

## 1. Impact Assessment

The over-arching objective of the detailed impact assessment forming part of the BA process is to identify, record and assess the scale of the changes that may occur within a specific receiving environment, in response to the introduction of new components or the expansion of current components within that receiving environment. In terms of Environmental Impact Assessment as provided for as an Integrated Environmental Management (IEM) tool for assessment in terms of the National Environmental Management Act and its associated Regulations, this refers to a specific site.

This approach enables the EAP to provide the team of specialist with a clearly defined Scope of Work and allows the specialist to focus and highlight pertinent changes as an independent assessor of the changes to the receiving environment in the context of their field of speciality.

The approach therefore provides a framework for the assessment of the impacts that the proposed project will have on the receiving environment, and of the impacts the environment will have on the proposed Project. Based on inputs from the project team, stakeholders, I&APs and specialists, the potential environmental (biophysical, social and cultural) impacts have been identified and have accordingly been assessed and their significance summarised as an 'Environmental Impact Statement.

The construction and operational phase related impacts have been assessed in terms of the worst-case scenario informed by the envelope of criteria. The envelope of criteria for the Project involves the delivery of a BESS solution at the Cuprum substation (at the location identified for the most feasible connection and off take requirements), along with the associated infrastructure development and adjustments (see Chapter 3 Project Overview) in order to connect this facility to the existing Eskom energy grid. The envelope of criteria informed the development of the worst-case scenario as assessed in this Final BAR, and further used to develop appropriate and Project specific mitigation measures for implementation. This will ensure that, regardless of which technology option is implemented in the end (should positive EA be granted for the Project), the environmental impacts assessed as part of this Final BAR will be for the worst-case scenario. Therefore, the implementation of either technology option will either hold the same or less significant environmental impacts to the receiving environment.

As mentioned previously, Eskom consulted with the DFFE in relation to the nature of the Project and the way forward in terms alternatives. Eskom indicated that due to the tender and procurement processes associated with the BESS infrastructure, a preferred technology cannot be recommended. Kindly refer to Appendix E for a copy of the meeting minutes. **No alternative(s), therefore, have been proposed for the Project. A selected technology option will be chosen upon finalisation of the procurement and bid process.**

### 1.1 Design and Construction Phase

Impacts during the construction phase of the Project are considered for the worst-case scenario (refer to section 4.5 of the Final BAR). Impacts of significance that may occur during the construction phase of the Project, include:

- Increased degradation and fragmentation of vegetation communities;
- Introduction and spread of alien invasive species;
- Displacement, loss and fragmentation of the faunal community due to habitat degradation/ destruction;
- Displacement, loss and fragmentation of the avifaunal communities due to habitat degradation and powerline collisions
- Degradation of receiving air quality conditions;
- Increased generation of noise;
- Soil contamination and erosion;
- Increased construction vehicle traffic on local roads;
- Local skills transfer and increased awareness of renewable energy;
- Increase in employment and skills development opportunities;
- Reduction in visual aesthetics;

- Damage or destruction of archaeological and/or palaeontological resources; and
- Pollution of the receiving environment due to inappropriate management and handling of waste.

## 1.2 Operational Phase

Impacts during the operational phase of the Project are considered for the worst-case scenario (refer to section 4.5 of the Final BAR). Impacts of significance that may occur during the operational phase of the Project, include:

- Loss and displacement of indigenous vegetation;
- Loss and fragmentation of the faunal and avifaunal communities;
- Increased disturbance to avifaunal communities due to powerline collisions and electrocutions;
- Contamination of soil and groundwater resources;
- Improved development opportunities due to increased reliability of energy services; and
- Reduction in visual aesthetics.

## 1.3 Decommissioning and Closure

Impacts associated with the Project during decommissioning and closure relate to the dismantling of the BESS and associated infrastructure. The lifespan of the BESS varies across the technologies after which Eskom plan to return the battery to the supplier for disposal. The impacts listed below relate to the dismantling and removal of the BESS, and return to the manufacturing facility:

- Contamination of soil and groundwater due to spills and leakages from the battery units during dismantling; and
- Contamination of soil and groundwater due to machinery hydrocarbon spills.

## 1.4 Impact Assessment Methodology

Each concern identified during the BA process consists of components that on their own or in combination with each other give rise to potential significant impacts, either positive or negative from the Project onto the environment or from the environment onto the Project. The significance of the potential impacts for the study area will be considered before and after the identified mitigation measures are implemented.

### 1.4.1 Impact Assessment Criteria

The criteria used for the assessment of the potential impacts of the Project are described in Table 1-1.

**Table 1-1 Impact Assessment Criteria**

Criteria	Description
Nature	Includes a description of what causes the effect, what will be affected and how it will be affected.
Duration	Lifetime of the impact is measured in relation to the lifetime of the Project.
Extent	Physical and spatial scale of the impact.
Intensity	Examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functioning, or slightly alters the environment.
Type	Description of the impact as positive, negative or neutral, and direct or indirect.
Consequence	Combination of duration, extent and intensity of impact in relation to the type.
Probability	This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the lifecycle of the activity, and not at any given time.
Significance	Synthesis of the characteristics described above and assessed as low, medium or high. Distinction will be made for the significance rating without the implementation of mitigation measures and with the implementation of mitigation measures.

### 1.4.2 Duration

The lifetime of the impact is measured in relation to the lifetime of the Project activity that the impact is linked to (refer to Table 1-2).

