

# CEWP: Technical Feasibility Study

## Environmental Screening (Pre-feasibility Phase)

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**WATER IS LIFE - SANITATION IS DIGNITY**



**water & sanitation**

Department:  
Water and Sanitation  
**REPUBLIC OF SOUTH AFRICA**



# PURPOSE

Environmental Screening based on information available from previous studies and publicly available datasets. Focus on biophysical aspects:

- Topography
- Climate
- Geology
- Soil, Land Use, Land Capability and Agricultural Potential
- Terrestrial Ecology
- Freshwater Ecology
- Archaeological and Heritage Resources

## OBJECTIVES

- Identify fatal flaws
- High level ranking of dam options based on environmental sensitivities and anticipated impacts → part of multi-criteria decision matrix

## METHODOLOGY

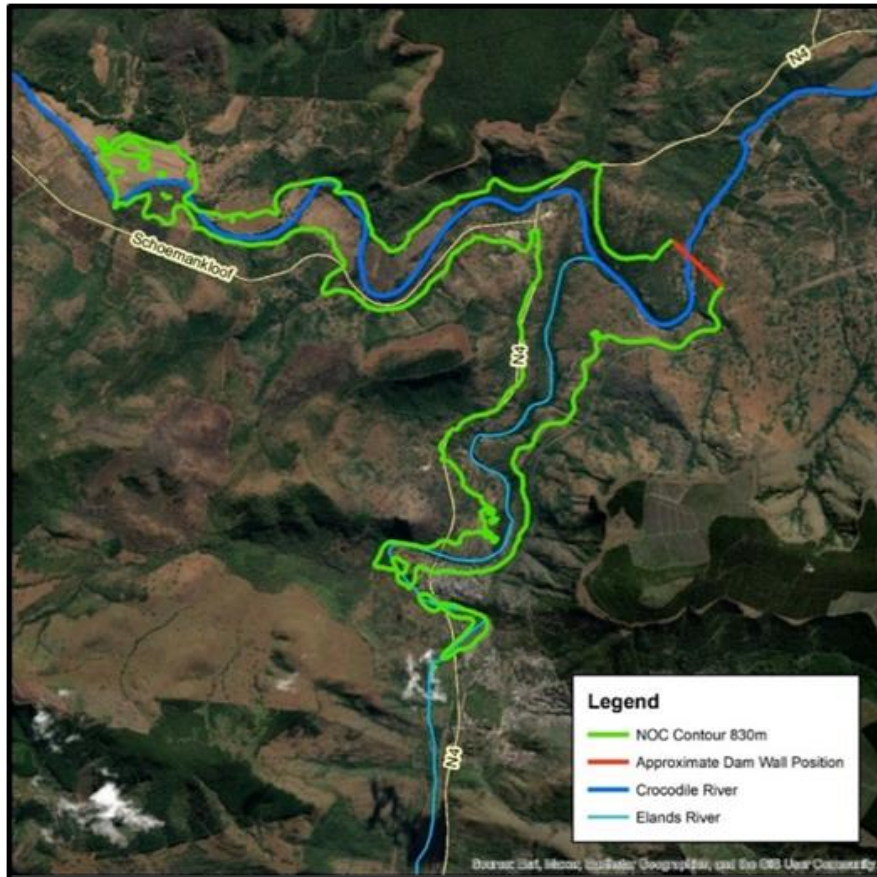
### Information sources:

- Information from previous assessments;
- Water Quality Status reports and Ecstatus reports published by IUCMA;
- Mpumalanga Biodiversity Sector Plan (MBSP);
- Biodiversity data from the web based Environmental Screening tool developed by DFFE;
- Relevant studies conducted as part of Phase 1: Pre-Feasibility study.

# METHODOLOGY

| Rating                                      |          | Description                                                                                                                                                                                                                       |
|---------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Least concern / impact</b>               | <b>5</b> | Proposed development has no, or very limited, potential negative impact or could result in a positive impact.                                                                                                                     |
| <b>Limited concern / impact</b>             | <b>4</b> | Proposed development has limited potential impacts.                                                                                                                                                                               |
| <b>Uncertain / impact can be mitigation</b> | <b>3</b> | Proposed development has potential negative impacts that can be mitigated, or where the potential impact associated with the proposed development is uncertain based on available information.                                    |
| <b>Significant impact</b>                   | <b>2</b> | Proposed development has potential negative impacts that could be mitigated, resulting in residual negative impact which may be acceptable.                                                                                       |
| <b>Very Significant Impact</b>              | <b>1</b> | Proposed development has potential negative impacts that could potentially be mitigated, resulting in residual negative impact. This may include the need to develop off-set strategies.                                          |
| <b>Fatal Flaw</b>                           | <b>0</b> | Potential impacts cannot be mitigated and the proposed development should not be considered based on available information. It is not expected that further detailed studies will change the outcome of the sensitivity analysis. |

