holding tank and returned to the supplier. 	

- Air pollution - The environmental impacts of wind-borne dust, gases and particulates from the construction activities associated with the proposed development are primarily related to human health and ecosystem damage.

One of the primary impacts on the biophysical environment is linked to emission of dusts and fumes from the transportation system. Dust pollution will impact the most severe during the construction phase. Construction vehicles and equipment are the major contributors to the impact on air quality. Dust is generated during site clearance for the

construction of infrastructure. Diesel exhaust gasses and other hydrocarbon emissions all add to the deterioration in air quality during this phase. Vehicles travelling at high speeds on dirt roads significantly aggravate the problem.

Although the potential for severe fugitive dust impacts is greatest within 100 m of the dust-generating activities, there is still the potential for dust to affect vegetation up to five kilometres or more downwind from the source. Dust deposited on the ground may cause changes in soil chemistry (chemical effects) and may over the long-term result in changes in plant chemistry, species composition and community structure. Sensitivities to dust deposition of the various plant species present in the area are not known. It is therefore difficult to predict which species may be susceptible.

Poor air quality results in deterioration of visibility and aesthetic landscape quality of the region, particularly in winter due to atmospheric inversions.

Air pollution	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Definite (5)	Highly Probable (5)
Duration	Medium term (3)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (55)	Negative Low (16)
Can impacts be mitigated?	Yes, the impact can be mitigated <ul style="list-style-type: none"> • A speed limit should be enforced on dirt roads (preferably 30-40km/h). • Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation. 	

- Spread and establishment of alien invasive species - Continued movement of vehicles on and off the site during the construction phase will result in a risk of importation of alien species. Vehicles often transport many seeds, and some may be of invader species, which may become established along the access road, especially where the area is disturbed. The construction phase carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provide the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites.

Spread and establishment of alien invasive species	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (55)	Negative Low (14)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated</p> <ul style="list-style-type: none"> Control involves killing the plants present, killing the seedlings which emerge, and establishing and managing an alternative plant cover to limit re-growth and re-invasion. Weeds and invader plants will be controlled in the manner prescribed for that category by the CARA or in terms of Working for Water guidelines. The control of these species should even begin prior to the construction phase considering that small populations of these species was observed during the field surveys. Institute strict control over materials brought onto site, which should be inspected for seeds of noxious plants and steps taken to eradicate these before transport to the site. Routinely fumigate or spray all materials with appropriate low-residual herbicides prior to transport to or in a quarantine area on site. The contractor is responsible for the control of weeds and invader plants within the construction site for the duration of the construction phase. Alien invasive tree species listed by the CARA regulations should be eradicated. Rehabilitate disturbed areas as quickly as possible to reduce the area where invasive species would be at a strong advantage and most easily able to establish. Institute a monitoring programme to detect alien invasive species early, before they become established and, in the case of weeds, before the release of seeds. Once detected, an eradication/control programme should be implemented to ensure that the species' do not spread to surrounding natural ecosystems. 	

- Negative effect of human activities - An increase in human activity on the site and surrounding areas is anticipated. The risk of snaring, killing, and hunting of certain faunal species is increased. If staff compounds are erected for construction workers, the risk of pollution because of litter and inadequate sanitation and the introduction of invasive fauna and flora are increased. The presence of many construction workers or regular workers

during the construction phase on site over a protracted period will result in a greatly increased risk of uncontrolled fires arising from cooking fires, improperly disposed cigarettes etc.

Negative effect of human activities	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Medium term (3)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (44)	Negative Low (14)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated</p> <ul style="list-style-type: none"> No staff should be accommodated on the site. If practical, construction workers should stay in one of the nearby villages / towns and transported daily to the site. The ECO should regularly inspect the site, including storage facilities and compounds and eradicate any invasive or exotic plants and animals. Maintain proper firebreaks around entire development footprint. Educate construction workers regarding risks and correct disposal of cigarettes. More fauna is normally killed the faster vehicles travel. A speed limit should be enforced (preferably 40 km/hour). It can be considered to install speed bumps in sections where the speed limit tends to be disobeyed. (Speed limits will also lessen the probability of road accidents and their negative consequences). Travelling at night should be avoided or limited as much as possible. 	

- Road mortalities - Large numbers of fauna are also killed daily on roads. They are either being crushed under the tyres of vehicles in the case of crawling species, or by colliding with the vehicle itself in the case of avifauna or flying invertebrates. The impact is intensified at night, especially for flying insects, as result of their attraction to the lights of vehicles.

Road mortalities	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Highly Probable (4)	Highly Probable (4)
Duration	Medium term (3)	Medium term (3)
Magnitude	Medium (6)	Low (2)

Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (44)	Negative Low (28)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated</p> <ul style="list-style-type: none"> No staff should be accommodated on the site. If practical, construction workers should stay in one of the nearby villages / towns and transported daily to the site. The ECO should regularly inspect the site, including storage facilities and compounds and eradicate any invasive or exotic plants and animals. Maintain proper firebreaks around entire development footprint. Educate construction workers regarding risks and correct disposal of cigarettes. More fauna is normally killed the faster vehicles travel. A speed limit should be enforced (preferably 40 km/hour). It can be considered to install speed bumps in sections where the speed limit tends to be disobeyed. (Speed limits will also lessen the probability of road accidents and their negative consequences). Travelling at night should be avoided or limited as much as possible. 	

- Impact on the characteristics of the watercourse, i.e. flow regime, habitat, biota, water quality and geomorphology due to construction within the floodline zone - The construction activities associated with the power line development will potentially have an impact on the wetland areas and water levels, whether it is through direct or indirect impacts at the crossings. The clearance of vegetation for the power line development will either have a direct or indirect impact on the wetlands and smaller drainage channels. Loss of the riparian and in-stream habitat will also result in permanent loss or displacement of the invertebrates, birds and small mammals' dependant on the wetland vegetation for feeding, shelter and breeding purposes. All functions associated with the riverine zones and the surrounding landscape will be compromised if mitigation measures are not applied correctly. Other indirect impacts of the construction of the power line development on the characteristics of the water course include impacts on water quality and changes to the geomorphology should the development cause impacts on downstream areas.