**Table 1-2 Description of Duration Criteria**

Description	Explanation	Scoring
Short term	Impact will either disappear with mitigation or will be mitigated through a natural process in a period shorter than any of the development phases.	1
Short to medium term	Impact will be relevant through to the end of the construction phase.	2
Medium term	Impact will last up to the end of the development phases, where after it will be entirely negated.	3
Long term	Impact will continue or last for the entire operational lifetime of the development, but will be mitigated by direct human action or by natural processes thereafter.	4
Permanent	The only impact class that is non-transitory. Mitigation by man or natural process will not occur in such a way or time span that the impact can be considered transient.	5

### 1.4.3 Extent

The physical and spatial scale of the impact is classified and described in Table 1-3 below:

**Table 1-3 Description of Extent Criteria**

Description	Explanation	Scoring
Footprint	Impacted area extends only as far as the activity, such as footprint occurring within the total site area.	1
Site	Impact could affect the whole, or a significant portion of the site.	2
Regional	Impact could affect the area around the site including neighbouring farms, transport routes and adjoining towns.	3
National	Impact could have an effect that expands throughout the country (South Africa).	4
International	Impact has international ramifications that go beyond the boundaries of South Africa	5

### 1.4.4 Intensity

The assessment of the intensity of the impact will be a relative evaluation within the context of all the activities and the other impacts within the framework of the Project. The intensity will be measured using the criteria listed in Table 1-4.

**Table 1-4 Description of Intensity Criteria**

Description	Explanation	Scoring
Low	Impact alters the affected environment in such a way that the natural processes or functions are not affected.	2
Low-Medium	Impact alters the affected environment in such a way that the natural processes or functions are slightly affected.	4
Medium	Affected environment is altered, but functions and processes continue, albeit in a modified way.	6
Medium-High	Affected environment is altered, and the functions and processes are modified immensely.	8
High	Function or process of the affected environment is disturbed to the extent where the function or process temporarily or permanently ceases.	10

### 1.4.5 Consequence

Based on the above criteria, the consequence of issues will be determined using the following formula:

$$\text{Consequence} = \text{Type} \times (\text{Duration} + \text{Extent} + \text{Intensity})$$

The consequence of the impact is rated and described in Table 1-5 below:

**Table 1-5 Description of Consequence Criteria**

Description	Explanation	Scoring
Extreme Detrimental	A very serious negative impact which may be sufficient by itself to prevent implementation of the Project. The impact may result in permanent change. Very often these impacts are immitigable and usually result in very severe effects. The impacts will be irreplaceable and irreversible should adequate mitigation and management measures not be successfully implemented.	-18 to -20
High Detrimental	A serious negative impact which may prevent the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term change to the (natural and/or social) environment and result in severe effects. The impacts may result in the irreversible damage to irreplaceable environmental or social aspects should mitigation measures not be implemented.	-14 to > -17
Moderate Detrimental	An important negative impact which requires mitigation. The impact is insufficient by itself to prevent the implementation of the Project but which in conjunction with other impacts may prevent its implementation. These impacts will usually result in negative medium to long-term effect on the social and/or natural environment.	-10 to -13
Slight Detrimental	A small negative impact. The impact will result in medium to short term effects on the social and/or natural environment.	-6 to -9
Negligible	An acceptable negative/positive impact for which mitigation is desirable but not essential. The impact by itself is insufficient even in combination with other low impacts to prevent the development being approved. These impacts will result in negative/positive medium to short term effects on the social and/or natural environment. The impacts are reversible and will not result in the loss of irreplaceable aspects.	-5 to 5
Slight Beneficial	A small positive impact. The impact will result in medium to short term effects on the social and/or natural environment.	6 to 9
Moderate Beneficial	An important positive impact. The impact is insufficient by itself to justify the implementation of the Project. These impacts will usually result in positive medium to long-term effect on the social and/or natural environment.	10 to 13
High Beneficial	A beneficial impact which may help to justify the implementation of the Project. These impacts would be considered by society as constituting a major and usually a long-term positive change to the (natural and/or social) environment.	14 to 17
Extreme Beneficial	A very beneficial impact which may be sufficient by itself to justify implementation of the Project. The impact may result in permanent positive change.	18 to 20

### 1.4.6 Probability

Probability describes the likelihood of the impact(s) occurring for any length of time during the lifecycle of the activity, and not at any given time. Table 1-6 shows the classes in relation to probability criteria.

**Table 1-6 Description of Probability Criteria**

Description	Explanation	Scoring
Improbable	Possibility of the impact occurring is none, due either to the circumstances, design or experience. The chance of this impact occurring is thus zero (0%).	1
Possible	Possibility of the impact occurring is very low, either due to the circumstances, design or experience. The chances of this impact occurring is defined as 25%.	2
Likely	There is a possibility that the impact will occur to the extent that provisions must therefore be made. The chances of this impact occurring is defined as 50%.	3
Highly likely	It is most likely that the impacts will occur at some stage of the Development. Plans must be drawn up before carrying out the activity. The chances of this impact occurring is defined as 75%.	4
Definite	Impact will take place regardless of any prevention plans, and only mitigation actions or contingency plans to contain the effect can be relied upon. The chance of this impact occurring is defined as 100%.	5

### 1.4.7 Confidence

The level of knowledge or information that the EAP or a specialist had in their judgement is rated as shown in Table 1-7. Note that this criterion is not given a numerical value.

**Table 1-7 Description of Confidence Criteria**

Criteria	Description
Low	Judgement is based on intuition and not on knowledge or information.
Medium	Judgement is based on common sense and general knowledge.

High Judgement is based on scientific and/or proven information.

### 1.4.8 Reversibility

Reversibility is the ability of the affected environment to recover from the impact, with or without mitigation (Table 1-8). Note that this criterion is not given a numerical value.

**Table 1-8 Description of Reversibility Criteria**

Criteria	Description
Yes	The affected environment will be able to recover from the impact.
No	The affected environment will be unable to recover from the impact that is permanently modified.