# Montrose Dam Option (1)



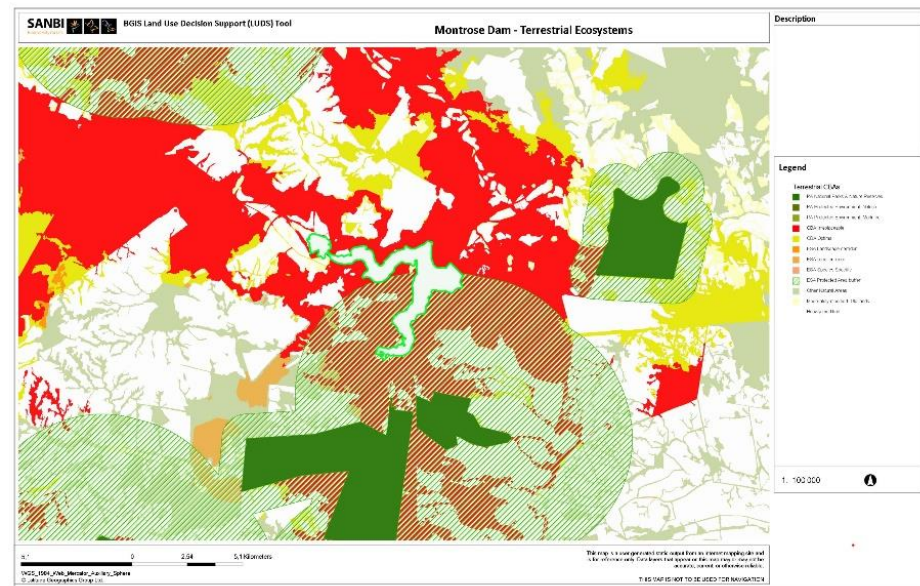
- Largely unmodified habitat along Elands River, with cultivation along Crocodile River
- Infrastructure to be inundated (e.g., portion of N4 highway, R539 road, new Montrose interchange, portion of Elandshoek township → depending on wall height)
- Loss of soils with high agricultural potential
- Potentially within close proximity of Heritage Sites

# Montrose Dam Option (2)

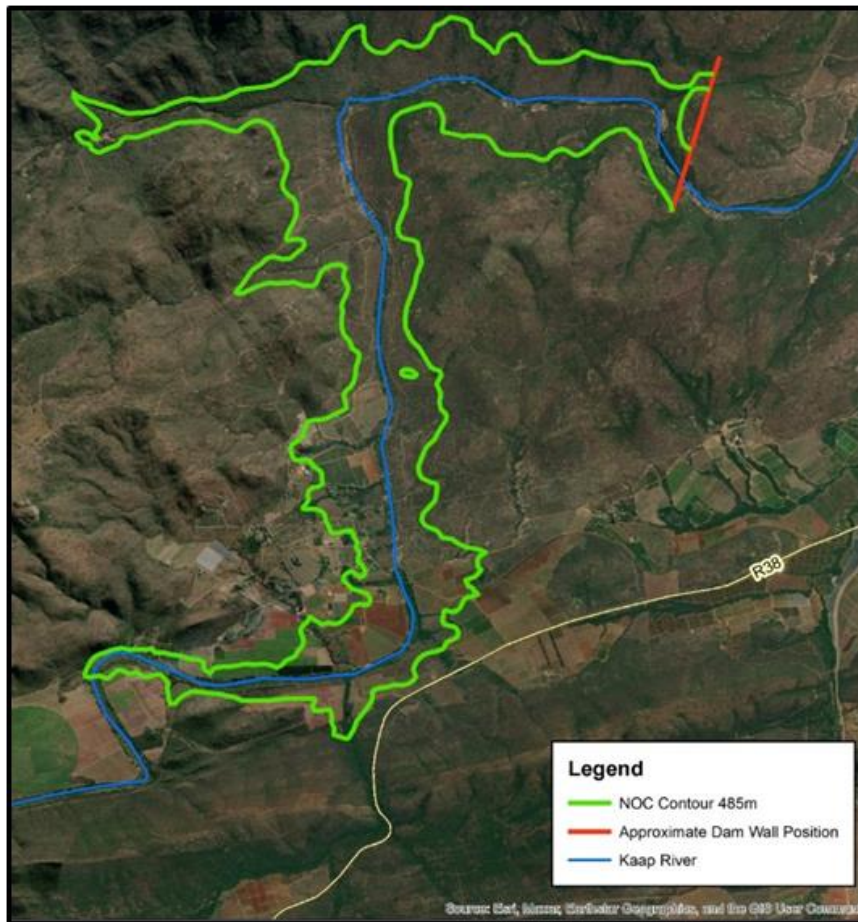
- Elands River and Crocodile River downstream of proposed dam are FEPA rivers
- Elands River is free flowing and flagship river
- Fish sanctuary and fish support areas
- Located within SWSA
- Endemic (CR) and unique fish species will be impacted
- MBSP Freshwater Ecosystem: Elands River categorised as CBA River
- Impact on downstream ecosystem