Impact to the watercourse characteristics	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Definite (5)	Highly Probable (4)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	

Significance	Negative Moderate (60)	Negative Low (32)
Can impacts be mitigated?	<p data-bbox="699 237 1007 266">Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> <li data-bbox="699 273 1359 658">• Clearing of vegetation at the crossings for the power line corridor should be scheduled for the drier winter months and limited to areas immediately needed for construction. Vegetation stripping should occur in parallel with the progress of construction to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Only selected plant species must be used in the re-vegetation process. <li data-bbox="699 665 1359 875">• Minimize soil exposure around the power line development. Re-vegetate exposed areas surrounding the power line development and allow a sufficient buffer between the development to prevent sedimentation into the wetlands / rivers. <li data-bbox="699 882 1359 943">• Manage water effectively on, to, within, and from this site. <li data-bbox="699 949 1359 2018">• The location where the power line crosses the drainage channels should be the least sensitive area. The site should be indicated by an ecologist after consultation by the engineers. The following mitigation measures and management actions should be taken to minimize potential impacts of the line crossing drainage channels: <ul style="list-style-type: none"> <li data-bbox="746 1205 1359 1310">○ Identify areas of historic or potential vulnerability, such as geologically unstable materials or areas subject to flooding. <li data-bbox="746 1317 1359 1480">○ Avoid problematic areas and avoid power line locations in areas of high natural hazard risk, such as landslides, rock-fall areas, steep slopes (over 60-70%), wet areas, saturated soils, etc. <li data-bbox="746 1487 1359 1621">○ Avoid or minimize construction in narrow canyon bottoms or on flood plains of rivers that will inevitably be inundated during major storm events. <li data-bbox="746 1628 1359 1839">○ Minimize changes to natural drainage patterns and crossings to drainages. Drainage crossings are potentially problematic, so they must be well designed. Changes to natural drainage patterns or channels often result in either environmental damage or failures. <li data-bbox="746 1845 1359 2018">○ Perform scheduled maintenance to be prepared for storms. Ensure that culverts have their maximum capacity, ditches are cleaned, and that channels are free of debris and brush than can plug structures. 	

	<ul style="list-style-type: none"> ○ Typically keep cut and fill slopes as flat as possible and well covered (stabilized) with vegetation to minimize slumping as well as minimize surface erosion. Well-cemented but highly erosive soils may best to resist surface erosion with near-vertical slopes that minimize the surface area exposed to erosion. ○ Use deep-rooted vegetation for biotechnical stabilization on slopes. Use a mixture of good ground cover plus deep-rooted vegetative species, preferably native species, to minimize deep-seated mass instability as well as offer surface erosion control protection. ○ Locate the power line on narrow sections of rivers and in areas of bedrock where possible. Avoid fine, deep alluvial deposits (of fine sand and silt) that are scour susceptible and problematic, or which otherwise require costly foundations. ○ Ensure that structural designs for the power line crossing the drainage channels include appropriate design criteria and have good foundations to prevent failures during floods. ○ Place retaining structures, foundations, and slope stabilization measures into bedrock or firm, in-place material with good bearing capacity to minimize undermining, rather than placing these structures on shallow colluvial soil or on loose fill material. ● The power line should not negatively impact on the actual riparian area itself, and the pylons should be placed outside any riparian zones. ● All development activities should be restricted to the footprint areas of the proposed power line development. The Environment Site Officer (ESO) should demarcate and control these areas. Storage of building equipment, fuel and other materials should be limited to demarcated areas. Layouts should be adapted to fit natural patterns rather than imposing rigid geometries. ● The Environment Control Officer (ECO) should advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment and specifically wetlands. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation. ● Rehabilitation of the development area after
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	<p>construction have been completed should be considered a high priority and all areas rehabilitated should be audited after construction has ceased by a suitably qualified environmentalist.</p> <ul style="list-style-type: none"> • Should the development be approved by authorities, environmental monitoring of environmental aspects should be implemented during and after the construction phase of the development to ensure that minimal impact is caused to the floodline or wetlands of the area. • Demarcate all riparian boundaries with pegs and danger tape. • Edge effects of pre-construction and construction activities, including erosion, sedimentation and alien/weed control, need to be strictly managed in wetland areas. • The following general rehabilitation measures should be implemented in the disturbed riparian zone: <ul style="list-style-type: none"> ○ All disturbed surface areas will be re-shaped to resemble the surrounding natural topography. Surfaces will be ripped / scarified, and re-vegetated with indigenous grass species. ○ As far, as is practical, implement concurrent rehabilitation processes to limit degradation of soil biota. ○ Terrestrial invasive removal programs must be maintained throughout the proposed development as well as in the aftercare and maintenance phases.
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- Soil compaction and increased risk of sediment transport and erosion - The use of heavy machinery during the construction process of the power line development will result in the compaction of soil, resulting in decreased infiltration of rainwater and increased surface run-off volumes and velocities leading to a greater erosion risk. The hardened surfaces of the road and compacted soils of the proposed development area will also lead to an increase in surface run-off during storm events which will likely be discharged via stormwater outlet points, concentrating flows leaving the exposed areas. This can lead to erosion and channel incision in the wetland / riparian zones and change the downstream habitat. This could result in higher velocity flows with greater erosive energy which can result in channel incision and gully erosion downstream within the channel riparian zones. Soil erosion also promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous fauna and flora. The development will cause insignificant changes to the sediment regime of the area considering that no major rivers or drainage channels occur on site.

Soil compaction and sediment transport and erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Regional (3)	Site (2)
Probability	Definite (5)	Highly Probable (4)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative High (70)	Negative Low (28)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> Stringent controls must be put in place to prevent any unnecessary disturbance or compaction of alluvial soils. Compaction of soils should be limited and / or avoided as far as possible. Compaction will reduce water infiltration and will result in increased runoff and erosion. Where any disturbance of the soil takes place (have taken place in the past), these areas must be stabilized and any alien plants which establish should be cleared and follow up undertaken for at least 2 years thereafter and preferably longer. Where compaction becomes apparent, remedial measures must be taken (e.g., "ripping" the affected area). Topsoil should preferably be separated from the subsoil, and topsoil sections should be kept intact as deep as possible. Reprofiling of the banks of disturbed drainage areas to a maximum gradient of 1:3 to ensure bank stability. Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles. This is especially relevant for the stormwater outlet area. Reseed any areas where earthworks have taken place with indigenous grasses to prevent further erosion. Erosion control mechanisms must be established as soon as possible. Further financial provision should be continued over the subsequent years to allow for maintenance of the gabions, reno mattresses, and associated structures. A stormwater plan must be developed with the aid of an engineer to ensure that water runoff is diverted off the site without pooling and stagnation or erosion. Financial provision for closure will include the estimated costs for erosion control post-construction. If compaction occurs, rectification can be done by application and mixing of manure, vegetation 	

