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PROPOSED DEVELOPMENT OF A HARDENED WATER RESERVOIR AND ASSOCIATED PIPING AT THE KOEBERG NUCLEAR POWER STATION LOCATED ON THE FARM DUYNEFONTYN NO.1552, MELKBOSSTRAND

APPENDIX F: IMPACT ASSESSMENT

IMPACT ASSESSMENT

This assessment of impacts adheres to the minimum requirements in the EIA Regulations, 2014 and takes applicable official guidelines into account.

1. ASSESSMENT METHODOLOGIES AND CRITERIA, GAPS IN KNOWLEDGE, UNDERLAYING ASSUMPTIONS AND UNCERTAINTIES

The criteria is based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act, 1989 (Act 73 of 1989) and the Department of Environmental Affairs and Development Planning, Guidelines for involving Biodiversity Specialists in EIA Processes, 2005.

These criteria include:

Nature of the impact

This is an appraisal of the type of effect the construction, operation and maintenance of a development would have on the affected environment. This description should include what is to be affected and how.

Extent of the impact

Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.

Duration of the impact

The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long term (15-30 years) or permanent.

Magnitude of the impact (intensity)

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

Probability of occurrence

The specialist should describe the probability of the impact actually occurring and should be described as improbable/unlikely (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

Reversibility

- **Completely reversible** – the impact can be reversed with the implementation of minor mitigation measures.
- **Partly reversible** – the impact is reversible but more intense mitigation measures are required
- **Barely reversible** – the impact is unlikely to be reversed even with intense mitigation measures
- **Irreversible** – the impact is irreversible and no mitigation measures exist

Irreplaceable loss of resources

Describes the degree to which resources will be irreplaceably lost due to the proposed activity. It can be no loss of resources, marginal loss, significant loss or complete loss of resources.

Cumulative effect

An effect which in itself may not be significant but may become significant if added to other existing or potential impacts that may result from activities associated with the proposed development. The cumulative effect can be:

- **Negligible** – the impact would result in negligible to no cumulative effect
- **Low** – the impact would result in insignificant cumulative effects
- **Medium** – the impact would result in minor cumulative effects
- **High** – the impact would result in significant cumulative effects

Significance

Significance of impacts are determined through a synthesis of the assessment criteria and is described as –

- **Negligible** – no measureable effect
- **Low negative**– where it would have negligible effects and would require little or no mitigation
- **Low positive** – the impact will have minor positive effects
- **Medium negative** – the impact will have moderate negative effects and will require moderate mitigation
- **Medium positive** – the impact will have moderate positive effects
- **High negative** – the impact will have significant effects and will require significant mitigation measures to achieve an accepted level of impact
- **High positive** – the impact will have significant positive effects
- **Very high negative** – the impact will have highly significant effects and are unlikely to be able to be mitigated adequately
- **High positive** – the impact will have highly significant positive effects

2. PLANNING, DESIGN AND CONSTRUCTION PHASE

The following tables describe all potential impacts that may result from the planning, design and construction phase, significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the planning, design and construction phase.

Potential impact on geological and physical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Potential soil and ground water contamination:** There is potential for soil and ground water contamination from accidental cement spills or oil leaks from construction vehicles during the construction phase, as a result of accidental spills or leaks, resulting in product seeping into the ground.		**Status Quo Remains** No impact foreseen.
Extent and duration of impact:	Local and medium term	Local and medium term	No impact
Magnitude of the impact:	Low	Low	-
Probability of occurrence:	Improbable	Improbable	-
Degree to which the impact can be reversed:	Completely reversible	Completely reversible	-
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	-
Cumulative impact prior to mitigation:	Low	Low	No impact
Significance rating of impact **prior to mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low – Medium negative	Low – Medium negative	No impact
Degree to which the impact can be mitigated:	High	High	-
Proposed mitigation:	• All construction vehicles must be properly maintained to prevent leaks. • Cement mixing must be confined to a designated area and must be done on an impervious surface, or pre-mixed cement must be used. • Any fuel stored on site must be kept in bunded storage tanks. • Drip trays are to be utilised during daily greasing and re-fuelling of machinery and to catch incidental spills and pollutants. • Drip trays are to be inspected on a weekly basis for leaks and effectiveness, and emptied when necessary. This is to be closely monitored during rain events to prevent overflow.		None required