# Montrose Dam Option (3)

- MBSP Terrestrial Ecosystem: CBA Irreplaceable
- Several faunal SCC (CR, VU and EN)
- Specific concern regarding impact on an active Crowned Eagle nest site
- Legogote Sour Bushveld (Threatened Ecosystem)
- Several floral SCC (CR, VU and EN), including *Aloe simii* (CR)
- Within NPAES



# Mountain View Dam Option (1)



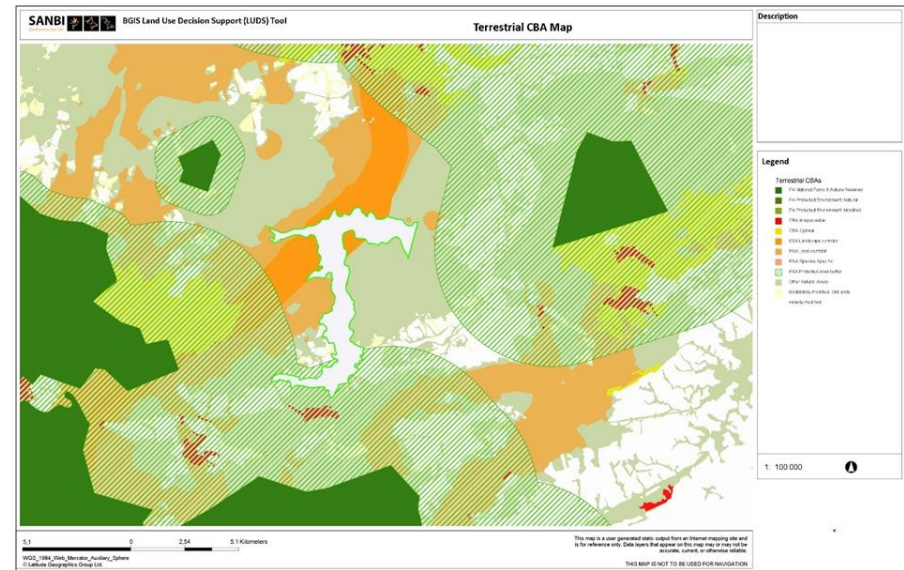
- Agricultural and residential areas in southern section, with large areas of dam basin unmodified habitat
- Loss of existing cultivated land / soil with high agricultural potential
- Potential proximity to Heritage Site(s).