	<p>mulch or any other organic material into the area. Use of well cured manure is preferable as it will not be associated with the nitrogen negative period associated with organic material that is not composted.</p> <ul style="list-style-type: none"> • Vehicle traffic should not be allowed on the rehabilitated areas, except on allocated roads. It will have a negative impact due to the dispersive/compaction characteristics of soils and its implications on the long term. • Appropriate design and mitigation measures must be developed and implemented to minimise impacts on the natural flow regime of the watercourse i.e., through placement of structures/supports and to minimise turbulent flow in the watercourse. • The indiscriminate use of machinery within the in-stream and riparian habitat will lead to compaction of soils and vegetation and must therefore be strictly controlled. • A buffer zone of 32 meters should be implemented around the drainage channels and riparian zone to prevent sediment changes to the channels. • Perform scheduled maintenance to be prepared for storms. Ensure that culverts have their maximum capacity, ditches are cleaned, and that channels are free of debris and brush than can plug structures.
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- Soil and water pollution - Construction work will also carry a risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface or ground water, leading to potential medium/long-term impacts on fauna and flora.

Soil and water pollution	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Regional (3)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (52)	Negative Low (16)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> • Ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. Regularly inspect all vehicles for leaks. Re-fuelling must take place on a 	

	<p>sealed surface area to prevent ingress of hydrocarbons into topsoil.</p> <ul style="list-style-type: none"> • No dumping of waste should take place within the wetland / riparian zone. If any spills occur, they should be immediately cleaned up. • Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility. • Excess waste or chemicals should be removed from site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously. • All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays to capture spills. Drip trays should be emptied into a holding tank and returned to the supplier. • Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) and chemical dust suppressants of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation. • A speed limit (preferably 40 km/hour) should be enforced on dirt roads. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with the label and application permit directions and stipulations for terrestrial and aquatic applications.
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- Spread and establishment of alien invasive species - The construction almost certainly carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provide the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites. Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project. Furthermore, the spread of the alien invasive species through the area will be accelerated when seeds are carried by storm water into the drainage features and riparian zones on the site that will cause environmental degradation and indigenous species to be displaced.

Spread and establishment of alien invasive species	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (52)	Negative Low (14)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> • Alien and invader vegetation must not be allowed to colonise in the area. Control involves killing alien invasive plants present, seedlings and establishing an alternative plant cover to limit re-growth. The use of indigenous plants must be encouraged in the rehabilitated areas (stormwater canals), and stockpiles containing mostly exotic or weedy species should receive specialised handling and should be invasion. Control should begin prior to construction phase considering small populations of alien invasive species occur around the sites. • Institute strict control over materials brought onto site, which should be inspected for seeds and steps taken to eradicate these before transport to the site. The contractor is responsible for the control of weeds and invader plants. • Rehabilitate disturbed areas as quickly as possible. • Institute a monitoring programme to detect alien invasive species early. • Institute an eradication/control programme for early intervention if invasive species are detected. The use of indigenous plants must be encouraged in the rehabilitated areas (stormwater canals), and stockpiles containing mostly exotic or weedy species should receive specialised handling and should be covered for extended periods to inhibit seedling germination of these species. Active management and eradication of exotic / alien plant species should also occur when seedlings are found. 	

- Displacement of priority avian species from important habitats - These impacts are expected to start during the construction phase, but will reduce through the operational phase, and be eliminated after decommissioning. The habitats are likely to be directly impacted/disturbed and the increased disturbance is likely to deter protected species from accessing the area.

Displacement of priority avian species from important habitats	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Probable (3)	Unlikely (1)
Duration	Short term (1)	Short term (1)
Magnitude	High (3)	High (2)
Reversibility	Partly Reversible (2)	Partly Reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (3)/(1)	
Significance	Negative Moderate (39)	Negative Low (18)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated</p> <ul style="list-style-type: none"> • Limit the construction footprint. • Retain indigenous vegetation wherever possible. • Limit access to remainder of area. • Avoid construction during the breeding season (summer). • Laydown areas to be placed only disturbed zones. • Construct in shortest timeframe. • Control noise to minimum. • Maintain single access and maintenance road within the power line servitude. • The entire power line will require the installation of markers due to the very high frequency of power line -sensitive species. • The no-go avifaunal areas around the wetland/dam on the outskirts of Theunissen and the drainage line habitat should be avoided for siting pylons and the actual lines should run as close to the R30 provincial road as possible in those sections. • Additional visibility markers will be required at the two no-go zones to improve visibility to avifauna, especially in low light. 	

- Displacement of resident avifauna through increased disturbance - These impacts are expected to start during the construction phase, and will decline through the operational phase, disappearing after decommissioning. Many of the resident species are expected to be displaced, either temporarily or permanently, due to the habitat transformation and ongoing human presence and disturbance.

Displacement of resident avifauna through increased disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Possible (2)	Possible (2)
Duration	Short term (1)	Short term (1)

Magnitude	Medium (2)	Medium (2)
Reversibility	Partly Reversible (2)	Partly Reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2)	
Significance	Negative Low (22)	Negative Low (22)
Can impacts be mitigated?	None required due to the low significance	

- Loss of important avian habitats - The site contains a threatened habitat types, namely the Vaal-Vet Sandy Grassland (Gh10) classified as Endangered. This is expected to be disturbed and transformed during construction. Furthermore, the area is within a critical biodiversity area, an ecological support area and is a focus area for protected area expansion. These impacts are expected to start during the construction phase, may last through the operational phase, into and after decommissioning. The transformation of some of the avian habitats will be permanent.

Loss of important avian habitats	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Possible (2)	Possible (2)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Medium (2)
Reversibility	Barely Reversible (3)	Barely Reversible (3)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (2)	
Significance	Negative Low (24)	Negative Low (24)
Can impacts be mitigated?	None required due to the low significance	

- Temporary noise disturbance - Construction activities will result in the generation of noise over a period of 12 months. Sources of noise are likely to include vehicles, the use of machinery such as drills and people working on the site. The noise impact is unlikely to be significant; but construction activities should be limited to normal working days and hours (7:00 – 18:00).