Potential impact on geological and physical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Cumulative impact post mitigation:	Negligible	Negligible	N/A
Significance rating of impact **after mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	N/A

Potential impact on geological and physical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	Slope stability, footing, sub-surface and surface drainage.		**Status Quo Remains** No impact foreseen.
Extent and duration of impact:	Local and long term	Local and long term	No impact
Magnitude of the impact:	High	High	-
Probability of occurrence:	Definite	Definite	-
Degree to which the impact can be reversed:	High	High	-
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss	Marginal loss	-
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact **prior to mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	No impact
Degree to which the impact can be mitigated:	High	High	
Proposed mitigation:	• All earthworks must be inspected by an experienced geotechnical engineer or engineering geologist.		None required
Cumulative impact post mitigation:	Low Negative to negligible	Low Negative to negligible	N/A
Significance rating of impact **after mitigation** (Low, Medium, Medium-High, High, or Very-High)	Negligible	Negligible	N/A

Potential impact on biological aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Loss of vegetation:** Loss of Medium sensitivity vegetation on site (about 85% of site)	**Loss of vegetation:** Loss of Medium sensitivity vegetation on site (about 15% of site)	Status Quo Remains - Random construction related clearing of vegetation
Extent and duration of impact:	Local and permanent	Local and permanent	Local and duration is variable
Magnitude of the impact:	Medium	Low	Variable and unknown
Probability of occurrence:	Definite	Definite	Unknown
Degree to which the impact can be reversed:	Irreversible	Irreversible	Depends on impact
Degree to which the impact may cause irreplaceable loss of resources:	Marginal loss	Marginal loss (very minor)	Depends on impact
Cumulative impact prior to mitigation:	Low negative	Negligible	Variable; negligible
Significance rating of impact **prior to mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	Neutral to Low negative
Degree to which the impact can be mitigated:	Low	Low	NA
Proposed mitigation:	• Alien invasive vegetation management around site. • Demarcate and fence off the construction site boundaries upon site establishment and limit all activities to inside these boundaries. • Limit the footprint area of the construction activity to the immediate site. • Designate areas outside the construction footprint as No Go areas. • Contractors must drive on existing access roads as far as possible to prevent formation of unnecessary tracks for access roads. • Prohibit temporary storage of building material or soil within areas of natural vegetation falling outside of the construction footprint.		None required
Cumulative impact post mitigation:	Low negative	Negligible	NA
Significance rating of impact **after mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	NA

Potential impact on air quality:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Dust nuisance and exhaust fumes:** There is potential for the air quality to be impacted through the construction activities that may generate dust through exposing soil and disturbing the ground. Fugitive dust is considered to be a nuisance factor for land users and occupiers. Construction vehicles will also emit exhaust fumes while in use.		**Status Quo Remains.** No dust will be generated.
Extent and duration of impact:	Local and short term	Local and short term	No impact
Magnitude of the impact:	Low	Low	-
Probability of occurrence:	Definite	Definite	-
Degree to which the impact can be reversed:	Completely reversible	Completely reversible	-
Degree to which the impact may cause irreplaceable loss of resources:	Negligible	Negligible	-
Cumulative impact prior to mitigation:	Low	Low	No impact
Significance rating of impact **prior to mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	No impact
Degree to which the impact can be mitigated:	High	High	-
Proposed mitigation:	• Dust suppression methods, such as wetting or laying straw, should be applied where there are large tracts of exposed surfaces. If wetting is used, consideration in the use of non-potable water must be considered. • Stock piles and spoil heaps must be covered with tarpaulins or straw to prevent fugitive dust. • All construction vehicles must be appropriately maintained to minimise exhaust emissions • All mitigation measures described in the EMPr relating to dust and vehicle emissions must be adhered to.		None required
Cumulative impact post mitigation:	Negligible	Negligible	N/A
Significance rating of impact **after mitigation** (Low, Medium, Medium-High, High, or	Low negative	Low negative	N/A