### 1.4.9 Level of Significance

Based on the above criteria, the significance of issues will be determined using the following formula:

$$\text{Significance} = \text{Consequence} \times \text{Probability}$$

The significance of the impact is rated and described in Table 1-9 below:

**Table 1-9 Impact Assessment Significant Rating**

Description	Explanation	Scoring
No Impact	There is no impact	0
Very Low	Impacts are near negligible. A few mitigation measures are required to reduce the negative impact	0 – 10
Low	Impacts are less important. Some mitigation is required to reduce the negative impacts.	11 – 30
Medium	Impacts are important and require attention. Mitigation is required to reduce the negative impacts.	31 – 60
High	Impacts are of high importance. Mitigation is essential to reduce the negative impacts.	61 – 89
Fatal Flaw	Impacts present a fatal flaw, and alternatives must be considered	90 – 100

## 1.5 Construction Impacts

### 1.5.1 Increased degradation and fragmentation of vegetation communities

IMPACT DESCRIPTION: Increased degradation and fragmentation of vegetation communities				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short to medium Term (2)	Equal to the duration of the construction phase	Consequence: Slightly detrimental (-9)	Significance: Low negative(-27)
Extent	Regional (2)	Localised		
Intensity x type of impact	Low Medium - negative (-4)	Low medium intensity due to unavoidable vegetation clearance required		
Probability	Likely (3)	Impact inevitable without appropriate mitigation		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>Any priority species encountered must be identified and rescued prior to any excavation or construction activities;</li> <li>As far as possible, the project aspects must be contained (and restricted) to within the footprint areas of the existing substation. This will require that existing access roads be used, and no new access routes are permitted (excluding the road extension from the substation as part of this Project);</li> <li>Additional areas of indigenous vegetation (outside of the required clearance), even secondary communities should under no circumstances be fragmented or disturbed further or used as an area for dumping of waste;</li> <li>All laydown, storage areas etc should be restricted to within the Project areas and all access roads must be kept within this area or from existing access roads;</li> <li>The footprint area must be kept clear of alien vegetation. The typical alien vegetation species found within the study area is <i>Prosopis glandulosa var. torreyana</i> (Honey Mesquite) ;</li> <li>Cleared areas for construction must be continually monitored to ensure no potential erosion can occur; and</li> <li>Areas that are denuded during construction need to be re-vegetated with indigenous vegetation to prevent erosion during flood events. This will also reduce the likelihood of encroachment by alien invasive plant species.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-10)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Mitigation will reduce the effects of additional clearance and loss of vegetation		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

**1.5.2 Introduction and spread of alien invasive species**

<b>IMPACT DESCRIPTION: Introduction and spread of alien invasive species</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Relevant to the end of the construction phase	Consequence: Slightly detrimental (-8)	Significance: Medium negative (-32)
Extent	Regional (1)	Localised to the development area		
Intensity x type of impact	Low Medium - negative (-4)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Highly likely (4)	There is a possibility that the impact will occur to the extent that provisions must therefore be made.		
<p><b>MITIGATION:</b></p> <ul style="list-style-type: none"> <li>• Compilation of and implementation of an alien vegetation management plan for the project areas;</li> <li>• Monitor the establishment of alien invasive species within the areas affected by the construction and maintenance and take immediate corrective action where invasive species are observed to establish;</li> <li>• Retain vegetation and soil in position for as long as possible, removing it immediately ahead of construction earthworks in that area and returning it where possible afterwards; and</li> <li>• Rehabilitate or revegetate disturbed areas in accordance with the Rehabilitation Plan for the substation and surrounding areas.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Low negative (-15)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Mitigation will control the introduction and spread of alien invasive species		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.5.3 Displacement, loss and fragmentation of the faunal community due to habitat degradation/ destruction

<b>IMPACT DESCRIPTION: Displacement, loss and fragmentation of the faunal community due to habitat degradation/destruction</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Medium Term (3)	Relevant to the end of the construction phase	Consequence: Moderately detrimental (-12)	Significance: Medium negative(-36)
Extent	Regional (3)	Localised to the development area		
Intensity x type of impact	Medium - negative (-6)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• No trapping, killing or poisoning of any wildlife is to be allowed on site;</li> <li>• Staff should be educated about the sensitivity of faunal species and measures should be put in place to deal with any species that are encountered during the construction process. The intentional killing of any animals including snakes, insects, lizards, birds or other animals should be strictly prohibited;</li> <li>• As far as possible, the project aspects must be contained (and restricted) to within the footprint areas of the existing substation. This will require that existing access roads be used, and no new access routes are permitted (excluding the road extension from the substation as part of this Project);</li> <li>• If any faunal species are recorded during construction, activities should temporarily cease, and an appropriate specialist should be consulted to identify the correct course of action. Care must be taken not to interact directly with any wildlife encountered; and</li> <li>• Any active animal burrows, nests etc. may not be disturbed and must be cordoned off and the relevant specialist consulted on how to proceed.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short to medium Term (2)	As for pre-mitigation	Consequence: Slightly detrimental (-8)	Significance: Low negative(-16)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low Medium - negative (-4)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			



<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).
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### 1.5.4 Displacement, loss and fragmentation of the avifaunal communities due to habitat degradation and powerline collisions