Temporary noise disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in negligible to no cumulative effects (1).	
Significance	Negative Low (20)	Negative Low (9)
Can impacts be mitigated?	Yes, management actions related to noise	

	pollution are included in the EMPr – refer to Appendix F.
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- Generation of waste - general waste, construction waste, sewage and grey water - The workers on site are likely to generate general waste such as food wastes, packaging, bottles, etc. Construction waste is likely to consist of packaging, scrap metals, waste cement, etc. The applicant will need to ensure that general and construction waste is appropriately disposed of i.e. taken to the nearest registered landfill. Sufficient ablution facilities will have to be provided, in the form of portable/VIP toilets. No pit latrines, French drain systems or soak away systems shall be allowed.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/district (2)	Local/district (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Low (1)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact	
Significance	Negative Medium (13)	Negative Low (13)
Can impacts be mitigated?	Yes, it is therefore important that all management actions and mitigation measures included in the EMPr are implemented – refer to Appendix F.	

- Impacts on heritage objects – In accordance with Section 38 of the NHRA, an independent heritage consultant was appointed to conduct a Heritage Impact Assessment (HIA) to determine if any sites, features or objects of cultural heritage significance occur within the boundaries of the area where it is planned to develop the grid infrastructure.

Impacts on heritage objects	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (1)	Site (1)
Probability	Possible (2)	Possible (2)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Irreversible (4)	Irreversible (4)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact.	
Significance	Negative Low (24)	Negative Low (12)
Can impacts be mitigated?	If archaeological sites or graves are exposed during construction work, it should immediately be reported to a heritage practitioner so that an investigation and evaluation of the finds can be made. Implement the Fossil Finds Procedure. Also refer to the mitigation measures provided in the EMPr – Appendix F.	

- Visual intrusion – Visual impacts are expected to occur on sensitive visual receptors in close proximity to the proposed project. Impacts during the construction phase of the project mainly relate to construction activities, dust generation and there may be a notable increase in heavy vehicles utilising the roads to the grid connection corridor that may cause, at the very least, a visual nuisance to other road users and landowners in the area

Visual intrusion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact (2). The construction of the solar plant and associated infrastructure will increase the cumulative visual impact of industrial type infrastructure in the region.	
Significance	Negative Low (28)	Negative Low (13)
Can impacts be mitigated?	<p>Yes, mitigation measures are included in the visual impact assessment study and the EMP.</p> <ul style="list-style-type: none"> • Retain and maintain natural vegetation immediately adjacent to the development footprint. • Ensure that vegetation is not unnecessarily removed during the construction phase. • Plan the placement of laydown areas and temporary construction equipment camps in order to minimise vegetation clearing (i.e., in already disturbed areas) where possible. • Restrict the activities and movement of construction workers and vehicles to the immediate construction site and existing access roads. • Ensure that rubble, litter, etc. are appropriately stored (if it can't be removed daily) and then disposed of regularly at a licenced waste site. • Reduce and control dust during construction by utilising dust suppression measures. • Reduce construction activities between 07:00 and 18:00, where possible, in order to reduce the impacts of construction lighting. • Rehabilitate all disturbed areas immediately after the completion of construction work and maintain good housekeeping. 	

Indirect impacts: The nuisance aspects generally associated with the installation of infrastructure will also be applicable to this development, which relates primarily to the increase in construction vehicle traffic.

- Increase in construction vehicle traffic – Building materials and infrastructure will be transported to site on a daily basis and there will be an increase in construction vehicles on access roads. The movement of heavy construction vehicles during the construction phase has the potential to damage local farm roads and create dust and safety impacts for other road users in the area. The potential safety for other road users associated with the movement of construction related traffic along these roads is likely to be low. The contractor should be required to ensure that damage to the road is repaired before the handover of the project.

Increase in construction vehicle traffic	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	The impact would result in low cumulative effects. If damage to roads is not repaired then this will affect the farming activities in the area and result in higher maintenance costs for vehicles of local farmers and other road users. The costs will be borne by road users who were not responsible for the damage.	
Significance	Negative Low (22)	Negative Low (11)
Can impacts be mitigated?	Yes, the impact can be mitigated. <ul style="list-style-type: none"> • The contractor must ensure that damage caused by construction related traffic to the relevant roads is repaired before the completion of the construction phase. The costs associated with the repair must be borne by the contractor. • Dust suppression measures must be implemented for heavy vehicles such as wetting of gravel roads on a regular basis and ensuring that vehicles used to transport sand and building materials are fitted with tarpaulins or covers; • All vehicles must be road-worthy and drivers must be qualified and made aware of the potential road safety issues and need for strict speed limits. 	

- Impact of construction workers on local communities - The presence of construction workers poses a potential risk to family structures and social networks. While the presence of construction workers does not in itself constitute a social impact, the manner in which construction workers conduct themselves can impact on local communities. The most significant negative impact is associated with the disruption of existing family structures and social networks.

Increase of construction workers on local communities	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative effects.	
Significance	Negative Low (24)	Negative Low (12)
Can impacts be mitigated?	<p>Yes, the potential risks associated with construction workers can be effectively mitigated.</p> <ul style="list-style-type: none"> • Implement a 'locals first' policy for construction jobs, specifically for semi and low-skilled job categories; • The construction area should be fenced off before construction commences and no workers should be permitted to leave the fenced off area; • The contractor should provide transport to and from the site on a daily basis for low and semi-skilled construction workers. This will enable the contractor to effectively manage and monitor the movement of construction workers on and off the site; • Where necessary, the contractors should make the necessary arrangements to enable low and semi-skilled workers from outside the area to return home over weekends and/ or on a regular basis. This would reduce the risk posed to local family structures and social networks; • It is recommended that no construction workers, with the exception of security personnel, should be permitted to stay over-night on the site. 	

- Influx of job seekers - Large construction projects tend to attract people to the area in the hope that they will secure a job, even if it is a temporary job. These job seekers can in turn become “economically stranded” in the area or decide to stay on irrespective of finding a job or not.

Influx of job seekers	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative effects	
Significance	Negative Low (22)	Negative Low (11)
Can impacts be mitigated?	It is not possible to prevent job seekers from coming to the area in search of a job. The potential influx of job seekers to the area is likely to be low. The following mitigation measures are proposed: <ul style="list-style-type: none"> • Where reasonably and practicably possible, implement a “locals first” policy, specifically with regard to unskilled and low skilled opportunities; • No employment must be available at the site. 	

