

## APPENDIX F: IMPACT ASSESSMENT WITH THE PROPOSED MITIGATION MEASURES FOR THE PROPOSED PROJECT

An impact can be defined as any change in the physical-chemical, biological, cultural and/or socio-economic environmental system that can be attributed to human activities related to alternatives under study for meeting a project need.

The significance of the aspects/impacts of the process were rated by using a matrix derived from Plomp (2004) and adapted to some extent to fit this process. These matrixes use the consequence and the likelihood of the different aspects and associated impacts to determine the significance of the impacts.

The significance of the impacts will be determined through a synthesis of the criteria below (refer to **Table 1**):

**Table 1: Significance Criteria**

<b>Aspect</b>		<b>Definition</b>
<b>Probability</b>		<b>This describes the likelihood of the impact actually occurring</b>
	<b>Description</b>	<b>Definition</b>
	<b>Improbable</b>	The possibility of the impact occurring is very low, due to the circumstances, design or experience.
	<b>Probable</b>	There is a probability that the impact will occur to the extent that provision must be made therefore.
	<b>Highly Probable</b>	It is most likely that the impact will occur at some stage of the development.
	<b>Definite</b>	The impact will take place regardless of any prevention plans and there can only be relied on mitigatory measures or contingency plans to contain the effect.
<b>Aspect</b>		<b>Definition</b>
<b>Duration</b>		<b>The lifetime of the impact</b>
	<b>Description</b>	<b>Definition</b>
	<b>Short Term</b>	The impact will either disappear with mitigation or will be mitigated through natural processes in a time span shorter than any of the phases.
	<b>Medium Term</b>	The impact will last up to the end of the phases, where after it will be negated.
	<b>Long Term</b>	The impact will last for the entire operational phase of the project but will be mitigated by direct human action or by natural processes thereafter.
	<b>Permanent</b>	The impact is non-transitory. Mitigation either by man or natural processes will not occur in such a way or in such a time span that the

		impact can be considered transient.
<b>Aspect</b>		<b>Definition</b>
<b>Scale</b>		<b>The physical and spatial size of the impact</b>
	<b>Description</b>	<b>Definition</b>
	<b>Local</b>	The impacted area extends only as far as the activity, e.g. footprint
	<b>Site</b>	The impact could affect the whole, or a measurable portion of the above mentioned properties.
	<b>Regional</b>	The impact could affect the area including the neighbouring residential areas.
<b>Aspect</b>		<b>Definition</b>
<b>Magnitude/ Severity</b>		<b>Does the impact destroy the environment, or alter its function</b>
	<b>Description</b>	<b>Definition</b>
	<b>Low</b>	The impact alters the affected environment in such a way that natural processes are not affected.
	<b>Medium</b>	The affected environment is altered, but functions and processes continue in a modified way.
	<b>High</b>	Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases.
<b>Aspect</b>		<b>Definition</b>
<b>Significance</b>		<b>This is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required.</b>
	<b>Description</b>	<b>Definition</b>

	<b>Negligible</b>	The impact is non-existent or unsubstantial and is of no or little importance to any stakeholder and can be ignored.
	<b>Low</b>	The impact is limited in extent, has low to medium intensity; whatever its probability of occurrence is, the impact will not have a material effect on the decision and is likely to require management intervention with increased costs.
	<b>Moderate</b>	The impact is of importance to one or more stakeholders, and its intensity will be medium or high; therefore, the impact may materially affect the decision, and management intervention will be required.
	<b>High</b>	The impact could render development options controversial or the project unacceptable if it cannot be reduced to acceptable levels; and/or the cost of management intervention will be a significant factor in mitigation.

