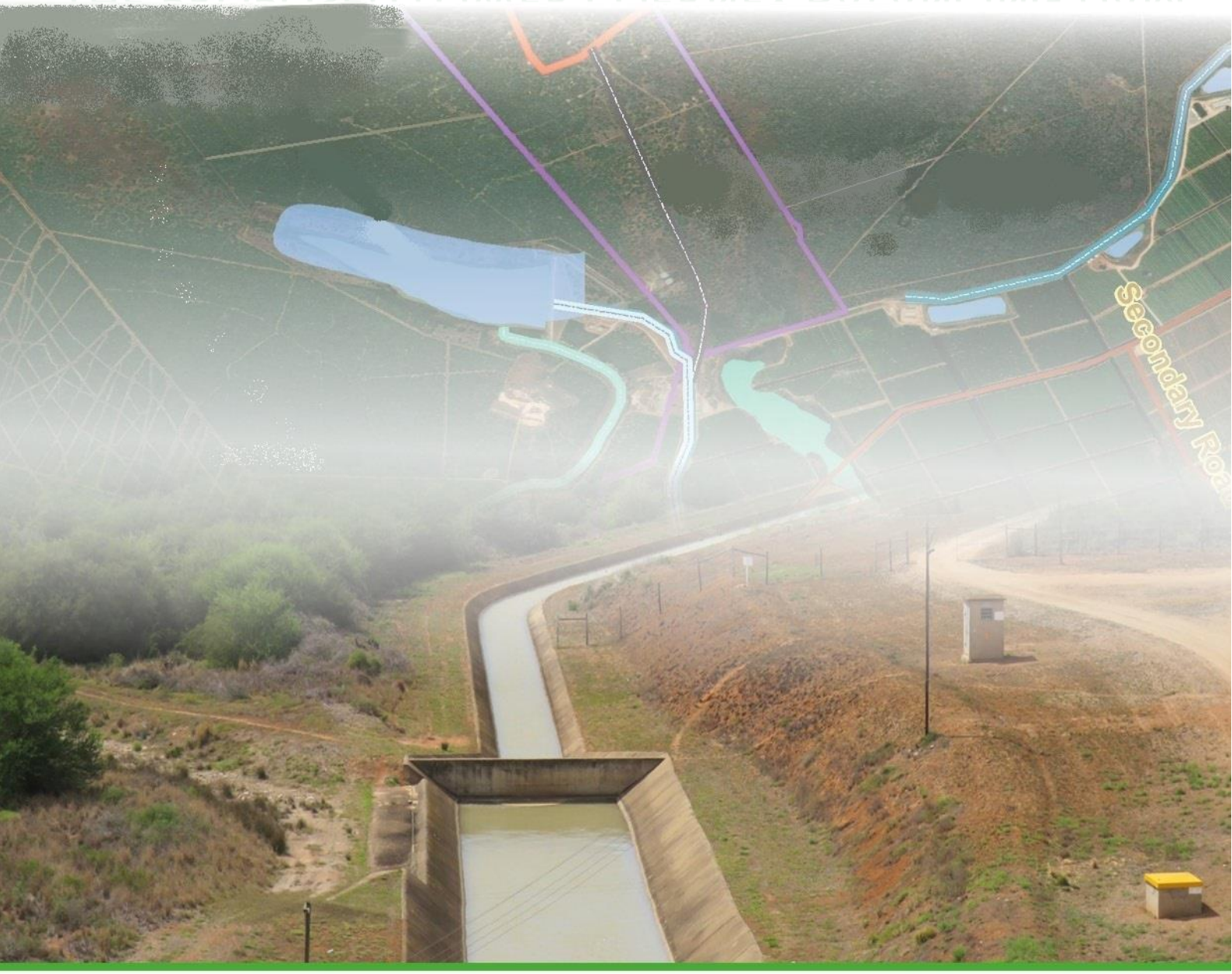
GA Environment

FINAL ENVIRONMENTAL IMPACT REPORT: THE PROPOSED LOWER COERNEY BALANCING DAM



FINAL ENVIRONMENTAL IMPACT REPORT (EIR)
LOWER COERNEY BALANCING DAM – DFFE Reference: 14/12/16/3/3/2/2222

THE PROPOSED LOWER COERNEY BALANCING DAM, SUNDAYS RIVER VALLEY LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

May 2023

Environmental best practice, safety and sustainability

FINAL ENVIRONMENTAL IMPACT REPORT

for

THE PROPOSED LOWER COERNEY BALANCING DAM, SUNDAYS RIVER VALLEY LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

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5 May 2023

PROJECT INFORMATION

Title:	Environmental Impact Assessment Process for the Proposed Lower Coerney Balancing Dam, Sundays River Valley Local Municipality, Eastern Cape Province
Competent Authority:	Department of Forestry, Fisheries and the Environment (DFFE)
DFFE Reference No.:	14/12/16/3/3/2/2222
Applicant:	Department of Water and Sanitation
Environmental Assessment Practitioner:	GA Environment (Pty) Ltd.
Compiler:	Vukosi Mabunda*, MSc, Reg. EAP & Pr.Sci.Nat*
Reviewer & Approver:	Nkhensani Khandlhela, *MSc, Pr.Sci.Nat, Reg. EAP*
Date:	05 May 2023

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1	04 May 2023	Draft for Client Review	Vukosi Mabunda	Nkhensani Khandlhela
2	05 May 2023	Final for Submission to DFFE	Vukosi Mabunda	Nkhensani Khandlhela

SIGNING OF THE ORIGINAL DOCUMENT

Original	Prepared by	Reviewed and Approved by
Date: **2nd May 2023**	Name: **Vukosi Mabunda**	Name: **Nkhensani Khandlhela**
Version 0	Signature: 	Signature: 

DISTRIBUTION LIST

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Mr. Menard Mugumo	Chief Engineer	Department of Water and Sanitation
Mr. Lunga Dlova	DFFE Case Officer	Department of Forestry, Fisheries and the Environment (DFFE)

AFFIRMATION OF ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

I ***Vukosi Mabunda***, an EAP employed by ***GA Environment (Pty) Ltd*** declare that the information provided in this report is correct and relevant to the activity/ project, that comments from interested and affected parties have been incorporated into this report that the information was made available to interested and affected parties for their comments.

SIGNATURE OF EAP 04 May 2023 **DATE**

SUMMARY

1. BACKGROUND

The Department of Water and Sanitation (DWS) intends to construct a balancing dam within the Sundays River Valley Local Municipality, Eastern Cape Province. The project is part of the Algoa Water Supply System (AWSS). The Draft Scoping Report was compiled and circulated to registered and affected parties (I&APs) for the legislated period of at least 30 days (14th October 2022 to 14th November 2023). The Final Scoping report and the application form for the aforementioned project were compiled and submitted to the Department of Forestry, Fisheries and the Environment (DFFE) in November 2022. The Scoping Report was approved by DFFE on 20th January 2023 and the Environmental Impact Assessment Phase commenced thereafter. The Draft Environmental Impact Assessment Report (EIR) was compiled and as per Regulation 40(1) of the NEMA (1998) EIA Regulations, 2014, as amended, the Report was circulated to the public for the legislated period of at least 30 days (31st of March 2023 to the 4th of May 2023). This report serves as the Final Environmental Impact Assessment Report to the Proposed Lower Coerney Balancing Dam, Sundays River Valley Local Municipality, Eastern Cape Province (DFFE Ref: 14/12/16/3/3/2/2222).

2. INTRODUCTION

The Department of Water and Sanitation (DWS, hereafter) is a state organ that exists to ensure equitable access to water for all South Africans as well as to protect, use, develop, conserve, manage and control water resources. In 2017, DWS undertook a feasibility study to assess five (5) potential dam sites for the Algoa Water Supply System (AWSS). The Lower Coerney site was eventually found to be the most feasible and most viable for the construction of the required balancing dam. Subsequently, GA Environment (Pty) Ltd was appointed by DWS, as independent Environmental Assessment Practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (EIA), and the Water Use License Application (WULA) process for the proposed construction of the Lower Coerney Balancing Dam, as part of the AWSS. It must be noted that the WULA process was discontinued in October 2022 due to the exemption for DWS from undertaking WULA processes as confirmed with the DWS Licensing Officials. The proposed dam will require approximately 77 hectares of land, have a dam wall of 20.5 m high and have a capacity of 4.69 million m^3. The objectives of the balancing dam are to:

- Limit risks of shortfall in supply to the Nelson Mandela Bay Metropolitan Municipality (NMBM) and the Lower Sundays River Government Water Scheme (LSRGWS);
- Remove potential operating system constraints for sustainable delivery of bulk Orange River water supply to the LSRGWS and NMBM, for water requirements up to 2040; and
- Limit operational risks to acceptable levels.

The existing Scheepersvlakte Dam is a balancing facility for water supply to the Lower Sundays River Water User Association (LSRWUA) and the Nelson Mandela Bay Metropolitan Municipality (NMBM) for emergency supply of up to 21 days. The need for a new balancing dam on the Scheepersvlakte Farm is due to the inadequate water supply owing to the smaller capacity of the existing Scheepersvlakte Dam to provide water supply to NMBM, during an emergency. The main purpose of

the proposed new balancing dam at the Coerney site is to eliminate the operational and balancing storage limitations imposed by the Scheepersvlakte Dam.

The main advantage of the dam site is that it will enable the dam to be operated under gravity. The dam will be filled from the Kirkwood Primary Canal via a new pipeline and the dam will supply the Nooitgedagt Water Treatment Works (WTW) via a new connecting pipeline to the existing 1 400 mm Nooitgedagt pipeline. The proposed Coerney Dam will be filled, and topped up, over a longer filling period through a gravity supply. The existing Scheepersvlakte Dam and proposed Coerney Dam, although filled from the same source, will be operated separately under normal operations. The proposed Coerney Dam will be used as balancing storage for NMBM and the Scheepersvlakte Dam will revert to its original function and will only be used as balancing storage for irrigation.

The purpose of the Environmental Impact Report (EIR) is to provide a description of the pre-construction environment, biophysical and socio-economic environment in terms of the study area. The report also assesses the significance of potential impacts, both positive and negative in relation to the proposed development. Mitigation measures are provided for potential negative impacts. The report provides a comprehensive description of the activities as well as specialist studies undertaken for the EIA Phase and Public Participation Process (PPP), as well as the way forward in the form of conclusions, recommendations and an Environmental Management Programme (EMPr).

3. ENVIRONMENTAL IMPACT ASSESSMENT AND PUBLIC PARTICIPATION PROCESS

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998. The proposed development triggers listed activities that require authorisation in terms GNR 983 (Listing Notice 1) of GNR 984 (Listing Notice 2) and GNR 985 (Listing Notice 3) of the NEMA EIA Regulations (2014), as amended as indicated in **Table 1**. Subsequently, ***a Scoping and EIA process is required in line with all the requirements of the NEMA EIA Regulations, 2014, as amended.***

Table 1: Listed Activities in terms of NEMA EIA Regulations, 2014 as amended

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
GN No 983 Listing Notice 1		
Activity 9	The development of infrastructure exceeding 1,000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more	A new pipeline is proposed from the existing Kirkwood Primary Canal to the new dam, including the inlet works at the dam. The gravity main will comprise a 2 500m long, 600 mm diameter steel or ductile iron pipeline.
Activity 12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	The proposed dam basin, dam wall and proposed 600 mm rising main will be within the watercourse and will exceed 100 m^2. Both are located within a rural area.
Activity 19	The infilling or depositing of any material of more than 10 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m^3 from – (i) A watercourse.	The proposed dam basin, dam wall and inlet/outlet structures will result in the deposition or removal of 10 m^3 or more of material from and in a watercourse**.**
Activity 30	Any process or activity identified in terms of Section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	Indigenous vegetation will need to be cleared (i.e., permanent removal) in a Critical Biodiversity Area to accommodate the construction of the dam.
Activity 56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres.	There are currently no formal access roads on site. Internal roads will need to be constructed to support the development.

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
Activity 63	The expansion of facilities or infrastructure for the transfer of water from and to or between any combination of the following— (i) water catchments; (ii) water treatment works; or (iii) impoundments; where the capacity will be increased by 50 000 cubic metres or more per day, but excluding water treatment works where water is treated for drinking purposes.	The proposed dam will include water transfer from the existing canal to the Lower Coerney Balancing Dam and from there to the Nooitgedacht WTW.
GN No 984 Listing Notice 2		
Activity 11	The development of facilities or infrastructure for the transfer of 50,000 cubic metres or more water per day, from and to or between any combination of the following:— (i) water catchments; (ii) water treatment works; or (iii) impoundments. Excluding treatment works where water is to be treated for drinking purposes,	Inlet and outlet pipelines will be constructed to transfer water daily from the Kirkwood primary canal into the dam and from the dam to the WTW.
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed dam basin, dam wall and inlet/outlet structures will result in the clearance of more than 20 hectares of indigenous vegetation. The dam basin is expected to cover an area of 77 hectares.
Activity 16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall is 5 metres or higher, or where the high-water mark of the dam covers an area of 10 hectares or more.	The proposed dam wall will have a height of 20.5m.
GN No 985 Listing Notice 3		
Activity 4	The development of a road wider than 4 metres with a reserve less than 13.5 metres. **a. Eastern Cape** Outside urban areas: (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	There are currently no formal access roads leading to the site where the dam is proposed. It is anticipated that current access roads may need to be upgraded to improve access to the proposed dam.

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. a. **Eastern Cape** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans.	Species of Conservation Concern (SCC) will need to be cleared (i.e.; permanent removal) in a Critical Biodiversity Area to accommodate the proposed dam.
Activity 14	The development of (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeding 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs (a) within a watercourse; (c) if no development setback has been adopted, within 32 meters of a watercourse. **a. Eastern Cape** i. Outside urban areas: (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	The proposed dam and the associated infrastructure will have a physical footprint greater than 10 square meters and will be undertaken within 32 m of a drainage line which is regarded as a watercourse.
Activity 18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **a. Eastern Cape** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	There are currently no formal access roads leading to the site where the dam is proposed. It is anticipated that current access roads may need to be upgraded to improve access to the proposed dam.

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
	(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or (kk) A watercourse	
Activity 23	The expansion of (i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback adopted in the prescribed manner; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; **a. Eastern Cape** i. Outside urban areas: (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	It is anticipated that existing canal and its associated infrastructure will be expanded by more than 10 square meters and will be undertaken within 32 m of a drainage line which is regarded as a watercourse.

In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported on to the Department of Forestry, Fisheries and the Environment as the competent authority (the decision-maker).

4. PUBLIC PARTICIPATION PROCESS

Various Interested & Affected Parties (I&APs), adjacent landowners, surrounding residents as well as various government departments and parastatals have been involved in the Public Participation Process (PPP) undertaken for the project in line with the minimum requirements for Public Participation as outlined in Chapter 6 of NEMA EIA Regulations. Comments raised by the Competent Authority as well as various Interested and Affected Parties (I&APs) have been addressed in and included in this report (**Appendix E8**).

The summary of the PPP undertaken for the project which commenced in October 2021 is provided as follows:

- Initial site visit and engagement with the Scheepersvlakte Farm Representatives, the Lower Sundays River Water Users Association (LSRWUA) and Die Kooperasie (Scheepersvlakte) Farm Development;
- A newspaper advertisement was placed on page 6 of the 30th of November 2021 edition of The Herald Newspaper distributed throughout the entire Port Elizabeth Region (**Appendix E2**);
- On-site notices presenting the project were erected within the site, local shops, LSRWUA Irrigation Board, Municipal Library, along public roads and areas visible to the public on the 30th of November and 1st of December 2021 (**Appendix E4**);
- Notification letters were compiled and distributed to adjacent landowners and in the Kirkwood residential area on the 30th of November and 1st of December 2021 (**Appendix E3**);
- The first Focus Group meeting between DWS, GA Environment (Pty) Ltd, LSRWUA and Die Kooperasie (Scheepersvlakte) Farm Development was held on the 26th of May 2022 (**Appendix E9**);
- The Draft Scoping Report was placed at Kirkwood Public Library and made available electronically for Public Review and Comment for the legislated 30 days (14th October 2022 to 14th November 2022). Hardcopies were also provided to Ward Cllr, Sundays River Valley Local Municipality, Sarah Baartman District Municipality, Nelson Mandela Bay Metropolitan Municipality, Department of Economic Development, Environmental Affairs and Tourism and Lower Sundays River Water Use Association. SMS, e-mail notifications and telephone calls were used to notify all registered I&APs about the availability of the Report (**Appendix E5**);
- The Draft EIR was placed at Kirkwood Public Library and made available electronically for Public Review and Comment for the legislated 30 days (31st March 2023 to 4th May 2022). Hardcopies were also provided to Ward Cllr, Sundays River Valley Local Municipality, Sarah Baartman District Municipality, Nelson Mandela Bay Metropolitan Municipality, Department of Economic Development, Environmental Affairs and Tourism and Lower Sundays River Water Use Association. E-mail notifications and telephone calls were used to notify all registered I&APs about the availability of the Report. Reminder email was sent to all I&APs on the 21st of April 2023 (**Appendix E6**);
- A second focus group meeting between the main stakeholders was held on the 14th of April 2023 (**Appendix E9.4**);

- A public meeting was held on the 20th of April 2023 at the Lower Sundays River Water Use Association near the proposed development site. All I&APs were invited to the meeting on the 4th of April 2023 and reminder emails were sent to the I&APS on the 17th of April 2023 (**Appendix E9.1)**;
- A site meeting was held on the 21st of April 2023 at the proposed development site. All I&APs were invited to the meeting on the 4th of April 2023 and were reminded at the Second Focus Group Meeting and at the public meeting (**Appendix E9.2**); and
- A final main stakeholder meeting to discuss operational issues which emanated from the public meeting was held on the 26th of April 2023 (**Appendix E9.5**).

Please refer to **Appendix E** for Public Participation undertaken during the Scoping and EIA process.

5. NATIONAL WATER ACT 36 OF 1998

Any person wishing to exercise a water use other than those defined in Schedule 1 of the National Water Act, or an existing lawful use, or a use promulgated by a General Authorisation, requires a water use license. The activities described below are water uses defined in terms of Section 21 of the National Water Act and need authorisation, which includes licensing. The triggered Section 21 activities were;

(b) storing of water;
(c) impeding or diverting the flow in a watercourse;
(d) engaging in a stream flow reduction activity; and
(i) altering the bed, banks, course or characteristics of a watercourse.

A pre-application meeting was held with various units of the Licencing Authority of the Gqeberha Office of the Department of Water and Sanitation on the 15th of December 2021. During the meeting, the abovementioned Section 21 activities were confirmed. **It must be noted that the Water Use License Application process has been discontinued following consultation with DWS Eastern Cape Region and based on the DWS Circular for Exclusions from Water Use Authorisation processes (Appendix E5.2) in October 2022.** According to this notice, DWS is excluded from applying for WULA as there are no legal requirements in terms of Chapter 4 of the National Water Act of 1998 to compel the Department of Water and Sanitation to also obtain a Water Use License for a development of approved Government Waterworks (Refer to **Appendix E5.2**).

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

An understanding of the overall character and other sensitivities that were identified in the surrounding environment is pertinent to the project. The Biophysical aspects discussed are *Agriculture*, *Climate, Hydrology, Archaeological and Palaeontological features, Geology, Soils, Protected Areas in terms of NEMPAA, local and regional vegetation and other geographic areas*. The Socio-Economic conditions, Demographics, employment levels as well as service delivery are also discussed in this report.

7. SPECIALIST STUDIES AND MANAGEMENT PLANS

In accordance with the requirements of Appendix 6 of the NEMA EIA Regulations, 2014 as amended, and a review of the DFFE Screening Tool, the following Specialist Studies were undertaken:

- Agricultural Impact Assessment;
- Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity Impact Assessment;
- Palaeontological Impact Assessment; and
- Phase I Archaeological Impact Assessment.

Based on information taken from the Agricultural Impact Assessment undertaken by The Biodiversity Company (2023) attached as **Appendix F1**, the proposed project area is characterised by the Fc 362 and la 85 land types. The Fc 362 land types mainly have Mispah, Oakleaf, Valsrivier and Hutton soil forms according to the Soil classification working group, (2018), with the occurrence of other soils within the landscape. The la 85 land type is characterised with occurrence of Oakleaf, Hutton and Dundee soil forms associated with other soils in the terrain. The most sensitive soil forms that can be expected based on the Land Type Survey Staff, (1972 – 2006) soil forms data within the project area are the Hutton and Oakleaf soil forms, with "Low to Moderate" and "Moderate to High" sensitivities. The proposed activities for the Lower Coerney Balancing Dam and associated infrastructure will not result in the segregation of any high production agricultural land. Therefore, **based on the findings of the agricultural impact assessment, there are no issues of major significance against the proposed development**. It must however, be noted that the proposed dam overlaps with approximately 36ha of land currently being prepared for future citrus farming and DWS will need to make the necessary arrangements / negotiations with Farm Scheepersvlakte farming community as indicated in the public meeting (**Appendix E9.1**), Focus Group Meeting (**Appendix E9.3**) and Main Stakeholders Engagement Meeting (**Appendix E9.4**).

According to the Terrestrial Biodiversity Impact Assessment undertaken by The Biodiversity Company (2022) attached as **Appendix F2**, the site is situated in the endangered Albany Alluvial Vegetation and the least threatened Sundays Valley Thicket vegetation type. The Albany Alluvial Vegetation conservation status is classified as endangered and the protection level is regarded as 'Not Protected/Poorly Protected' Ecosystem. There are four habitats (Alluvial Vegetation, Valley Thicket, Disturbed Valley Thicket and Transformed). The Alluvial Vegetation habitat has high conservation importance and site ecological importance (SEI) while the Valley Thicket has medium and high conservation importance and SEI respectively. Although the project area does not overlap with any protected area, it is however 8.2 km from the Addo Elephant National park, which means it is in the 10km buffer zone of the park. The distribution of the plant SCC within the assessment area may be regarded as spaced naturally and occurring abundantly throughout. There are at least four (4) protected floral species and twenty-one (21) fauna recorded on site. The study found that the proposed activity overlaps with an Ecological Support Area 1 and that the current dam layout overlaps within sensitive habitats and other areas of high biodiversity potential. Portions of the current expected development would be considered to have a high negative impact as it would directly affect the habitat of threatened/protected plant species and expected listed faunal species that use these ecosystems. It is the opinion of the ecologist that the project may proceed, but a biodiversity compensation strategy must be included as a condition of the environmental authorisation (The Biodiversity Company, 2023).

Based on information taken from the Aquatic Biodiversity Impact Assessment undertaken by The Biodiversity Company (2022) attached as **Appendix F3**, the hydrological setting of the project area falls within the Mzimvubu - Tsitsikamma Water Management Area (WMA 7) and the South Eastern

Coastal Belt aquatic ecoregion (Dallas, 2007). The watercourses which may potentially be impacted by the construction of the Coerney Dam include the N40D - 08561 Sub-Quaternary Reach (SQR) or Coerney River. This catchment is not listed as a Freshwater Ecosystem Priority Area according to Nel et al., (2011). With regards to the Strategic Water Source Areas of South Africa, Lesotho and Swaziland (SWSAs), the project area is not located within the SWSAs with all SWSA aligned along the coast. The Present Ecological State (PES) of the Coerney River tributary across which the proposed dam will be constructed is considered largely modified (Class D). Furthermore, *in situ* water quality for the Coerney River system indicates modified water quality when compared to Target Water Quality Ranges. Collectively, the freshwater impact analysis indicates the system to be of low sensitivity within an ecological support area that is moderately protected. It is the opinion of the ecologist that the project may proceed, but a conservative buffer zone of 18 m along the delineated riparian area for the construction phases of the project must be implemented (The Biodiversity Company, 2023).

According to the information obtained from the Paleontological Impact Assessment undertaken by Natura Viva CC (2022) attached as **Appendix F4**. The project area is underlain at depth by potentially fossiliferous continental and marine shelf sediments of the Cretaceous Uitenhage Group (Sundays River Formation and possibly also Kirkwood Formation). DFFE site sensitivity mapping suggests that the project area is of Very High Palaeosensitivity. The study found that Cretaceous bedrocks within or close to the site area are very poorly exposed. Within the dam basin, they are largely buried beneath thick sandy to gravelly alluvium of probable Quaternary to Recent age. The only fossils recorded here are sparse, poorly-preserved moulds and petrified blocks of fossil wood of low scientific and conservation value, while occasional subfossil land snail shells are found within the overlying mantle of Late Caenozoic alluvium. It is concluded that the project area is of *Low Palaeosensitivity* overall and the original DFFE sensitivity mapping is therefore *contested*. Anticipated impacts on local fossil heritage resources of scientific and conservation value due to the proposed dam development are likely to be of low significance and there are no objections on palaeontological heritage grounds to the proposed dam development. If any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol must be applied.

A Phase I Archaeological Impact Assessment was undertaken in 2014 and revised in 2018 (**Appendix F5.2**) for the extended site assessment of approximately 516ha on the Remainder of Portion 7 of the Farm Scheepersvlakte 98 (where the current development is being proposed), for the cultivation of annual crops (e.g. maize) and the establishment of a variety of citrus. Given the recent study within the same area, A Phase I Archaeological Impact Assessment Compliance Statement was undertaken by Eastern Cape Heritage Consultants (2022) attached as **Appendix F5.1**. Based on the Archaeological Reports, stone stools were the only archaeological material located and were mainly observed in areas where the river gravel is exposed and top soil has been disturbed. Regardless of the large areas investigated on foot, no other remains such as bone, ostrich eggshell or pottery were observed. However, it is possible that sites/ materials are covered by vegetation and soil. The main impact on archaeological sites/ remains will be the physical disturbance of the material and its context. The clearing of vegetation to accommodate the proposed development and associated infrastructure (~77ha) may expose, disturb and destroy archaeological sites/ material. However, from the investigation and observations in adjacent areas, it would appear that the proposed area earmarked for development is of low archaeological sensitivity and the visual impact on the surrounding cultural

landscape will also be low. It must be noted that, there is always a possibility that human remains, and/ or other archaeological and historical material may be uncovered during the construction and/or operational phase.

The Geotechnical Investigations Report compiled by Aurecon (2019), indicates an underlying geology comprising of alluvium, colluvium, reworked terrace gravels (mixed origin), thin grey sandstones, siltstones and mudrocks of the Sundays River Formation of the Uitenhage Group; part of a collection of sedimentary strata within the structurally controlled Algoa Basin. The seismic hazard of the area is considered to be very low and the Peak Ground Acceleration (PGA) values are less than 0.02g, with a 10% probability of being exceeded in a 50-year period. The dam site is characterised by gentle, almost flat slopes; as is the greater basin. For the most part, the site is covered by very dense bush. The geological profile is characterised by soil strata with thickness up to 7 m to 8 m on the left flank, but 3 m to 4 m on the right flank and river section. The study recommended that the Coerney Dam be constructed as a homogeneous earth fill embankment rather than a zoned embankment. Subsequently, DWS proposed a homogeneous earth-fill embankment dam.