- Risk to safety, livestock and farm infrastructure - The presence on and movement of construction workers on and off the site poses a potential safety threat to local farmer's and farm workers in the vicinity of the site threat. In addition, farm infrastructure, such as fences and gates, may be damaged and stock losses may also result from gates being left open and/or fences being damaged or stock theft linked either directly or indirectly to the presence of farm workers on the site.

Risk to safety, livestock and farm infrastructure	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local/Regional (2)	Local/Regional (2)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects, provided losses are compensated for.	
Significance	Negative Low (22)	Negative Low (11)
Can impacts be mitigated?	Key mitigation measures include: <ul style="list-style-type: none"> • The construction area should be fenced off prior to the commencement of the construction phase. 	

	<p>The movement of construction workers on the site should be confined to the fenced off area;</p> <ul style="list-style-type: none"> • Contractors appointed should provide daily transport for low and semi-skilled workers to and from the site. This would reduce the potential risk of trespassing on adjacent properties; • Contractors should be held liable for compensating farmers in full for any stock losses and/or damage to farm infrastructure that can be linked to construction workers. • Contractors appointed must ensure that construction workers who are found guilty of trespassing, stealing livestock and/or damaging farm infrastructure are dismissed and charged. This should be contained in the Code of Conduct. All dismissals must be in accordance with South African labour legislation; • The housing of construction workers on the site should be strictly limited to security personnel.
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- Increased risk of grass fires - The presence of construction workers and construction-related activities on the site poses an increased risk of grass fires that could in turn pose a threat to livestock, crops, wildlife and farmsteads in the area. In the process, farm infrastructure may also be damaged or destroyed and human lives threatened.

Increased risk of grass fires	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Probable (3)	Probable (3)
Duration	Short term (1)	Short term (1)
Magnitude	Medium (2)	Low (1)
Reversibility	Completely reversible (1)	Completely reversible (1)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Negligible cumulative effects (1), provided losses are compensated for.	
Significance	Negative Low (16)	Negative Low (8)
Can impacts be mitigated?	<p>The mitigation measures include:</p> <ul style="list-style-type: none"> • Contractor should ensure that open fires on the site for cooking or heating are not allowed except in designated areas; • Contractor to ensure that construction related activities that pose a potential fire risk, such as welding, are properly managed and are confined to areas where the risk of fires has been reduced. Measures to reduce the risk of fires include avoiding working in high wind conditions when the risk of fires is greater. In this regard special care should be taken during the high risk dry, windy winter months; 	

	<ul style="list-style-type: none"> • Contractor to provide adequate fire fighting equipment on-site, including a fire fighting vehicle; • Contractor to provide fire-fighting training to selected construction staff; • No construction staff, with the exception of security staff, to be accommodated on site over night; • As per the conditions of the Code of Conduct, in the advent of a fire being caused by construction workers and or construction activities, the appointed contractors must compensate farmers for any damage caused to their farms. The contractor should also compensate the fire fighting costs borne by farmers and local authorities.
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5.1.1 Impacts that may result from the operational phase

Direct impacts: During the operational phase the grid connection corridor will house the proposed grid connection infrastructure and the impacts are generally associated with visual intrusion and avifauna impacts, impacts to riparian and wetland systems and the change in the sense of place. The operational phase will also have a direct positive impact through the provision of permanent employment opportunities, although very limited. The abovementioned impacts are discussed in more detail below:

- Potential visual impacts on sensitive visual receptors within a 5km radius - The power line is expected to have a relative impact on visual receptors located within a 5km radius of the proposed project. These most sensitive of these visual receptors are road users, as well as agricultural developments in the area. The power line was assessed within a 200m wide corridor. Due to the height of the Power Lines and extent of the project, no viable mitigation measures can be implemented to eliminate the visual impact of the power line. Numerous other power lines and substations are present in the area surrounding the proposed power line.

Visual impacts within 5km	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Probable (3)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	High (3)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact	
Significance	Negative Medium (39)	Negative Medium (39)
Can impacts be mitigated?	Yes, mitigation measures are included in the EMPr – Appendix F. <ul style="list-style-type: none"> • Retain / re-establish and maintain natural 	

	vegetation under the power line. <ul style="list-style-type: none"> • Maintain general appearance of the power line corridor.
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- Potential visual impacts on sensitive visual receptors within the region (5-10km radius) - The power line is expected to have a low visual impact on observers located between 5-10km from the proposed power line. There are a number of agricultural developments located in the area. The power line was assessed within a 200m wide corridor. Due to the height of the Power Lines and extent of the project, no viable mitigation measures can be implemented to eliminate the visual impact of the power line. Numerous other power lines and mines are present in the area.

Visual impacts within 5km	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly reversible (2)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resources (1)	No loss of resources (1)
Cumulative impact	Low cumulative impact	
Significance	Negative Low (28)	Negative Low (28)
Can impacts be mitigated?	Yes, mitigation measures are included in the EMPr – Appendix F. <ul style="list-style-type: none"> • Retain / re-establish and maintain natural vegetation under the power line. • Maintain general appearance of the power line corridor. 	

- Displacement of priority avian species from important habitats - These impacts are expected to start during the construction phase, but will reduce through the operational phase, and be eliminated after decommissioning. The habitats are likely to be directly impacted/disturbed and the increased disturbance is likely to deter protected species from accessing the area.

Displacement of priority avian species from important habitats	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (1)	Possible (1)
Duration	Long term (3)	Long term (3)
Magnitude	High (3)	Medium (2)
Reversibility	Barely Reversible (3)	Barely Reversible (3)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact(1)	

Significance	Negative Medium (36)	Negative Low (24)
Can impacts be mitigated?	Yes, impacts can be mitigated. <ul style="list-style-type: none"> • Maintain natural vegetation. • Maintain single access and maintenance road within the power line servitude. 	

- Displacement of resident avifauna through increased disturbance - These impacts are expected to start during the construction phase, and will decline through the operational phase, disappearing after decommissioning. Many of the resident species are expected to be displaced, either temporarily or permanently, due to the habitat transformation and ongoing human presence and disturbance.