**Table 2: The following weights were assigned to each attribute:**

<b>Aspect</b>	<b>Description</b>	<b>Weight</b>
<b>Probability</b>	<b>Improbable</b>	<b>1</b>
	<b>Probable</b>	<b>2</b>
	<b>Highly Probable</b>	<b>4</b>
	<b>Definite</b>	<b>5</b>
<b>Duration</b>	<b>Short term</b>	<b>1</b>
	<b>Medium term</b>	<b>3</b>
	<b>Long term</b>	<b>4</b>
	<b>Permanent</b>	<b>5</b>
<b>Scale</b>	<b>Site</b>	<b>1</b>
	<b>Local</b>	<b>2</b>
	<b>Regional</b>	<b>3</b>

<b>Magnitude/Severity</b>	<b>Low</b>	<b>2</b>
	<b>Medium</b>	<b>6</b>
	<b>High</b>	<b>8</b>
<b>Significance</b>	<b>Sum (Duration, Scale, Magnitude) x Probability</b>	
	<b>Negligible</b>	<b>≤20</b>
	<b>Low</b>	<b>&gt;20 ≤40</b>
	<b>Moderate</b>	<b>&gt;40 ≤60</b>
	<b>High</b>	<b>&gt;60</b>

The significance of each activity was rated without mitigation measures (WOM) and with mitigation (WM) measures for both construction, operational and closure phases of the proposed development.

The purpose of this section is to identify potential impacts and to recommend mitigation measures to minimise detrimental environmental impacts. The descriptions will feature project phases (construction and operation) where the impacts are more pronounced. The associated impact assessment tables for each impact will be categorised according to project phases, prior to and post mitigation. The following are identified as possible activities that will have impacts on the environment.

## **1.1 IMPACTS ON BIODIVERSITY**

### **1.1.1 Potential Impacts**

As already established, the site has no natural areas remaining and has been heavily degraded by historical and current activities associated with the Camden Power Station. The only concerns with regards to biodiversity is as follows:

- Contaminated run-off as a result of wastewater spillages from the Surge Tower, the Ash Water Return Reservoir and the Reclamation Dam causing loss of surrounding biodiversity;
- Construction of the Reclamation dam pump upgrade pipe work further degrading the surrounding area;
- Incorrect disposal of construction waste can result in a loss of biodiversity; and
- Run-off from construction activities can result in the polluting of surrounding areas.

### **1.1.2 Mitigation measures**

The following obligatory recommendations are applicable to the project area:

- The Surge Tower, Reclamation Dam pump upgrade (including pipe work) and the Ash Water Return Reservoir are located with the Camden Power Station plant area, which has already been degraded due to current and historic activities;
- Construction waste should be disposed of in a waste skip, in a demarcated area within the plant area, to ensure no further biodiversity is impacted upon;
- The Surge Tower, Reclamation Dam pump upgrade (including pipe work) and the Ash Water Return Reservoir is situated within the Camden Power Station storm water management system, therefore contaminated water emanating from the surge tower and reclamation dam pump upgrade (including the pipe work) will be contained. The wastewater will be reused in the power plant processes; and
- Where encountered, declared alien vegetation should be controlled and the spread thereof proactively managed. Declared alien vegetation should be controlled and removed in compliance with the Conservation of Agricultural Resource Act and the National Environmental Management Biodiversity Act. If successfully implemented, the impact on the vegetation could be considered moderately positive on a local scale in the long term.

**Table 3: Biodiversity impacts associated with the construction phase**

ALTERNATIVE 1: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Loss of biodiversity	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (4)
Degradation of surrounding areas	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (4)
ALTERNATIVE 2: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Loss of biodiversity	Without management	3	1	6	4	Moderate (40)
	With management	3	1	2	1	Negligible (6)
Degradation of surrounding areas	Without management	3	1	6	4	Moderate (40)
	With management	3	1	2	1	Negligible (6)
ALTERNATIVE 3: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Loss of biodiversity	Without management	1	1	6	4	Low (32)

	With management	1	1	2	1	Negligible (4)
Degradation of surrounding areas	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (4)

**Table 4: Biodiversity impacts associated with the Operation phase**

ALTERNATIVE 1: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Loss of biodiversity	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Degradation of surrounding areas	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
ALTERNATIVE 2: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Loss of biodiversity	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Degradation of surrounding areas	Without management	5	1	6	2	Low (24)