Potential impact on air quality:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Very-High)			

Potential impact on socio-economic aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Job creation:** The development is expected to generate temporary jobs during the construction phase.		**Status Quo Remains.** No job creation foreseen.
Extent and duration of impact:	Local and short term	Local and short term	No impact
Magnitude of the impact:	Low	Low	-
Probability of occurrence:	Probable	Probable	-
Degree to which the impact can be reversed:	N/A	N/A	-
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	-
Cumulative impact prior to mitigation:	Low positive	Low positive	No positive impact
Significance rating of impact **prior to mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low positive	Low positive	No positive impact.
Degree to which the impact can be mitigated:	Medium	Medium	-
Proposed mitigation:	• The developer should encourage the contractor to increase the local procurement practices and employment of people from local communities as far as feasible to maximize the benefits to the local economies.		None required
Cumulative impact post mitigation:	Low positive	Low positive	N/A
Significance rating of impact **after mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low positive	Low positive	N/A

Potential impact on cultural-historical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**

Nature of impact:	**Loss of fossil-bearing deposits:** Excavating into potentially fossil-bearing deposits during the pre-construction phase.		**Status quo remains.** No positive cultural-heritage impacts foreseen.
Extent and duration of impact:	Local and short term	Local and short term	No impact
Magnitude of the impact:	High	High	-
Probability of occurrence:	Improbable	Improbable	-
Degree to which the impact can be reversed:	Irreversible	Irreversible	-
Degree to which the impact may cause irreplaceable loss of resources:	High	High	-
Cumulative impact prior to mitigation:	Unknown	Unknown	Unknown
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium negative	Medium negative	No impact
Degree to which the impact can be mitigated:	High	High	-
Proposed mitigation:	• Refer to the mitigation measures proposed by the Heritage specialist, as described in the Heritage impact Assessment (HIA) Report, the Basic Assessment Report (BAR), and the Environmental Management Programme (EMPr). • All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.		None required
Cumulative impact post mitigation:	N/A	N/A	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Negligible	Negligible	N/A

Potential impact on cultural-historical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Discovery of fossil-bearing deposits:** Excavating into potentially fossil-bearing deposits during the pre-construction phase. Opportunity to assess actual and recover information not otherwise accessible.		**Status quo remains.** No positive cultural-heritage impacts foreseen.
Extent and duration of impact:	Local and short term	Local and short term	No impact

Magnitude of the impact:	High	High	-
Probability of occurrence:	Improbable	Improbable	-
Degree to which the impact can be reversed:	Irreversible	Irreversible	-
Degree to which the impact may cause irreplaceable loss of resources:	High	High	-
Cumulative impact prior to mitigation:	Unknown	Unknown	No impact
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low positive	Low positive	No impact
Degree to which the impact can be mitigated:	High	High	-
Proposed mitigation:	• Refer to the mitigation measures proposed by the Heritage specialist, as described in the Heritage impact Assessment (HIA) Report, the Basic Assessment Report (BAR), and the Environmental Management Programme (EMPr). • All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.		None required
Cumulative impact post mitigation:	Unknown	Unknown	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium positive	Medium positive	N/A

Potential impact on cultural-historical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Loss of heritage material:** Likely loss of heritage material and information during the construction phase.		**Status quo remains.** No positive cultural-heritage impacts foreseen.
Extent and duration of impact:	Local and short term	Local and short term	No impact
Magnitude of the impact:	High	High	-
Probability of occurrence:	Improbable	Improbable	-
Degree to which the impact can be reversed:	Irreversible	Irreversible	-