<b>IMPACT DESCRIPTION: Displacement, loss and fragmentation of the avifaunal community due to habitat degradation and powerline collisions</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Short to medium Term (2)	Equal to the duration of the construction phase	Consequence: Moderately detrimental (-10)	Significance: Low negative(-30)
Extent	Site (2)	Localised		
Intensity x type of impact	Medium - negative (-6)	Low medium intensity due to unavoidable vegetation clearance required		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Construction should commence in the dry winter period when birds are least active if possible;</li> <li>• All construction activities must remain within the construction footprint. Construction camps, stockpiles, and temporary storage areas must remain within the study area and within the substation property. No natural vegetation in the surrounding areas must be cleared;</li> <li>• During construction, if any active bird nests are encountered, the area must be cordoned off and the relevant specialist consulted on how to proceed;</li> <li>• During construction no wild bird or animal may under any circumstance be hunted, handled, removed or be interfered with by construction workers or by maintenance staff during operations;</li> <li>• During the powerline re-alignment, only pole structures that are approved as “bird friendly” by Eskom’s ENVIROTECH Forum should be used for the new pole positions; and</li> <li>• Powerlines in the vicinity of the substation must be monitored on a regular basis for bird mortalities by electrocution or collision with the lines.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-10)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.5.5 Degradation of receiving air quality conditions

IMPACT DESCRIPTION: Degradation of the receiving air quality conditions				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short to medium Term (2)	Equal to the duration of the construction phase	Consequence: Slightly detrimental (-6)	Significance: Low negative(-18)
Extent	Site (2)	Impact could affect the whole or a significant portion of the site		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Likely (3)	Due to the nature of the project dust impacts are likely, however within manageable means with the appropriate mitigation measures,		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Dust emissions must be monitored and comply with regulatory requirements, including the air quality management plan for the Siyathemba Municipality;</li> <li>• Dust monitoring should be implemented on site and control measures implemented when needed</li> <li>• Routinely spray all dust generating surfaces with water, a dust suppressant agent or similar to prevent dust generation;</li> <li>• The clearing of vegetation must be limited to where necessary;</li> <li>• Stockpiles (e.g. soil) must be maintained for as short a time as possible and should be enclosed by windbreak enclosures of a similar height to the stockpile. These can also be closed with nets and revegetated to prevent erosion. Stockpiles should be situated away from nearby receptors and should consider the predominant wind direction;</li> <li>• During the transfer of material to stockpiles, the drop heights must be minimised to control the dispersion of materials;</li> <li>• Handling of soils is not to be conducted during high winds;</li> <li>• The Contractor will be solely responsible for the management and mitigation of dust generation;</li> <li>• During periods of wind in excess of 35 km/h, soils should not be handled;</li> <li>• Erect appropriate notification signs at construction areas to warn the public about the hazards around the construction site; and</li> <li>• Construction vehicles must keep to the speed limits (25 km/h within the construction site).</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-10)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.5.6 Increased generation of noise

<b>IMPACT DESCRIPTION: Increased generation of noise</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Short to medium Term (2)	Equal to the duration of the construction phase	Consequence: Slightly detrimental (-6)	Significance: Low negative(-12)
Extent	Site (2)	Impact could affect the whole or a smaller portion of the site		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Noise levels should be monitored to ensure they comply with regulatory requirements;</li> <li>• Construction activities should be limited to working hours (07h00-18h00) Monday to Saturday excluding public holidays (unless prior permission is provided by surrounding landowners);</li> <li>• Vehicles and construction equipment should be kept in good working condition to limit excessive noise pollution;</li> <li>• Limit the movement of construction vehicles to off-peak periods (where possible) and where sensitive receptors are situated;</li> <li>• Noise monitoring is to be undertaken by the Contractor where there is a risk of noise levels being 7dB higher than ambient to receptors in the area of activities. Where the Contractor can manage the noise generation so that this risk is avoided or where activities are not close to the public, this monitoring will not be necessary; and</li> <li>• Adhere to the Siyathemba Municipality Noise Policy with regards to prohibitions relating to disturbing noise, generator sets and construction noise, including the SANS 10103:2008 and Occupational Health and Safety Act requirements.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-5)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Unlikely (1)	Probability of this impact occurring is unlikely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.5.7 Soil contamination and erosion

IMPACT DESCRIPTION: Soil contamination and erosion				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Medium Term (3)	Equal to the duration of the construction phase and operational phase	Consequence: Moderately detrimental (-12)	Significance: Medium negative(-36)
Extent	Regional (3)	Impact could affect the whole or a significant portion of the site		
Intensity x type of impact	Medium - negative (-6)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• The Contractor(s) are to develop an Emergency Response Plan which highlights the procedures to follow in the event of an emergency incident (fire, spills, etc);</li> <li>• A Method Statement must be developed for the handling and transportation of the battery components and electrolytes. All cargo must be checked and transported to the site (by an authorisation transportation company);</li> <li>• All electrolyte and active materials must be encapsulated by a protective covering;</li> <li>• Where possible material must be prefabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site;</li> <li>• All hazardous substances to be kept in a bunded, impermeable and ventilated facility;</li> <li>• All relevant staff are to be trained in the safe handling and spill management of all substances used on site;</li> <li>• All relevant staff are to be trained in the management of hazardous substances;</li> <li>• All small portable equipment which contains fuel or oil should be placed in a drip tray to prevent potential leaks from impacting on the soil or groundwater;</li> <li>• Spill kits, absorbents and spill containment products must be kept on site and used where spills occur or there is a risk of contamination;</li> <li>• All staff are to be provided with appropriate Personal Protective Equipment (PPE);</li> <li>• All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site;</li> <li>• Emergency numbers for spills management are to be available on site at all times;</li> <li>• Spills which occur shall be immediately contained to prevent spreading, contaminated soil shall be removed where applicable and the area remediated using a suitable spill absorbent/remediation product;</li> <li>• Records of all spillages shall be maintained.</li> <li>• All stockpiles must be protected from erosion, stored on flat areas where run-off will be minimised, and be surrounded by bunds;</li> <li>• All stockpiles shall be stabilised, not be higher than 2m, and must blend in with the surrounding topography;</li> <li>• Spoil must be used as backfill to rehabilitate areas impacted upon by earthwork activities;</li> <li>• A rehabilitation plan must be compiled for the topsoil which include erosion control measures;</li> <li>• Excavated and graded bare areas should not be left for long period without been constructed; and</li> <li>• Graded bare soil and stockpiles should be protected and located away from stormwater drainage lines to avoid siltation and sedimentation.</li> </ul>				
<b>OST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Slightly detrimental (-7)	Significance: Low negative(-14)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low Medium - negative (-4)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.5.8 Increased construction vehicle traffic