According to Regulation 16(1)(v) of the NEMA EIA Regulations 2014, as amended, an Application for Environmental Authorisation must be accompanied by a 'the report generated by the national web based environmental screening tool'. The report which is generated by the Department of Forestry, Fisheries and the Environment (DFFE) Environmental Screening Tool Report is attached as **Appendix I.** Although the DFFE Screening Report indicates that certain Specialist Assessments must be undertaken for the proposed development, there is an allowance for the EAP to motivate against the necessity of undertaking certain identified assessments. The DFFE Screening Tool Report sensitivity themes identified specialist assessments and the motivation by the EAP for not undertaking certain studies provided in Section 3.7 of this report.

The Specialist reports are attached to **Appendix F** of this EIR. With respect to the Management Plans for the project, an Environmental Management Programme (EMPr) has been compiled to provide mitigation measures for all potential issues that are likely to emanate from the project whereas a Soil and Erosion Management Plan, Alien Invasive Management Plan and Rehabilitation Plan will provide the contractor, the developer, and the ECO with guidelines on how to effectively manage alien soil erosion, invasive species and rehabilitation during the pre-construction and post-construction phases. This plan must be implemented in conjunction with the approved EMPr.

8. ALTERNATIVES

Several options associated with the construction of the dam and for improving the assurance of water supply were considered. The options (alternatives) for the development of the Lower Coerney Balancing Dam and water supply to the Nooitgedagt Water Treatment Works (WTW) were identified and undertaken by DWS during the prefeasibility and feasibility assessments in 2019 (Aurecon, 2019; DWS, 2019). The prefeasibility and feasibility options considered are discussed in this report. The following alternatives were assessed as part of this EIR:

a. No-go Alternative

The no-development alternative would entail continuing with the status quo, i.e.; a situation where the proposed dam is not constructed and the low water supply and/or shortages continue in the region.

b. Activity Alternatives

The activity alternative would entail a situation where the proposed development site is used for a different project other than the dam. There is one activity alternative for the current project which is the development of the Lower Coerney Balancing Dam.

c. Location/ property alternatives

This alternative would entail a situation where the same Balancing Dam is developed in a different location to the Lower Coerney site. Based on the prefeasibility studies by DWS (2019), three (3) alternative dam sites were assessed near Scheepersvlakte Dam and four (4) possible sites for a balancing dam near the Nooitgedagt WTW were evaluated. The preferred location is the **Lower Coerney site**. *The Lower Coerney Dam site is preferred over the Upper Scheepersvlakte and Upper Coerney Dam site as placing the same dam at the upper Scheepersvlakte or Coerney sites would reduce the structural integrity of the dam and a major dam wall collapse would likely occur. In addition, the Upper Scheepersvlakte and Coerney sites would be financially costly to operate as it would require a pump for water supply rather than the gravitational pipeline.*

d. Process Alternatives

In order to accommodate the proposed balancing dam development, vegetation clearance will need to be undertaken. Process alternatives are also known as technological and equipment alternatives that can be implemented for the required removal of vegetation. The process alternatives can be either mechanical (physical), chemical or biological and must be suitable to the specific type of plant intended for clearing. Three process alternatives (mechanical clearing of vegetation by hand, chemical clearing through the application of herbicides and biological clearance of vegetation (use of insects and micro-organisms) were considered in this EIA.

e. Demand alternatives

- This alternative arises when a demand for a certain product or service can be met by some alternative means. This is applicable to the demand for a product or service.
- The demand alternatives for the project are linked to the capacity (volume) of the dam:
    - Option 1: A smaller balancing dam near the present Scheepersvlakte Balancing Dam; or
    - **Option 2**: A suitable balancing dam near the present Scheepersvlakte Balancing

f. Operational alternatives

- This alternative is related to specific controls on the operational aspects of the project such as pressure pipes, pumps, as well as valves.
- The various dam sites were evaluated on specific operational factors including:
    - Capital Cost (R Million);
    - Capital Cost (cost of pumps reduced by 50%) (R Million);
    - Cost;
    - Pumping required;
    - Operational Complexity;
    - Strategic Location near WTW;
    - Ecological considerations (Reserve);
    - Considerations of floods; and
    - Environmental & Social Impacts.

It must be noted that the operational issues as discussed in the 2nd Focus Group Meeting (**Appendix**

E9.2), the public meeting (**Appendix E9.3**) and Main Stakeholders Engagement Meeting (**Appendix E9.4**) relating to the possibility of pumping of water directly from Coerney Dam by Farm Scheepersvlakte Farming Community or the possibility of pumping water from the existing Scheepersvlakte Dam once the Coerney Dam operational should be addressed before the construction phase to eliminate potential operational issues associated with the proposed development.

The delimitations and limitations of each of these alternatives have been discussed in this EIR. Overall, the preferred option came out from a combination of activity alternatives, site location, process alternatives and operational alternatives.

9. ENVIRONMENTAL IMPACTS

This EIR has provided a comprehensive assessment of the potential environmental impacts associated with the proposed development. These impacts have been identified by the EAP and the specialist studies undertaken for the proposed development. The key findings of the EIA Process are discussed in this report. The impact assessment has revealed that the construction and operational phases of the proposed project will generate impacts of low to medium after mitigation, but of a positive socio-economic impact, agricultural productivity and water security.

In accordance with Government Notice R. 982, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), the EAP is required to assess the significance of potential impacts in terms of the following criteria:

- Nature of the impact;
- Extent of the impact;
- Intensity of the impact;
- Duration of the impact;
- Probability of the impact occurring;
- Reversibility of impacts;
- Impact on irreplaceable resources; and
- Cumulative impacts.

Table 2 indicates a summary of impacts identified. Cumulative impacts assessed have been included in **Chapter 8** of the report.

Table 2: Impact Assessment Table Summary

Impact description	Type of impact	Project phase	Significance without mitigation	Significance with mitigation
IMPACT 1: Impacts on Floral Species	**NEGATIVE**	Construction	High	Medium
		Operational	Medium	Low
IMPACT 2: Impacts on Fauna Species	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	Low
IMPACT 3: Impacts on Surface Water	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	Low
IMPACT 4: Impacts on Groundwater	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	Low

IMPACT 5: Impacts on Agricultural Potential	**POSITIVE**	Construction	Medium (Negative)	Low
		Operational	Medium (Positive)	No Significance
IMPACT 6: Erosion and Soil Disturbance Impacts	**NEGATIVE**	Construction	Medium (Negative)	Low
		Operational	Medium (Positive)	Low
IMPACT 7: Impacts on Heritage Resources	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	Low
IMPACT 8: Impacts on Palaeontological Resources	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	Low
IMPACT 9: Visual and Aesthetic Impacts	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	Low
IMPACT 10: Socioeconomic Impacts	**POSITIVE**	Construction	Positive	No significance
		Operational	Positive	No significance
IMPACT 11: Impacts on Traffic	**NEGATIVE**	Construction	Low	No significance
		Operational	Low	No significance
IMPACT 12: Impacts on Air Quality	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	No significance
IMPACT 13: Noise Impact	**NEGATIVE**	Construction	Medium	Low
		Operational	Low	No significance
IMPACT 14: Health and Safety Impacts	**NEGATIVE**	Construction	Medium	Low
		Operational	Medium	Low
IMPACT 15: Impact on Water Security	**POSITIVE**	Construction	Positive	No Significance
		Operational	Positive	No Significance

10. CONCLUSION AND RECOMMENDATIONS

The Environmental Impact Report (EIR) provides a broader description of the biophysical and socio-economic issues associated with the proposed Lower Coerney Balancing Dam development in Sundays River Valley Local Municipality, Eastern Cape Province.

The impact assessment has revealed that the construction and operational phases of the proposed project will generate impacts of low to medium after mitigation, but of a positive socio-economic impact, agricultural productivity and water security. It is the opinion of the EAP that all impacts have been assigned appropriate management measures. The overall impacts of the proposed balancing dam will have high to moderate impacts on the bio-physical environment and some of the impacts can be reduced to a medium to low significance provided all recommended mitigation are adhered to.

Although the proposed development has been assessed to pose significant negative environmental or social impacts, there are significant positive socio-economic impacts that will emanate from the proposed project, and the development will address the water shortages in the Nelson Mandela Bay Metropolitan Municipality while also promoting the growth of the citrus farming community through the provision of irrigation water. It must be noted that there are certain sensitivities on site that are

unavoidable by either of the alternatives. In order to protect the biodiversity and conserve sensitive environments during development, steps that should be followed are to firstly to avoid, minimize, repair or restore, and finally compensate for, or offset the negative effects of any development on biodiversity (McFarlane, 1993).

Thus, where the impact is unavoidable, the impacts must be minimised and the unavoidable and unforeseen impacts restored or rehabilitated. Taking into consideration the findings of the environmental impact assessment, the project benefits outweigh the negative impacts identified provided that mitigation measures are applied effectively. Impacts of high significance are not foreseen once proper mitigation measures have been implemented.

This EIR has provided a comprehensive assessment of the potential environmental impacts associated with the proposed development. These impacts have been identified by the EAP and the specialist studies undertaken. The key findings of the EIA Process are discussed in this report. It is therefore recommended that the environmental authorities subject the proposed application to the following conditions:

a. Final land negotiations and operational arrangements as discussed during the public meeting and the Main Stakeholder Engagement Meeting should be addressed before the construction phase to eliminate potential operational issues associated with the proposed development.

b. The Contractor shall inform all adjacent landowners of the commencement of construction activities at least 30 days before commencement;

c. An Independent Environmental Control Officer must be appointed to monitor all construction activities and ensure the demarcation of all applicable areas and approve the locations of all infrastructure;

d. Monthly monitoring reports must be submitted to DFFE for the evaluation of the project's compliance to the EMPr and Environmental authorisation;

e. A Dam-break risk management and hazard mitigation must be undertaken and implemented for the project;

f. Contractor must appoint a Health and Safety Officer for the construction phase of the project;

g. Stakeholder engagement must be undertaken during the project phases to investigate possible scenarios for appropriate compensation of landowners for high land capability areas where necessary;

h. The designed dam should be built according to the capacity of a 1:100-year flood as dam collapse in this non-perennial system will result in extensive damage to downstream systems which include the highly sensitive estuary;

i. A storm water management plan must be compiled for both the construction and operation of the dam;

j. The buffer zone of 18 m along the delineated riparian area must be established as a no-go area for all farming activities/clearing as well as associated aspects of the development which aren't directly related to the watercourse;

k. Prior to construction, the development footprint area must be demarcated on site to ensure

that construction impacts are contained within this area. If necessary, these areas may be fenced or, alternatively, nearby sensitive areas are to be fenced to prevent access.

l. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season to identify and mark any identified SSC and/or protected species as ‘’no go’’-areas.

m. Areas rated as High sensitivity outside of the direct development areas should be declared as ‘no-go’ areas during the life of the project, and all efforts must be made to prevent development access to these areas from construction workers and machinery.

n. Construction should be limited to the dry season when the channel is dry to limit potential modification to the system.

o. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to within the very low sensitivity areas.

p. The spillway must be fitted with infrastructure such as gabions or flow dissipation to remedy point source erosion at the end of the spillway. The spillway must be regularly monitored and maintained/vegetated.

q. All declared alien plants must be identified and managed in accordance with The Alien and Invasive Species Regulations (GNR 599 of 2014), and the implementation of a monitoring programme in this regard is recommended.

r. The period for which the Environmental Authorisation is required is 10 years.

s. Drainage lines downslope of the project must also be checked regularly for erosion during the operational phase of the project and any erosion noted must be treated immediately using soft engineering techniques.

t. If any human remains or any other concentrations of archaeological heritage material are exposed during construction, all work must cease, and it must be reported immediately to the archaeologist at the Albany Museum and the Eastern Cape Provincial Heritage Resources Authority. Sufficient time should be allowed to investigate and to remove such material.

u. It is recommended that if any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol outlined in Appendix 3 of the Palaeontological Impact Assessment Report must be implemented.

v. Continued consultation and engagement with all relevant stakeholders - especially property owners, neighbouring and local communities, and respective municipalities during labour recruitment and procurement for services and supplies during construction phase must be undertaken.

w. Adhere to all conditions of the Environmental Authorisation issued by DFFE as well as any conditions of permits that may be required thereafter; and

x. Adhere to all recommendations outlined in the specialist Reports**,** and the Environmental Management Programme**.**

LEGISLATIVE REQUIREMENTS FOR AN ENVIRONMENTAL IMPACT REPORT

The Environmental Impact Assessment Regulations 2014 (as amended), Government Notice 982, Appendix 3 prescribes the required content of an Environmental Impact Report. These requirements and the sections of the report in which they have been addressed is provided in **Table 3**.

Table 3: Requirements for an Environmental Impact Report

GN 982, Appendix 3 Ref.:	Item	Section Ref.:
(3) (a) (i)	Details of the EAP who prepared the report	1.11 & Appendix H
(3) (a) (ii)	The expertise of the EAP, including a Curriculum Vitae	1.11 & Appendix H
(3) (b) (i)	The location of the development footprint of the activity on the approved site as contemplated in the accepted scoping report including: the 21-digit Surveyor General code of each cadastral land parcel	1.2
(3) (b) (ii)	The physical address and farm name (where available)	1.2
(3) (b) (iii)	The coordinates of the boundary of the property (where (3) (b) (i) and (3) (b) (ii) are not available)	1.2
(3) (c)	A plan which locates the proposed activity or activities applied for as well as the associated structures and infrastructure at an appropriate scale	Chapter 1 and Appendix A
(3) (c) (i)	For linear activities: a description and coordinates of the corridor in which the proposed activity is to be undertaken	N/A
(3) (c) (ii)	On land where the property has not been defined, the coordinates within which the activity is to be undertaken	N/A
(3) (d)	A description of the scope of the proposed activity, including:	
(3) (d) (i)	All listed and specified activities trigger and being applied for	1.6
(3) (d) (ii)	A description of the associated structures and infrastructure related to the development	1.4
(3) (e)	A description of the policy and legislative context and an explanation of how the proposed development complies with and responds to the legislative and policy context	2
(3) (f)	A motivation for the need and desirability for the proposed development, including the need and desirability of the activity in the context of the preferred development footprint within the approved site as contemplated in the accepted scoping report.	1.5
(3) (g)	A motivation for the preferred development footprint within the approved site as contemplated in the accepted scoping report.	5
(3) (h)	A full description of the process followed to reach the proposed development footprint within the approved site as contemplated in the accepted scoping	5
(3) (h) (i)	Details of the development footprint alternatives considered	5
(3) (h) (ii)	Details of the public participation process undertaken, including copies of the supporting documents and inputs	7

GN 982, Appendix 3 Ref.:	Item	Section Ref.:
(3) (h) (iii)	A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them	7
(3) (h) (iv)	The environmental attributes associated with the development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	3
(3) (h) (v)	The impacts and risks identified, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts can be reversed, may cause irreplaceable loss of resources, and can be avoided, managed or mitigated	9
(3) (h) (vi)	The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks	8
(3) (h) (vii)	Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected, focusing on the geographical, physical, biological, social, economic, heritage and cultural	9
(3) (h) (viii)	The possible mitigation measures that could be applied and level of residual risk	9
(3) (h) (ix)	If no alternative development locations for the activity were investigated, the motivation for not considering such	6
(3) (h) (x)	A concluding statement indicating the preferred alternative development location within the approved site	10
(3) (i)	A full description of the process undertaken to identify, assess and rank the impacts the activity and associated structures and infrastructure will impose on the preferred location through the life of the activity, including:	8
(3) (i) (i)	A description of all environmental issues and risks that were identified during the environmental impact assessment process	9
(3) (i) (ii)	An assessment of the significance of each issue and risk and an indication of the extent to which the issue and risk could be avoided or addressed by the adoption of mitigation measures	9
(3) (j)	An assessment of each identified potentially significant impact and risk, including:	
(3) (j) (i)	Cumulative impacts	9
(3) (j) (ii)	The nature, significance and consequences of the impact and risk	9
(3) (j) (iii)	The extent and duration of the impact and risk	9
(3) (j) (iv)	The probability of the impact and risk occurring	9
(3) (j) (v)	The degree to which the impact and risk can be reversed	9
(3) (j) (vi)	The degree to which the impact and risk may cause irreplaceable loss of resources	9
(3) (j) (vii)	The degree to which the impact and risk can be mitigated	9
(3) (k)	Where applicable, a summary of the findings and recommendations of any specialist report and an indication as to how these findings and recommendations have been included in the final assessment report	9 & 10
(3) (l)	An EIS which contains	
(3) (l) (i)	A summary of the key findings of the environmental impact assessment	10

GN 982, Appendix 3 Ref.:	Item	Section Ref.:
(3) (l) (ii)	A map at an appropriate scale which superimposes the proposed activity and its associated structures and the infrastructure on the environmental sensitivities of the preferred site indicating any areas that should be avoided, including buffers	10 & Appendix A
(3) (l) (iii)	A summary of the positive and negative impacts and risks of the proposed activity and identified alternatives	9 & 10
(3) (m)	Based on the assessment, and where applicable, recommendations from specialist reports, the recording of proposed impact management objectives, and the impact management outcomes for the development for inclusion in the EMP as well as for inclusion as conditions of authorisation	9 & Appendix F
(3) (n)	The final proposed alternatives which respond to the impact management measures, avoidance, and mitigation measures identified through the assessment	6 & 11
(3) (o)	Any aspects which were conditional to the findings of the assessment either by the EAP or specialist which are to be included as conditions of authorization	11
(3) (p)	A description of any assumptions, uncertainties and gaps in knowledge relate to the assessment and mitigation measures proposed;	1.8
(3) (q)	A reasoned opinion as to whether the proposed activity should or should not be authorized, and if the opinion is that it should be authorized, any conditions that should be made in respect of that authorisation;	11
(3) (r)	proposed activity does not include operational aspects, the period for which the environmental authorisation is required and the date on which the activity will be concluded and the post construction monitoring requirements finalized	11
(3) (s)	An undertaking under oath or affirmation by the EAP in relation to	
(3) (s) (i)	The correctness of the information provided in the reports	Page iv
(3) (s) (ii)	The inclusion of comments and inputs from stakeholders and I&APs	Appendix E8
(3) (s) (iii)	The inclusion of inputs and recommendations from the specialist reports where relevant	Page viii and Appendix F
(3) (s) (iv)	Any information provided by the EAP to interested and affected parties and any responses by the EAP to comments or inputs made by interested or affected parties	Page vi Appendix E
(3) (t)	Where applicable, details of any financial provisions for the rehabilitation, closure, and ongoing, post decommissioning, management of negative environmental impacts	N/A
(3) (u)	An indication of any deviation from the approved scoping report including the plan of study including-	N/A
(3) (u) (i)	Any deviation from the methodology used in determining the significance of potential environmental impacts and risks; and	N/A
(3) (u) (ii)	A motivation for the deviation	N/A
(3) (v)	Any specific information that may be required by the Competent Authority; and	N/A
(3) (w)	Any other matters required in terms of Section 24(4)(a) and (b) of the act	N/A

THE PROPOSED LOWER COERNEY BALANCING DAM, SUNDAYS RIVER VALLEY LOCAL MUNICIPALITY, EASTERN CAPE PROVINCE

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LIST OF ABBREVIATIONS / ACRONYMS

ADD	Average Day Demand
AWSS	Algoa Water Supply System
CBA	Critical biodiversity area
CMA	Catchment Management Agency
CPA	Communal Property Association
DEDEAT	Eastern Cape Department of Economic Development, Environmental Affairs and Tourism
DFFE	Department of Forestry, Fisheries and the Environment
DN	Nominal diameter
DSR	Draft Scoping Report
DWA	Department of Water Affairs (currently Department of Water and Sanitation)
DWAF	Department of Water Affairs and Forestry (which then changed to DWA and is currently the Department of Water and Sanitation)
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environmental Conservation Act (Act 73 of 1989
ECPHRA	Eastern Cape Provincial Heritage Resources Authority
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMP	Environmental Management Plan
EMPR	Environmental Management Programme Report
ESA	Ecological Support Area
FSR	Final Scoping Report
FSL	Full Supply Level
GA	General Authorisation
Ha	hectares
I&APs	Interested and Affected Parties
IDP	Integrated Development Plan
LSRGWS	Lower Sundays River Government Water Scheme
LSRWUA	Lower Sundays River Water Use Association
Mℓ	Mega litre
NEMA	National Environmental Management Act (NEMA), 1998 (Act No. 107 of 1998)
NMBM	Nelson Mandela Bay Municipality
SACNASP	South African Council for Natural Scientific Professions
SBDM	Sarah Baartman District Municipality
SRIB	Sundays River Irrigation Board

SRVM	Sundays River Valley Local Municipality
WUA	Water Use Authorisation
WUL	Water Use Licence
WULA	Water Use Licence Application
NWA	National Water Act (Act No. 36 of 1998)
mamsl	Meters above mean sea level
NOC	Non-overspill Crest
RDF	Recommended Design Flood
SEF	Safety Evaluation Flood
KPC	Kirkwood Primary Canal
NGP	Nooitgedacht / Nooitgedagt Pipeline
CA	Competent Authority
HIA	Heritage Impact Assessment
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
WTW	Water Treatment Works

GLOSSARY OF TERMS

This section provides a catalogue of terms and definitions, which may be used in this report and, or other documents compiled as part of the project. Where more than one definition for a term exists in the literature, additional definitions have been provided for clarity.

Table 4: Glossary of terms

Term	Definition
Alien Invasive Species	Species of plants, animals or other organisms that are not indigenous to a region and which easily spread and destroy the indigenous plant species, taking over an area and causing biological and socio-economic harm.
Basic Assessment Process	An environmental assessment process that is undertaken in line with Listing Notices 1 and 3 the NEMA EIA Regulations with the aim of obtaining Environmental Authorisation.
Competent Authority	An organ of state charged by the National Environmental Management Act (NEMA) with evaluating the environmental impact of an activity and, where appropriate, with granting or refusing an environmental authorisation in respect of that activity.
Conservation Plan Areas (C-Plan Areas)	Areas that are deemed important to conserve ecosystems and species. For this reason, these areas require protection.
Cultural significance	Means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance.
Cumulative Impacts	Direct and indirect impacts that act together with current or future potential impacts of other activities or proposed activities in the area/region that affect the same resources and/or receptors.
Development	Means the building, erection, construction or establishment of a facility, structure or infrastructure, including associated earthworks or borrow pits, that is necessary for the undertaking of a listed or specified activity, but excludes any modification, alteration or expansion of such a facility, structure or infrastructure, including associated earthworks or borrow pits, and excluding the redevelopment of the same facility in the same location, with the same capacity and footprint.
Ecological Support Area	Areas that support the ecological functioning of protected areas or CBAs or provide important ecological infrastructure.
Environmental Assessment Practitioner	Individual responsible for the planning, management, coordination or review of environmental impact assessments, strategic environmental assessments, environmental management programmes or any other appropriate environmental instruments introduced through regulations.
Environmental Authorisation	This is a decision by a Competent Authority to authorise a listed activity in terms of the National Environmental Management Act (NEMA). The authorisation means that a project, either in totality or partially, can commence subject to certain conditions. The Competent Authority has a right to refuse to grant authorisation for a project in totality or partially.
Environment	The external circumstances, conditions and objects that affect the existence of an individual, organism or group. These circumstances include biophysical, social, economic, historical and cultural aspects.
Environmental Impact Assessment	A process of evaluating the environmental and socio-economic consequences of a proposed course of action or project.
Fauna	The collective animals of a particular region, habitat or geological period.
Flora	The collective plants of a particular region, habitat or geological period.
Heritage Resource	Means any place or object of cultural significance.
Hydrology	The study of surface water flow.

Term	Definition
Indigenous Vegetation	Plant species occurring naturally in an area, regardless of the level of alien infestation and where the topsoil has not been lawfully disturbed during the preceding ten years.
Interested and Affected Party	In relation to an application for Environmental Authorisation, this refers to an interested and affected party whose name is recorded in the register opened for that application in terms of regulation 42 of the NEMA EIA Regulations. This party will ideally be interested in the development but also affected by the proposed application and have a certain interest in the application.
Regulated area of a watercourse:	• The outer edge of the 1:100-year flood line and /or delineated riparian habitat whichever is the greatest measured from the middle of a river, spring, natural channel, lake or dam; • In the absence of a determined 1:100-year flood line or riparian area, the area within 100m from the edge of a watercourse where the edge of the watercourse is the first identifiable annual bank fill flood bench (subject to compliance to section 144 of the Act); • 500m radius from the delineated boundary of any wetland or pan.
Riparian Area	A Habitat that includes the physical structure and associated vegetation of the areas associated with a watercourse which are commonly characterised by alluvial soils, and which are inundated or flooded to an extent and with a frequency sufficient to support vegetation of species with a composition and physical structure distinct from those of adjacent land areas.
Threatened or Protected Species	These refers to either plants or animals that are at a threat of Extinction or are protected due to their high conservation value or national importance.
Urban edge	A demarcated edge of an area that is used as land use management tool to manage, direct and control the outer limits of development growth around an urban area. The aim is to control urban sprawl due to its associated adverse impacts.
Watercourse:	(a) a river or spring; (b) a natural channel in which water flows regularly or intermittently; (c) a wetland, lake or dam into which, or from which, water flows; and (d) any collection of water which the Minister may, by notice in the Gazette, declare to be a watercourse, and a reference to a watercourse includes, where relevant, its bed and banks;
Wetland	Land which is transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is periodically covered with shallow water, and which land in normal circumstances supports or would support vegetation typically adapted to life in saturated soil.

1 INTRODUCTION

1.1 Background

The Department of Water and Sanitation (DWS, hereafter) is a state organ that exists to ensure equitable access to water for all South Africans as well as to protect, use, develop, conserve, manage and control water resources. In 2017, DWS undertook a feasibility study to assess five (5) potential dam sites for the Algoa Water Supply System (AWSS). The Lower Coerney site was eventually found to be the most feasible and most viable option for the construction of the required balancing dam. Subsequently, GA Environment (Pty) Ltd was appointed by DWS, as independent Environmental Assessment Practitioner (EAP) to undertake the Scoping and Environmental Impact Assessment (EIA) and the Water Use License Application (WULA) process for the proposed construction of the Lower Coerney Balancing Dam as part of the AWSS. It must be noted that the Water Use License Application process has been discontinued following consultation with DWS Eastern Cape Region Licensing Officials and based on the DWS Circular for Exclusions from Water Use Authorisation processes (**Appendix E5.2**) in October 2022. According to this notice, DWS is excluded from applying for WULA as there are no legal requirements in terms of Chapter 4 of the National Water Act of 1998 to compel the Department of Water and Sanitation to also obtain a Water Use License for a development of approved Government Waterworks.