Degree to which the impact may cause irreplaceable loss of resources:	High	High	-
Cumulative impact prior to mitigation:	Unknown	Unknown	No impact
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium negative	Medium negative	No impact
Degree to which the impact can be mitigated:	High	High	-
Proposed mitigation:	• Refer to the mitigation measures proposed by the Heritage specialist, as described in the HIA report, the BAR, and the EMPr. • All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.		None required
Cumulative impact post mitigation:	N/A	N/A	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Negligible	Negligible	N/A

Potential impact on cultural-historical aspects:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	**Discovery of fossil-bearing deposits:** Excavating into potentially fossil-bearing deposits during the construction phase. Opportunity to gain new information and recover material.		**Status quo remains.** No positive cultural-heritage impacts foreseen.
Extent and duration of impact:	Local and short term	Local and short term	No impact
Magnitude of the impact:	High	High	-
Probability of occurrence:	Improbable	Improbable	-
Degree to which the impact can be reversed:	Irreversible	Irreversible	-
Degree to which the impact may cause irreplaceable loss of resources:	High	High	-
Cumulative impact prior to mitigation:	Unknown	Unknown	No impact
Significance rating of impact prior to mitigation	Low positive	Low positive	No impact

(Low, Medium, Medium-High, High, or Very-High)			
Degree to which the impact can be mitigated:	High	High	-
Proposed mitigation:	• Refer to the mitigation measures proposed by the Heritage specialist, as described in the Heritage impact Assessment (HIA) Report, the Basic Assessment Report (BAR), and the Environmental Management Programme (EMPr). • All mitigation measures described in the EMPr relating to the protection of archaeological or palaeontological artefacts must be adhered to.		None required
Cumulative impact post mitigation:	Unknown	Unknown	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Medium positive	Medium positive	N/A

Potential noise impacts:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	Construction vehicles and other construction machinery will increase the noise levels during working hours. Increased noise levels may be a nuisance factor to occupiers of the land.		**Status Quo Remains.** No noise impact foreseen.
Extent and duration of impact:	Local and short term	Local and short term	No impact
Magnitude of the impact:	Low	Low	-
Probability of occurrence:	Highly Probable	Highly Probable	-
Degree to which the impact can be reversed:	Completely reversible	Completely reversible	-
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	-
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	No impact
Degree to which the impact can be mitigated:	Medium	Medium	-
Proposed mitigation:	• Construction activities as well as the use of construction vehicles on the road must		None required

	only occur between 07:00am and 05:00pm. • All construction vehicles must be fitted with silencers to avoid excessive noise. • All equipment to be adequately maintained and kept in good working order to reduce noise. • All employees must be given the necessary ear protection gear. • Noise levels must comply with the SANS 100103 – 0994 (recommended noise levels), as well as the Western Cape Noise Control Regulations (Provincial Notice 200/2013) of 20 June 2013. • All mitigation measures relating to noise control as described in the EMPr must be adhered to.		
Cumulative impact post mitigation:	Negligible	Negligible	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	N/A

Potential visual impacts:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Nature of impact:	Unsightly views due to construction site.		**Status Quo Remains.** No visual impact foreseen.
Extent and duration of impact:	Local and short-term	Local and short-term	No impact
Magnitude of the impact:	Low	Low	-
Probability of occurrence:	Highly Probable	Highly Probable	-
Degree to which the impact can be reversed:	Medium	Medium	-
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	-
Cumulative impact prior to mitigation:	Low negative	Low negative	No impact
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	No impact
Degree to which the impact can be mitigated:	Medium	Medium	-
Proposed mitigation:	• The visual impact experienced during the construction phase would be relatively		None required

	short-term and be mitigated by good housekeeping and regular removal of rubble on the site. • An approved EMPr must be adhered to in order to minimize the visual impacts of construction phase activities. • An ECO must be appointed. The EMPr must be enforced and monitored by the ECO. The site must be kept clean and tidy at all times. No stockpiles may exceed 2m in height.		
Cumulative impact post mitigation:	Negligible	Negligible	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	N/A

3. OPERATIONAL PHASE

The following tables describe all possible impacts that may result from the operational phase, significance rating of impacts, proposed mitigation and significance rating of impacts after mitigation that are likely to occur as a result of the operational phase.