IMPACT DESCRIPTION: Increased construction vehicle traffic				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase	Consequence: Negligible (-5)	Significance: Very Low negative(-10)
Extent	Site (1)	Impacts will be felt by residents of the study area and road users in the area, including transport routes and adjoining towns		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Appropriate notification signs shall be erected at entrances to the construction site to warn visitors and pedestrians about the hazards around the construction site and the presence of heavy vehicles, where appropriate;</li> <li>• Construction vehicles are to keep to the speed limits (25 km/h on the construction site);</li> <li>• All vehicles must travel along designated routes;</li> <li>• No additional access routes are permissible (only existing routes); and</li> <li>• Roads must be maintained in an acceptable condition for the safe travel of the public and project personnel.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-5)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	As for pre-mitigation		
Probability	Unlikely (1)	As for pre-mitigation		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

**1.5.9 Local skills transfer and increased awareness of renewable energy**

<b>IMPACT DESCRIPTION: Local skills transfer and Increased awareness of renewable energy</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase	Consequence: Negligible (0)	Significance: No impact(0)
Extent	Regional (1)	Impact could affect the broader portion of the region		
Intensity x type of impact	Negligible (0)	Impact does not alter the environment in a negative manner		
Probability	Unlikely (1)	Probability of this impact occurring is unlikely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Ensure Interested and Affected Parties are aware of the project and how renewable energy contributes towards a lower carbon footprint; and</li> <li>• Provide clear and concise information about BESS technology and the associated benefits.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Slightly beneficial (6)	Significance: Low positive(12)
Extent	Regional (2)	As for pre-mitigation		
Intensity x type of impact	Low - positive (2)	Mitigation will create a positive beneficial impact		
Probability	Possible (2)	Mitigation will maximise probability that positive benefits of the project are realised.		
<b>Level of Confidence in Impact</b>	Judgement is based on intuition and not on knowledge or information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is irreplaceable.			

### 1.5.10 Increase in employment opportunities

IMPACT DESCRIPTION: Increase in employment opportunities				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase	Consequence: Negligible (0)	Significance: No impact(0)
Extent	Site (1)	Employment opportunities will be limited to the project		
Intensity x type of impact	Negligible (0)	No employment opportunities are available due to lack of recruitment structures		
Probability	Likely (3)	The proposed project requires the use of machinery and equipment.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Prevent nepotism/ corruption in local recruitment structures;</li> <li>• Proportionally divide any potential local unskilled labour opportunities with the assistance of the Ward Councillors. These opportunities include the performance of general and basic construction activities (e.g., digging trenches, foundations, and the erection of notices, etc.);</li> <li>• Promote employment of women; and</li> <li>• Monitor employment targets over the duration of construction.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (5)	Significance: Very Low positive(10)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - positive (2)	Mitigation will maximise local job creation		
Probability	Possible (2)	Mitigation will maximise probability that local recruitment targets are achieved and local benefits optimised		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.5.11 Reduction in visual aesthetics

IMPACT DESCRIPTION: Reduction in visual aesthetics				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase	Consequence: Negligible (-5)	Significance: Low negative(-15)
Extent	Site (1)	Impacts will be felt by residents of the study area and road users in the area, including surrounding mines and solar farms		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Likely (3)	This impact will likely occur due to the nature of the project.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Keep dust levels down by regularly wetting dirt roads and exposed soil areas;</li> <li>• Remove rubble and other waste that is generated by the construction process as soon as possible and dispose at an appropriate dump site;</li> <li>• Implement rehabilitation of disturbed areas as soon as possible to limit the duration of exposed soil surfaces;</li> <li>• Monitor the rehabilitated areas for at least 6 months to ensure a sufficient vegetation cover is established that will prevent erosion from occurring;</li> <li>• Keep the construction camp neat and tidy at all times. Remove any waste from the site or contain it in an enclosed area out of sight from sensitive viewpoints.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-5)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Mitigation will slightly reduce the visual impacts associated with the project		
Probability	Unlikely (1)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is irreplaceable.			



### 1.5.12 Damage or destruction of archaeological and/or palaeontological resources

IMPACT DESCRIPTION: Damage or loss to archaeological and/or palaeontological resources				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase and operational phase	Consequence: Slightly detrimental (-9)	Significance: Low negative(-18)
Extent	Site (1)	Impact could affect the whole or a significant portion of the site		
Intensity x type of impact	Medium - negative (-6)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Should any archaeological or physical cultural property heritage resources be exposed during excavation for the purpose of construction, construction in the vicinity of the finding must be stopped until heritage authority has cleared the development to continue;</li> <li>• Should any archaeological, cultural property heritage resources be exposed during excavation or be found on development site, a registered heritage specialist or PHRA official must be called to site for inspection;</li> <li>• Under no circumstances may any archaeological, historical or any physical cultural property heritage material be destroyed or removed from site;</li> <li>• Should remains and/or artefacts be discovered on the development site during earthworks, all work will cease in the area affected and the Contractor will immediately inform the Construction Manager who in turn will inform PHRA; and</li> <li>• Should any remains be found on site that is potentially human remains, the PHRA, Eskom and South African Police Service should be contacted.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (-5)	Significance: Very Low negative(-5)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	As for pre-mitigation		
Probability	Unlikely (1)	Probability of this impact occurring is unlikely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is irreplaceable.			