# Mountain View Dam Option (2)

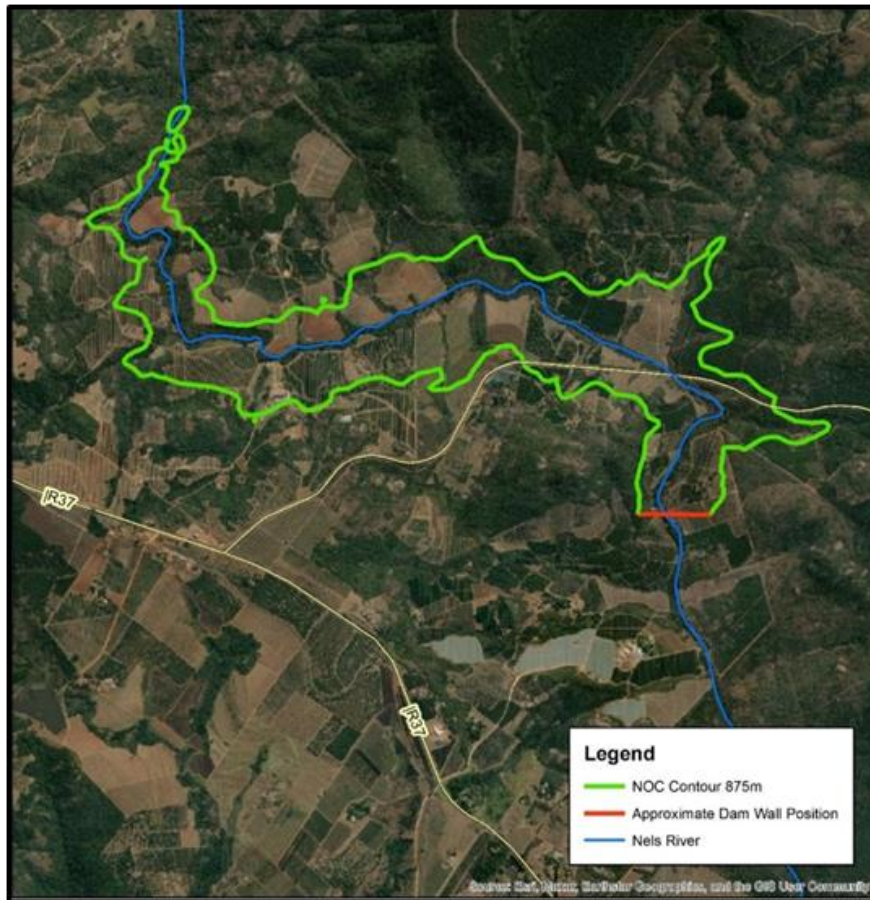
- Located within Upstream Management Area of FEPA river
- MBSP Freshwater Ecosystem: Largely Heavily Modified and ONA, with small ESA area at proposed dam wall
- Known SCC will be impacted
- Migration barrier
- Impact on downstream ecosystem

# Mountain View Dam Option (3)

- MBSP Terrestrial Ecosystem: Largely ESA and ONA. Small area (6.8 ha) identified as CBA Irreplaceable (unlikely to present a fatal flaw since other linkages/corridors exist)
- Some faunal SCC (VU, EN and NT)
- Specific concern regarding impact on active Crowned Eagle nest site
- Some floral SCC (VU, EN and CR)
- Within NPAES due to ecological corridor



# Boschjeskop Dam Option (1)



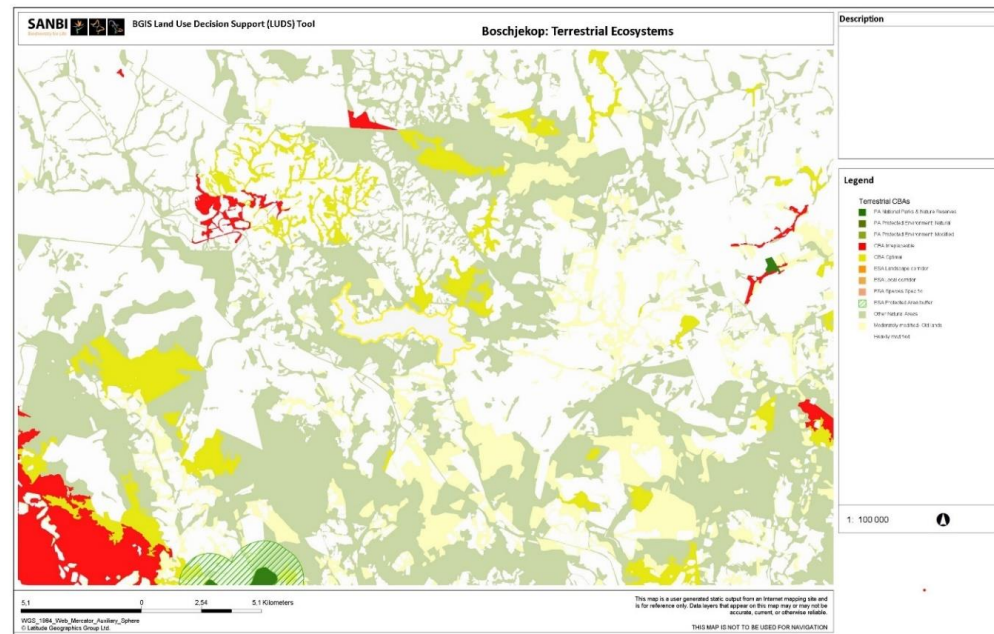
- Largely disturbed – agriculture and afforestation.
- Infrastructure associated with agricultural activities and portion of provincial road to be inundated.
- Significant loss of agricultural soils