The objectives of the balancing dam are to:

- Limit risks of shortfall in supply to the Nelson Mandela Bay Metropolitan Municipality (NMBM) and the Lower Sundays River Government Water Scheme (LSRGWS);
- Remove potential operating system constraints for the sustainable delivery of bulk Orange River water supply to the LSRGWS and NMBM, for water requirements up to 2040; and
- Limit operational risks to acceptable levels.

The National Environmental Management Act 107 of 1998, as amended (NEMA) and the Environmental Impact Assessment Regulations 2014 (as amended) requires that listed activities warrant an Environmental Authorisation (EA) from the relevant competent authority. As the applicant (DWS) is an organ of the state, the competent authority for the application is the Department of Forestry, Fisheries and the Environment (DFFE). A Scoping and Environmental Impact Assessment was required to support an application for an EA. The Draft Scoping report and the application form were submitted to DFFE in October 2022. As per Regulation 40(1) of the NEMA (1998) EIA Regulations, 2014, as amended, the Report was circulated to the public for the legislated period of at least 30 days. The Final Scoping report inclusive of public consultation comments was submitted to DFFE in November 2023 and approved on the 20th of January 2023. The approval letter is attached as **Appendix C** of this Final Environmental Impact Report. The Draft EIR was compiled and as per Regulation 40(1) of the NEMA (1998) EIA Regulations, 2014, as amended, the Report was circulated to the public for the legislated period of at least 30 days (31st of March 2023 to the 4th of May 2023). This report serves as the Final Environmental Impact Assessment Report to the Proposed Lower Coerney Balancing Dam, Sundays River Valley Local Municipality, Eastern Cape Province (DFFE Ref: 14/12/16/3/3/2/2222).

1.2 Locality Description

The proposed Lower Coerney Balancing Dam site is located on Portion 7 of the Farm Scheepersvlakte No. 98 (C07600000000009800007), Farm 713 Uitenhage (C07600000000071300000) and the Remaining Extent of Farm 40 Farm Enon Mission 574 (C07600000000075800000) owned by Scheepersvlakte Farms CC, Venter Wildlife Trust and the Moravian Church in South Africa respectively. Landowner Consent forms for all directly affected properties are attached in **Appendix 3** of the application form. The study area is located in the town of Addo near Kirkwood, Sundays River Local Municipality in the Eastern Cape Province. The approximate coordinates of the site are 33°26'29.77"S and 25°37'23.68"E**.** The site four corners as indicated in Section 1.2 of the EIR are A (33°26'58.50"S; 25°37'25.62"E), B (33°26'47.71"S; 25°37'40.91"E), C (33°25'51.99"S; 25°37'21.39"E) and D (33°25'50.53"S; 25°37'28.72"E). The proposed location of the Coerney Dam is upstream of the Coerney Syphon outlet in a valley east of and adjacent to the existing Scheepersvlakte Dam as indicated in **Figure 1**.

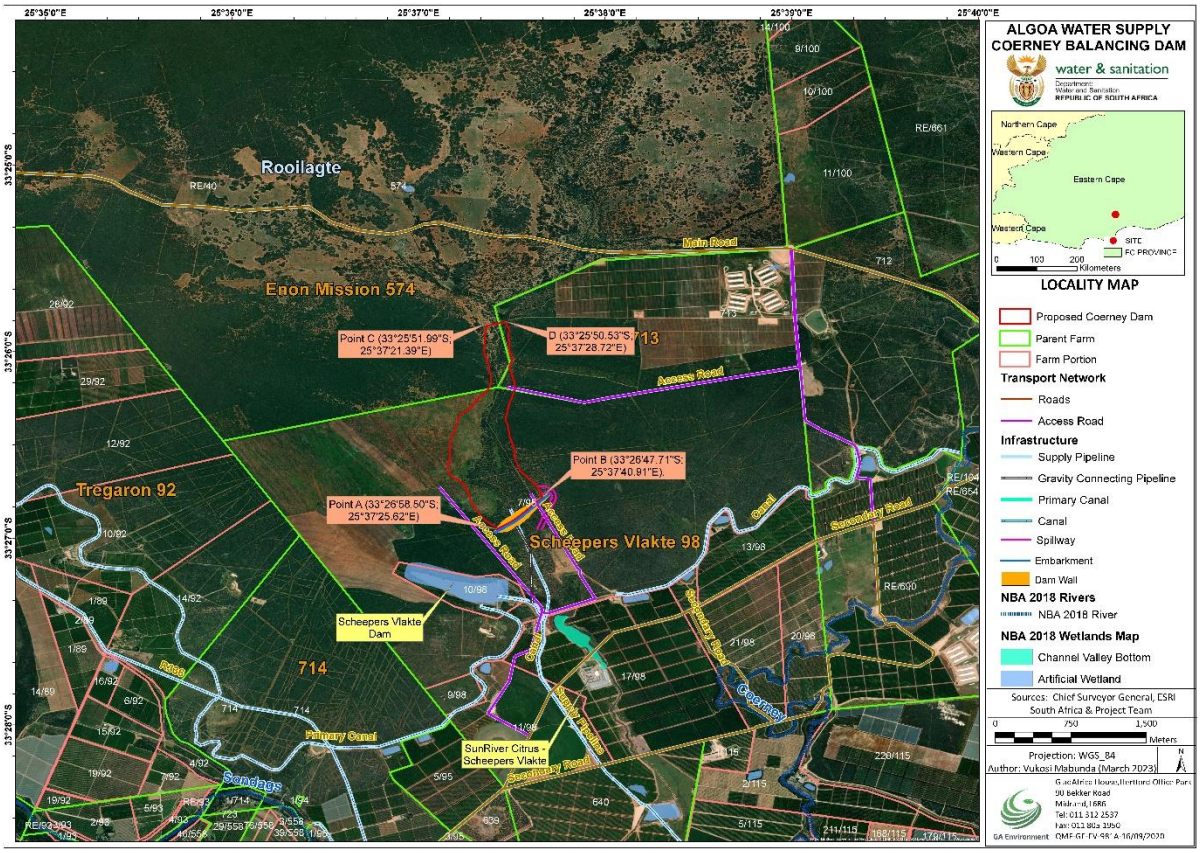


Figure 1: Locality Map of the Proposed Lower Coerney Balancing Dam

The site can be accessed from a gravel road that connects to the R336 approximately 4 km southwest of the proposed development site. There are currently no formal roads within the Scheepersvlakte farm. The footprint of the proposed Coerney Dam is approximately 77.1 hectares and a portion of this footprint overlaps with portions of the planned future development on Scheepersvlakte Farms. The area of proposed future citrus orchards which may be impacted by the proposed dam is approximately 36ha. Refer to **Figure 1** for the locality map of the proposed dam.

1.3 Surrounding land-uses

The proposed Lower Coerney Balancing Dam is located within the Scheepersvlakte Citrus Farm Region close to the town of Kirkwood. The adjacent land uses are citrus farms and several waterbodies that support the farming community (**Figure 2**). The region is the biggest citrus producer and exporter, based in the Sundays River Valley, South Africa with farms in Kirkwood, Sunland and Addo. Sundays River has grown from humble beginnings into one of South Africa's leading citrus growers and exporters. The Scheepersvlakte Citrus Farm development project near Kirkwood in the Eastern Cape was highlighted by President Cyril Ramaphosa during the recent Sustainable Infrastructure Development Symposium in South Africa. It was described as a "greenfield" investment project to grow over 500ha of citrus, with a proposed investment value of R122 million over five years (Pressreader, 2020).

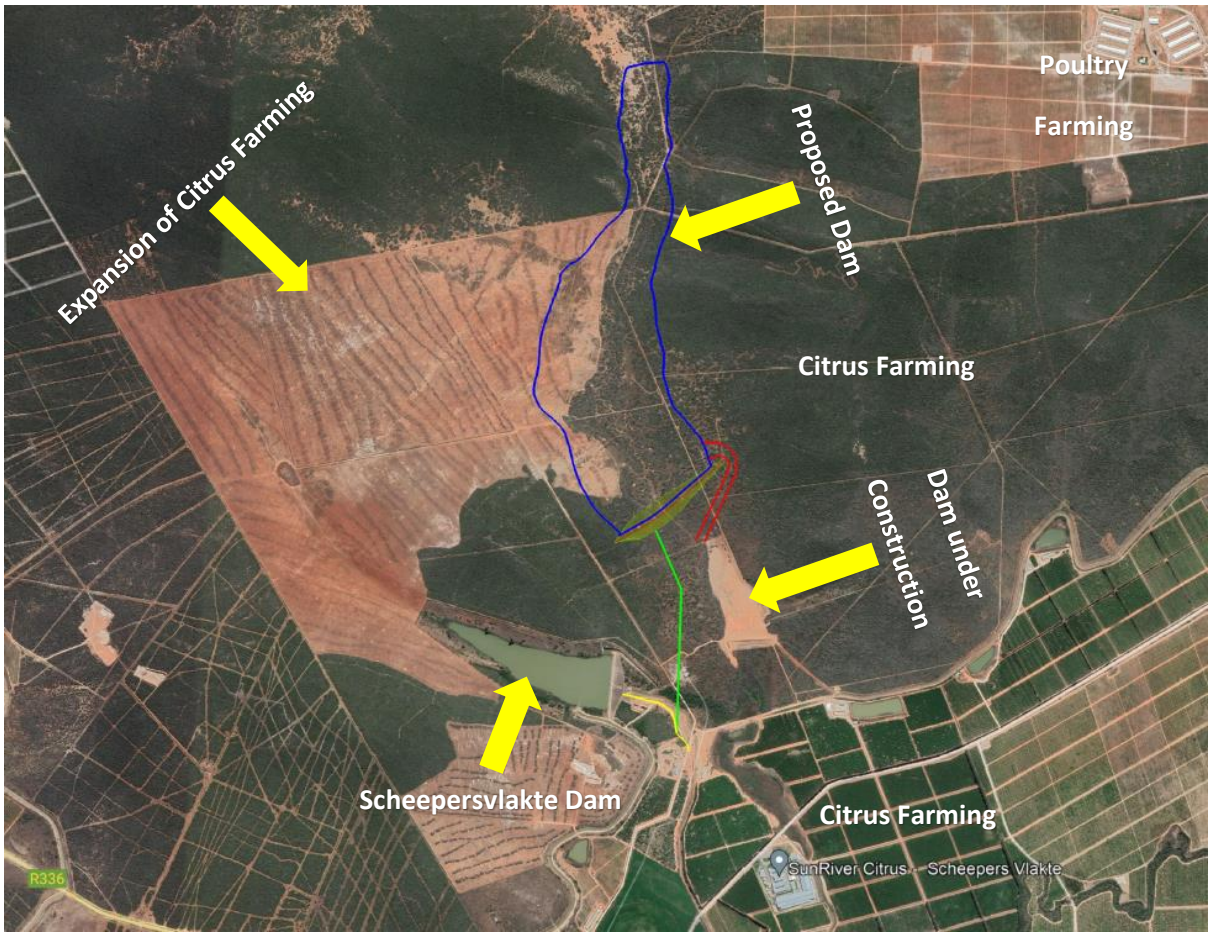


Figure 2: Surrounding land-uses

1.4 Description of the proposed activity

The existing Scheepersvlakte Dam is a balancing facility for water supply to the Lower Sundays River Water User Association (LSRWUA) and the Nelson Mandela Bay Metropolitan Municipality (NMBM) for emergency supply. The need for a new balancing dam on the Scheepersvlakte Farm is due to the inadequate smaller capacity of the existing Scheepersvlakte Dam to provide water supply to NMBM during an emergency. The main purpose of the proposed new balancing dam at the Coerney site is to eliminate the operational and balancing storage limitations imposed by Scheepersvlakte Dam.

DWS intends to construct a 77 ha homogeneous earth-fill embankment dam with a wall height of 20.5 m high and a capacity of 4.69 million m3 to provide an emergency water supply of 21-days to the Nelson Mandela Bay Metropolitan Municipality. The main advantage of the dam site is that it will enable the dam to be operated under gravity. The dam will be filled from the Kirkwood Primary Canal via a new pipeline and the dam will supply the Nooitgedagt Water Treatment Works (WTW) via a new connecting pipeline to the existing 1 400 mm Nooitgedagt pipeline. The proposed Coerney Dam will be filled, and topped up, over a longer filling period through a gravity supply. The existing Scheepersvlakte Dam and proposed Coerney Dam, although filled from the same source, will be operated separately under normal operations. The proposed Coerney Dam will be used as balancing storage for NMBM and the Scheepersvlakte Dam will revert to its original function and will only be used as balancing storage for irrigation. See **Table 5** for a summary of key technical details.

Table 5: Technical background information

Aspect	Detail
Type of Dam:	Homogeneous Earthfill Embankment Dam.
Main advantage of dam site:	The dam will be filled and supply water under gravity (no need for water to be pumped).
Source of water:	Kirkwood Primary Canal via a new pipeline.
Wall height:	20.5m
Storage capacity (before excavation):	4.69 million m^3
Maximum water depth (before excavation):	16.2 m
Hazard rating:	High
Hazard dam type:	Category III Dam
Materials required and not available on site:	Sand, gravel, rocks and concrete aggregates (which all need to be imported).

1.5 Motivation for the need of the project

The existing Scheepersvlakte Balancing Dam is a balancing facility for water supply to the Lower Sundays River Water User Association (LSRWUA) and the Nelson Mandela Bay Municipality (NMBM), and for emergency supply. The Lower Coerney Balancing Dam Project was declared by the previous Department of Water and Sanitation Minister, Ms. Lindiwe Sisulu as an Emergency Works Project in 2020, prioritizing its development as a high and urgent priority. The existing Scheepersvlakte Balancing Dam has been identified by NMBM officials and the DWS as a growing, high, operational risk to the bulk water supply of the NMBM system, with part of the supply area even running dry from time to time. The Scheepersvlakte Balancing Dam had an initial storage capacity of 820 000 m^3, but this has been reduced through siltation and is further constrained by operational limitations and problems. Additional future balancing capacity should be provided to supply 210 Mℓ /day for 21 days (4.1 million m^3) to NMBM.

In addition, the NMBM has recently been in the media regarding water constraints. In June 2022, the Department of Water and Sanitation in the Eastern Cape called on residents to adhere to water restrictions imposed by local municipalities to ensure water security. The call was a response to dam levels in Nelson Mandela Bay Metro continue to decline on a weekly basis. The municipality said it had imposed the restrictions guided by Section 4 of the Water Services Act 108 (no 108 of 1997) and clause 31 of the Water and Sanitation Services by-law (https://businesstech.co.za/news/government/597542/this-coastal-city-in-south-africa-now-faces-40-water-restrictions/).

1.5.1 Addressing the limited balancing capacity

There is currently unreliability of supply from the Scheepersvlakte Balancing Dam to supply water to the Nooitgedagt WTW. The Scheepersvlakte Balancing Dam was designed and sized to balance irrigation supplies into the Lower Coerney canal only. The key factors which determine the reliability of supply to Nooitgedagt WTW are as follows:

- There is limited balancing capacity in Scheepersvlakte Dam, which is operated at a capacity of 550 000 m^3 to avoid spillages, although the dam has a total capacity of 820 000 m^3; and
- There is a risk of failure of the aging upstream canal, syphon and weir infrastructure, such as the May 2017 failure of the main canal.

According to the information taken from the prefeasibility studies (DWS, 2019), irrigation water releases from the Scheepersvlakte Balancing Dam into the Coerney Canal receives priority on a Monday morning, whether the dam level at that point in time permits sufficient flow to the Nooitgedagt WTW or not. Limitations on draw-down levels (limited balancing capacity) will limit the peak capacity available to NMBM when the supply source (storage dams) to the west of Port Elizabeth has a breakdown. This limitation of balancing capacity is a high risk to the continuity of bulk water supply to the Nooitgedagt WTW. Therefore, the proposed Lower Coerney Balancing Dam seeks to address the limitation of the balancing capacity.

1.5.2 Reducing Operational Limitations

The LSRWUA controls water releases from Darlington Dam, which is situated some 50 km upstream of the Korhaansdrift Weir. The LSRWUA must be notified in advance by all irrigators as well as the NMBM on what their water requirements for the following week will be. In the case of the NMBM, operations could change within hours, as a major pipe burst on bulk supplies from the western sources could happen over weekends or as a worst-case scenario, on a Monday when the Scheepersvlakte Balancing Dam is down to a minimum level. This will require the Nooitgedagt WTW to increase output over a period of days, which then upsets the operation at the LSRWUA and impacts on the balance of water available for irrigators.

The Scheepersvlakte Balancing Dam, being an irrigation balancing dam, has a bottom outlet (intake to gravity pipeline). This bottom intake and bottom orientation of the offtakes to the gravity pipeline (emergency scheme modifications) result in sediment and debris from the dam being drawn into the Nooitgedagt pipeline. This is worsened when the dam levels are low and at times when draining of the dam is required. Fish and trash are then drawn into the gravity supply to the WTW. The outlet works that convey dam water to the Coerney Lower Canal and the Nooitgedagt pipeline is prone to mechanical failures, which generally require a 3-day complete shut-down to remove or re-install a faulty valve. This operational problem transfers major risks onto the NMBM water supply system. The risk will be effectively eliminated through the development of the Coerney Dam, which can provide up to 21 days of water supply during the maintenance and operational works of the existing Scheepersvlakte Balancing Dam.

1.5.3 Ageing Infrastructure

During winter dry periods, the water supply is operated on the basis of three days on and two days off. This requires a major effort by the LSRWUA to ensure that Scheepersvlakte Balancing Dam, with such a small balancing capacity, is operated with sufficient water in storage to meet NMBM's water requirements. The current manner of accommodating the dry period maintenance programme appears to work well for the present. The infrastructure is, however ageing, and it is doubtful whether the same methodology will remain applicable to maintain the canal system for another 25 to 30 years. The limited balancing capacity will then become a more serious risk to the NMBM. The status of supply from the Scheepersvlakte Balancing Dam therefore poses a high risk for reliability of water supply to the NMBM. New infrastructure is required to cope with the methods undertaken to ensure water supply during the winter dry season.

1.6 Triggered activities in terms of NEMA

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities which require authorisation as these activities may negatively affect the environment. Environmental Impact Assessment (EIA) Regulations were promulgated in December 2014 (as amended) in terms of Section 24(5) and Section 44 of the National Environmental Management Act (NEMA), Act 107 of 1998 and consist of the following:

- Regulation 982 provide details on the processes and procedures to be followed when undertaking an Environmental Authorisation process;
- Listing Notice 1 (Regulation 983) define activities that will trigger the need for a Basic Assessment process;
- **Listing Notice 2 (Regulation 984) defines activities that trigger an Environmental Impact Assessment (EIA) process. If activities from both R 983 and R 984 are triggered, then an EIA process will be required**.
- Listing Notice 3 (Regulations 985) defines certain additional listed activities for which a Basic Assessment process would be required within identified geographical areas.

The above regulations were reviewed to determine whether the proposed project will trigger any of the above listed activities, and if so, what Environmental Authorisation Process would be required. The triggered listed activities presented in **Table 6** will require authorisation in terms of GNR 983 Listing Notice 1, GNR 984 Listing Notice 2 and GNR 985 Listing Notice 3 of the NEMA EIA Regulations (2014), as amended. A Scoping and EIA process will be undertaken in line with all the requirements of the NEMA EIA Regulations, 2014, as amended.

Table 6: Listed Activities in terms of NEMA EIA Regulations, 2014 as amended

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
GN No 983 Listing Notice 1		
Activity 9	The development of infrastructure exceeding 1,000 metres in length for the bulk transportation of water or storm water— (i) with an internal diameter of 0.36 metres or more; or (ii) with a peak throughput of 120 litres per second or more	A new pipeline is proposed from the existing Kirkwood Primary Canal to the new dam, including the inlet works at the dam. The gravity main will comprise a 2 500m long, 600 mm diameter steel or ductile iron pipeline.
Activity 12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse	The proposed dam basin, dam wall and proposed 600 mm rising main will be within the watercourse and will exceed 100 m^2. Both are located within a rural area.
Activity 19	The infilling or depositing of any material of more than 10 m^3 into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10m^3 from – (i) A watercourse.	The proposed dam basin, dam wall and inlet/outlet structures will result in the deposition or removal of 10 m^3 or more of material from and in a watercourse**.**
Activity 30	Any process or activity identified in terms of Section 53(1) of the National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004).	Indigenous vegetation will need to be cleared (i.e., permanent removal) in a Critical Biodiversity Area to accommodate the construction of the dam.
Activity 56	The widening of a road by more than 6 metres, or the lengthening of a road by more than 1 kilometre— (i) where the existing reserve is wider than 13,5 meters; or (ii) where no reserve exists, where the existing road is wider than 8 metres.	There are currently no formal access roads on site. Internal roads will need to be constructed to support the development.

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
Activity 63	The expansion of facilities or infrastructure for the transfer of water from and to or between any combination of the following— (i) water catchments; (ii) water treatment works; or (iii) impoundments; where the capacity will be increased by 50 000 cubic metres or more per day, but excluding water treatment works where water is treated for drinking purposes.	The proposed dam will include water transfer from the existing canal to the Lower Coerney Balancing Dam and from there to the Nooitgedacht WTW.
GN No 984 Listing Notice 2		
Activity 11	The development of facilities or infrastructure for the transfer of 50,000 cubic metres or more water per day, from and to or between any combination of the following:— (i) water catchments; (ii) water treatment works; or (iii) impoundments. Excluding treatment works where water is to be treated for drinking purposes,	Inlet and outlet pipelines will be constructed to transfer water daily from the Kirkwood primary canal into the dam and from the dam to the WTW.
Activity 15	The clearance of an area of 20 hectares or more of indigenous vegetation, excluding where such clearance of indigenous vegetation is required for— (i) the undertaking of a linear activity; or maintenance purposes undertaken in accordance with a maintenance management plan.	The proposed dam basin, dam wall and inlet/outlet structures will result in the clearance of more than 20 hectares of indigenous vegetation. The dam basin is expected to cover an area of 77 hectares.
Activity 16	The development of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall is 5 metres or higher, or where the high-water mark of the dam covers an area of 10 hectares or more.	The proposed dam wall will have a height of 20.5m.
GN No 985 Listing Notice 3		
Activity 4	The development of a road wider than 4 metres with a reserve less than 13.5 metres. **a. Eastern Cape** Outside urban areas: (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	There are currently no formal access roads leading to the site where the dam is proposed. It is anticipated that current access roads may need to be upgraded to improve access to the proposed dam.

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
Activity 12	The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan. a. **Eastern Cape** i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004; ii. Within critical biodiversity areas identified in bioregional plans.	Species of Conservation Concern (SCC) will need to be cleared (i.e.; permanent removal) in a Critical Biodiversity Area to accommodate the proposed dam.
Activity 14	The development of (i) dams or weirs, where the dam or weir, including infrastructure and water surface area exceeding 10 square metres; or (ii) infrastructure or structures with a physical footprint of 10 square metres or more where such development occurs (a) within a watercourse; (c) if no development setback has been adopted, within 32 meters of a watercourse. **a. Eastern Cape** i. Outside urban areas: (dd) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ff) Critical biodiversity areas or ecosystem service areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	The proposed dam and the associated infrastructure will have a physical footprint greater than 10 square meters and will be undertaken within 32 m of a drainage line which is regarded as a watercourse.
Activity 18	The widening of a road by more than 4 metres, or the lengthening of a road by more than 1 kilometre. **a. Eastern Cape** i. Outside urban areas: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (cc) Sensitive areas as identified in an environmental management framework as contemplated in chapter 5 of the Act and as adopted by the competent authority; (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	There are currently no formal access roads leading to the site where the dam is proposed. It is anticipated that current access roads may need to be upgraded to improve access to the proposed dam.

Activity No	Activity in writing as per Listing Notices 1,2 & 3 (GN No 983, 984 & 985)	Applicability
	(ii) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or (kk) A watercourse	
Activity 23	The expansion of (i) dams or weirs where the dam or weir is expanded by 10 square metres or more; or (ii) infrastructure or structures where the physical footprint is expanded by 10 square metres or more; where such expansion occurs— (a) within a watercourse; (b) in front of a development setback adopted in the prescribed manner; or (c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse; **a. Eastern Cape** i. Outside urban areas: (cc) Sensitive areas as identified in an environmental management framework as contemplated in Chapter 5 of the Act and as adopted by the competent authority (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans.	It is anticipated that existing canal and its associated infrastructure will be expanded by more than 10 square meters and will be undertaken within 32 m of a drainage line which is regarded as a watercourse.

In terms of Section 24(1) of NEMA, the potential impact on the environment associated with these listed activities must be considered, investigated, assessed and reported to DFFE as the competent authority (the decision-maker). This EIA was conducted in accordance with Section 21- 24 and Appendix 3 of the NEMA EIA regulations, 2014, as amended. NEMA requires that an EIA be undertaken in order to inform the authorisation process for a listed activity. The NEMA EIA regulations, 2014, as amended (Government Notice R. 982), published in terms of Sections 24(5) and 44 of NEMA, defines the manner in which the EIA is to be undertaken. Guideline documents have been published by the DFFE and these provide further guidance in implementing the EIA Regulations. The guideline documents were used as reference documents for the purpose of this EIA.

1.7 Purpose of the Report

In line with the National Environmental Management Act 107 of 1998, Environmental Impact Assessment (EIA) Regulations 2014, as amended, the proposed project will require an Environmental Authorisation prior to the commencement of construction activities. The purpose of the Environmental Impact Report (EIR) is to provide a description of the pre-development environment, biophysical and socio-economic environment in terms of the study area. The report also assesses the significance of potential impacts, both positive and negative in relation to the proposed development. Mitigation measures are provided for potential negative impacts. The report also provides a comprehensive description of the activities as well as specialist studies that have been undertaken for the EIA Phase and Public Participation Process (PPP), as well as the way forward in the form of conclusions, recommendations and an Environmental Management Programme (EMPr).

1.8 Assumptions and Limitations

The following assumptions have been made in the undertaking of the EIA process:

- The application is limited to the proposed Lower Coerney Balancing Dam site;
- The WULA process has been discontinued as indicated in Section 1.1;
- The information obtained from the specialist studies undertaken for this project is accurate, objective and sufficient for the level of assessment required;
- The information provided by the applicant is accurate, adequate, and unbiased, and no information that could change the outcome of the EIA process has been withheld;
- In accordance with the Protection of Personal Information Act (Act 4 of 2013), personal information (emails, contact numbers, address) is blanked out and excluded during the Public Participation and only provided to DFFE officials;
- Personal information of I&APs was made available to the competent authority shall only be used by the authorities to confirm or obtain information regarding this specific project; and
- It is assumed that I&APS and stakeholders who have been consulted, but do not provide comments on the reports, have no objections against the project.