### 1.5.13 Pollution of the receiving environment due to inappropriate management and handling of waste

<b>IMPACT DESCRIPTION: Pollution of the receiving environment due to inappropriate management and handling of waste</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Long Term (4)	Equal to the duration of the construction phase	Consequence: Moderately detrimental (-12)	Significance: Medium negative(-36)
Extent	Site (4)	Waste generated during construction will generally affect the immediate site.		
Intensity x type of impact	Medium - negative (-6)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Likely (3)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Regular litter picking and general waste bins must be readily available for litter disposal and general housekeeping;</li> <li>• All solid waste generated during the construction process must be placed in a designated waste collection area within the construction camp and must not be allowed to blow around the site, be accessible to animals, or be placed in piles adjacent the waste skips / bins;</li> <li>• All solid waste must then be disposed of at the nearest licensed landfill and safe disposal certificates obtained. Separate waste skips/ bins for the different waste streams must be available on site and be clearly marked;</li> <li>• The waste containers must be appropriate to the waste type contained therein and where necessary should be lined and covered. This will be managed through the site specific EMPr and monitored by the ECO;</li> <li>• No waste (hazardous or general) will be disposed of in the trenches around the construction footprint. All hazardous material must be carefully stored and then disposed of offsite at the licensed hazardous landfill site;</li> <li>• All excess material and rubble must be removed from the site so not to restrict the rehabilitation process;</li> <li>• Adequate toilet facilities must be provided for all staff members as standard construction practice in a 1:15 ratio (one (1) toilet for up to fifteen (15) workers with separate toilet(s) for male(s) and female(s)). Monitor the sewerage facilities for spillages, and handle any spillages as hazardous waste;</li> <li>• Chemical toilets must be placed within the construction camp and not in close proximity to the river/wetlands. The chemical toilets to be provided must be from a registered company and all sewage must be disposed of at an appropriate facility. Safe disposal certificates must be kept on record; and</li> <li>• Machinery must be properly maintained to keep oil leaks in check.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short to medium Term (2)	As for pre-mitigation	Consequence: Slightly detrimental (-6)	Significance: Very Low negative(-6)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	As for pre-mitigation		
Probability	Unlikely (1)	Probability of this impact occurring is unlikely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

## 1.6 Operational Impacts

### 1.6.1 Loss and displacement of indigenous vegetation

<b>IMPACT DESCRIPTION: Loss and displacement of indigenous vegetation due to BESS failure</b>				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Medium Term (3)	Equal to the duration of the construction phase	Consequence: Moderately detrimental (-12)	Significance: Low negative(-24)
Extent	Regional (3)	Localised		
Intensity x type of impact	Medium - negative (-6)	Low medium intensity due to unavoidable vegetation clearance as a consequence		
Probability	Possible (2)	Impact inevitable without appropriate mitigation		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• An operating and maintenance programme must be implemented in some manner which includes identification of overcharge, overheating and short circuits. The applicant must further investigate insulation material to be used around the modules;</li> <li>• Short circuit detection and protection must be implemented in some manner in the BESS technology selected;</li> <li>• Fire detection and suppression systems must be installed;</li> <li>• Handling of the battery modules must be undertaken in accordance with the operating manual and OEM instructions;</li> <li>• Auditing of all operating and maintenance functions should occur by a professional product engineer;</li> <li>• Staff should be trained and accredited to effectively handle plant fires and explosions;</li> <li>• Fire extinguishers must be available at all points of storage of flammable product;</li> <li>• The fire extinguishers must be checked on a monthly basis to ensure they have not been used or damaged from surrounding construction activities;</li> <li>• Basic firefighting equipment shall be kept and maintained at all construction fronts at all times. Basic firefighting equipment shall not be restricted to fire extinguishers, but shall take cognisance of site-specific conditions;</li> <li>• The Contractor shall assign the position of Fire Officer to one of its senior staff members who shall be competent and adequately trained to fulfil the position of Fire Officer. Fire Officer must be able to detect fires and undertake regular monitoring;</li> <li>• The Fire Officer shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Fire Officer will be responsible for contacting emergency services for assistance;</li> <li>• Any fires that occur shall be reported to the applicant immediately and reported in turn to the relevant authorities;</li> <li>• All staff shall receive training on fire prevention and safety in the event of a fire. Annual refresher courses shall be presented to all staff;</li> <li>• Details of the Siyathemba Fire Department should be recorded on site and updated quarterly;</li> <li>• Ensure that the necessary materials and equipment for dealing with oil, fuel and hazardous substance spills and leaks as well as potential fires are available on site and up to date at all times;</li> <li>• No open fires shall be permitted on or off-site, except for activities authorised by the Applicant. All authorised fires shall occur at designated fireplaces, which shall be suitably resourced to contain and suppress any potential run-away fire;</li> <li>• No on-site burning of any waste materials, vegetation, litter or refuse shall be permitted;</li> <li>• The disposal of cigarette butts into the surrounding environment shall not be permitted;</li> <li>• Biomass in the vicinity of infrastructure shall be removed at regular intervals to reduce fuel load and fire hazards; and</li> <li>• Conduct fire and emergency drills every six months and record details within the environmental and safety file.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short to medium Term (2)	As for pre-mitigation	Consequence: Slightly detrimental (-8)	Significance: Very Low negative (-8)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low Medium - negative (-4)	Low intensity due to unavoidable vegetation clearance as a consequence		
Probability	Unlikely (1)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