# Boschjeskop Dam Option (2)

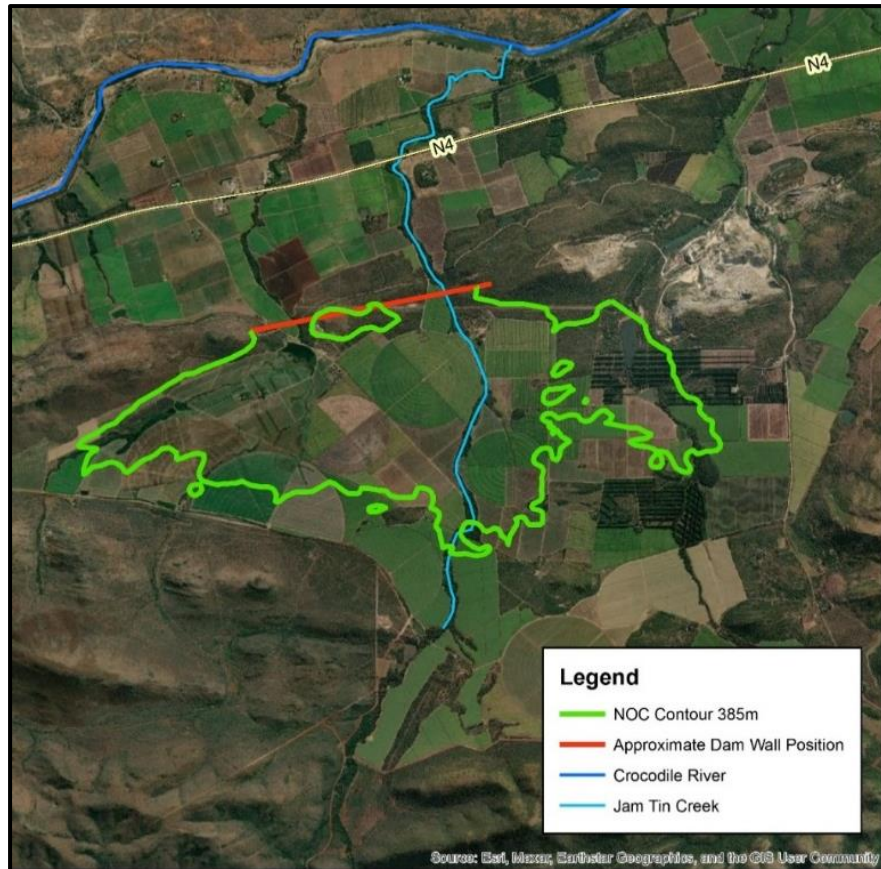
- MBSP Freshwater Ecosystem: ESA due to fish support areas
- Fish Support Area for CR and EN fish species
- Small portion of the upper reaches of dam basin located within SWSA
- SCC known to occur
- Migration barrier
- Impact on downstream ecosystem

# Boschjeskop Dam Option (3)

- MBSP Terrestrial Ecosystem: CBA Optimal, ONA, Modified habitat
- Faunal SCC (VU, EN, NT) known/expected to occur
- Legogote Sour Bushveld (Threatened ecosystem)
- Floral SCC may be impacted, including *Aloe simii* (CR)



# Strathmore Dam Option (1)



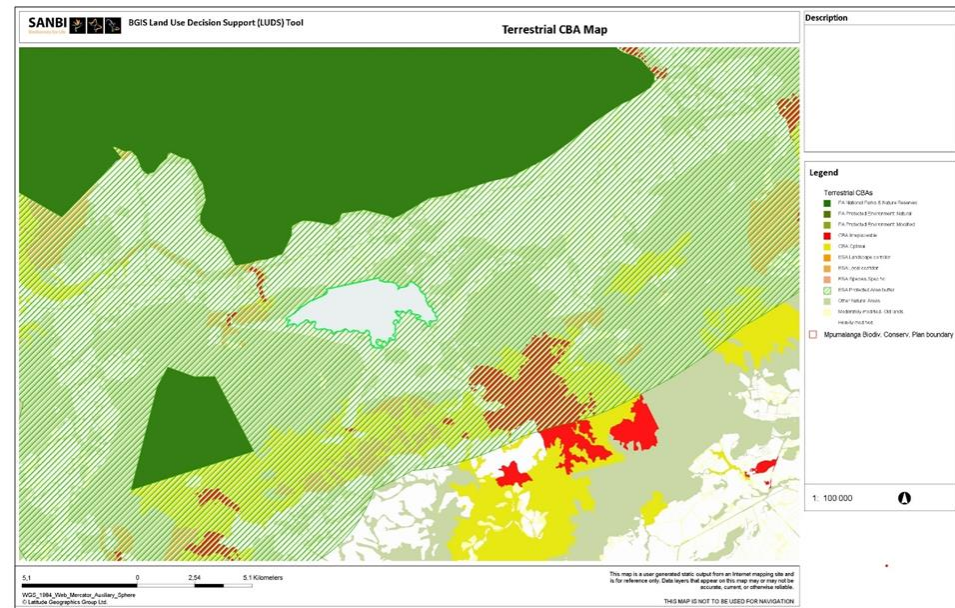
- Largely modified due to agricultural activities
- Adjacent to magnesite mine
- Significant loss of Agricultural soils
- Jam Tin Creek not a significant resource