1.9 Scoping and EIA Requirements

The list of activities applied in terms of the NEMA EIA Regulations has already been discussed in **Section 1.6.** These listed activities triggered by the proposed Lower Coerney Balancing Dam must follow the required Environmental Impact Assessment process as required by the NEMA EIA Regulations 2014, as amended. Based on these Regulations, a Scoping and EIA process was followed. The Application Form has been submitted to the DFFE as the relevant Competent Authority as per the 2014 NEMA EIA Regulations application procedures.

1.9.1 The Environmental Impact Assessment Phase

The EIA process must be undertaken in accordance with the 2014 EIA Regulations No. 982, as amended. The main objectives of the EIA Phase, in terms of the regulatory requirements stipulated in *Appendix 3* of the 2014 EIA Regulations, are to:

a) determine the policy and legislative context within which the activity is located and document how the proposed activity complies with and responds to the policy and legislative context;
b) describe the need and desirability of the proposed activity, including the need and desirability of the activity in the context of the preferred location;
c) identify the location of the development footprint within the preferred site based on an impact and risk assessment process inclusive of cumulative impacts and a ranking process of all the identified development footprint alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects of the environment;
d) determine the—
    i) nature, significance, consequence, extent, duration and probability of the impacts occurring to inform identified preferred alternatives; and
    (ii) degree to which these impacts-
        (aa) can be reversed;
        (bb) may cause irreplaceable loss of resources,
        (cc) can be avoided, managed or mitigated;
e) identify the most ideal location for the activity within the preferred site based on the lowest level of environmental sensitivity identified during the assessment;
f) identify, assess, and rank the impacts the activity will impose on the preferred location through the life of the activity;
g) identify suitable measures to avoid, manage or mitigate identified impacts; and
h) identify residual risks that need to be managed and monitored.

1.9.2 The Environmental Impact Report

As the Scoping process is complete, an Environmental Impact Report (EIR) was prepared and details the scope of the EIA required for the proposed activities. This EIR was compiled in accordance with the requirements set out in Appendix 3 of the 2014 EIA Regulations (GNR 982), which outlines the scope and contents of the Environmental Report and provides the requirements necessary for undertaking the Public Participation Process.

1.10 Structure of the Environmental Impact Report

This report has also considered the requirements outlined in Appendix 3 of the NEMA EIA Regulations 2014, as amended regarding the content of the Environmental Impact Report (EIR hereafter). In addressing these requirements, this EIR is divided into **12 Chapters**, the contents of which will be presented as follows in this report:

- **Chapter 1** introduces the background to the development proposal and profiles its proponents. Furthermore, this chapter provides an indication of the EIA process that was followed as well as providing insights into the legislative requirements that have resulted in the need for this process;

- **Chapter 2** provides the legislative framework for the EIA process and the context of the proposed development;
- **Chapter 3** is a detailed project description and proposed infrastructure;
- **Chapter 4** is a detailed description of the adopted Scoping and Environmental Impact methodologies that was implemented throughout the project;
- **Chapter 5** is a description of the receiving environment associated with the proposed project;
- **Chapter 6** is a description and comparative assessment of the alternatives that were considered;
- **Chapter 7** details the various steps and processes that were followed in the Public Participation Process. It also summarises key outcomes of the process;
- **Chapter 8** details the methodology used to identify and measure the impacts;
- **Chapter 9** details the issues and potential impacts identified and mitigation measures;
- **Chapter 10** provides an environmental impact statement;
- **Chapter 11** is a conclusion to the report as well as recommendations; and
- **Chapter 12** provides references used in the report.

1.11 Application Details

This section of the EIR provides the particulars, including contact details, of the key stakeholders (Applicant's representative, Environmental Assessment Practitioner and the relevant, Competent Authority Official associated with the project. These details are outlined in **Table 7** below.

Table 7: Application details

Applicant's representative	Environmental Impact Practitioner	Competent Authority Representative
Name: Fourie Chriselna **Designation**: Chief Director **Tel:** 082 809 2355 **e-Mail:** fouriec2@dws.gov.za **Name:** Dr. Dayton Tagwi **Designation**: Programme Director **Tel:** 067 415 8085 **e-Mail:** tagwid@dws.gov.za	**Name: Mr.** Vukosi Mabunda **Designation**: Environmental Impact Assessment Practitioner **Address:** GladAfrica House, International Business Gateway, 6th Rd, Midridge Park, Midrand, 1685 **Tel:** 011 312 2537 **Fax:** 011 805 1950 **Email:** vukosim@gaenvironment.com/ environment@gaenvironment.com	**Name:** Mr. Lunga Dlova **Designation**: 14/12/16/3/3/2/2222 Case Officer **Address:** Environment House 473 Steve Biko Road, Arcadia, Pretoria, 0001 **Tel:** 012 399 8524 **Email:** Dlova@dffe.gov.za

This EIR was prepared by **Vukosi Mabunda,** a Registered Environmental Assessment Practitioner (EAP) employed by GA Environment. His CV is included in **Appendix H** of this report. Mr. Vukosi Mabunda is a current Geographic Information Systems (GIS) Specialist and Environmental Assessment Practitioner with 5 years of working experience. Vukosi is a Registered Environmental Assessment Practitioner with the Environmental Assessment Practitioners Association of South Africa (EAPASA). He is one of the few dual registered professionals with SACNASP as a Professional Geospatial Scientist and Professional Environmental Scientist. Vukosi has a dual professional background in Geographic and Environmental Sciences with a Master of Science Degree in Geography.

1.12 Specialist Details

In accordance with the requirements of Appendix 6 of the NEMA EIA Regulations, 2014 as amended, and the National web-based environmental screening tool, the following specialist studies **Table 8** have been commissioned for the proposed development:

Table 8: Specialist Studies and Contact Details

No	Specialist Study	Company Name	Contact Person and Details
1.	Terrestrial Biodiversity Impact Assessment	The Biodiversity Company	Andrew Husted andrew@thebiodiversitycompany.com
2.	Aquatic Biodiversity Impact Assessment	The Biodiversity Company	Andrew Husted andrew@thebiodiversitycompany.com
3.	Agricultural Impact Assessment	The Biodiversity Company	Andrew Husted andrew@thebiodiversitycompany.com
4.	Phase I Archaeological Impact Assessment	Eastern Cape Heritage Consultants CC	Kobus Reichert kobusreichert@yahoo.com
5.	Palaeontological Impact Assessment	Natura Viva cc	Dr. John E. Almond almond@zsd.co.za
6.	Geotechnical Investigation Report	Aurecon South Africa (Pty) Ltd	E van der Berg erik.vanderberg@aurecongroup.com tshwane@aurecongroup.com

The specialist reports are attached as **Appendix F** of this report**.**

2 LEGISLATIVE FRAMEWORK

This section of the EIR discusses applicable legal provisions and the legal context for the Environmental Impact Assessment process required for the proposed Lower Coerney Balancing Dam. It provides a review of relevant legislation, regulations, policies and guidelines, which apply to or have implications, for the proposed project.

The contents of this report are based on a review of the information that was available at the time of the compilation of the report. The discussion in this chapter is by no means an exhaustive list of the legal obligations of the applicant in respect of environmental management for the proposed dam. These are:

- The Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996);
- National Environmental Management Act, 1998 (Act No. 107 of 1998);
- National Environmental Management: Biodiversity Act (NEMBA), 2004 (Act 10 of 2004);
- National Environmental Management; Waste Act, No 59 of 2008;
- National Environmental Management EIA Regulations 2014 (as amended);
- National Water Act, 1998 (Act No. 36 of 1998);
- The Water Services Act 108 of 1997;
- National Forests Act, 1998 (Act No 84 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Web-Based Environment Screening Tool;
- National Environmental Management Laws Amendment Act (Act No. 2 of 2022)
- Mineral and Petroleum Resources Development Act (No. 28 of 2002, as amended);
- Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983);
- Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013);
- Expropriation Act 63 of 1975;
- Protection of Personal Information Act, 2013 (Act 4 of 2013);
- Promotion of Access to Information Act, 2000 (Act No. 2 of 2000);
- Draft Eastern Cape Environmental Management Bill (2019); and
- Eastern Cape Biodiversity Conservation Plan (2018).

2.1 Legislation Review

2.1.1 Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996)

The environmental right is mentioned in Section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996). This states the following:

"...everyone has the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that prevent pollution and ecological degradation, promote conservation, and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development".

The State must therefore respect, protect, promote and fulfil the social, economic and environmental rights of everyone and strive to meet the basic needs of previously disadvantaged communities. The Constitution therefore recognises that the environment is a functional area of concurrent national and provincial legislative competence, and all spheres of government and all organs of state must cooperate with, consult and support one another if the State is to fulfil its constitutional mandate.

The application for Environmental Authorisation for the proposed Lower Coerney Balancing Dam will ensure that the environmental right enshrined in the Constitution contributes to the protection of the biophysical and social environment.

2.1.2 National Environmental Management Act, 1998 (Act No. 107 of 1998)

In order to bring section 24 of the Constitution of the Republic of South Africa, 1996 (Act No. 108 of 1996) into realisation, the National Environmental Management Act, 1998 (NEMA) (Act No. 107 of 1998) was promulgated to serve to *'provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote cooperative governance and procedures for co-ordinating environmental functions exercised by organs of state; to provide for certain aspects of the administration and enforcement of other environmental management laws; and to provide for matters connected therewith'.* NEMA is the main Environmental Legislation in South Africa and other Specific Environmental Management Acts (SEMA's) support its objectives. Examples of SEMA's include the following:

- National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008);
- National Water Act, 1998 (Act No. 36 of 1998);
- National Heritage Resources Act, 1999 (Act No. 25 of 1999);
- National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004); and
- National Environmental Management: Air Quality Act, 2004 (Act No. 39 of 2004)

Some specific Environmental Management Legislation is discussed in **Chapters 2.1.3 to 2.1.8.** The key principles of NEMA as outlined in Section 2 can be summarised as follows:

- sustainability must be pursued in all developments to ensure that biophysical and socio-economic aspects are protected or;
- there must be equal access to environmental resources, services and benefits for all citizens including the disadvantaged and the vulnerable. Adverse environmental impacts shall be distributed fairly among all citizens;
- environmental governance must include the participation of all interested and affected parties who must be catered for to allow their effective participation;
- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably; and
- The polluter pays principle must be applied in all cases where any person has caused pollution or undertaken any action that led to the degradation of the environment.

2.1.3 National Environment Management Act, 1998 (Amendments)

The National Environmental Management Act (Act No. 107 of 1998) has been amended numerous times to better meet its overall objective of the protection of the environment.

The amendments to NEMA include but are not limited to:

- National Environmental Management Act (Act No. 56 of 2002);
- National Environmental Management Act (Act No. 8 of 2004); and
- National Environmental Management Act (Act No. 46 of 2003).

2.1.4 NEMA Environmental Impact Assessment Regulations, 2014 as amended

In terms of section 24(2) of NEMA, the Minister and or any MEC in concurrence with the Minister may identify activities that require authorisation as these activities may negatively affect the environment. The Act requires that in such cases the impacts must be considered, investigated and assessed before their implementation, and reported to the organ of state charged by law with authorising, permitting, or otherwise allowing the implementation of an activity. The NEMA EIA Regulations guide the processes required for the assessment of impacts of Listed Activities.

The requirement for the undertaking of Environmental Impact Assessments and Basic Assessments began in 1997 with the promulgation of the EIA Regulations under the Environment Conservation Act, 1989 (ECA) (Act No. 73 of 1989). These were followed by the 2006, 2010 and 2014 regulations. **Table 5** is a summary of the progression of the EIA regulations to date.

Table 9: Summary of the South African EIA regulations from inception to date

EIA Regulations	Government Gazette
EIA Regulations promulgated in terms of the ECA, Act No 73 of 1989	GNR 1182 & 1183: Government Gazette No 18261, 5 September 1997
Amendment of the ECA EIA Regulations	GNR 670 and GNR 672 of 10 May 2002, Government Gazette No 23401
2006 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 385, 386 and 387 Government Gazette No 28753, Pretoria, 21 April 2006
2010 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 543, 544, 545 and 546 Government Gazette No 33306, Pretoria, 18 June 2010
2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 982, 983, 984 and 985 Government Gazette No 38282, Pretoria, 04 December 2014
Current Amendment of the 2014 EIA Regulations promulgated in terms of the NEMA, Act No 107 of 1998	GNR 982, 983, 984 and 985 Government Gazette No 40772, Pretoria, 07 April 2017

The Environmental Impact Assessment (EIA) for the proposed Lower Coerney Balancing Dam is undertaken in terms of the NEMA EIA Regulations, 2014, amended in 2017 and 2021.

2.1.5 National Water Act, 1998 (Act No. 36 of 1998)

The National Water Act, 1998 (Act No. 36 of 1998) aims to provide for management of the national water resources to achieve sustainable use of water for the benefit of all water users. This act requires that the quality of water resources is protected, used, developed, conserved, managed and controlled with the delegation of powers to institutions at the regional or catchment level. The purpose of the Act is to ensure that the nation's water resources are protected, used, developed, conserved and managed in ways that take into account:

- Meeting basic human needs of present and future generations;
- Promoting equitable access to water;
- Redressing the results of past racial discrimination;
- Promoting the efficient, sustainable and beneficial use of water in the public interest; facilitation social and economic development;
- Providing for the growing demand for water use;
- Protecting aquatic and associated ecosystems and their biological diversity;
- Reducing and preventing pollution and degradation of water resources;
- Meeting international obligations;
- Promoting dam safety; and
- Managing floods and drought.

In pursuit of these objectives, Chapter 4 of the act regulates water use, while Section 21 lists eleven water use types that are regulated [Section 21 (a) – (k)]. Watercourses and wetlands are protected in terms of this section, as both are regarded as water resources. Any person wishing to exercise a water use other than those defined in Schedule 1 of the National Water Act, or an existing lawful use, or a use promulgated by a General Authorisation, requires a water use licence. The activities described below are water uses defined in terms of section 21 of the National Water Act and needs authorisation, which includes licensing. The triggered Section 21 activities are;

(b) storing of water;

(c) impeding or diverting the flow in a watercourse;

(d) engaging in a stream flow reduction activity; and

(i) altering the bed, banks, course or characteristics of a watercourse.

A pre-application meeting was held with various units of the Licencing Authority of the Gqeberha Office of the Department of Water and Sanitation on the 15th of December 2021. During the meeting, the abovementioned Section 21 activities were confirmed. It must be noted that the Water Use License Application process has been discontinued following consultation with DWS Eastern Cape Region and based on the DWS Circular (**Appendix F**) in October 2022. The Draft Scoping Report was submitted to the Department of Water and Sanitation Eastern Cape Region for review and comment. At the time of compilation of this report, no comments on the environmental authorisation process were received from Department of Water and Sanitation Eastern Cape Region. However, input on the Water Use Authorisation process was provided by the DWS Eastern Cape Region.

2.1.6 The Water Services Act 108 of 1997

The Water Services Act (Act 108 of 1997) intends to:

- to provide for the rights of access to basic water supply and basic sanitation;
- to provide for the setting of national standards and norms, and standards for tariffs;
- to provide for water services development plans;
- to provide a regulatory framework for water services institutions and water services intermediaries;
- to provide for the establishment and disestablishment of water boards and water services committees and their powers and duties;
- to provide for the monitoring of water services and intervention by the Minister or by the relevant Province;
- to provide financial assistance to water services institutions;
- to provide for certain general powers of the Minister;
- to provide for the gathering of information in a national information system and the distribution of that information;
- to repeal certain laws; and
- to provide for matters connected therewith.

The Department of Water and Sanitation is complying with this act as they intend to develop the Lower Coerney Balancing Dam to provide water for irrigation to the farmers and provide a 21-day emergency supply of water to the NMBM.

2.1.7 National Heritage Resources Act, 1999 (Act No. 25 of 1999)

The objective of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) is to introduce an integrated system for the management of national heritage resources. The identification, evaluation and assessment of any cultural heritage site, artefact or find in South Africa is required by this Act.

Section 38(1) of this Act states that: *"...any person who intends to undertake a development categorised as...any development or other activity which will change the character of a site-*

(i) exceeding 5 000 m^2 in extent; or
(ii) involving three or more existing erven or subdivisions thereof; or
(iii) involving three or more erven or divisions which have been consolidated within the past 5 years; or
(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
(v) The rezoning of a site exceeding 10 000m^2 in extent; or
(vi) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish

it with details regarding the location, nature and extent of the proposed development".

Section 38(3) further states that the responsible heritage resources authority must specify the information to be provided in a report required in terms of subsection (2)(a). The Act stipulates that cultural heritage resources may not be disturbed without authorisation from the relevant heritage authority. Section 34(1) of the Act states that "no person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority…"

Section 35 of the Act pertains to the protection of archaeological and palaeontological sites or material as well as meteorites. Section 35(4)(1)(a) states that

'No person may, without a permit issued by the responsible heritage resources authority—

(a) destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite.

According to the national web-based environmental screening tool (DFFE Screening Tool Report) promulgated into law on the 4th of October 2019 under NEMA EIA Regulations, 2014 as amended, the proposed development is located within an area of low relative archaeological and cultural heritage theme sensitivity. However, a Heritage Impact Assessment (Compliance Statement at the minimum) must be undertaken to cater for Section 38(1) of this Act.

2.1.8 National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004)

The purpose of this Act is to provide for the:

- Management and conservation of South Africa's biodiversity within the framework of the National Environmental Management Act,1998;
- The protection of species and ecosystems that warrant national protection;
- The sustainable use of indigenous biological resources;
- The fair and equitable sharing of benefits arising from bio-prospecting involving indigenous biological resources; and
- The establishment and functions of a South African National Biodiversity Institute.

Chapter 7 of the NEMBA regulations govern the 'PERMIT SYSTEM FOR LISTED THREATENED OR PROTECTED SPECIES'. In order to remove or relocate any Threatened species or Protected species identified on the site, the relevant permits must be applied for. According to the Eastern Cape Biodiversity Conservation Plan (ECBCP), the proposed site falls within a Critical Biodiversity Area. The proposed dam will involve the removal of vegetation as well as trees. Therefore, the impacts on the biodiversity of the project will be assessed.

2.1.9 National Forests Act, 1998 (Act No 84 of 1998)

The purpose of the Act is to promote the sustainable management and development of forests and to provide protection for certain forests and trees in terms of:

- Section 15 (1) of the National Forest Act (Act 84 of 1998), any person wishing to cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree or

any forest product derived from a protected tree must apply for a license from the Minister or any delegated institution or authority; and

- Government Notice 38215, Notice of the List of Protected Tree Species under the National Forests Act, 1998 (Act No 84 of 1998) was gazetted in November 2014.

The proposed project will require the removal of trees, an Ecological assessment will be required to determine if any protected tree species will potentially be affected by the proposed dam. Should the proposed project require the removal of any protected tree species, then the application will have to be lodged with DFFE.

2.1.10 National Environmental Management; Waste Act, No 59 of 2008

The National Environmental Management: Waste Act, no 59 of 2008 came into effect on the 1st of July 2009. The Waste Act places a general duty on a holder of waste to avoid the generation of waste and where such generation cannot be avoided, to minimise the toxicity and amounts of waste that are generated; reduce, re-use, recycle and recover waste; where waste must be disposed of, ensure that the waste is treated and disposed of in an environmentally sound manner; manage the waste in such a manner that it does not endanger the health or the environment or cause a nuisance through noise, odour or visual impacts; prevent any employee or any person under his or her supervision from contravening the Act; and prevent the waste from being used for an unauthorised purpose. All waste that will be generated during the construction phase of the development must be managed in accordance with this Act.

2.1.11 National Environmental Management Air Quality Act (Act 39 of 2004)

The purpose of the act is to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development; to provide for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto. Construction/building waste generated during the construction phase will be managed in accordance with this Act.

2.1.12 Mineral and Petroleum Resources Development Act (No. 28 of 2002, as amended)

The construction of the dam and specifically the dam wall and embankments will require a significant quantity of material. DWS has indicated that the material will either be from the excavations or from commercial sources and there will be no need for borrow material. Should the material excavated for the dam basin prove to be unsuitable, material will have to be sourced elsewhere either from a commercial source or from a project-specific borrow pit/quarry. In the case of the latter, the applicant (currently considered to be DWS) will have to apply for a mining permit or license which is subject to an EIA under Listing Notice 1 or 2 of the 2014 EIA Regulations. The aforementioned EIA cannot be done as part of an integrated EIA process, and the EA application and permit/license application have to be submitted to the regional Department of Mineral Resources (DMR) offices (in this instance in Gqeberha). The need for a mining permit/license and associated EIA should be re-evaluated once geotechnical investigations have been completed and the suitability of *in situ* material for construction has been determined and/or commercial sources for material have been identified.

2.2 National Web-Based Environment Screening Tool

On the 5th of July 2019, The Department of Forestry, Fisheries and the Environment issued a Notice of the requirement to submit a report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and Regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended. The submission of this report is compulsory when applying for environmental authorisation in terms of Regulation 19 and Regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from the 4th of October 2019. The DFFE Screening Tool Report was generated on the 9th of November 2021. The Screening report is provided in **Appendix I** of this report. The main findings to be discussed from the screening report are listed below.

i. Proposed Development Area Sensitivity

The following summary of the study area's environmental sensitivities were identified in the Environmental Screening Report. The environmental sensitivities for the proposed development footprint are indicated on **Table 6**.

Table 10: Environmental Sensitivity of Project Area

Theme	Very High sensitivity	High sensitivity	Medium sensitivity	Low sensitivity
Agriculture Theme		X		
Animal Species Theme		X		
Aquatic Biodiversity Theme				X
Archaeological and Cultural Heritage Theme				X
Civil Aviation Theme			X	
Defence Theme				X
Palaeontology Theme	X			
Plant Species Theme			X	
Terrestrial Biodiversity Theme	X			

Based on the environmental sensitivities of the proposed project area summarised in **Table 6**, the following list of specialist assessments were identified by the Environmental Screening Report. **Table 7** provides the Specialist studies identified in the Screening report. A motivation or compliance statement has been provided by the EAP where a study was not undertaken.

Table 11: Specialist Assessments Identified

No	Specialist Assessment	EAP Motivation
1	Agricultural Impact Assessment	The proposed dam is approximately 77 ha and is located within the largest Citrus production in the South Africa. It is anticipated that a large agricultural field area will be lost due to the dam. However, apart from acting as an emergency supply during low water supply, the dam will in fact supply water to the farms to ensure ongoing production. In addition, there is a shortage of water supply to the farming community at large and the dam will provide additional water supply. Nevertheless, an Agricultural Impact Assessment was be undertaken (**Appendix F1**).
2	Landscape/Visual Impact Assessment	This is not recommended as the proposed development and its locality does not trigger the need for this specialist study based on the triggers as identified by Oberholzer (2005). The development will not be a possible visual intrusion as it will blend in with existing land uses which includes

		the existing dams and surrounding citrus farm and will not change the fabric or character of its vicinity. **Therefore, this study was not undertaken**.
3	Archaeological and Cultural Heritage Impact Assessment	Although the site is located within a low Archaeological and Cultural Heritage Sensitivity theme, a compliance statement is recommended to ensure no potential heritage features are impacted upon given the large footprint of the development as well as to ensure that Section 38(1) of the NHRA is catered for. As such, an Archaeological and Cultural Heritage Impact Assessment was undertaken (**Appendix F5**).
4	Palaeontology Impact Assessment	A Palaeontology Impact Assessment was required as the development area is located within an area of Very High paleontological sensitivity. A Palaeontology Impact Assessment is attached as (**Appendix F4**).
5	Terrestrial Biodiversity Impact Assessment	A Terrestrial Biodiversity Impact Assessment was required as the development area is located within an area of high ecological sensitivity. A Terrestrial Biodiversity Impact Assessment was undertaken and is attached as (**Appendix F2**).
6	Aquatic Biodiversity Impact Assessment	Although the site is located within an area of low aquatic sensitivity, an Aquatic Biodiversity Impact Assessment was recommended due to the nature of the development as well as to support the Water Use Authorisation Application. An Aquatic Biodiversity Impact Assessment was undertaken and is attached as (**Appendix F3**).
7	Noise Impact Assessment	The proposed access (gravel) roads will tie into existing surfaced roads south of the study area. Most of the noise is anticipated during the construction phase, however given the surroundings of the area, the trees and vegetation (natural noise barriers) will absorb any noise produced. In addition, there are no residential areas surrounding the site. As such, the EAP suggested that a Noise Impact Assessment was not required.
8	Geotechnical Assessment	Geotechnical investigations are necessary for a development of this nature to ensure sustainability and safety issues are catered for during the design. Geotechnical investigations for the site were undertaken in September 2019 and attached as (**Appendix F6**).
9	Socio-Economic Assessment	In terms of land use change, it is not anticipated that the proposed dam will lead to a drastic land use change as the proposed activities will blend with the existing activities within the larger area. The proposed dam will in fact support the surrounding farming communities. There is a likelihood of temporary employment during the construction phase of the project and permanent employment opportunities during the operational phase. It was the opinion of the EAP that a Socio-Economic Assessment was not necessary for project.
10	Seismicity Assessment	This study was covered by the Geotechnical investigations undertaken for the site in September 2019 attached as (**Appendix F6**).
11	Plant Species Assessment	This study was covered by the Terrestrial Biodiversity impact assessment attached as (**Appendix F2**).
12	Animal Species Assessment	This study will be covered by the Terrestrial Biodiversity Impact assessment attached as (**Appendix F2**).

2.3 National Environmental Management Laws Amendment Bill (Act No. 2 of 2022)

The National Environmental Laws Amendment Bill, known as 'the NEMLA Bill' or 'NEMLAA4' (Act No. 2 of 2022), finally became an Act on 24 June 2022 and will introduce a major shift in South Africa's environmental legislation on a date to be fixed and proclaimed by the President. Act No. 2 of 2022 – undoubtedly the most significant piece of environmental legislation that has been published since the implementation of the One Environmental System (OES) in 2014 – has finally been signed into law (the Act). Many of the changes under NEMLA are intended to clean up a range of issues associated with the roll-out of the OES – which overhauled the manner in which environmental issues are regulated on mine sites, among other things. Overall, the changes imposed by the Act aim to deter non-compliance with environmental laws by, among other things, introducing new offences, increasing the quantum of fines and administrative penalties where laws or licences have been contravened, and extending enforcement powers to enable more widespread enforcement of environmental laws. The developer must ensure that the development takes into consideration the changes stipulated under NEMLA. A review of NEMLA and its impact on the development may be applicable should the developer fail to comply with the legislation discussed in this report, the EA and/or any other authorisations / licenses applicable to the development. The developer (DWS) may face harsh penalty fines should they fail to comply with NEMA EIA Regulations, 2014 as amended and/or specific conditions which will be stipulated in the Environmental Authorisation by the competent authority (DFFE).