## 1.6.2 Loss and fragmentation of the faunal and avifaunal communities

<b>IMPACT DESCRIPTION: Loss and fragmentation of the faunal and avifaunal community due to BESS failure</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Medium Term (3)	Relevant to the end of the construction phase	Consequence: Highly detrimental (-14)	Significance: Low negative(-28)
Extent	Regional (3)	Localised to the development area		
Intensity x type of impact	Medium high - negative (-8)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Possible (2)	There is a possibility that the impact will occur to the extent that provisions must therefore be made.		
<p><b>MITIGATION:</b></p> <ul style="list-style-type: none"> <li>• Short circuit detection and protection must be implemented in some manner in the BESS technology selected;</li> <li>• Fire detection and suppression systems must be installed;</li> <li>• Handling of the battery modules must be undertaken in accordance with the operating manual and Original Equipment Manufacturer (OEM) instructions;</li> <li>• All nests should be removed from the site and any species of conservation concern;</li> <li>• Ensure that the necessary materials and equipment for dealing with oil, fuel and hazardous substance spills and leaks as well as potential fires are available on site and up to date at all times;</li> <li>• The Contractor shall assign the position of Fire Officer to one of its senior staff members who shall be competent and adequately trained to fulfil the position of Fire Officer. Fire Officer must be able to detect fires and undertake regular monitoring;</li> <li>• The Fire Officer shall be responsible for ensuring immediate and appropriate actions in the event of a fire and shall ensure that employees are aware of the procedures to be followed. The Fire Officer will be responsible for contacting emergency services for assistance;</li> <li>• Fire extinguishers must be available at all points of storage of flammable product;</li> <li>• The fire extinguishers must be checked on a monthly basis to ensure they have not been used or damaged from surrounding construction activities;</li> <li>• Basic firefighting equipment shall be kept and maintained at all construction fronts at all times. Basic firefighting equipment shall not be restricted to fire extinguishers, but shall take cognisance of site-specific conditions; and</li> <li>• The Contractor must aim to undertake basic firefighting training with at least 50% of the staff based on site.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short to medium Term (2)	As for pre-mitigation	Consequence: Slightly detrimental (-8)	Significance: Low negative(-16)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low Medium - negative (-4)	Mitigation will control the introduction and spread of alien invasive species		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.6.3 Reduced health conditions for surrounding communities and residents

IMPACT DESCRIPTION: Reduced health conditions for surrounding communities and residents				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Long Term (4)	Relevant to the end of the construction phase	Consequence: Moderately detrimental (-13)	Significance: Low negative(-26)
Extent	Regional (4)	Localised to the development area		
Intensity x type of impact	Medium - negative (-6)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Short circuit detection and protection must be implemented in some manner in the BESS technology selected;</li> <li>• Fire detection and suppression systems must be installed;</li> <li>• Handling of the battery modules must be undertaken in accordance with the operating manual and OEM instructions;</li> <li>• Conduct fire and emergency drills periodically with all staff based at Cuprum substation. Staff must be aware of the Emergency Response Plan (ERP) approved for the Project;</li> <li>• Ensure staff are medically trained with regards to First Aid. Staff must be able to identify airborne chemicals (i.e., smell);</li> <li>• In the case of a fire, staff must understand the process to be undertaken once an individual inhales smoke (Health and Safety Plan); and</li> <li>• All associated infrastructure must be maintained regularly however hazardous material must follow a strict protocol for storage and handling in accordance with the EMPr.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Long Term (4)	As for pre-mitigation	Consequence: Moderately detrimental (-10)	Significance: Very Low negative (-10)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low Medium - negative (-4)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Unlikely (1)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be unable to recover from the impact that is permanently modified.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.6.4 Increased disturbance to avifaunal communities due to powerline collisions and electrocutions

<b>IMPACT DESCRIPTION: Increased disturbance to avifaunal communities due to powerline collisions and electrocutions</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Long Term (4)	Equal to the duration of the construction phase	Consequence: Slightly detrimental (-8)	Significance: Low negative(-16)
Extent	Site (4)	Localised		
Intensity x type of impact	Low - negative (-2)	Low medium intensity due to unavoidable vegetation clearance required		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• Powerlines in the vicinity of the substation must be monitored at least once a year for bird mortalities by electrocution or collision with the lines;</li> <li>• In the event of bird mortalities, an Eskom representative should undertake a preliminary investigation as to whether additional measures, e.g., bird reflectors, can be implemented to prevent further bird mortalities.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Long Term (4)	As for pre-mitigation	Consequence: Slightly detrimental (-8)	Significance: Low negative(-16)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

1.6.5 Contamination of soil and groundwater resources

IMPACT DESCRIPTION: Contamination of soil and groundwater resources due to hazardous chemicals				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Long Term (4)	Equal to the duration of the construction phase and operational phase	Consequence: Highly detrimental (-16)	Significance: Medium negative(-32)
Extent	Site (4)	Impact could affect the whole or a significant portion of the site		
Intensity x type of impact	High - negative (-10)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>• A primary and secondary containment system should be placed around the BESS. This should include a bunded platform which can contain up to 110% of the liquid contents;</li> <li>• Leak Detection must be monitored according to manufacturing requirements;</li> <li>• A maintenance schedule should be developed and implemented prior to operation. Regular inspections should be undertaken by an experienced professional to determine the state of the battery and whether emergency replacement or maintenance is required;</li> <li>• The Contractor(s) are to develop an Emergency Response Plan which highlights the procedures to follow in the event of an emergency incident (fire, spills, etc);</li> <li>• Where possible material must be pre-fabricated and then transported to site to avoid the risks of contamination associated with mixing, pouring and the storage of chemicals and compounds on site;</li> <li>• All other hazardous substances to be kept in a bunded, impermeable and ventilated facility;</li> <li>• All relevant staff are to be trained in the safe handling and spill management of all substances used on site;</li> <li>• All relevant staff are to be trained in the management of hazardous substances;</li> <li>• All small portable equipment which contains fuel or oil should be placed in a drip tray to prevent potential leaks from impacting on the soil or groundwater;</li> <li>• Spill kits, absorbents and spill containment products must be kept on site and used where spills occur or there is a risk of contamination;</li> <li>• At least one (1) staff member should be available on site at all construction times that have been trained on how to use the spill kit. Proof of training to be kept on site;</li> <li>• All staff are to be provided with appropriate Personal Protective Equipment (PPE);</li> <li>• All machinery and equipment should be inspected regularly for faults and possible leaks, these should be serviced off-site as per manufacturer requirements;</li> <li>• Emergency numbers for spills management are to be available on site at all times;</li> <li>• Spills which occur shall be immediately contained to prevent spreading, contaminated soil shall be removed where applicable and the area remediated using a suitable spill absorbent/remediation product; and</li> <li>• Records of all spillages shall be maintained in the incident register.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short to medium Term (2)	As for pre-mitigation	Consequence: Moderately detrimental (-10)	Significance: Low negative(-20)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Medium - negative (-6)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.6.6 Improved development opportunities due to increased reliability of energy services