# Strathmore Dam Option (2)

- MBSP Freshwater Ecosystem: Located in ESA
- Not notable impact expected on aquatic species
- Not expected to result in change of TEC in downstream ecosystem.

# Strathmore Dam Option (3)

- MBSP Terrestrial Ecosystem:  
Located in ESA
- Faunal SCC (CR, EN, NT, VU)  
known / expected to occur.
- Not within threatened  
ecosystem
- Floral SCC (VU and EN)  
known / expected to occur



# ENVIRONMENTAL SCREENING (PRE-FEASIBILITY)

## RATING AND RANKING

| Aspect                                                                | Montrose  | Mountain View | Boschjeskop | Strathmore |
|-----------------------------------------------------------------------|-----------|---------------|-------------|------------|
| <b>Topography</b>                                                     |           |               |             |            |
| Change in topography                                                  | 2         | 2             | 3           | 3          |
| <b>Soil, Land Use, Land Capability and Agricultural Potential</b>     |           |               |             |            |
| Land Use                                                              | 2         | 2             | 4           | 4          |
| Loss of arable land / high land capability / agricultural potential   | 2         | 2             | 1           | 1          |
| <b>Rivers, Wetlands and Freshwater Ecosystems</b>                     |           |               |             |            |
| Strategic Water Source Area                                           | 1         | 4             | 3           | 4          |
| NFEPA Rivers and Wetlands                                             | 1         | 2             | 2           | 3          |
| Impact on Fish                                                        | 0         | 2             | 1           | 3          |
| Impact on Aquatic Macro-invertebrates                                 | 2         | 2             | 2           | 3          |
| Impact on Freshwater Conservation Targets                             | 0         | 3             | 2           | 2          |
| Impact on downstream freshwater ecology                               | 0         | 2             | 0           | 3          |
| <b>Terrestrial Ecosystem</b>                                          |           |               |             |            |
| Impact on Fauna                                                       | 2         | 2             | 3           | 3          |
| Impact on Flora                                                       | 2         | 3             | 2           | 3          |
| Impact on Terrestrial Conservation Targets                            | 0         | 1             | 2           | 3          |
| Threat to Protected Areas or NPAES                                    | 2         | 2             | 4           | 4          |
| <b>Heritage and Cultural Resources</b>                                |           |               |             |            |
| Loss of sites of historical, archaeological and cultural significance | 2         | 3             | 4           | 4          |
| <b>Overall rating</b>                                                 | <b>18</b> | <b>32</b>     | <b>33</b>   | <b>43</b>  |
| <b>Ranking</b>                                                        | <b>4</b>  | <b>3</b>      | <b>2</b>    | <b>1</b>   |

# CONCLUDING REMARKS

- Montrose Dam option has lowest environmental rating:
  - Sensitivity and importance of terrestrial and freshwater ecosystems could present a fatal flaw
- Proposed off-channel Strathmore Dam option has highest environmental score and best ranking option
- Mountain View and Boschjeskop Dam options are similar in terms of environmental rating:
  - Boschjeskop site already transformed due to agricultural, afforestation and other land uses. Significant loss of agricultural soils will occur.
  - Mountain View site is largely undisturbed with agricultural activities in the southern section. Significant loss of natural habitat as well as some soils with high agricultural potential will occur. Specific concerns exist regarding an active Crowned Eagle nest and this aspect will need further assessment by a specialist. Could also impact on Cultural and Heritage resources.
  - Boschjeskop Dam option, however, has a fatal flaw due to downstream ecological impact