Potential impact on geological and physical aspects:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	The activity is not expected to have any impact on any geographical or physical aspects during the operational phase.		

Potential impact on biological aspects:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	**Alien invasive vegetation:** Spread of alien invasive vegetation associated with the soil disturbance caused by construction.		None, or random construction related clearing of vegetation
Extent and duration of impact:	Local and ongoing	Local and ongoing	Site scale; variable
Magnitude of the impact:	Low	Low	Variable and unknown
Probability of occurrence:	Probable	Probable	Unknown
Degree to which the impact can be reversed:	Completely reversible	Completely reversible	Depends on impact
Degree to which the impact may cause irreplaceable loss of resources:	No loss of resources	No loss of resources	Depends on impact
Cumulative impact prior to mitigation:	Low negative	Low negative	Variable; negligible
Significance rating of impact **prior to mitigation** (Low, Medium, Medium-High, High, or Very-High)	Low negative	Low negative	Neutral to Low negative
Degree to which the impact can be mitigated:	Fully	Fully	NA
Proposed mitigation:	• Ongoing alien invasive vegetation management. • All mitigation measures relating to alien invasive vegetation as described in the EMPr must be adhered to.		NA
Cumulative impact post mitigation:	Low negative	Low negative	None, or random construction related clearing of vegetation
Significance rating of impact **after mitigation**	Low negative	Low negative	Site scale; variable

Potential impact on biological aspects:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
(Low, Medium, Medium-High, High, or Very-High)			

Potential impact on air quality:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	The activity is not expected to have any impact on air quality during the operational phase.		

Potential impact on socio-economic aspects:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	The activity is not expected to have any impact on any socio-economic aspects during the operational phase.		

Potential impact on cultural-historical aspects:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	The activity is not expected to have any impact on any cultural-historical aspects during the operational phase. Any potential loss minimised during the pre-construction and construction phases.		

Potential noise impacts:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	No noise impacts will result from the proposed activity.		

Potential visual impacts:	Alternative 1 (Preferred Alternative)	Alternative 2:	No-go option
Nature of impact:	Unsightly views of reservoir.		N/A
Extent and duration of impact:	Local and medium-term	Local and medium-term	N/A
Magnitude of the impact:	Low	Low	-
Probability of occurrence:	Probable	Probable	-
Degree to which the impact can be reversed:	Medium	Medium	-
Degree to which the impact may cause irreplaceable loss of resources:	Low	Low	-
Cumulative impact prior to mitigation:	Low - Medium negative	Low - Medium negative	N/A

Potential visual impacts:	**Alternative 1 (Preferred Alternative)**	**Alternative 2:**	**No-go option**
Significance rating of impact prior to mitigation (Low, Medium, Medium-High, High, or Very-High)	Low - Medium negative	Low - Medium negative	N/A
Degree to which the impact can be mitigated:	High	High	
Proposed mitigation:	• Re-vegetation and landscaping with plant species indigenous to the Cape Flats Dune Strandveld biome must be undertaken, where possible, to minimise the visual effects of the reservoir.		None required
Cumulative impact post mitigation:	Low Negative	Low Negative	N/A
Significance rating of impact after mitigation (Low, Medium, Medium-High, High, or Very-High)	Low Negative	Low Negative	N/A

4. DECOMMISSIONING PHASE

The proposed development will not be decommissioned, therefore this is not applicable.

No other impacts were identified.