IMPACT DESCRIPTION: Increased reliability of energy services				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase	Consequence: Negligible (0)	Significance: No Impact(0)
Extent	Site (1)	Impact could affect the whole or a significant portion of the site		
Intensity x type of impact	Negligible (0)	Impact alters the affected environment in such a way that the natural process or functions are not affected		
Probability	Unlikely (1)	Due to the nature of the project dust impacts are likely, however within manageable means with the appropriate mitigation measures,		
<p><b>MITIGATION:</b></p> <ul style="list-style-type: none"> <li>• Ensure the BESS and associated infrastructure are maintained regularly and operate efficiently to reach full extent of the positive impact; and</li> <li>• Ensure compliance to all environmental permits, management and rehabilitation plans in order to reach optimal functioning and safety targets</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (5)	Significance: Low positive(15)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - positive (2)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Likely (3)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			



### 1.6.7 Reduction in visual aesthetics

<b>IMPACT DESCRIPTION: Change in visual aesthetics due to the installation of the BESS</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Short Term (1)	Equal to the duration of the construction phase	Consequence: Negligible (-5)	Significance: Very Low negative (-10)
Extent	Site (1)	Impact could affect the whole or a smaller portion of the site		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected		
Probability	Possible (2)	Probability of this impact occurring is possible, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>All waste should be regularly removed from site as well as all damaged/replaced equipment associated with the BESS and additional infrastructure</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence: Negligible (0)	Significance: No Impact(0)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Negligible (0)	Impact alters the affected environment in such a way that the natural process or functions are not affected.		
Probability	Unlikely (1)	Probability of this impact occurring is unlikely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

## 1.7 Cumulative Impacts

### 1.7.1 Increased disturbance of indigenous vegetation and faunal displacement

<b>IMPACT DESCRIPTION: Cumulative impact on vegetation</b>				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Long Term (4)	Lifecycle of the project	Consequence: Slightly detrimental (-8)	Significance: Low negative(-24)
Extent	Site (4)	Eskom are responsible for alien invasive species on the site		
Intensity x type of impact	Low - negative (-2)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>MITIGATION:</b>				
<ul style="list-style-type: none"> <li>An Alien Invasive Management Plan should be developed for the lifecycle of the project coupled with regular monitoring and removal of invasive species.</li> </ul>				
<b>POST-MITIGATION</b>				
Duration	Short Term (1)	As for pre-mitigation	Consequence :Negligible (-5)	Significance: Very Low negative(-10)
Extent	Site (2)	As for pre-mitigation		
Intensity x type of impact	Low - negative (-2)	As for pre-mitigation		
Probability	Possible (2)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		
<b>Level of Confidence in Impact</b>	Judgement is based on scientific and/or proven information.			
<b>Reversibility</b>	The affected environment will be able to recover from the impact.			
<b>Replaceability</b>	Affected environment is replaceable, that is, an irreplaceable resource is not damaged, or the resource is not irreplaceable (not scarce).			

### 1.7.2 Contribution to climate change reduction

<b>IMPACT DESCRIPTION: Cumulative impact on climate change</b>				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	Rating	Motivation		
<b>PRE-MITIGATION</b>				
Duration	Medium Term (3)	Impact will occur beyond the construction and operational phase	Consequence: Moderately beneficial (11)	Significance: Medium positive(33)
Extent	National (3)	The proposed activity will result in an impact which will have a national outreach.		
Intensity x type of impact	Low medium - positive (4)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		

**1.7.3 Increased energy efficiencies throughout the Eskom grid**

<b>IMPACT DESCRIPTION: Cumulative energy efficiency</b>				
<b>Predicted for project phase:</b>	Pre-construction	Construction	Operation	Decommissioning
<b>Dimension</b>	<b>Rating</b>	<b>Motivation</b>		
<b>PRE-MITIGATION</b>				
Duration	Long Term (4)	Impact will occur beyond the construction and operational phase	Consequence: Moderately beneficial (11)	Significance: Medium positive(33)
Extent	Regional (4)	The proposed activity will result in an impact which will have a national outreach.		
Intensity x type of impact	Low medium - positive (4)	Impact alters the affected environment in such a way that the natural process or functions are slightly affected.		
Probability	Likely (3)	Probability of this impact occurring is likely, either due to the circumstances, design or experience.		

**1.8 Decommissioning and Closure Impacts**

Decommissioning of the BESS and associated infrastructure has not been determined as a viable option for Eskom in the foreseeable future. Eskom have therefore, planned to undertake maintenance activities regarding the BESS and associated infrastructure.

In the instance whereby replacement components are required for the BESS, the supplier must dispose the replaced components in line with legislative requirements.

If at any stage Eskom wishes to decommission the BESS and associated infrastructure, the EMPr will be used as a guideline document together with the necessary required EA for the decommissioning activities.

Therefore, no impacts have been assessed further in this section.