	With management	5	1	2	1	Negligible (8)
<b>ALTERNATIVE 3: OPERATION PHASE</b>						
<b>Nature of Impact</b>	<b>Management Measures</b>	<b>Duration</b>	<b>Scale</b>	<b>Severity</b>	<b>Probability</b>	<b>Significance</b>
Loss of biodiversity	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Degradation of surrounding areas	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)

## **1.2    *IMPACT ON GROUNDWATER***

### **1.2.1. Potential Impacts**

The potential impacts regarding the Surge Tower, AWRR partitioning and Reclamation Dam pump upgrade on groundwater are follows:

- Contamination of groundwater as a result of spillages during construction;
- Contamination of groundwater as a result of spillages during operation; and
- Contamination of groundwater from the incorrect disposal of construction waste during construction.

### **1.2.2 Proposed Mitigation**

The following mitigations measures are proposed obligatory recommendations are applicable to the project area:

- The Surge Tower, Ash Water Return Reservoir and Reclamation Dam pump upgrade (including pipe work) are situated in a highly polluted area (power station plant area), and therefore any spillages that contaminate groundwater will be considered cumulative;
- The Surge Tower, Reclamation Dam pump upgrade (including pipe work) and the Ash Water Return Reservoir is situated within the Camden Power Station storm water management system, therefore contaminated water emanating from the surge tower and reclamation dam pump upgrade (including the pipe work) will be contained. The wastewater will be reused in the power plant processes;
- A emergency response and readiness plan for spillages to ensure any chemicals etc spilled during construction is quickly and effectively cleaned up;
- Monitoring of operations and pipe work to detect any leakages or spillages that can cause groundwater contamination; and
- Construction waste should be disposed of in a waste skip, in a demarcated area within the plant area, to ensure no contaminated run-off emanating form the disposal of construction waste.

**Table 5: Groundwater impacts associated with the construction phase**

ALTERNATIVE 1: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Contamination of groundwater resources	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (4)
ALTERNATIVE 2: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Contamination of groundwater resources	Without management	3	1	6	4	Moderate (40)
	With management	3	1	2	1	Negligible (6)
ALTERNATIVE 3: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Contamination of groundwater resources	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (4)

**Table 6: Groundwater impacts associated with the operation phase**

ALTERNATIVE 1: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Contamination of groundwater resources	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
ALTERNATIVE 2: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Contamination of groundwater resources	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
ALTERNATIVE 3: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Contamination of groundwater resources	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)

### **1.3    IMPACTS ON SURFACE WATER**

#### **1.3.1. Potential Impacts**

The potential impacts regarding the Surge Tower, AWRR partitioning and Reclamation Dam pump upgrade on surface water resources are follows:

- Decrease in water quality as a result of contamination from spillage and leakages;
- Loss of wetland, riparian, and drainage line vegetation and habitat as a result of contamination; and
- Increased sedimentation and erosion.

#### **10.3.2 Proposed Mitigation**

The following mitigations measures are proposed obligatory recommendations are applicable to the project area:

- The Surge Tower, Ash Water Return Reservoir and Reclamation Dam pump upgrade (including pipe work) are not situated within close proximity of any water resources, however, water resources are present within the Camden Power Station boundary;
- The Surge Tower, Reclamation Dam pump upgrade (including pipe work) and the Ash Water Return Reservoir is situated within the Camden Power Station storm water management system, therefore contaminated water emanating from the surge tower and reclamation dam pump upgrade (including the pipe work) will be contained. The wastewater will be reused in the power plant processes;
- A emergency response and readiness plan for spillages to ensure any chemicals etc spilled during construction is quickly and effectively cleaned up;
- Monitoring of operations and pipe work to detect any leakages or spillages that can cause contaminated surface water run-off; and
- Construction waste should be disposed of in a waste skip, in a demarcated area within the plant area, to ensure no contaminated run-off emanating from the disposal of construction waste.