Displacement of resident avifauna through increased disturbance	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (1)	Possible (1)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Partly Reversible (2)	Partly Reversible (2)
Irreplaceable loss of resources	Marginal loss of resource (2)	Marginal loss of resource (2)
Cumulative impact	Low cumulative impact (1)	
Significance	Negative Low (22)	Negative Low (22)
Can impacts be mitigated?	None required due to the low significance	

- Collision when flying into power line infrastructure - The 132 kV power lines are expected to be quite high and some species that are sensitive to power line collisions occur on site. These impacts are expected to start during the construction phase, will last through the operational phase, but will cease upon decommissioning and demolition.

Collision when flying into power line infrastructure	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Possible(1)
Duration	Long term (3)	Long term (3)
Magnitude	Very High (4)	High (3)
Reversibility	Irreversible (4)	Partly Reversible (2)
Irreplaceable loss of resources	Loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	High cumulative impact(4)	Medium cumulative impacts (2)
Significance	Negative Very High (80)	Negative Medium (36)
Can impacts be mitigated?	Yes, impacts can be mitigated. <ul style="list-style-type: none"> • Undertake a walk-through after pole positions are determined to demarcate sections requiring bird deterrents/flappers. • Install flappers on all required sections of power 	

	<p>lines on or directly adjacent to site. Flappers or large PVC spiral-type bird flight diverters must be installed at least every 5m on earth and live wires (this is an absolute requirement).</p> <ul style="list-style-type: none"> • The entire extent of the power line must be fitted with bird flight diverters. • Undertake quarterly fatality monitoring.
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- Electrocution when perched on power line infrastructure - The 132 kV power lines are expected to be quite high and some species that are sensitive to power line electrocution occur on site or have a reasonable chance of occurring on site. These impacts are expected to start during the construction phase, will last through the operational phase, but will cease upon decommissioning and demolition.

Electrocution when perched on power line infrastructure	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Unlikely (1)
Duration	Long term (3)	Long term (3)
Magnitude	Very High (4)	High (3)
Reversibility	Irreversible (4)	Reversible (1)
Irreplaceable loss of resources	Loss of resource (3)	Marginal loss of resource (2)
Cumulative impact	High cumulative impact (4)	Medium cumulative impacts (2)
Significance	Negative High (72)	Negative Medium (33)
Can impacts be mitigated?	<p>Yes, impacts can be mitigated.</p> <ul style="list-style-type: none"> • Pole designs to discourage bird perching and to be signed off by avifaunal specialist. • Undertake quarterly fatality monitoring. 	

- Impact on the characteristics of the watercourse, i.e. flow regime, habitat, biota, water quality and geomorphology due to construction within the floodline zone - The construction activities associated with the power line development will potentially have an impact on the wetland areas and water levels, whether it is through direct or indirect impacts at the crossings. The clearance of vegetation for the power line development will either have a direct or indirect impact on the wetlands and smaller drainage channels. Loss of the riparian and in-stream habitat will also result in permanent loss or displacement of the invertebrates, birds and small mammals' dependant on the wetland vegetation for feeding, shelter and breeding purposes. All functions associated with the riverine zones and the surrounding landscape will be compromised if mitigation measures are not applied correctly. Other indirect impacts of the construction of the power line development on the characteristics of the water course include impacts on water quality and changes to the geomorphology should the development cause impacts on downstream areas.

Impact to the watercourse characteristics	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (1)	Local (1)
Probability	Definite (5)	Highly Probable (4)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (60)	Negative Low (32)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> • Clearing of vegetation at the crossings for the power line corridor should be scheduled for the drier winter months and limited to areas immediately needed for construction. Vegetation stripping should occur in parallel with the progress of construction to minimise erosion and/or run-off. Large tracts of bare soil will either cause dust pollution or quickly erode and then cause sedimentation in the lower portions of the catchment. Only selected plant species must be used in the re-vegetation process. • Minimize soil exposure around the power line development. Re-vegetate exposed areas surrounding the power line development and allow a sufficient buffer between the development to prevent sedimentation into the wetlands / rivers. • Manage water effectively on, to, within, and from this site. • The location where the power line crosses the drainage channels should be the least sensitive area. The site should be indicated by an ecologist after consultation by the engineers. The following mitigation measures and management actions should be taken to minimize potential impacts of the line crossing drainage channels: <ul style="list-style-type: none"> ○ Identify areas of historic or potential vulnerability, such as geologically unstable materials or areas subject to flooding. ○ Avoid problematic areas and avoid power line locations in areas of high natural hazard risk, such as landslides, rock-fall areas, steep slopes (over 60-70%), wet areas, saturated soils, etc. ○ Avoid or minimize construction in narrow canyon bottoms or on flood plains of rivers that will inevitably be inundated during major storm events. ○ Minimize changes to natural drainage 	