2.4 Spatial Planning and Land Use Management Act, 2013 (Act No. 16 of 2013)

The Spatial Planning and Land Use Management Act, No.16 of 2013, has been in effect since July 2015. Essentially SPLUMA applies to the governance of how land is used, which is significant for developers who are applying for land developments. The objectives of the act are to:

- provide for a uniform, effective and comprehensive system of spatial planning and land use management for the Republic;
- ensure that the system of spatial planning and land use management promotes social and economic inclusion;
- provide for development principles and norms and standards;
- provide for the sustainable and efficient use of land;
- provide for cooperative government and intergovernmental relations amongst the national, provincial and local spheres of government; and
- redress the imbalances of the past and ensure that there is equity in the application of spatial development planning and land use management systems.

The proposed site falls within an "Agricultural" zone and the main function will be to provide water supply for agricultural activities and an emergency water supply to the Nelson Mandela Bay Metropolitan Municipality. Therefore, the development is located within an appropriate land use zone.

2.5 Expropriation Act 63 of 1975

The Expropriation Act 63 of 1975 intends to provide for the expropriation of land and other property for public and certain other purposes. Expropriation means the compulsory acquisition of land from a

private person (individuals and juristic persons) by the state for constitutionally circumscribed purposes. Under section 25 of the Constitution, an expropriation is legally justified if it serves a public purpose or a public interest. Although neither term is defined in the Constitution, courts have defined public purposes as “government-related purposes” like the building of schools or hospitals or providing basic services like water.

Public interest is much broader but includes the need for land reform. The decision to expropriate must be taken by the state and the ownership of land, initially vests with the state, after which it may be transferred to another private individual or held by the state in perpetuity. Should there be issues with the landowner refusing to give off the land for the development of the dam in line with the land acquisition and applicable compensation process, the Developer (DWS) would have to exercise the expropriation of land. DWS will formally engage and negotiate will all affected landowners before considering the land expropriation process.

2.6 Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)

This Act provides for the protection of agricultural land in rural areas, i.e., land that is not situated in urban areas (except for provisions for the control of weeds that do apply to land in urban areas). The Act shall not apply to mountain catchment areas. The objective of this Act is to provide for the conservation of the natural agricultural resources of the Republic by the maintenance of the production potential of land, by combating and prevention of erosion and weakening or destruction of the water sources, and by protection of the vegetation and the combating of weeds and invader plants.

The Act prohibits the spreading of weeds and empowers the Minister to prescribe control measures which shall be complied with by land users to whom they apply. Such control measures may relate to: (a) the cultivation of virgin soil; (b) the utilization and protection of land which is cultivated; (c) the irrigation of land; (d) the prevention or control of waterlogging or salination of land; (e) the utilization and protection of vleis, marshes, water sponges, water courses and water sources; (f) the regulating of the flow pattern of run-off water; (g) the utilization and protection of the vegetation; (h) the grazing capacity of veld, expressed as an area of veld per large stock unit; (i) the maximum number and the kind of animals which may be kept on veld; (j) the prevention and control of veld fires; (k) the utilization and protection of veld which has burned; (l) the control of weeds and invader plants; (m) the restoration or reclamation of eroded land or land which is otherwise disturbed or denuded; (n) the protection of water sources against pollution on account of farming practices; and (o) the construction, maintenance, alteration or removal of soil conservation works or other structures on land.

The executive officer may by means of a direction order a land user to comply with a particular control measure. The Minister may, by notice in the Gazette, establish assistant schemes for purposes of this Act. If necessary for the restoration or reclamation of the natural agricultural resources of any land to achieve the objectives of this Act, the Minister may expropriate land. The Act establishes the Conservation Advisory Board and empowers the Minister to establish (regional) conservation committees. The developer must comply with the conditions of this act. Environmental Management Plans including an Environmental Management Programme (EMPr), Alien Invasive Species

Management Species, Rehabilitation Plan and Soil and Erosion Management Plan will be compiled to effectively manage and guide the development.

2.7 Protection of Personal Information Act, 2013 (Act 4 of 2013)

The Protection of Personal Information Act (or POPI Act) sets some conditions for responsible parties (called controllers in other jurisdictions) to lawfully process the personal information of data subjects (both natural and juristic persons). To comply with the requirements of this Act, all personal information (emails, contact numbers, address) are blanked out during the Public Participation process and only provided to DFFE officials who do not require consent to receive such information in the performance of their official duties.

2.8 Promotion of Access to Information Act, 2000 (Act No. 2 of 2000)

This Act gives effect to the constitutional right of access to any information held by the State and any information that is held by another person and that is required for the exercise or protection of any rights. To comply with the requirements of this Act, all documents relating to the EIA Process will be made available to the public and relevant authorities in the different spheres of Government.

2.9 Draft Eastern Cape Environmental Management Bill (2019)

Its professed objectives are to rationalize, consolidate and reform the law regulating environmental management and to provide for the harmonisation of provincial legislation with national legislation regulating protected areas, biodiversity, waste management and air quality and to provide for matters connected therewith. It is proposed in the draft bill that the following Acts applying in the Eastern Cape are repealed:

- Nature and Environmental Conservation Ordinance, 1974;
- Nature Conservation Act, 1987 (Ciskei);
- Environmental Conservation Decree, 1992 (Transkei); and
- Mountain Catchment Areas Act, 1970.

The Developer must ensure that the necessary environmental processes, applications, studies and investigations are undertaken before the construction phase in accordance with the Eastern Cape Environmental Management Bill. The conditions, recommendations and mitigation measures provided in the studies must be implemented as far as possible to ensure the environmental impacts are kept as low as possible.

2.10 Eastern Cape Biodiversity Conservation Plan (2018)

The Eastern Cape Biodiversity Conservation Plan (ECBCP) is the new biodiversity planning product developed for the Eastern Cape Province to mainstream biodiversity into the municipal planning process, in particular the Spatial Development Frameworks (SDFs), in protecting biodiversity and promoting appropriate development. The overall goal of the ECBCP is to facilitate sustainable development in the Eastern Cape, by ensuring that the province's ecosystems continue to deliver vital services for human well-being by:

- Providing information that strengthens land-use planning and streamlines environmental decision-making;
- Enhancing effective conservation and management of biodiversity; and

- Guiding the expansion of the provincial protected area network.

According to the ECBCP, the proposed dam is located within a Critical Biodiversity Areas (CBAs). CBAs are terrestrial and aquatic features in the landscape that are critical for conserving biodiversity and maintaining ecosystem functioning. The dam footprint is approximately 77ha and will require clearance of vegetation within a CBA, therefore the developer (DWS) must ensure that all applications, permits and licenses are obtained in line with NEMA, Eastern Cape Environmental Management Bill and ECBCP before any clearance can be undertaken for the development.

3 PROJECT AND PROCESS DESCRIPTION

The information provided in this Section is taken from the feasibility reports; *Options Analysis Report: Support of the Water Reconciliation Strategy for the Algoa Water Supply System* by Aurecon (2019) and *the Support of the Water Reconciliation Strategy for the Algoa Water Supply System – Series* by the Department of Water and Sanitation (2019*).*

The objective of the Water Reconciliation Strategy for the Algoa Water Supply System is to:

- limit risks of shortfall in supply to the Nelson Mandela Bay Municipality (NMBM) and the Lower Sundays River Government Water Scheme (LSRGWS);
- remove potential operating system constraints for the sustainable delivery of bulk Orange River water supply to the LSRGWS and NMBM, for water requirements up to 2040; and
- limit operational risks to acceptable levels.

The existing Scheepersvlakte Balancing Dam is a balancing facility that is currently used for water supply to both LSRWUA and NMBM, but has inadequate capacity for emergency supply to NMBM. Feasibility study investigations were undertaken to provide dedicated balancing storage for water supply to the Nooitgedagt water treatment works (WTW), which provides potable water to NMBM. The main purpose of the proposed new balancing dam, at the Lower Coerney site, is to improve operation and provide balancing storage for NMBM. After investigation of a number of potential dam sites, the Lower Coerney site was found to be the most favorable site for the proposed new balancing dam for emergency water supply to NMBM. The feasibility design was undertaken on the Lower Coerney Balancing Dam.

3.1 Overview of the proposed Coerney Balancing Dam Design and Infrastructure

The feasibility-level design of the conveyance infrastructure associated with the proposed balancing dam has concluded the following:

1. The proposed scheme comprises of two gravity pipelines.
2. The main advantages of the proposed scheme are that the proposed Coerney Dam would increase the raw water storage capacity of NMBM and the high point in the existing Nooitgedagt WTW gravity main would be bypassed.
3. The hydraulic calculations of both pipelines are based on a design capacity of 280 mega liters a day (Mℓ/d) or 3.24 cubic meters per second (m^3/s) and Coerney Dam water levels at Minimum Operating Level (MOL) of 86 meters above the mean seal level (masl) and a Full Supply Level (FSL) of 98.2 masl.
4. A storage capacity of only 17% would be required for a Nominal Diameter (DN) 1400 pipeline to deliver the design flow rate of 3.24 m^3/s. A flow of 106.6 Mℓ/d can be discharged through a Diameter Nominal (DN) 1400 pipeline with the dam level at MOL, i.e., almost 40% of the maximum flow rate.
5. Based on the hydraulic gradient lines, it would be possible to discharge 280 Mℓ/d from the Kirkwood Canal to the Coerney Dam.
6. It is proposed that steel pipes be considered as the preferred pipe material for the proposed pipelines.

7. Based on the preliminary wall thickness calculations, the proposed pipelines will be DN 1400, Grade X52 steel with a yield strength of 358 MPa and a recommended wall thickness of 10 mm.
8. The proposed dam will be supplied from the Kirkwood primary canal through a DN 1400 pipeline, which will also be used to transfer water to the tie-in point on the existing Nooitgedagt pipeline.
9. The offtake from the Kirkwood primary canal will be located downstream of the Coerney syphon intake, and upstream of the long weir. It is proposed that the new offtake comprises an adjustable weir that would allow regulating of the flow that could be discharged from the canal to the WTW or the Coerney Dam.
10. A connection will be made into the existing Nooitgedagt WTW supply pipeline downstream of the cross-connection with the Scheepersvlakte syphon, and downstream of the existing high point in the existing supply pipeline.
11. The Middle Addo canal will have to be crossed at two locations using a pipe bridge.
12. The proposed Coerney Dam spillway will need to be crossed by the DN 1400 pipeline, if the spillway is constructed on the right abutment of the dam. There will be no impact on the pipeline if the spillway is constructed on the left abutment.
13. An additional syphon under the Sundays River on the existing Nooitgedagt WTW supply pipeline is proposed. The purpose is to reduce the risk of supply failure and to mitigate the risk of the new balancing storage being located on the opposite side of the river, relative to the WTW.
14. It is proposed that the new syphon be located upstream and separate from the existing syphon. Apart from doubling the syphon it is also recommended that an adequate stockpile of replacement pipes be kept on site, to enable quick repair of the pipeline in case of failure.

3.2 Pipeline Design

The proposed scheme comprises two gravity pipelines, namely a pipeline supplying water from the Kirkwood Primary canal to the proposed Coerney Dam, and a pipeline supplying water from the proposed Coerney Dam to a tie-in point on the existing Nooitgedagt pipeline that feeds the Nooitgedagt WTW. The main advantages of the proposed scheme are that the proposed Coerney Dam would increase the raw water storage capacity of NMBM. The high point in the existing Nooitgedagt WTW gravity main would be bypassed, to increase the hydraulic capacity during periods with low water levels in the dam. Refer to **Figure 3** for the Schematic layout of the proposed new dam and connecting pipelines.

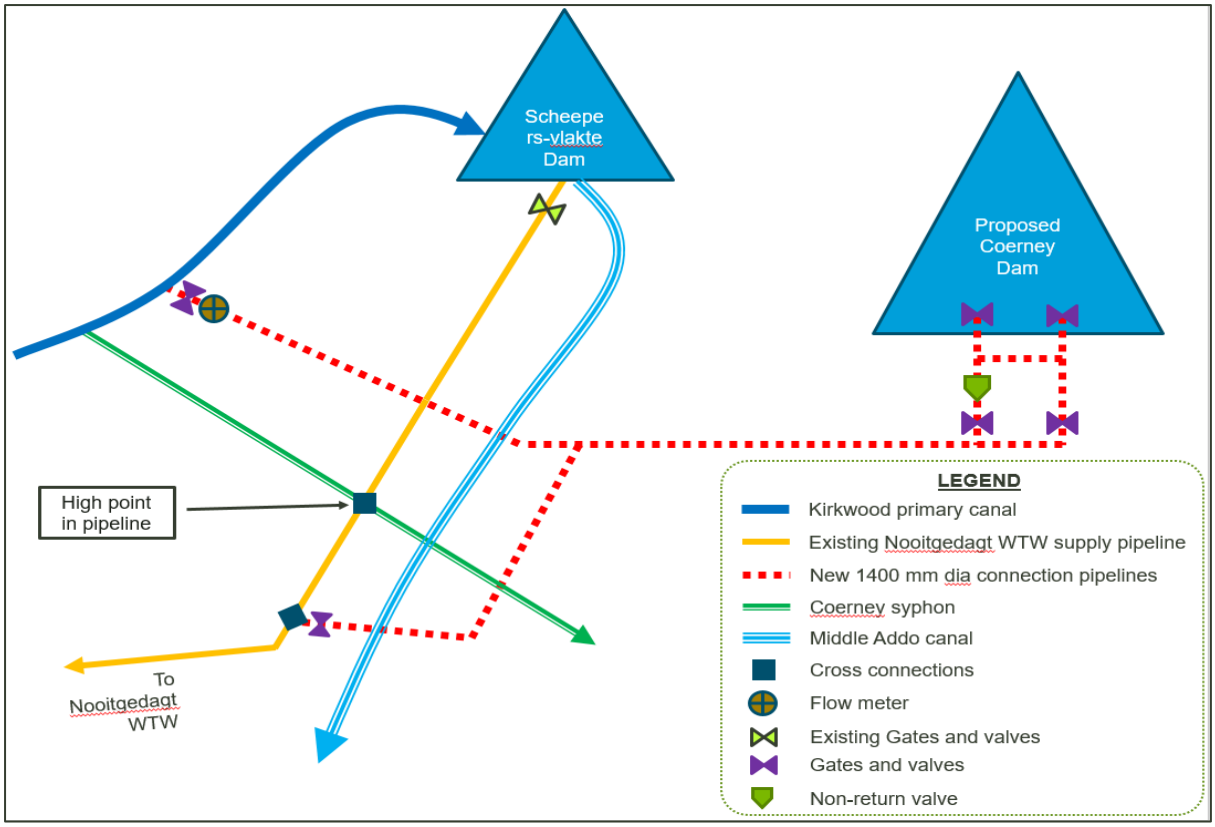


Figure 3: Schematic layout of the proposed new dam and connecting pipelines (DWS, 2020)

The hydraulic calculations of both pipelines are based on a design capacity of 280 Mℓ/d (3.24 m^3/s) and the Coerney Dam water levels at a minimum operating level of 86 masl and a full supply level of 98.2 masl. The Hazen-Williams equation was used to determine the operating level required for a flow of 280 Mℓ/d. The results were compared against the Depth-Storage Curve for the dam to compare the percentage storage versus the minimum water level required to discharge the maximum flow of 280 Mℓ/d. Based on the hydraulic gradient lines it would be possible to discharge 280 Mℓ/d from the Kirkwood Canal to the Coerney Dam, even when the dam is at the full supply level. A residual pressure of approximately 3 m would be available at the tie-in point to the existing Nooitgedagt WTW supply pipeline.

Glass reinforced polyester (GRP), ductile iron and steel pipes were considered suitable pipe materials, based on the pipeline diameter and expected working pressures. Given the advantages of steel pipes, it is proposed that this be considered as preferred pipe material for the proposed pipelines.

A preliminary wall thickness calculation was undertaken based on limited geotechnical information, hydraulic analyses and external loads. Based on the assumptions and calculations the proposed pipelines will be DN 1400, Grade X52 steel with a yield strength of 358 MPa and a recommended wall thickness of 10 mm. The maximum soil cover of 3.4 m will have to be adhered to during the detailed design of the vertical alignment of the pipelines. A wall thickness of more than 10 mm might be required if the E-value of the native soil is worse than expected or if the E-value of the bedding material is lower than anticipated.

3.3 New offtake at Kirkwood primary canal

The proposed offtake from the Kirkwood primary canal will be located downstream of the Coerney syphon intake, and just upstream of the long weir, which will provide head to the new intake. It is proposed that the new offtake comprises an adjustable weir that would allow for regulating the flow that could be discharged from the canal to the WTW or to Coerney Dam. At the offtake location, the canal has a floor level of 103.9 masl with the top of the long weir at a level of 105.8 masl. The length of the adjustable weir (or sluice gate) must therefore be such that the head required would be less than the overflow level of the long weir. **Table 12** shows the head required for different weir widths to discharge different flows, e.g., for a weir width/length of 1.0 m, a discharge head of 1.426 m would be required for a flow of 250 Mℓ/d.

Table 12: Kirkwood canal offtake - Flow depths for different flows and weir widths (DWS, 2020)

Width of weir (m)	Flow (Mℓ/d)					
	50	100	150	200	250	280
0.5	0.774	1.229	1.610	1.950	2.236	2.441
1.0	0.488	0.774	1.014	1.229	1.426	1.537
1.5	0.372	0.591	0.774	0.938	1.088	1.173
2.0	0.307	0.488	0.639	0.774	0.898	0.969
2.5	0.265	0.420	0.551	0.667	0.774	0.835
3.0	0.234	0.372	0.488	0.591	0.685	0.739

It is proposed that the floor level be raised at the off-take to a level of 104.2 masl to mitigate the risk of sediment being transported from the bottom of the canal to the pipeline. This leaves 1.6 m as the maximum head available to discharge a flow of 280 Mℓ/d, meaning that a 1.5m weir length would still allow just over 400 mm of freeboard. The water from the off-take will discharge into a wet well that will be piped through a magnetic flow meter. The display from the flow meter will be positioned next to the adjustable sluice gate, which will allow the weir to be adjusted to discharge a certain flow. The proposed offtake configuration is shown in **Figure 4**.

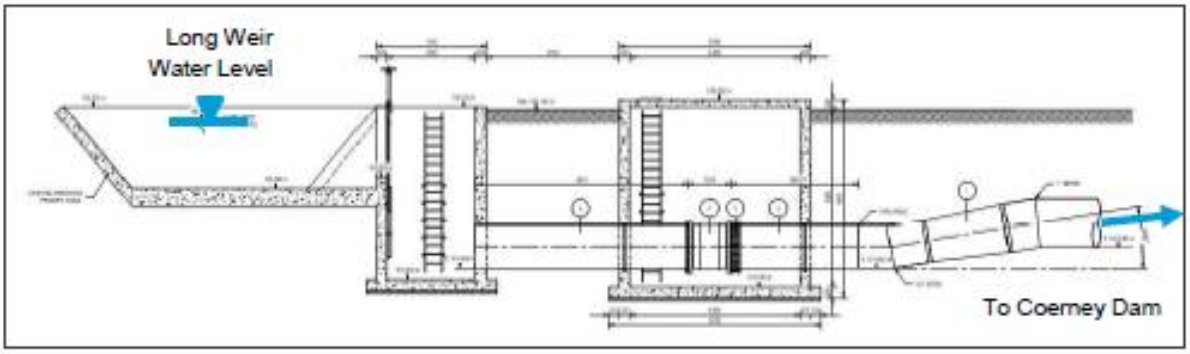


Figure 4: Section view of Offtake at Kirkwood Canal (DWS, 2020)

3.4 Coerney Dam Inlet/Outlet Chamber

The proposed dam will be supplied from the Kirkwood primary canal with a DN 1400 pipeline, which will also be used to transfer water to the tie-in point on the existing Nooitgedagt pipeline. The pipe for supplying water to and from the dam will bifurcate into an inlet and outlet branch at the outlet chamber at the downstream toe of the dam wall embankment. The inlet branch will have an isolation valve for shutting off the supply when the dam is full; this is to prevent spilling canal water. The outlet branch will be fitted with a non-return valve and an isolation valve upstream and downstream. The non-return valve will ensure that water can be automatically supplied from the dam in the event that the inlet has been shut to avoid spilling of the dam when it is full.

The isolation valves will ensure that the non-return valve can be serviced while the inlet pipe remains in operation. The inlet and outlet pipe branches will reduce from DN 1400 to DN 1200 at the bifurcation and reduce from DN 1200 to DN 1000 after the cross-connection before passing through the dam wall embankment in a concrete encasement. Both pipes will connect to a wet well outlet tower in the dam basin. The Inlet/Outlet chamber is shown in **Figure 5**.

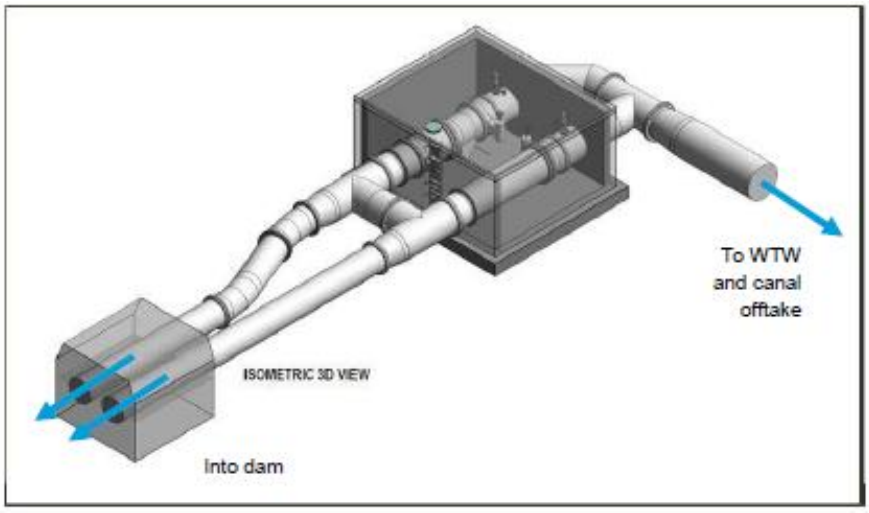


Figure 5: Isometric view of Coerney Dam Inlet/Outlet Chamber (DWS, 2020)

3.5 Tie in to existing Nooitgedagt WTW supply pipeline

A connection needs to be made into the existing 1400 mm diameter Nooitgedagt supply pipeline. The existing pipeline is manufactured from Grade B steel with a cement-mortar lining and bitumen fiberglass coating and has an 11 mm wall thickness at the connection point. The tie-in will be located downstream of the cross-connection with the Scheepersvlakte syphon and downstream of the existing high point in the existing supply line. The tie-in will comprise a 1400 mm x 1400 mm equal tee that will be cut into the existing pipeline. The branch of the tee will be fitted with an isolation valve should maintenance be required on this pipeline. The tie-in drawing is shown in **Figure 6**.

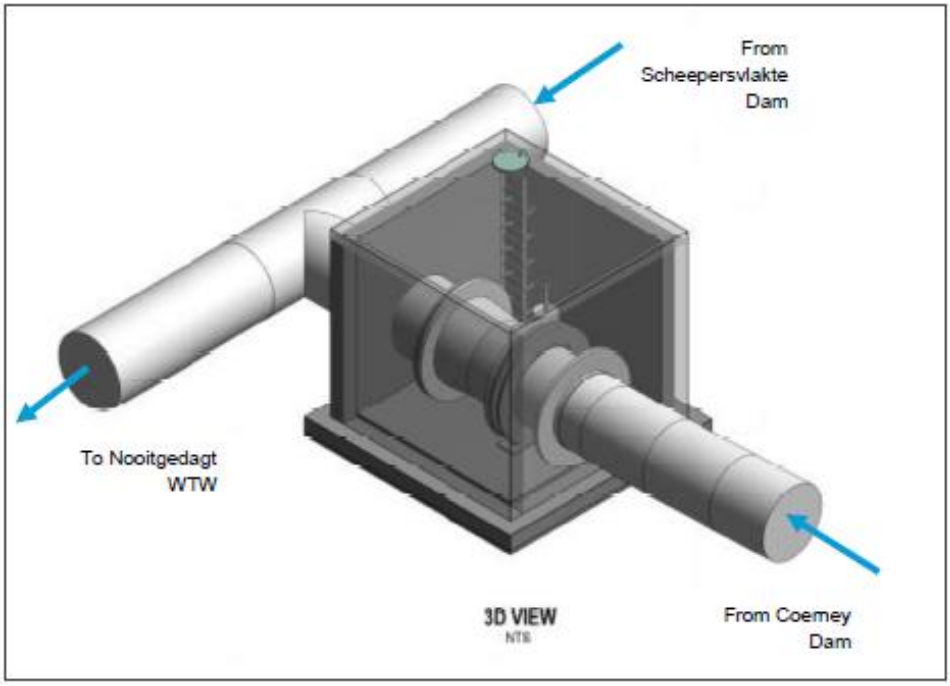


Figure 6: Isometric view of Tie-in to Existing Nooitgedagt Supply Pipeline (DWS, 2020)

3.6 Middle Addo Canal Crossings

The new supply pipeline to the Coerney Dam and the bypass pipeline will need to cross the Middle Addo canal. The approximate elevations and width of the canal at the points of crossing are indicated in **Table 13**.

Table 13: Middle Addo Canal details (DWS, 2020)

Canal Details	New Supply Pipeline to Lower Coerney Dam	Bypass Pipeline to WTW
Canal width	5.35 m	1.610
Centre line canal	82.43 masl[1]	82.23 masl[1]
Left Bank canal	83.91 masl[1]	83.73 masl[1]

The exact positions of the Middle Addo canal crossing must be verified during the detailed design of the pipelines. It is proposed that the pipeline be installed over the canal (above ground) not to impact the operation or integrity of the canal, and to facilitate easier maintenance if required. The 1400 mm diameter steel pipe will serve as the pipe bridge with concrete supports on either side of the canal. An air valve will have to be installed at the high point created by the canal crossing. The air valve will also serve as an access point into the pipeline for maintenance purposes. Additional protection of the exposed pipe may be required. A typical detail of the pipe bridge is shown in **Figure 7**.