**Table 7: Surface Water impacts associated with the construction phase**

ALTERNATIVE 1: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Pollution damage (contamination) a result of construction vehicle refuelling, chemical and wastewater spills	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
Increased flow rate and sedimentation of surrounding water resources	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
ALTERNATIVE 2: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Pollution damage (contamination) a result of construction vehicle refuelling, chemical and wastewater spills	Without management	3	1	6	2	Moderate (40)
	With management	3	1	2	1	Negligible (6)
Increased flow rate and sedimentation of surrounding water resources	Without management	3	1	6	2	Moderate (40)
	With management	3	1	2	1	Negligible (6)

ALTERNATIVE 3: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Pollution damage (contamination) a result of construction vehicle refuelling, chemical and wastewater spills	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
Increased flow rate and sedimentation of surrounding water resources	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)

**Table 8: Surface Water impacts associated with the operation phase**

ALTERNATIVE 1: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Pollution damage (contamination) a result of spillage or leakage	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
ALTERNATIVE 2: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Pollution damage (contamination) a result of spillage or leakage	Without management	5	1	6	2	Low (24)

	With management	5	1	2	1	Negligible (8)
<b>ALTERNATIVE 3: OPERATION PHASE</b>						
<b>Nature of Impact</b>	<b>Management Measures</b>	<b>Duration</b>	<b>Scale</b>	<b>Severity</b>	<b>Probability</b>	<b>Significance</b>
Pollution damage (contamination) a result of spillage or leakage	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)



## **1.4    *IMPACTS ON THE SOCIO-ECONOMIC***

### **1.4.1. Potential Impacts**

The potential impacts regarding the Surge Tower, AWRR partitioning and Reclamation Dam pump upgrade on the socio-economic aspect of the surrounding communities are follows:

- Influx of job seekers;
- Local Economic Contribution;
- Shutting down of electricity generation during AWRR partitioning;
- Health risks associated with leaks and spills;
- Health risks associated with the flooding of the Reclamation Dam; and
- Continued generation of electricity.

### **1.4.2 Proposed Mitigation**

The following mitigations measures are proposed obligatory recommendations are applicable to the project area:

- Camden Power Station will utilise already employed contractors for construction and operation of the surge tower and reclamation dam pump upgrade;
- Surge tower and the reclamation dam pump upgrade is situated within the Camden Power Station storm water management system, therefore contaminated water emanating from the surge tower and reclamation dam pump upgrade (including the pipe work) will be contained. The wastewater will be reused in the power plant processes thereby, minimising the potential health risks to surrounding water users; and
- Construction waste should be disposed of in a waste skip, in a demarcated area within the plant area, to ensure no contaminated run-off emanating from the disposal of construction waste.

**Table 9: Socio-economic impacts during construction phase**

Alternative 1: Construction Phase						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Influx of job seekers	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
Health risks to surrounding communities	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
Local Economic Contribution	Positive Impact					
Alternative 2: Construction Phase						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Influx of job seekers	Without management	3	1	6	2	Moderate (40)
	With management	3	1	2	1	Negligible (6)
Health risks to surrounding communities	Without management	3	1	6	2	Moderate (40)
	With management	3	1	2	1	Negligible (6)
Local Economic Contribution	Positive Impact					
Alternative 3: Construction Phase						

Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Influx of job seekers	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
Health risks to surrounding communities	Without management	1	1	6	4	Low (32)
	With management	1	1	2	1	Negligible (8)
Ceasing electricity generation during construction	Without management	1	3	8	5	High (60)
	With management	1	3	8	5	High (60)
Loss of productivity and economic growth as a result of electricity generation stoppages	Without management	1	3	8	5	High (60)
	With management	1	3	8	5	High (60)
Local Economic Contribution	Positive Impact					

**Table 10: Socio-economic impacts during operation phase**

ALTERNATIVE 1: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Influx of job seekers	Without management	5	1	6	2	Low (24)