	<p>patterns and crossings to drainages. Drainage crossings are potentially problematic, so they must be well designed. Changes to natural drainage patterns or channels often result in either environmental damage or failures.</p> <ul style="list-style-type: none"> ○ Perform scheduled maintenance to be prepared for storms. Ensure that culverts have their maximum capacity, ditches are cleaned, and that channels are free of debris and brush than can plug structures. ○ Typically keep cut and fill slopes as flat as possible and well covered (stabilized) with vegetation to minimize slumping as well as minimize surface erosion. Well-cemented but highly erosive soils may best to resist surface erosion with near-vertical slopes that minimize the surface area exposed to erosion. ○ Use deep-rooted vegetation for biotechnical stabilization on slopes. Use a mixture of good ground cover plus deep-rooted vegetative species, preferably native species, to minimize deep-seated mass instability as well as offer surface erosion control protection. ○ Locate the power line on narrow sections of rivers and in areas of bedrock where possible. Avoid fine, deep alluvial deposits (of fine sand and silt) that are scour susceptible and problematic, or which otherwise require costly foundations. ○ Ensure that structural designs for the power line crossing the drainage channels include appropriate design criteria and have good foundations to prevent failures during floods. ○ Place retaining structures, foundations, and slope stabilization measures into bedrock or firm, in-place material with good bearing capacity to minimize undermining, rather than placing these structures on shallow colluvial soil or on loose fill material. <ul style="list-style-type: none"> ● The power line should not negatively impact on the actual riparian area itself, and the pylons should be placed outside any riparian zones. ● All development activities should be restricted to the footprint areas of the proposed power line development. The Environment Site Officer (ESO) should demarcate and control these areas. Storage of building equipment, fuel and other materials should be limited to demarcated areas. Layouts should be adapted to fit natural patterns rather than imposing rigid geometries. ● The Environment Control Officer (ECO) should
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	<p>advise the construction team in all relevant matters to ensure minimum destruction and damage to the environment and specifically wetlands. The ECO should enforce any measures that he/she deem necessary. Regular environmental training should be provided to construction workers to ensure the protection of the habitat, fauna and flora and their sensitivity to conservation.</p> <ul style="list-style-type: none"> • Rehabilitation of the development area after construction have been completed should be considered a high priority and all areas rehabilitated should be audited after construction has ceased by a suitably qualified environmentalist. • Should the development be approved by authorities, environmental monitoring of environmental aspects should be implemented during and after the construction phase of the development to ensure that minimal impact is caused to the floodline or wetlands of the area. • Demarcate all riparian boundaries with pegs and danger tape. • Edge effects of pre-construction and construction activities, including erosion, sedimentation and alien/weed control, need to be strictly managed in wetland areas. • The following general rehabilitation measures should be implemented in the disturbed riparian zone: <ul style="list-style-type: none"> ○ All disturbed surface areas will be re-shaped to resemble the surrounding natural topography. Surfaces will be ripped / scarified, and re-vegetated with indigenous grass species. ○ As far, as is practical, implement concurrent rehabilitation processes to limit degradation of soil biota. ○ Terrestrial invasive removal programs must be maintained throughout the proposed development as well as in the aftercare and maintenance phases.
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- Soil compaction and increased risk of sediment transport and erosion - The use of heavy machinery during the construction process of the power line development will result in the compaction of soil, resulting in decreased infiltration of rainwater and increased surface run-off volumes and velocities leading to a greater erosion risk. The hardened surfaces of the road and compacted soils of the proposed development area will also lead to an increase in surface run-off during storm events which will likely be discharged via stormwater outlet points, concentrating flows leaving the exposed areas. This can lead to erosion and channel incision in the wetland / riparian zones and change the downstream habitat. This could

result in higher velocity flows with greater erosive energy which can result in channel incision and gully erosion downstream within the channel riparian zones. Soil erosion also promotes a variety of terrestrial ecological changes associated with disturbed areas, including the establishment of alien invasive plant species, altered plant community species composition and loss of habitat for indigenous fauna and flora. The development will cause insignificant changes to the sediment regime of the area considering that no major rivers or drainage channels occur on site.

Soil compaction and sediment transport and erosion	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Regional (3)	Site (2)
Probability	Definite (5)	Highly Probable (4)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative High (70)	Negative Low (28)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> • Stringent controls must be put in place to prevent any unnecessary disturbance or compaction of alluvial soils. Compaction of soils should be limited and / or avoided as far as possible. Compaction will reduce water infiltration and will result in increased runoff and erosion. Where any disturbance of the soil takes place (have taken place in the past), these areas must be stabilized and any alien plants which establish should be cleared and follow up undertaken for at least 2 years thereafter and preferably longer. Where compaction becomes apparent, remedial measures must be taken (e.g., “ripping” the affected area). Topsoil should preferably be separated from the subsoil, and topsoil sections should be kept intact as deep as possible. • Reprofilng of the banks of disturbed drainage areas to a maximum gradient of 1:3 to ensure bank stability. • Reinforce banks and drainage features where necessary with gabions, reno mattresses and geotextiles. This is especially relevant for the stormwater outlet area. • Reseed any areas where earthworks have taken place with indigenous grasses to prevent further erosion. • Erosion control mechanisms must be established as soon as possible. Further financial provision should be continued over the subsequent years to allow for maintenance of the gabions, reno mattresses, and associated structures. 	

	<ul style="list-style-type: none"> • A stormwater plan must be developed with the aid of an engineer to ensure that water runoff is diverted off the site without pooling and stagnation or erosion. Financial provision for closure will include the estimated costs for erosion control post-construction. • If compaction occurs, rectification can be done by application and mixing of manure, vegetation mulch or any other organic material into the area. Use of well cured manure is preferable as it will not be associated with the nitrogen negative period associated with organic material that is not composted. • Vehicle traffic should not be allowed on the rehabilitated areas, except on allocated roads. It will have a negative impact due to the dispersive/compaction characteristics of soils and its implications on the long term. • Appropriate design and mitigation measures must be developed and implemented to minimise impacts on the natural flow regime of the watercourse i.e., through placement of structures/supports and to minimise turbulent flow in the watercourse. • The indiscriminate use of machinery within the in-stream and riparian habitat will lead to compaction of soils and vegetation and must therefore be strictly controlled. • A buffer zone of 32 meters should be implemented around the drainage channels and riparian zone to prevent sediment changes to the channels. • Perform scheduled maintenance to be prepared for storms. Ensure that culverts have their maximum capacity, ditches are cleaned, and that channels are free of debris and brush than can plug structures.
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- Soil and water pollution - Construction work will also carry a risk of soil and water pollution, with large construction vehicles contributing substantially due to oil and fuel spillages. If not promptly dealt with, spillages or accumulation of waste matter can contaminate the soil and surface or ground water, leading to potential medium/long-term impacts on fauna and flora.

Soil and water pollution	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Regional (3)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Long term (4)	Long term (4)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible

Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (52)	Negative Low (16)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> • Ensure that all hazardous storage containers and storage areas comply with the relevant SABS standards to prevent leakage. Regularly inspect all vehicles for leaks. Re-fuelling must take place on a sealed surface area to prevent ingress of hydrocarbons into topsoil. • No dumping of waste should take place within the wetland / riparian zone. If any spills occur, they should be immediately cleaned up. • Appropriate sanitary facilities must be provided for the duration of the proposed development and all waste removed to an appropriate waste facility. • Excess waste or chemicals should be removed from site and discarded in an environmentally friendly way. The ECO should enforce this rule rigorously. • All vehicles should be inspected for oil and fuel leaks on a regular basis. Vehicle maintenance yards on site should make provision for drip trays to capture spills. Drip trays should be emptied into a holding tank and returned to the supplier. • Implement standard dust control measures, including periodic spraying (frequency will depend on many factors including weather conditions, soil composition and traffic intensity and must thus be adapted on an on-going basis) and chemical dust suppressants of construction areas and access roads, and ensure that these are continuously monitored to ensure effective implementation. • A speed limit (preferably 40 km/hour) should be enforced on dirt roads. • Limit pesticide use to non-persistent, immobile pesticides and apply in accordance with the label and application permit directions and stipulations for terrestrial and aquatic applications. 	