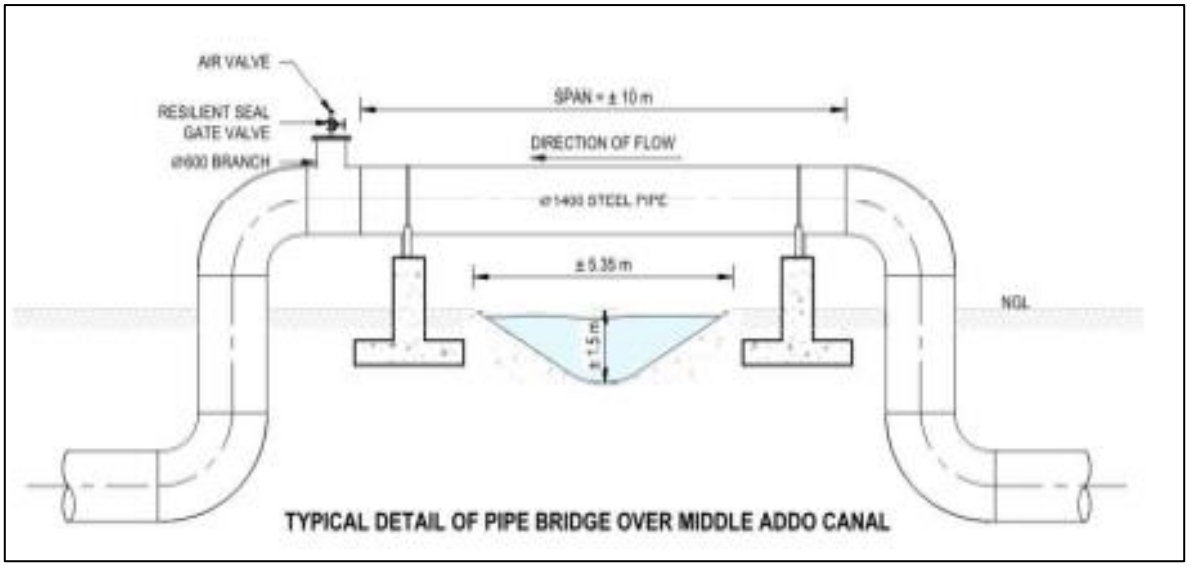


Figure 7: Typical detail of Pipe Bridge over Middle Addo Canal (DWS, 2020)

3.7 Proposed Coerney Dam spillway crossing

The position of the Coerney Dam spillway is not yet finalized. If the spillway is constructed on the left, it will have no impact on the proposed pipeline. If the Coerney Dam spillway is positioned on the right the proposed DN 1400 pipeline will need to cross it, in which event it is proposed that the pipeline crosses under the spillway just downstream of the stilling basin as shown in **Figure 8**. The pipeline will most likely be encased as part of the stilling basin's end sill.

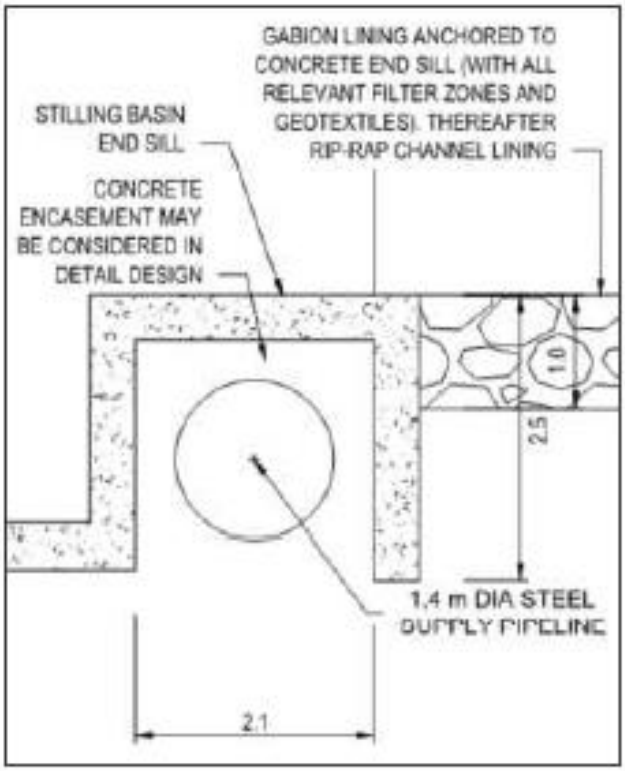


Figure 8: Typical detail of pipe underneath spillway (DWS, 2020)

3.8 Existing Nooitgedagt WTW supply pipeline crossing

The proposed pipeline from the Kirkwood primary canal to the Coerney Dam will have to cross the existing Nooitgedagt WTW supply pipeline. The proposed pipeline would need to cross under the existing Nooitgedagt WTW pipeline due to the limited soil cover on the existing pipeline at the point of crossing. The invert level at the proposed crossing is approximately 83.7 masl. The new pipeline will have a 300 mm clearance between the invert of the existing pipeline and the crown of the new pipeline. The existing pipeline will have to be excavated by hand to confirm the exact levels during the construction phase of the project and to ensure that no damage is done to the existing pipeline.

3.9 Syphon under Sundays River

An additional syphon under the Sundays River on the existing Nooitgedagt WTW supply pipeline is proposed to:

- Reduce the risk of supply failure in the event of damage to the existing syphon; and
- Mitigate the risk due to the new balancing storage being located on the opposite side of the river, relative to the WTW.

The additional syphon under the Sundays River will be concrete encased. The top of the reinforced pipe encasement should be below the riverbed level. The length of the encasement is assumed to be approximately 105 m (the same as the existing pipeline). It is proposed that the new syphon be located upstream of the existing syphon at a suitable point to cross the river. The new syphon should be separate from the existing syphon at a suitable distance upstream. The additional syphon will potentially also be on private property and landowner discussions will need to be initiated.

An air valve chamber and a scour valve chamber will have to be installed, and tie-ins made into the existing pipeline. The air valve will also serve as an access point into the new pipeline for maintenance purposes. The tie-ins will comprise 1400 mm x 1400 mm equal tees that will be cut into the existing pipeline and installed on the new syphon pipeline. Isolating valves will be provided so that the new syphon can be isolated, as it will only be used if the existing syphon is damaged or when maintenance is required.

An example of the syphon is indicated in Section 5.1 (**Figure 9**). As-built drawings and/or information will have to be obtained of the existing syphon during the detailed design phase of the project. Apart from doubling the syphon it is also recommended that an adequate stockpile of replacement pipes be kept, to be able to quickly repair the pipeline in case of failure.

4 EIA METHODOLOGY

The NEMA Regulations of 2014, as amended identify three separate administrative processes for EIAs, depending on the nature of the activity. A Basic Assessment process (Listing Notice 1) is identified for those activities that have less of a possible detrimental impact to the environment. A Scoping and EIA process (Listing Notice 2) is necessary for those activities, which are identified as having more of a possible detrimental impact on the environment, whereas Listing Notice 3 relates to identified activities that would require environmental authorisation prior to the commencement of those activities in specific identified geographical areas only. The Scoping and EIA process was required for this project as the proposed development triggers Listing Notice 2 activities as presented in **Section 1.6**.

4.1 Pre-Consultation with the Competent Authority

A pre-Consultation meeting was not held with the Department of Forestry, Fisheries and the Environment (DFFE) as the project description and process are well understood. However, a pre-application from was submitted to the department together with the Public Participation Plan in and approved in November 2021 (**Appendix E1**). On the 5th of June and the 9th of September 2020, the Minister issued directions regarding the measures to address, prevent and combat the spread of the COVID-19 relating to the National Environmental Management Permits and Licenses. One of the requirements provided in the directions is that a Public Participation Plan (PP Plan) shall be submitted to the identified competent authority, in instances where a case officer has been assigned to the project then the Public Participation Plan shall be submitted to the case officer. It must be noted that the abovementioned directions were withdrawn effective from 22nd March 2022.

4.2 Registration of the Application with the Competent Authorities

An Application for Environmental Authorisation was completed and submitted to DFFE for review and consideration with the Draft Scoping Report on 14th October 2022. The Final Scoping Report and EA Application form were submitted on the 25th of November 2022. The application reference for the project with DFFE is **14/12/16/3/3/2/2222**. The Scoping Report was approved by DFFE on the 19th of January 2023. A copy of the approval has been attached as **Appendix C**.

4.3 Public Participation Process (Scoping Phase)

A Public Participation Process (PPP) consistent with Chapter 6 of Government Notice R. 982 (Regulations 39 – 44) was undertaken for the proposed development. This included identification of Interested and Affected Parties (I&APs) and the compilation of an I&AP database (**Appendix E7**). The Knock and Drop register as well as an e-mail notifying potential I&APs about the project can be referred to in **Appendix E3.** Notification letters (**Appendix E3**) were distributed to the adjacent landowners on an on-going basis from the 23rd of October 2019 via email and had delivered. The placement of site notices at visible and accessible locations close to the site (**Appendix E4**) and a newspaper advertisement in a local newspaper (**Appendix E2**). A Focus Group meeting between DWS, GA Environment (Pty) Ltd, LSRWUA and Die Kooperasie (Scheepersvlakte) Farm Development was held on the 26th of May 2022 (**Appendix E9.2**). The Draft Scoping Report was placed at Kirkwood Public

Library and Lower Sundays River Water Use Association Board and also made available electronically (GladAfrica Group Website) and through hardcopies to commentary authorities for Public Review and Comment for the legislated 30 days (14th of October 2022 to 14th of November 2022). The purpose of the public review period was to identify any additional environmental issues and concerns for inclusion in the Scoping Report that the environmental practitioners and specialists may not have identified. Please refer to **Appendix E** and/or **Chapter 7** of this report for a detailed description of the PPP undertaken to during the Scoping Phase.

4.4 Review and Approval of the Scoping Report by Competent Authorities

The Final Scoping Report was submitted to DFFE on the 25th of November 2022 following the conclusion of the public review period. The Final Scoping report documented the findings of the Scoping Phase and included comments received from stakeholders during the Public Participation Process. In accordance with the requirements of NEMA EIA Regulations, 2014, a Scoping Report and a Plan of Study for the proposed project were reviewed by DFFE and accepted on the 20th of January 2023. Refer to **Appendix C** for the approval letter.

4.5 Environmental Impact Assessment Phase

The EIA Phase commenced after the competent authority accepted the Scoping Report and advised the EAP in terms of Regulation 23(1) (a) of Government Notice R. 982 to proceed with the tasks contemplated in the Plan of Study for EIA.

This report represents the Final EIR for the project and builds on the findings of the Scoping Phase. The EIR contains all information that is necessary for the Competent Authority to consider the application and to reach a decision. It details the process followed during the EIA Phase including details of the PPP and an assessment of each identified potentially significant impact. Impacts that were identified during the scoping phase are assessed and mitigation measures are provided for impacts. Where applicable various alternatives are evaluated. The EAP assessed the impacts using professional judgement and scientific evaluations, where possible. In addition to this, an Environmental Management Program (EMPr) for the mitigation of impacts is provided within this EIR (Refer to **Appendix G**). The EMPr will attempt to mitigate the construction and operational related impacts of the proposed.

4.6 Requirement to submit a report generated by the national web-based screening tool

On 5th July 2019, The Department of Environment, Forestry and Fisheries (Now DFFE), gave Notice of the Requirement to submit a Report generated by the National Web-based Environmental Screening Tool in terms of section 24(5)(h) of the NEMA, 1998 (Act No 107 of 1998) and regulation 16(1)(b)(v) of the EIA regulations, 2014, as amended. The submission of this report is compulsory when submitting an application for environmental authorisation in terms of regulation 19 and regulation 21 of the Environmental Impact Assessment Regulations, 2014 effective from 4 October 2019. A Screening Report was generated and has been attached as **Appendix I** of this report. The main findings to be discussed from the screening report are already discussed in **Section2.2** of this report. The findings of the specialist studies outlined in the Plan of Study for the EIA have been incorporated into this report.

Specialist findings are assessed and discussed in Chapters 7 and 8 of this report. Specialist investigation reports are attached in **Appendix F**.

4.7 Other Supporting Documents to the Environmental Impact Assessment Report

As part of the EIR for the proposed development, an Environmental Management Programme (EMPr), has been compiled in line with Appendix 4 of the NEMA EIA Regulations, 2014, as amended. The EMPr provides guidelines to the Project Developer, the Contractor as well as various other members of the technical team on how best to implement the mitigation measures for the proposed activity on site in order to avoid adverse environmental impacts. Refer to **Appendix G1** of this Environmental Impact Assessment Report for the EMPr. As the proposed project will require the clearance of indigenous vegetation, a Rehabilitation Plan has been compiled to support the application (**Appendix G2**). The Rehabilitation Plan will provide the Contractor, the Developer and the ECO with guidelines on how to plan revegetation and rehabilitation work and assists in understanding the concepts behind successful rehabilitation.

An Alien Invasives Species Management Plan was compiled to assist with the management of Alien Invasive Species proliferation due to the proposed development. Alien Invasive Species (plants, animals and micro-organisms) are species that occur outside of their natural habitat or country of origin and due to their ability to outperform and outgrow indigenous species; they establish themselves in these non-native habitats. The Alien Invasives Management Plan has been attached as **Appendix G3**. As the proposed project will require the clearance of vegetation (bare soil), bulk earthworks and stockpiling, an Erosion and Soil Management Plan has been compiled to support the application. The Erosion and Soil Management Plan will provide the contractor, the developer, and the ECO with guidelines on how to plan erosion and soil management and assists in understanding the concepts behind successful erosion and soil management. The management plans must be implemented in conjunction with the approved EMPr as well as other management plans prepared for this proposed development. The exact details of the management plans will depend on the extent of the construction site and activities that will have to be undertaken, available funding, and the desired end state of the project.

4.8 Consideration of Alternatives

The NEMA EIA Regulations (2014) require that alternatives be considered. In terms of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. The feasible alternatives identified for the proposed development are described and assessed in **Chapter 6** of this report.

4.9 Environmental Impact Report

This EIR contains all the information that is necessary for the Competent Authority to consider the application and to reach a decision. The EIR also details the process followed during the EIA Phase including details of the PPP and an assessment of each identified potentially significant impact. An Environmental Management Program (EMPr) for the mitigation of impacts has been provided within

the EIR. The EMPr will attempt to mitigate the construction and operation related impacts of the proposed expansion.

4.10 Competent Authority Decision on the EIR Report

Following the review of the EIR, DFFE will issue the Applicant with their decision on the application, which could either be the rejection of the application or an approval for which an Environmental Authorisation (EA) will be issued in terms of Section 24 of NEMA. This Environmental Authorisation will be issued to the Department of Water and Sanitation as the Applicant. It should be noted that the EA may state that the activity may not commence before certain conditions are complied with. The EA may also include any other conditions which DFFE considers necessary for the protection of the environment. DWS must adhere to the Conditions of the EA or may be subjected to fines and penalties as stipulated in Section 24 of NEMA and NEMLA.

4.11 Appeal Period

After a decision has been reached by DFFE, Chapter 2 of the National Appeal Regulations 2014 makes provision for any affected person to appeal against the decision. Within 20 days of being notified of the decision by the competent authority, the Appellant must submit the appeal to the appeal administrator. An appeal panel may be appointed at the discretion of the delegated or organ of state to handle the case and it would then submit its recommendations to that organ of state for a final decision on the appeal to be reached. GA Environment will communicate the decision of the DFFE and the manner in which appeals should be submitted to the Minister and to all I&APs as soon as reasonably possible after the final decision has been received.

5 DESCRIPTION OF THE AFFECTED ENVIRONMENT

This Chapter serves to describe the environmental setting of the area identified whilst the environmental issues that were identified to be of significance are discussed in **Chapter 8** of this report. The Chapter will also provide a description of the overall character and other sensitivities that were identified in the surrounding environment. Specialist assessments commissioned for the proposed development and subsequent site visits have also been considered in this section.

5.1 General Conditions of the Site

An initial site visit was undertaken on the 14th of October 2021 and subsequent to the initial PP undertaken in November 2021. As observed during the site visit the proposed study area is northeast of the existing Scheepersvlakte Dam and immediately north of the smaller Scheepersvlakte Dam (**Figure 9**). The site is located within a citrus farming community and will blend into the existing land uses. The general conditions of the site and adjacent areas are as follows;

- The aerial view of the proposed development site indicating the cleared vegetation and remaining intact units is indicated in **Figure 10**.
- The proposed dam is located north west of the Scheepervlakte Dam and will have similar infrastructure (**Figure 11**).
- The primary water source for the dam will be through the Kirkwood Primary Canal south west of the site (**Figure 12**);
- The dam will have a gravitational pipeline which will join the Nooitgedagt Canal flowing to Nooitgedagt WTP (**Figure 13**);
- The dam will be filled via a siphon from the Kirkwood Primary Canal similar to the existing siphon (**Figure 14**);
- There smaller Scheepersvlakte Dam under construction immediately south of the proposed dam site (**Figure 15**);
- The site is characterised by cleared vegetation and remaining intact vegetation units of the Western Endangered Albany Alluvial Vegetation and the least threatened Sundays Valley Thicket vegetation type on site (**Figures 16 to 19**);
- There are existing access roads and services on site such as electricity (**Figure 20**); and
- There is a landfill and cemetery for the farming community approximately 1 km south of the site (**Figure 21**).

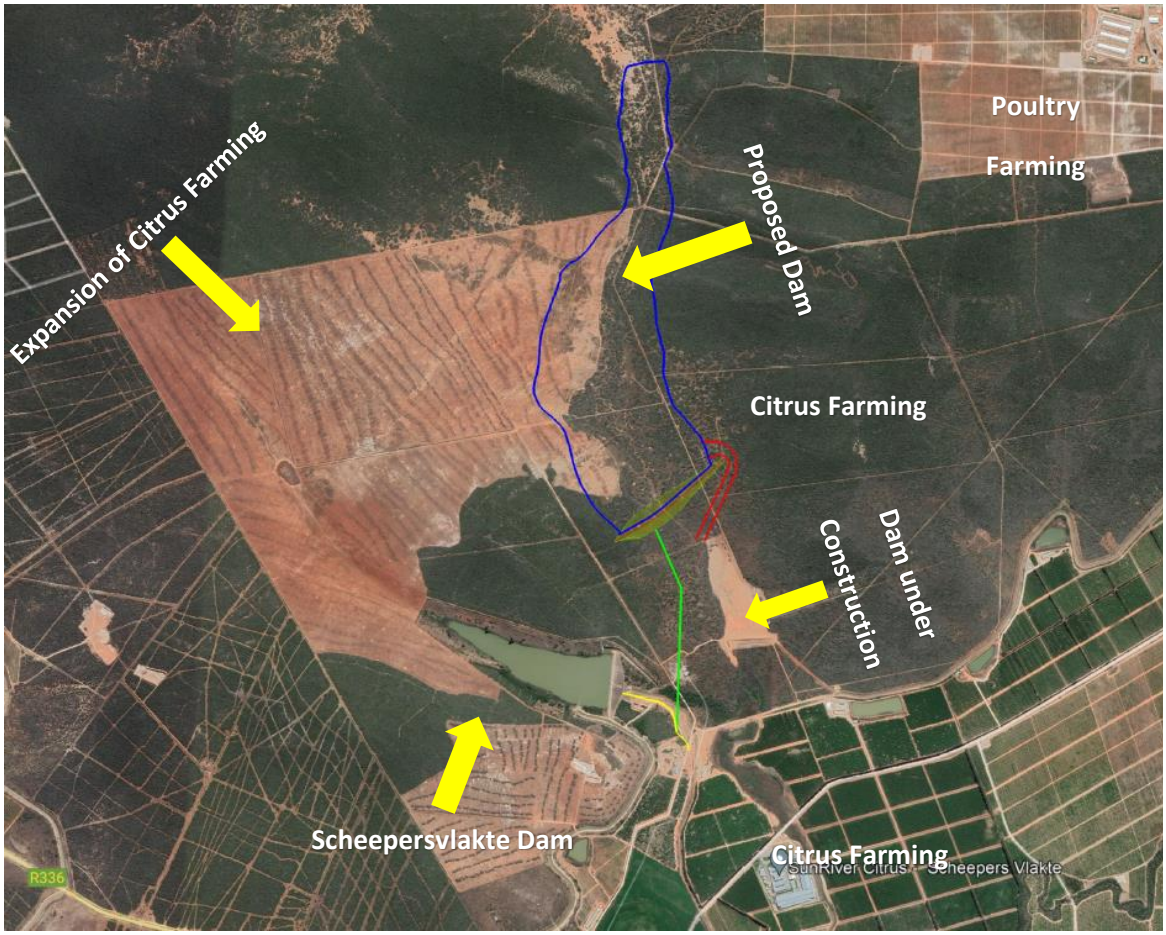


Figure 10: Land uses surrounding the site

Figure 11: Aerial view of the proposed development site

Figure 12: Existing Scheepersvlakte Dam

Figure 13: Kirkwood Primary Canal, the source of water for the dam

Figure 14: Nooitgedagt Canal flowing to Nooitgedagt WTP

Figure 15: Existing siphon off-taking from Kirkwood Primary Canal similar to the proposed siphon infrastructure

Figure 16: Smaller Scheepersvlakte Dam under construction immediately south of the proposed dam site

Figure 17: Clearance of vegetation on site for the smaller Scheepersvlakte Dam and expansion of citrus farming

Figure 18: The northern edge of the site indicating the clearance and adjacent intact vegetation

Figure 19: Endangered Albany Alluvial and the least threatened Sundays Valley Thicket vegetation on site

Figure 20: Adjacent intact vegetation units

Figure 21: Main access roads and existing services on site

Figure 22: Landfill and cemetery approximately 1 km south of the site

5.2 Climatic Conditions

Climate is an important element for the project due to the following key factors:

1. To plan for the construction phase as climate (particularly rainfall) can impact on project progress as noted in sources such as Ballesteros-Pérez (2017) & Freeman (2017);
2. To establish the viability of the proposed site for proposed activities; and
3. To plan and mitigate soil and erosion due to the development.

The town of Addo is influenced by the local steppe climate. During the year, there is little rainfall in Addo. This location is classified as BSh by Köppen and Geiger. The summer season is in December end in March. The average annual temperature in Addo is 18.6 °C. About 502 mm of precipitation falls annually. The driest month is May, with 23 mm of rainfall. Most precipitation falls in November, with an average of 62 mm. **Figures 22** and **23** presents the annually weather conditions in Addo.

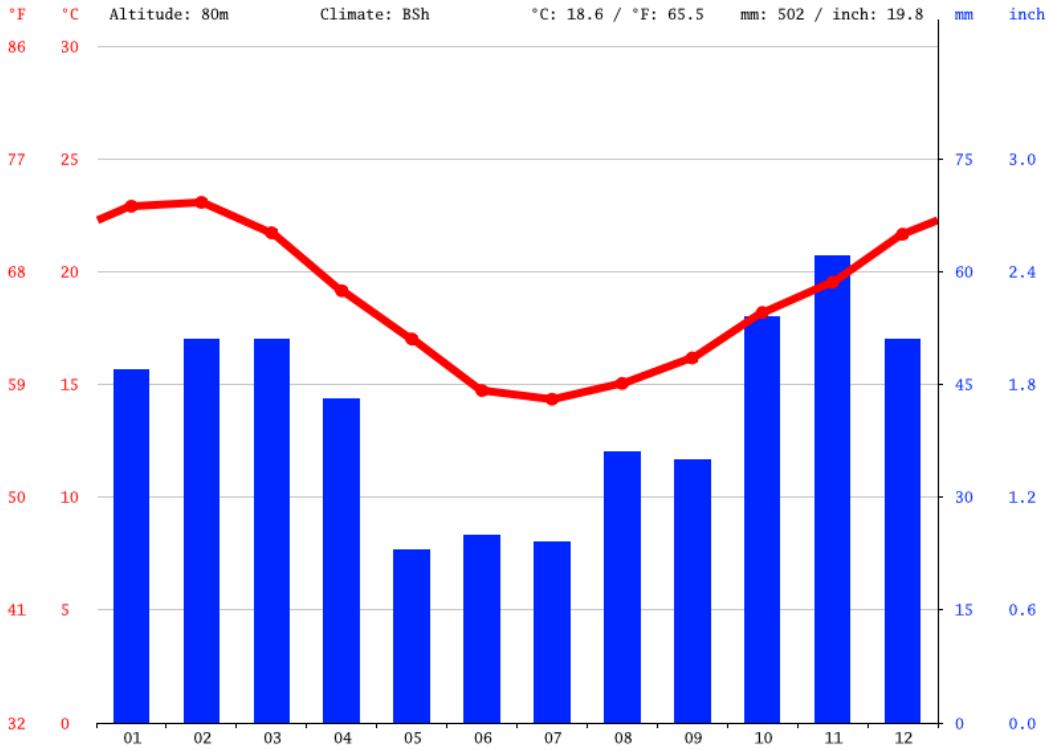


Figure 23: Climate Graph of Monthly weather conditions (Climate-Data.Org, 2022)

	January	February	March	April	May	June	July	August	September	October	November	December
Avg. Temperature °C (°F)	22.9 °C (73.2) °F	23.1 °C (73.5) °F	21.7 °C (71.1) °F	19.2 °C (66.5) °F	17 °C (62.6) °F	14.7 °C (58.5) °F	14.3 °C (57.8) °F	15 °C (59.1) °F	16.2 °C (61.1) °F	18.2 °C (64.7) °F	19.5 °C (67.2) °F	21.7 °C (71) °F
Min. Temperature °C (°F)	17.7 °C (63.8) °F	18 °C (64.3) °F	16.5 °C (61.8) °F	13.7 °C (56.7) °F	11.3 °C (52.3) °F	8.8 °C (47.8) °F	8.3 °C (47) °F	8.9 °C (47.9) °F	10.1 °C (50.2) °F	12.4 °C (54.3) °F	14 °C (57.2) °F	16.3 °C (61.4) °F
Max. Temperature °C (°F)	29.3 °C (84.7) °F	29.5 °C (85) °F	28.3 °C (82.9) °F	25.8 °C (78.5) °F	24 °C (75.3) °F	21.8 °C (71.2) °F	21.6 °C (70.9) °F	22.4 °C (72.4) °F	23.5 °C (74.3) °F	25 °C (77) °F	25.9 °C (78.6) °F	28 °C (82.4) °F
Precipitation / Rainfall mm (in)	47 (1.9)	51 (2)	51 (2)	43 (1.7)	23 (0.9)	25 (1)	24 (0.9)	36 (1.4)	35 (1.4)	54 (2.1)	62 (2.4)	51 (2)
Humidity(%)	65%	67%	67%	66%	60%	55%	54%	57%	61%	64%	64%	64%
Rainy days (d)	6	7	7	5	3	3	3	4	5	6	6	7
avg. Sun hours (hours)	8.0	7.4	7.6	7.5	7.8	7.7	7.7	7.9	8.0	7.9	8.2	8.0

Figure 24: Weather averages in Addo (Climate-Data.Org, 2022)

The warmest month of the year is February, with an average temperature of 23.1 °C. In July, the average temperature is 14.3 °C. It is the lowest average temperature of the whole year. The difference in precipitation between the driest month and the wettest month is 39 mm. The average temperatures vary during the year by 8.7 °C. The month with the highest relative humidity is February (66.84 %). The month with the lowest relative humidity is July (53.99 %). The month with the highest number of rainy days is December (9.13 days). The month with the lowest number of rainy days is July (3.83 days).