	With management	5	1	2	1	Negligible (8)
Health risks to surrounding communities	Without management	5	1	6	4	Low (24)
	With management	5	1	2	1	Negligible (8)
Continued electricity generation	Positive Impact					
ALTERNATIVE 2: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Influx of job seekers	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Health risks to surrounding communities	Without management	5	1	6	4	Low (24)
	With management	5	1	2	1	Negligible (8)
Insufficient pumping capacity resulting in the flooding of the Reclamation dam	Without management	5	1	6	4	Moderate (48)
	With management	5	1	6	4	Moderate (48)
Continued electricity generation	Positive Impact					
ALTERNATIVE 3: OPERATION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Influx of job seekers	Without management	5	1	6	2	Low (24)

	With management	5	1	2	1	Negligible (8)
Health risks to surrounding communities	Without management	5	1	6	4	Low (24)
	With management	5	1	2	1	Negligible (8)
Continued electricity generation	Positive Impact					

## **1.5    *IMPACTS ON THE VISUAL ENVIRONMENT***

### **1.5.1   Potential Impacts**

The potential impacts on the visual environment include:

- Creating a visual intrusion;
- Deposition of construction waste; and
- Night light.

### **1.5.2   Proposed Mitigation**

The following mitigation measures are proposed:

- The surge tower and reclamation dam pump upgrade will be constructed within the Camden Power Station plant area, therefore will be in an area that already has substantial visual intrusions;
- Construction waste should be disposed of in a waste skip, in a demarcated area within the plant area, to ensure no contaminated run-off emanating from the disposal of construction waste and orderly state at all times. All signs and advertisements erected for the development and within its confines must be in line with the guidelines of the South African Manual for Outdoor Advertising Control; and
- Security and operation lights are to be angled downwards avoid disturbance to surrounding communities. However, the surge tower and reclamation dam pump upgrade are situated within the Camden Power Station plant area which already contains a large number of security and operational lights.

**Table 11: Visual impacts associated with construction phase**

ALTERNATIVE 1: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance rate
Creating a visual intrusion	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Disposing of construction waste	Without management	1	1	6	2	Negligible (16)
	With management	1	1	2	1	Negligible (4)
Security and operation lights	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
ALTERNATIVE 2: CONSTRUCTION PHASE						
Nature of Impact	Management Measures	Duration	Scale	Severity	Probability	Significance
Creating a visual intrusion	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Disposing of construction waste	Without management	3	1	6	4	Moderate (40)
	With management	3	1	6	1	Low (10)
Security and operation lights	Without management	5	1	6	2	Low (24)

	With management	5	1	2	1	Negligible (8)
<b>ALTERNATIVE 3: CONSTRUCTION PHASE</b>						
<b>Nature of Impact</b>	<b>Management Measures</b>	<b>Duration</b>	<b>Scale</b>	<b>Severity</b>	<b>Probability</b>	<b>Significance</b>
Creating a visual intrusion	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Disposing of construction waste	Without management	1	1	6	2	Negligible (16)
	With management	1	1	2	1	Negligible (4)
Security and operation lights	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)

**Table 12: Visual impacts associated with operation phase**

<b>ALTERNATIVE 1: OPERATION PHASE</b>						
<b>Nature of Impact</b>	<b>Management Measures</b>	<b>Duration</b>	<b>Scale</b>	<b>Severity</b>	<b>Probability</b>	<b>Significance rate</b>
Creating a visual intrusion	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Security and operation lights	Without management	5	1	6	2	Low (24)



	With management	5	1	2	1	Negligible (8)
<b>ALTERNATIVE 2: OPERATION PHASE</b>						
<b>Nature of Impact</b>	<b>Management Measures</b>	<b>Duration</b>	<b>Scale</b>	<b>Severity</b>	<b>Probability</b>	<b>Significance</b>
Creating a visual intrusion	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Security and operation lights	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
<b>ALTERNATIVE 3: OPERATION PHASE</b>						
<b>Nature of Impact</b>	<b>Management Measures</b>	<b>Duration</b>	<b>Scale</b>	<b>Severity</b>	<b>Probability</b>	<b>Significance</b>
Creating a visual intrusion	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)
Security and operation lights	Without management	5	1	6	2	Low (24)
	With management	5	1	2	1	Negligible (8)