- Spread and establishment of alien invasive species - The construction almost certainly carries by far the greatest risk of alien invasive species being imported to the site, and the high levels of habitat disturbance also provide the greatest opportunities for such species to establish themselves, since most indigenous species are less tolerant of disturbance. The biggest risk is that seeds of noxious plants may be carried onto the site along with materials that have been stockpiled elsewhere at already invaded sites. Continued movement of personnel and vehicles on and off the site, as well as occasional delivery of materials required for maintenance, will result in a risk of importation of alien species throughout the life of the project. Furthermore, the spread of the alien invasive species through the area

will be accelerated when seeds are carried by storm water into the drainage features and riparian zones on the site that will cause environmental degradation and indigenous species to be displaced.

Spread and establishment of alien invasive species	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Site (2)	Site (2)
Probability	Highly Probable (4)	Probable (2)
Duration	Permanent (5)	Medium term (3)
Magnitude	Medium (6)	Low (2)
Reversibility	Reversible	Reversible
Irreplaceable loss of resources	Marginal loss of resource	Marginal loss of resource
Cumulative impact	Low cumulative impact	
Significance	Negative Moderate (52)	Negative Low (14)
Can impacts be mitigated?	<p>Yes, the impact can be mitigated.</p> <ul style="list-style-type: none"> • Alien and invader vegetation must not be allowed to colonise in the area. Control involves killing alien invasive plants present, seedlings and establishing an alternative plant cover to limit re-growth. The use of indigenous plants must be encouraged in the rehabilitated areas (stormwater canals), and stockpiles containing mostly exotic or weedy species should receive specialised handling and should be invasion. Control should begin prior to construction phase considering small populations of alien invasive species occur around the sites. • Institute strict control over materials brought onto site, which should be inspected for seeds and steps taken to eradicate these before transport to the site. The contractor is responsible for the control of weeds and invader plants. • Rehabilitate disturbed areas as quickly as possible. • Institute a monitoring programme to detect alien invasive species early. • Institute an eradication/control programme for early intervention if invasive species are detected. The use of indigenous plants must be encouraged in the rehabilitated areas (stormwater canals), and stockpiles containing mostly exotic or weedy species should receive specialised handling and should be covered for extended periods to inhibit seedling germination of these species. Active management and eradication of exotic / alien plant species should also occur when seedlings are found. 	

Indirect impacts: The operational phase will have an indirect negative impact through the change in the sense of place and an indirect positive impact through the provision of additional electrical infrastructure.

- Change in the sense of place – An area's sense of place is created through the interaction of various characteristics of the environment, including atmosphere, visual resources, aesthetics, climate, lifestyle, culture, and heritage. An area's sense of place is however subjective and largely dependent on the demographics of the population residing within the area and their perceptions regarding trade-offs. For example, while some individuals may prefer not to see any form of infrastructure development, others may have an interest in large-scale infrastructure, or engineering projects, and the operation of such facilities, and consider the impact to be less significant. Such a scenario may especially be true given that the project comprises a Renewable Energy project and could therefore be seen as benefitting the local environment, when compared to non-renewable energy generation projects.

An impact on the sense of place is one that alters the visual landscape to such an extent that the user experiences the environment differently, and more specifically, in a less appealing or less positive light. The visual impacts associated with the impact on sense of place relate to the change in the landscape character and visual impact of the power line. The area surrounding the power line route is degraded and characterised by agricultural developments and mines. Considering this, it can be anticipated that the visual and sense of place impacts associated with the operation of the facility will be of low significance.

Change in sense of place	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Possible (2)	Possible (2)
Duration	Long term (3)	Long term (3)
Magnitude	Medium (2)	Medium (2)
Reversibility	Reversible (1)	Reversible (1)
Irreplaceable loss of resources	Significant loss of resource (3)	Significant loss of resource (3)
Cumulative impact	Low cumulative impact	
Significance	Negative Low (26)	Negative Low (26)
Can impacts be mitigated?	Yes, mitigation measures relating to visual impacts are included in the EMPr.	

5.1.2 Impacts that may result from the decommissioning and closure phase

Direct impacts: In the case of the proposed power line the decommissioning phase is likely to involve the disassembly and replacement of the existing components with more modern / improved technology. This is likely to take place in the 20 - 30 years post commissioning. The decommissioning phase is therefore likely to create additional, construction type jobs, as opposed to the jobs losses typically associated with decommissioning. If infrastructures are removed after a 20/30 year period, the site will be returned to its natural state. Therefore, the physical environment will benefit from the closure of the solar facility.

- Rehabilitation of the physical environment – The physical environment will benefit from the closure of the solar facility (and the associated grid connection infrastructure) since the site will be restored to its natural state.

Rehabilitation of the physical environment	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Positive	Positive
Extent	Site (1)	Site (1)
Probability	Possible (2)	Probable (3)
Duration	Long term (3)	Long term (3)
Magnitude	Low (1)	Medium (2)
Reversibility	N/A	N/A
Irreplaceable loss of resources	N/A	N/A
Cumulative impact	The impact would result in negligible to no cumulative effects (1)	
Significance	Negative Low (7)	Negative Low (16)
Can impacts be mitigated?	No mitigation measures required.	

- Generation of waste - The removal of the supporting infrastructure such as the concrete foundations, cabling, fencing and control rooms, etc. will generate waste. Some of the waste will where possible be recycled, for example steel support structures can be re-used elsewhere or melted down to form new products. The applicant will need to assess the project lifespan and make suitable arrangements for waste disposal when the site is decommissioned.

Generation of waste	Pre-mitigation impact rating	Post mitigation impact rating
Status (positive or negative)	Negative	Negative
Extent	Local (2)	Local (2)
Probability	Definite (4)	Definite (4)
Duration	Short term (1)	Short term (1)
Magnitude	High (3)	Medium (2)
Reversibility	Irreversible (4)	Partly reversible (2)
Irreplaceable loss of resources	No loss of resource (1)	No loss of resource (1)
Cumulative impact	Low cumulative impact	
Significance	Negative Medium (45)	Negative Low (26)
Can impacts be mitigated?	Yes – refer to the EMPr, Appendix F.	

Indirect impacts: No indirect impacts are anticipated from the decommissioning phase of the proposed development.