5.3 Topography

Topography of a site in essence determines if the site is qualified to dam or not. It helps in allowing the following preliminary assessments to be carried out. Further detailed investigations of course would follow.

- Assurance that the length of the dam would be reasonably adequate, and for a given height, it would store the maximum volume of water;
- That the topography will not reduce the structural integrity of the dam;
- That additional auxiliary dams to assuredly dam the likely reservoir are not required;
- That the general bed level of the dam site is higher than that of the river basin. This will amount to reducing the height of the dam;
- That suitable site for the spillway is available in the near vicinity;
- That the site is accessible, so that it could be economically connected to important towns and cities;
- Availability and qualification of the site for establishing labor colonies;
- That the likely reservoir would not excessively include inhabited and expensive areas; and
- Likely locales for borrow materials for the dam might as well be spotted.

According to The Biodiversity Company (2023), the slope percentage of the project area is characterised by a slope percentage between 0 and 10%, with some smaller patches within the project area characterised by a slope percentage ranging from 10 to 31%. This illustration indicates a few irregularities in the topography in scattered areas the majority of the area being characterised by a gentle slope. The DEM of the project area indicates an elevation of 83 to 122 metres above sea level (masl). Refer to **Figure 24** for the topographical representation of the area.

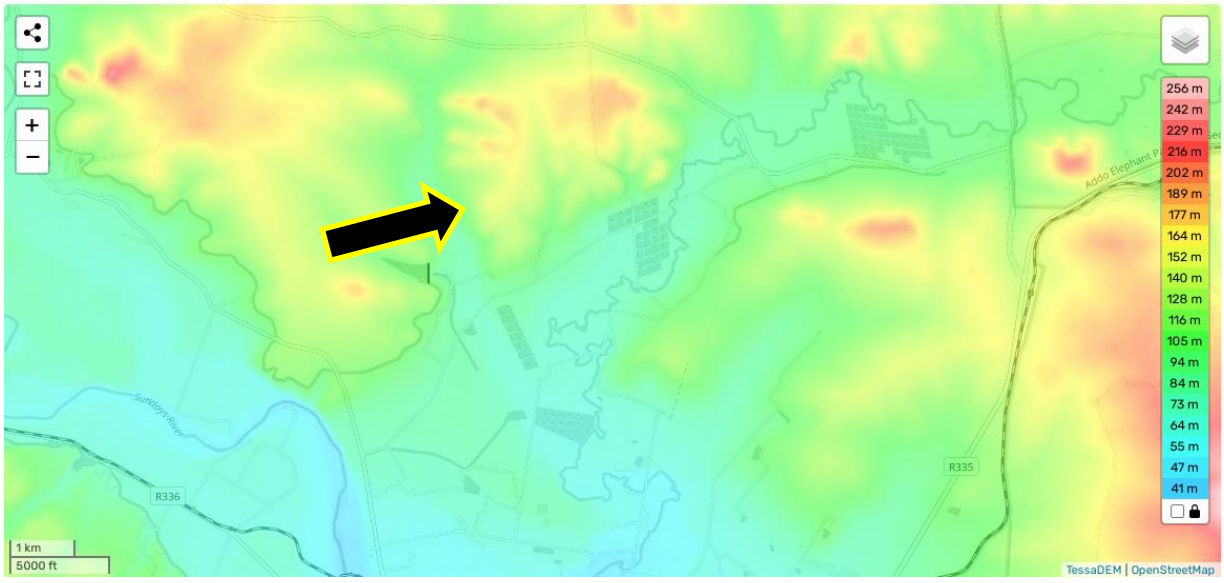


Figure 25: Addo topographic map, elevation and terrain (topographic-map.com, 2023)

In terms of the topography, the ratio of crest length to the maximum height of the dam is a common consideration in dam type selection. For this Lower Coerney Dam site the ratio is roughly 30, which

already points to an embankment dam. The site is characterised by gently sloping flanks and a relatively wide river section. The flat topography favours an embankment dam (Aurecon, 2019).

5.4 Biodiversity

5.4.1 Flora

The variety of plant and animal life in the world or in a particular habitat, a high level of which is usually considered to be important, and desirable is known as biodiversity. Due to the continual development and loss of biodiversity, Biodiversity Conservation Plans have become vital for conservation of flora and fauna habitats and ecosystems. The purpose of a Biodiversity Conservation Plan is to inform land use planning, environmental assessments, land and water use authorisations, as well as natural resource management, undertaken by a range of sectors whose policies and decisions impact on biodiversity. This is done by providing a map of biodiversity priority areas, referred to as Critical Biodiversity Areas (CBAs) and Ecological Support Areas (ESAs). According to the Eastern Cape Conservation Biodiversity Plan, the proposed site falls within a CBA (**Figure 25**). The development of the dam will require the vegetation clearance of approximately 77ha. As already indicated, approximately 36ha has already been cleared by the farming community in preparation for the new citrus fields. An Ecological assessment was undertaken to assess the terrestrial biodiversity and potential impacts associated with the proposed dam and the associated infrastructure.

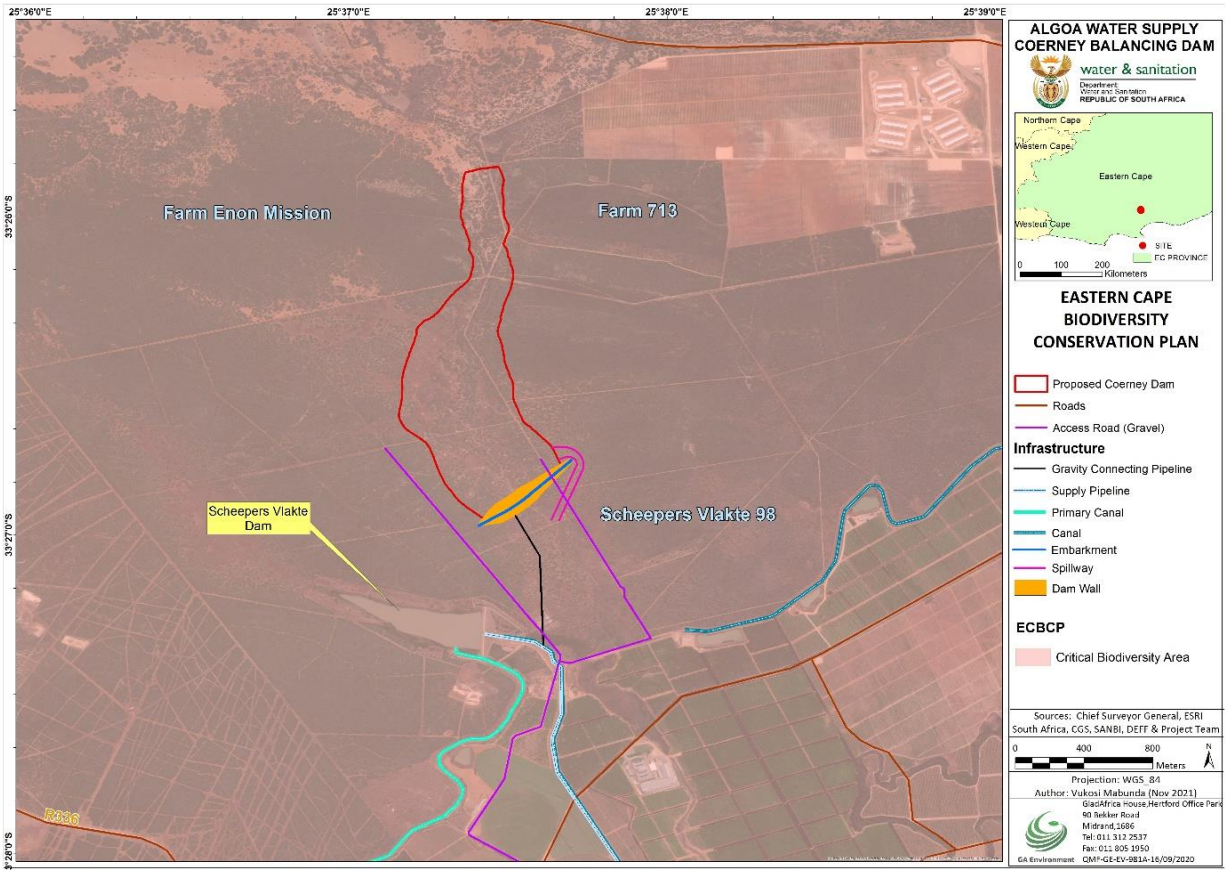


Figure 26: Eastern Cape Conservation Biodiversity Plan

The site is situated within the Albany Alluvial and Sundays River Thicket Vegetation units as indicated in the Vegetation Map (**Figure 26**). The Albany Alluvial vegetation type is found in the Eastern Cape between East London and Cape St Fransis. This alluvial unit is embedded within the Albany Thicket Biome. It is made up of two major vegetation patterns: riverine thicket and thornveld (*Vachellia natalitia*). The riverine thicket tends to occur in the narrow floodplain zones in regions close to the coast or further inland, whereas the thornveld occurs in the wide floodplains further inland. This vegetation is classified as endangered (EN) by Mucina and Rutherford (2006). The conservation target is 30% of which only 6 % is Greater Addo Elephant National Park, Baviaanskloof Wilderness Area, Loerie Dam, Springs, Swartkops Valley and Yellowwoods Nature Reserves and the Double Drift Reserve Complex.

Sundays Valley Thicket vegetation type is found in the Eastern Cape, at an altitude of 0-800m. It is characterised by undulating plains and low mountains and foothills covered with tall, dense thicket, where trees, shrubs and succulents are common, with many spinescent species. According to Mucina and Rutherford (2006), this vegetation type is classified as Least threatened (LT). The conservation target is19 %, with portions of this statutorily protected in Greater Addo Elephant National Park, Groendal Wilderness area as well as in Swartkops Valley and Springs Nature Reserves. Private conservation areas, especially game farms (*Kuzuko, Koedoeskop, Schuilpatdop, Tregathlyn, Citruslandgoed, Voetpadskloof*) also conserve portions of the vegetation unit.

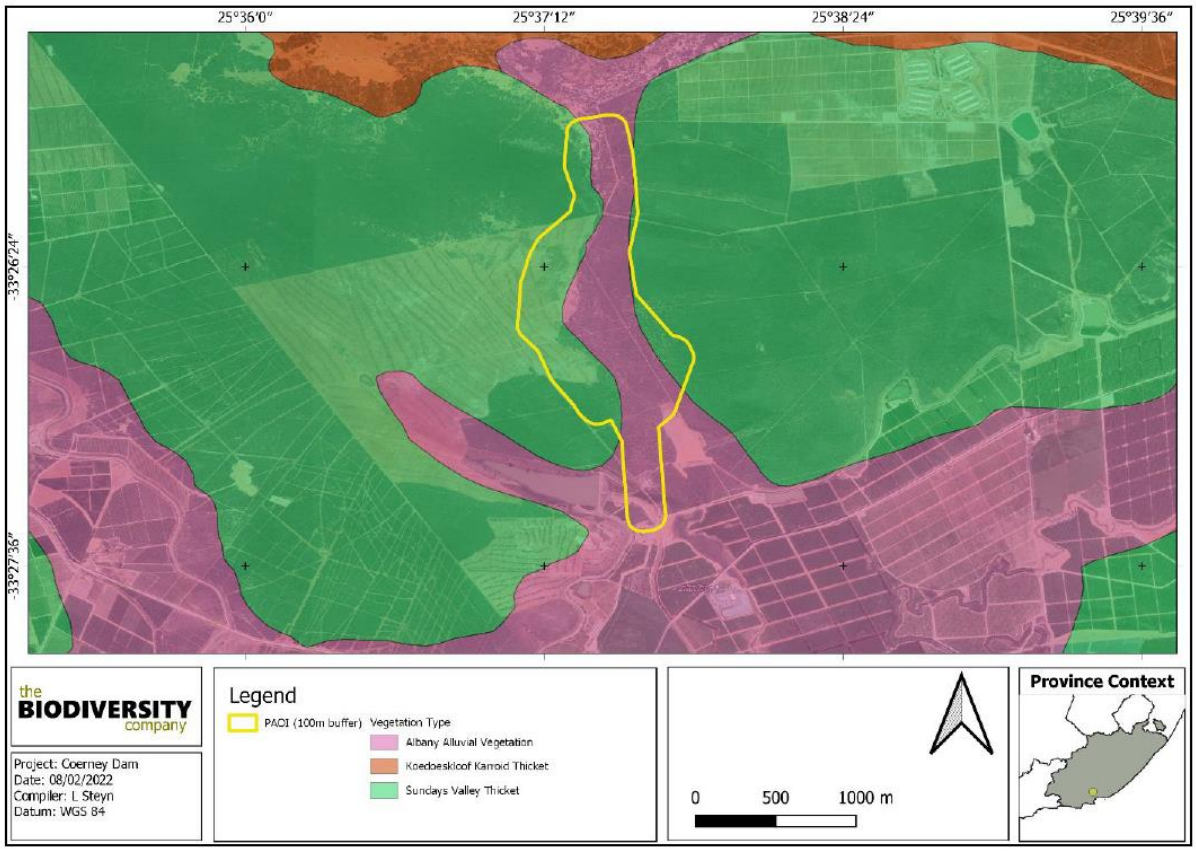


Figure 27: Vegetation in relation to the proposed site (The Biodiversity Company, 2022)

Based on information taken from the Terrestrial Biodiversity Impact Assessment (The Biodiversity Company, 2022), the species composition of the assessment area was consistent with typical Albany

alluvial and Sundays Valley Thicket vegetation types. Distinctive vegetation communities were observed within these vegetation types and can be classified into alluvial vegetation, valley thicket, disturbed and transformed areas (**Table 14** and **Figure 27**). The plant species recorded is by no means comprehensive, and repeated surveys during different phenological periods not covered, may likely yield up to 30% additional flora species for the project area. However, floristic analysis conducted to date is however regarded as a sound representation of the local flora for the project area.

Table 14: Natural habitat types delineated within the project (The Biodiversity Company, 2022)

Habitat Type	Description	Ecosystem Processes and Services	Sensitivity
Alluvial Vegetation	Low to no slope with alluvial soils. Channel through which surface water naturally collates and flows. Ephemeral systems both considered for this habitat type.	Water Paths, functions as important Water resources. Provides refuge and grazing areas, especially during the dry seasons Provides surface water within the landscape. Aids in trapping sediment and nutrients derived from land runoff. Is important as a movement corridor as it creates a link between the system and its surrounding terrestrial landscape for several faunal species, especially birds and mammals.	High
Valley Thicket and Disturbed Valley Thicket	Semi-natural thicket, on low mountains and foothills covered with tall, dense thicket but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement.	Provides grazing for livestock. Aids in filtration of water permeating through the soil into drainage lines. Acts as Corridor for fauna dispersion within the landscape. Acts as buffer for high sensitivity areas. The unit acts as a greenland which supports viable plant species populations and is also used for foraging by fauna.	High
Transformed habitat	Areas that have been heavily modified, largely due to previous and current clearing for agricultural activities and building of dams.	The transformed areas are the areas which have little to no natural areas left due to being transformed. These habitats are in a constant disturbed state as it cannot recover to a more natural state due to ongoing disturbances and impacts it receives.	Very low

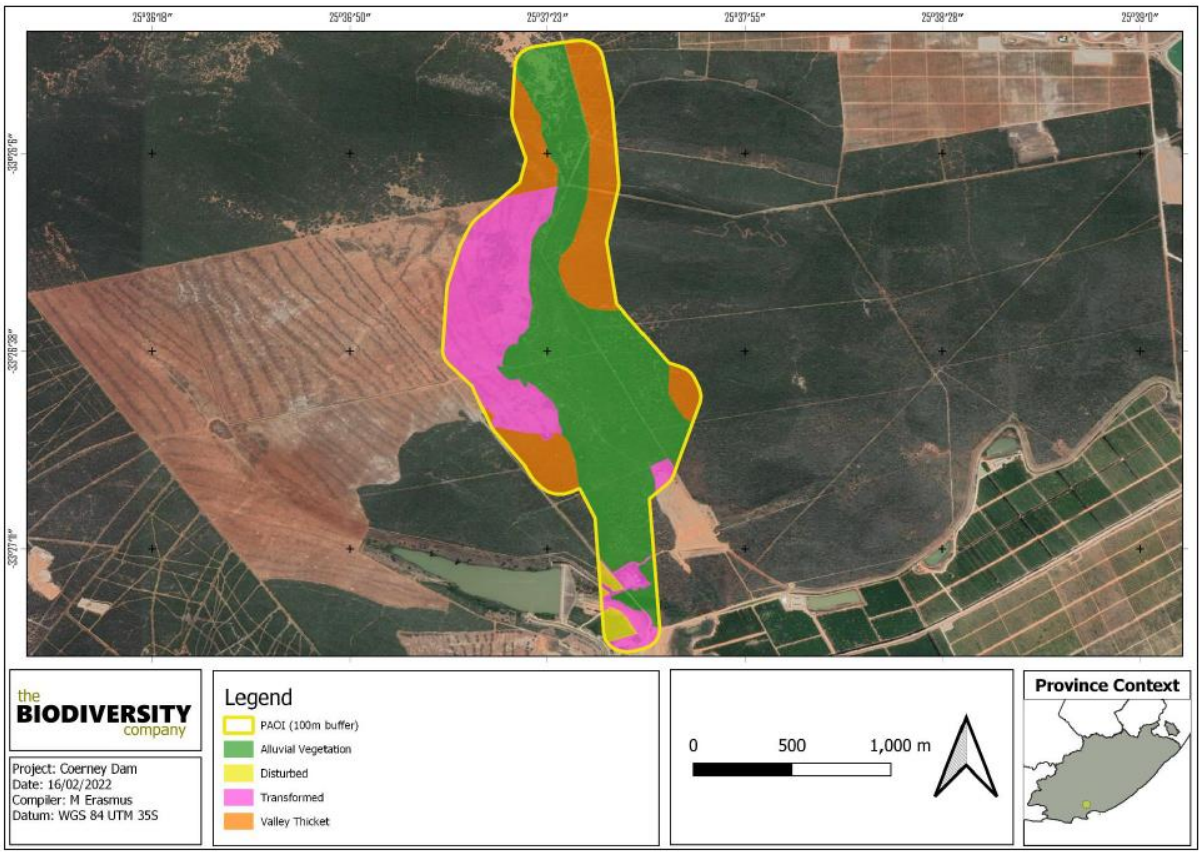


Figure 28: Habitats identified in the project area (The Biodiversity Company, 2022)

The Alluvial Vegetation habitat is regarded as areas where intermittent water sporadically moves through and exists as well as the drainage flats connected to these areas (**Figure 28A**). This habitat type is regarded as semi-natural shrubland, but slightly disturbed due to the grazing by livestock, the associated human infringement and use (dam). Current human infringement still occurs throughout, especially in areas close to the roads. The current ecological condition of this habitat with regard to the main driving forces, are intact, which is evident in the amount of, and importance of the species recorded in the flora and faunal assessment, and also to the type of plant species recorded corresponding to the vegetation type as described by Mucina (2006). This habitat unit can be regarded as highly important, not only within the local landscape, but also regionally as its acts as a viable EN ecosystem. The habitat has a high conservation importance and high site ecological importance (The Biodiversity Company, 2022).

The Valley Thicket and Disturbed Valley Thicket habitat is the remainder of the shrubland that has been disturbed by historic and current grazing (**Figure 28B & 28C**). This habitat type is regarded semi-natural thicket, on low mountains and foothills covered with tall, dense thicket, but slightly disturbed due to the grazing by livestock, mismanagement and also human infringement. Some of these have not been entirely transformed but is in a constant disturbed state, as they cannot recover to a more natural state due to ongoing disturbances and impacts received from grazing from sheep and edge effects from the adjacent land use, hence called disturbed. The current ecological condition of this habitat with regard to the main driving forces, are intact, which is evident in the amount of, and importance of the species recorded in the flora and faunal assessment, and also to the type of plant

species recorded corresponding to the vegetation type as described by Mucina (2006). Even though this habitat is partly disturbed, it supports largely intact vegetation and acts as corridor for fauna dispersion within the landscape. The Valley Thicket habitat has a medium conservation importance and high site ecological importance whereas the Disturbed Valley Thicket habitat has a medium conservation importance and medium site ecological importance (The Biodiversity Company, 2022).

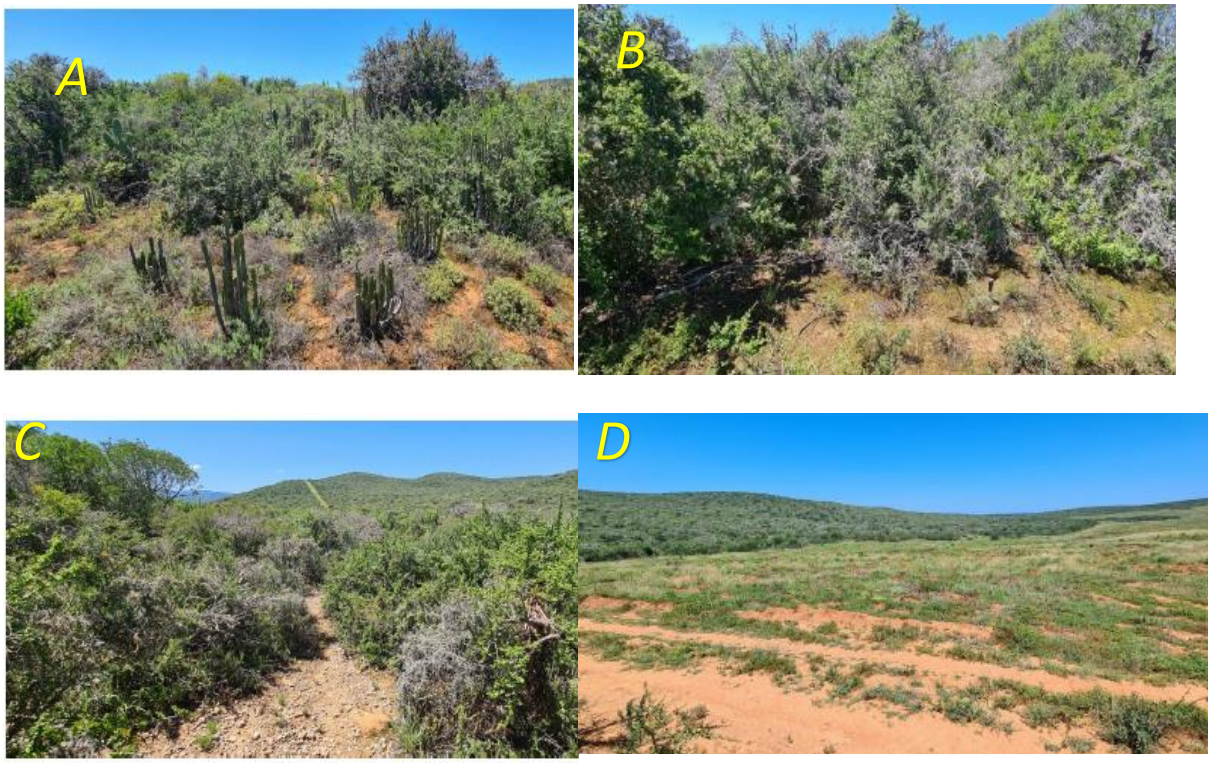


Figure 29: Habitats identified in the project area. a) Alluvial Vegetation habitat, b) Valley Thicket, c) Valley Disturbed Valley Thicket Habitat and d) Transformed Habitat (The Biodiversity Company, 2022)

Transformed habitat represent areas that have been heavily modified (**Figure 28D**), largely due to previous and current clearing for agricultural activities and building of dams. The transformed areas are the areas which have little to no natural areas left due to being transformed. These habitats are in a constant disturbed state as it cannot recover to a more natural state due to ongoing disturbances and impacts it receives. The habitat has a medium conservation importance and very low site ecological importance (The Biodiversity Company, 2022).

The distribution of the plant SCC within the assessment area may be regarded as spaced naturally and occurring abundantly throughout. *Pappea capensis* and *Carissa bispinosa* were the woody plant species that were most marked protected plants, mainly due to them being the dominant woody plant species within the area and being more easily observed due to their growth form. Herbaceous species, especially all plants belonging to the *Aizoaceae/Mesembryanthemaceae* family, also occurred in large numbers, especially when found in dense stands. However, the species are more “cryptic”, especially the bulbs, within the landscape usually growing underneath woody shrubs occurred more sporadically depending on the condition of the habitat. One such species was *Pachypodium succulentum*.

Succulents were ubiquitous throughout the assessment area and occurred within all the communities described above. Geophytes were present and occurred within the alluvial vegetation and low laying areas. It is important to note that these growth forms, and their non-succulent relatives, are protected under the Eastern Cape Legislation. The protected flora species occurring on site are indicated in **Figure 29**. The Site Ecological Importance of the identified habitats is indicated in **Table 15.**

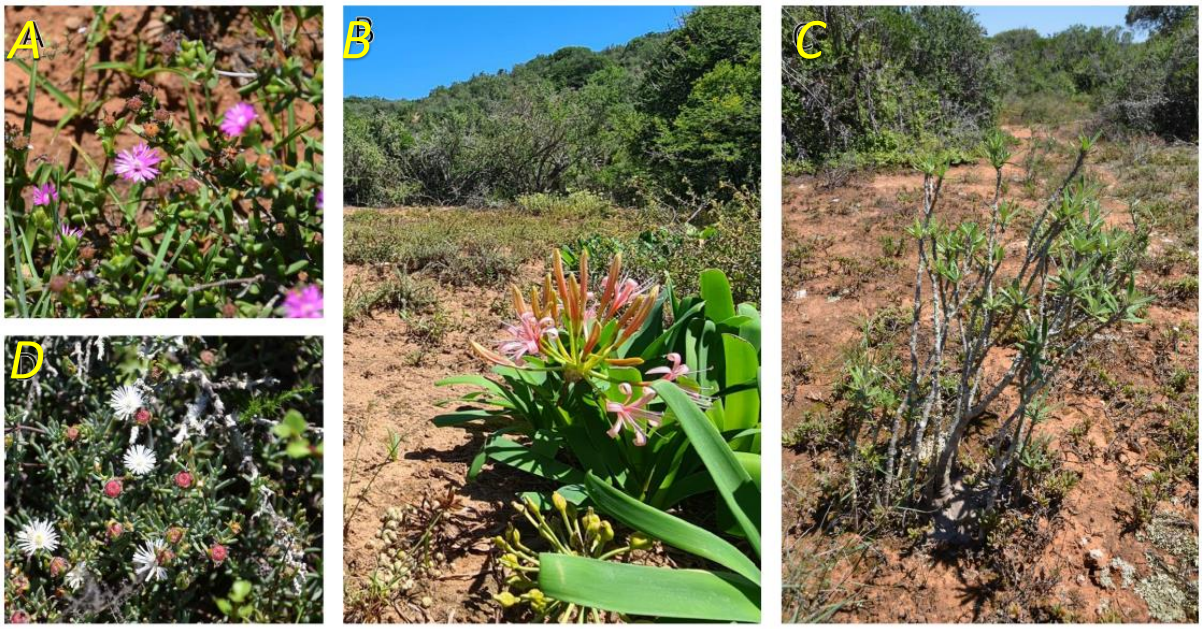


Figure 30: Photographs illustrating some of the protected flora recorded within the assessment area. A) Ruschia aristata and B) *Ammocharis coranica,* C) *Pachypodium succulentum* and D) *Delosperma uitenhagense (The Biodiversity Company, 2022)*

Table 15: Site Ecological Importance of habitat types within project area (The Biodiversity Company, 2022)

Habitat	Conservation Importance	Functional Integrity	Biodiversity Importance	Receptor Resilience	Site Ecological Importance
Alluvial Vegetation	High	Medium	Medium	Low	High
Valley Thicket	Medium	Medium	Medium	Low	High
Disturbed	Medium	Low	Low	Medium	Medium
Transformed	Medium	Very Low	Very Low	High	Very Low

5.4.2 Fauna

In terms of fauna, the Biodiversity Impact Assessment (The Biodiversity Company, 2022), two (2) species of reptiles and three (3) mammal species were observed during the survey of the project area based on the presence of visual tracks and signs (**Figure 30**). One of the mammal's species (*Raphicerus campestris,* commonly own as Steenbok) is provincially protected. However, there is the possibility of more species being present, as certain reptile species are secretive and require long-term surveys to ensure capture. No amphibian species were recorded during the survey period. Sixteen (16) Avifauna species were recorded in the project area during the survey based on either direct observation, vocalisations, or the presence of visual tracks & signs. All species, except two, were listed as protected provincially (**Figure 31**).

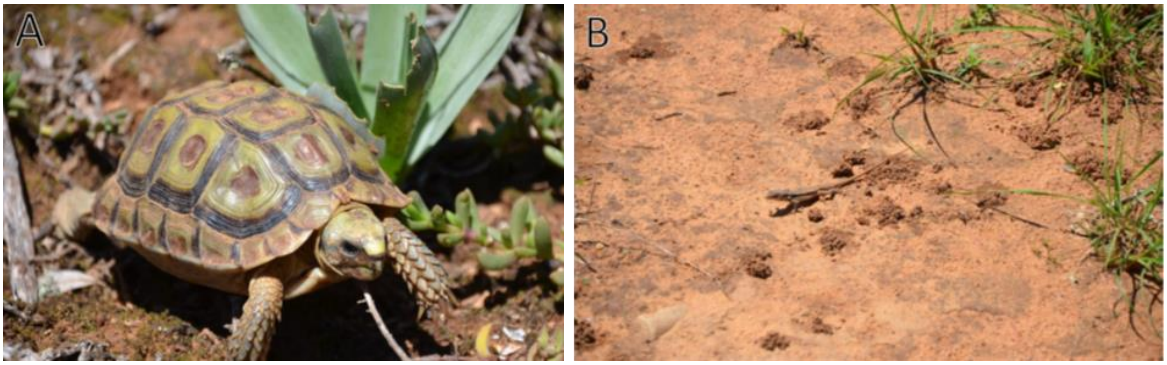


Figure 31: Reptile species recorded in the project area: A) Homopus areolatus and B) Pedioplanis lineoocellata pulchella (The Biodiversity Company, 2022)

Figure 32: Avifaunal species recorded on site: A) Cinnyris afer (Sunbird), B) Zosterops virens (White-eye), C) Pycnonotus tricolor (Bulbul, Dark-capped) and D) Ploceus capensis (Weaver).The Biodiversity Company, 2022

According to the Terrestrial Biodiversity Impact Assessment undertaken by The Biodiversity Company (2022) attached as **Appendix F2**, the site is situated in the endangered Albany Alluvial Vegetation and the least threatened Sundays Valley Thicket vegetation type as indicated in **Figure 26**. The Albany Alluvial Vegetation conservation status is classified as endangered and the protection level is regarded as 'Not Protected/Poorly Protected' Ecosystem. There are four habitats (Alluvial Vegetation, Valley Thicket, Disturbed Valley Thicket and Transformed). The Alluvial Vegetation habitat has high conservation importance and site ecological importance (SEI) while the Valley Thicket have medium and high conservation importance and SEI respectively. Although the project area does not overlap with any protected area, it is however 8.2 km from the Addo Elephant National park, which means it is in the 10km buffer zone of the park. The study found that the proposed activity overlaps with an Ecological Support Area 1 and that the current dam layout overlaps within sensitive habitats and other areas of high biodiversity potential. Portions of the current expected development would be considered to have a high negative impact as it would directly affect the habitat of

threatened/protected plant species and expected listed faunal species that use these ecosystems. It is the opinion of the ecologist that the project may proceed, but a biodiversity compensation strategy must be included as a condition of the environmental authorisation (The Biodiversity Company, 2023).

The Draft Scoping Report was provided to the Department of Forestry, Fisheries and the Environment Biodiversity and Conservation Unit for review and comment (**Appendix E5**). The comments received from the authorities are indicated in **Appendix E6**. All comments received during the Draft EIR Phase have been captured and addressed accordingly in the Comments and Responses Report (**Appendix E8).**

5.5 Aquatic Biodiversity

The hydrological setting of the project area is presented in **Figure 32** which is within the Mzimvubu - Tsitsikamma Water Management Area (WMA 7) (NWA, 2016) and the South Eastern Coastal Belt aquatic ecoregion (Dallas, 2007). The watercourses which may potentially be impacted by the construction of the Coerney Dam includes the N40D - 08561 Sub-Quaternary Reach (SQR) or Coerney River as well as the non-perennial/ephemeral tributary along which the proposed dam will be constructed, which drain the N40D quaternary catchment. The site hydrological conditions are presented in **Figure 32**.

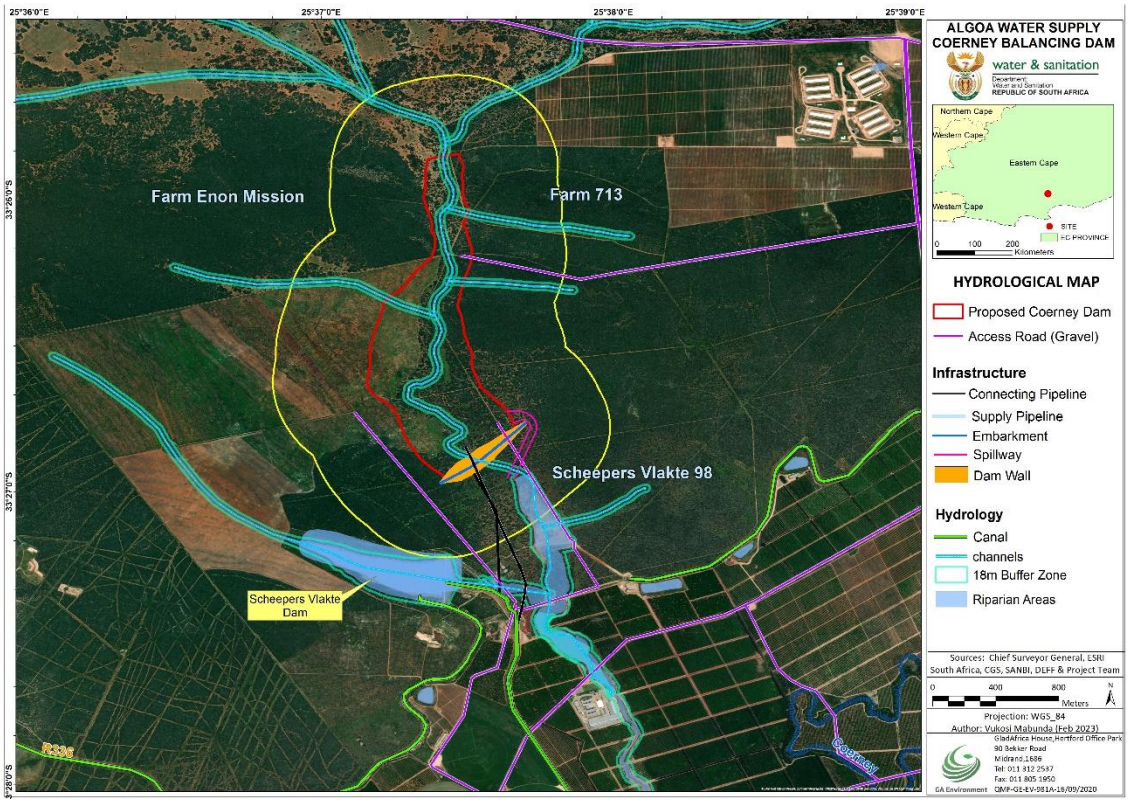


Figure 33: Hydrological conditions of the Site

In situ water quality for the Coerney River system indicates modified water quality when compared to Target Water Quality Ranges (TWQR). The pH within the project area is considered alkaline with the existing dam having a pH concentration elevated above the TWQR upper limit. The low water level

within this dam results from evaporation which concentrates dissolved nutrients and salts within the system which could result in the elevated pH due to lack of dilution. The elevated electrical conductivities recorded are considered to be of low confidence as despite literature indicating that the Lower Coerney River Valley experiences elevated salts from the Orange Transfer Scheme, they typically range from 1500 to 3000 µS/cm, excluding the site in the estuaries where 8000 µS/cm were recorded. There is therefore potential for the recorded values to have resulted from a faulty water quality meter at the time of the survey. Recorded water quality parameters are considered a limiting factor for aquatic biota in the system.

Table 16: In situ surface water quality results (The Biodiversity Company, 2022)

Site	pH	Electrical Conductivity (µS/cm)	Dissolved Oxygen (mg/l)	Temperature (°C)
TWQR*	6.5-9*	-	>5.00*	5-30*
CD1	8.65	920	2.83	26.5
CTD0	9.12	773	7.96	31.2
Coerney River	8.18	6890	3.76	27.1
CTDS2	8.06	7750	2.10	24.6

*TWQR – Target Water Quality Range; Levels exceeding guideline levels are indicated in red

The Aquatic Biodiversity Impact Assessment (The Biodiversity Company, 2022) found that the Sub-Quaternary Reach (SQR) of the Coerney River (N40D - 08561 SQR) is a 2nd order stream which spans 41.48 km. The Present Ecological State (PES) category of the reach is classed as largely modified (class D) (**Table 17**). The largely modified state of these reaches is due to impacts to instream habitat, wetland and riparian zone continuity, flow modifications and moderate potential impacts on physico-chemical conditions (water quality). Anthropogenic impacts identified within the Coerney River sub-quaternary catchment include water abstraction, canal systems, agriculture and small dams.

Table 17: Summary of the PES of the SQRs associated with the Coerney River (The Biodiversity Company, 2022)

SQR Importance and Sensitivity	Score
N40D - 08561 (Coerney River)	
Present Ecological Status	Largely Modified (class D)
Ecological Importance	Moderate
Ecological Sensitivity	Moderate
Default Ecological Category	class C

Based on information taken from the Aquatic Biodiversity Impact Assessment undertaken by The Biodiversity Company (2022) attached as **Appendix F3, t**he project area is situated within the Albany Alluvial Vegetation type (**Section 5.4.1**) within the Albany Thicket Biome. It is made up of two major vegetation patterns: riverine thicket and thornveld (*Vachellia natalitia*). The riverine thicket tends to occur in the narrow floodplain zones in regions close to the coast or further inland, whereas the thornveld occurs on the wide floodplains further inland (Mucina & Rutherford, 2006). The riparian areas of the watercourses considered were highly varied. Upstream along the Coerney River tributary the riparian area is limited by lack of surface flow with no vegetation indicating wet soils. As a result, terrestrial vegetation has encroached and taken over the channels in the upper reaches. Therefore, the vegetation is comprised of grasses and small shrubs in the channel with trees. The study found

two distinctive habitats, the instream (aquatic) habitat and riparian habitat (The Biodiversity Company, 2022). Refer to **Figure 33** for the identified habitats.

Figure 34: Example of the upstream (A) and downstream conditions (B) and the instream habitat (C) and riparian habitat (D) (The Biodiversity Company, 2022)

The results of the Habitat Integrity Assessment of the Coerney River tributary as indicated in the Aquatic Biodiversity Impact Assessment (**Appendix F3**) indicates that instream habitat is moderately modified (class C) while the riparian habitat is largely modified (class D). This indicates that the instream habitat has experienced a loss and change of natural habitat and biota, but the basic ecosystem functions are still predominantly unchanged while riparian habitat has experienced a large loss of natural habitat, biota and basic ecosystem functions. The surrounding land use of the Coerney River tributary is presented in **Section 5.1** which is dominated by agriculture in the form of citrus plantations. The altered land-use is the source of the largest influence on the system resulting from vegetation removal and encroachment as well as resulting in riparian/wetland zone discontinuity. General physico-chemical modification results from runoff (return water) from the surrounding and extensive agriculture.

The Draft Scoping Report and Draft EIR were provided to the DFFE Biodiversity and Conservation Unit for review and comment (**Appendix E6**). During the compilation of this Final EIR, no comments from DFFE Biodiversity and Conservation Unit were received. All comments received during the Draft EIR

Phase have been captured and addressed accordingly in the Comments and Responses Report (**Appendix E8).**

5.6 Agriculture

Based on information taken from the Agricultural Impact Assessment undertaken by The Biodiversity Company (2023) attached as **Appendix F1**, the proposed project area is characterised by the Fc 362 and Ia 85 land types (**Figure 34**). The Fc 362 land types mainly have Mispah, Oakleaf, Valsrivier and Hutton soil forms according to the Soil classification working group, (2018), with the occurrence of other soils within the landscape. The Ia 85 land type is characterised with occurrence of Oakleaf, Hutton and Dundee soil forms associated to other soils in the terrain. The Fc 362 land types consist of shallow, lithic and hard rock soils forms, with the presence of lime in the entire landscape. The Ia 85 land types are characterised by miscellaneous land classes with undifferentiated deep deposits. The land terrain units for the featured Fc 362 and Ia 85 land types land type are illustrated in **Figure 35**.

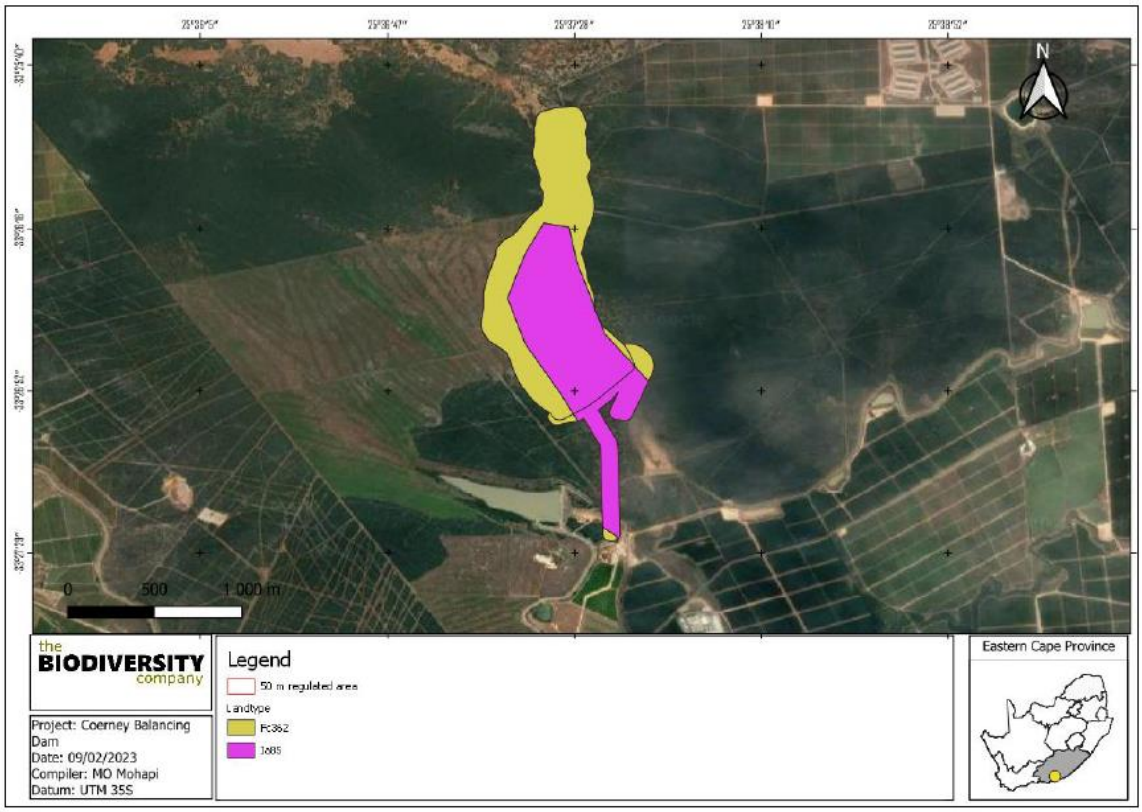


Figure 35: Land types found within the proposed project area (The Biodiversity Company, 2022)

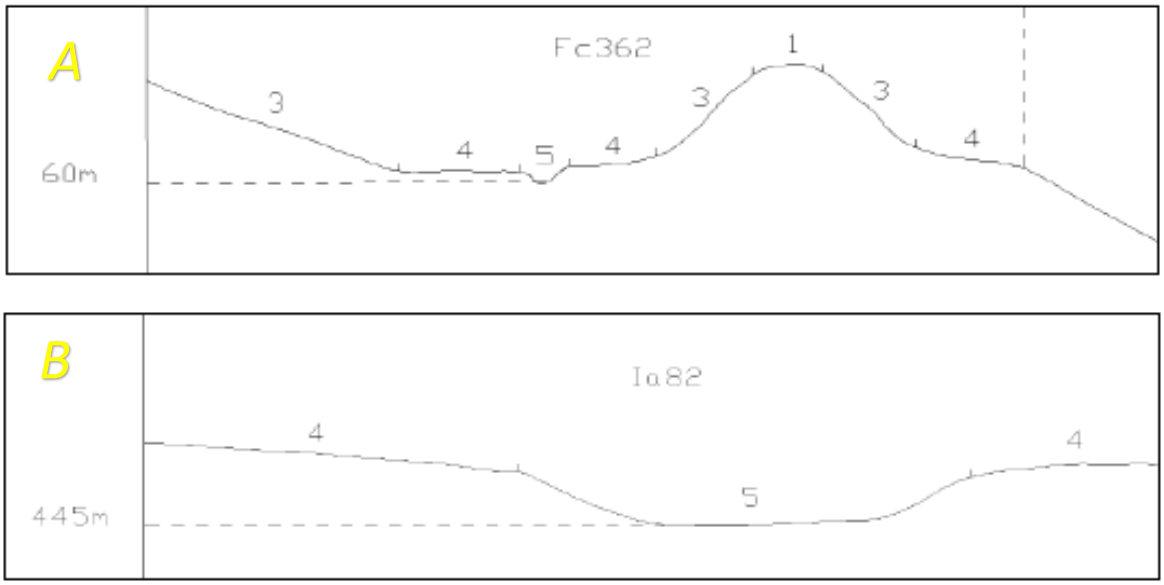


Figure 36: Illustration of land type Fc 362 terrain unit (A) and Ia 85 terrain unit (B) (The Biodiversity Company, 2022)

The most sensitive soil forms that can be expected based on the Land Type Survey Staff, (1972 – 2006) soil forms data in **Table 18** within the project area is the Hutton and Oakleaf soil forms, with other associated soils also occurring. The Hutton soil form consists of an orthic topsoil on top of a thick red apedal horizon. The Oakleaf soil form has an orthic topsoil underlain with a neocutanic subsurface diagnostic horizon. The climate capability level of the above-mentioned soils has been determined to have a climate capability level "8". This climate capability has low Mean Annual Precipitation (MAP) and high Mean Annual Potential Evapotranspiration (MAPE) rates. Commonly severe to moderate limitations occur due to soil, slope, temperatures, or rainfall in such areas (The Biodiversity Company, 2022).

Table 18: Soils expected at the respective terrain units (The Biodiversity Company, 2022)

Terrain Units							
1 (10%)		**3 (60%)**		**4 (25%)**		**5 (5%)**	
Mispah	80%	Valsrivier	55%	Oakleaf	90%	Oakleaf	100%
Hutton	20%	Oakleaf	20%	Valsrivier	5%		
		Mispah	10%	Swartland	5%		
		Hutton	10%				
		Swartland	5%				

The Hutton and Oakleaf soil forms have "Low to Moderate" and "Moderate to High" sensitivity. The proposed activities for the Lower Coerney Balancing Dam and associated infrastructure will not result in the segregation of any high production agricultural land. Therefore, based on the findings of the agricultural impact assessment, the specialist proposes that the balancing dam project development be considered for authorisation (The Biodiversity Company, 2023). Furthermore, it is the EAP's opinion that the proposed balancing dam will have a net positive impact on agricultural production as the

citrus farming community is constantly expanding and requires additional water supply for irrigation. It is the understanding of the EAP that the farming community will be able to abstract water from the Lower Coerney Balancing Dam for irrigation purposes through the Lower Sundays River Water Use Association as the controlling body.

The Draft Scoping Report and Draft EIR were provided to the Eastern Cape Department of Rural Development and Agrarian Reform (ECDRDAR) for review and comment (**Appendix E6**). During the compilation of this Final EIR, no formal comments from the commentary authority were received. However, comments were received from the ECDRDAR during the 2nd Focus Group Meeting (Appendix E9.3) and the public meeting (**Appendix E9.4**). All comments received during the Draft EIR Public Review Phase haven captured and addressed accordingly on the Final Comments and Responses Report (**Appendix E8**).

5.7 Geology and Soils

Geologically, the area of interest falls within the Algoa Basin which is one of the complex grabens and half-graben structures along the present eastern and southern coast associated accumulations of Jurassic and Cretaceous deposits. These basins formed along the margins of the newly formed African continent at the time of the break-up of Gondwana (Newton et al., 2006). According to the 1:250 000 geological map (Port Elizabeth Sheet 3324, Council for Geoscience), the dam is underlain by the strata of the Sunday River Formation and Kirkwood Formation (**Figure 36**). All are part of the Uitenhage Group.

According to the Geotechnical Investigation by Aurecon (2019), the older Kirkwood Formation consists of porous and permeable, coarse- to medium-grained, buff- and olive colored lithic sandstone. Sandstone beds may be up to several meters thick and of variable lateral extent, interbedded with thick (often more than 30 m thick), red and greyish green siltstones and mudrocks. The younger Sundays River Formation overlies and appears to grade laterally into the Kirkwood Formation. This Sundays River Formation consists of thin grey sandstones, siltstones and mudrocks. The sandstones are less porous and permeable than the older Kirkwood strata. The oldest Enon Formation sediments of the Uitenhage Group are located to the north of the area of interest and do not impact directly on the discussion on the prevailing geological and geotechnical conditions of the respective sites (Aurecon, 2019). Refer to **Figure 36** for the geology of the study area.

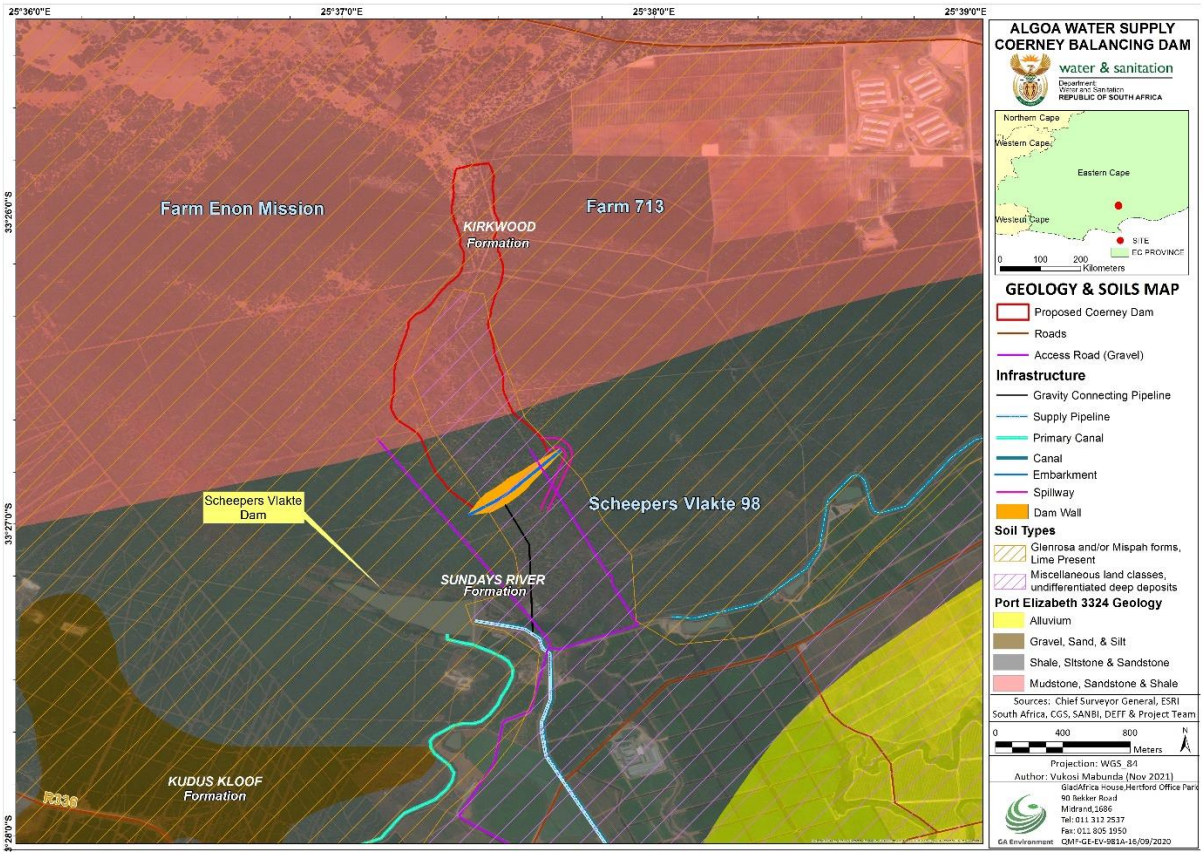


Figure 37: Geology of the study area

The study area is underlain by the Glenrosa and/or Mispah soils forms with lime and Miscellaneous land classes, undifferentiated deep deposits. The Mispah soil form is characterised by an Orthic A – horizon (topmost layer of a soil profile commonly known as the topsoil, usually a darker colour than underlying layers because of the presence of decomposed organic matter) overlying hard rock. Mispah soil is horizontally orientated, hard, fractured sediments which do not have distinct vertical channels containing soil material. There is usually a red or yellow-brown apedal horizon with very low organic matter content. The Glenrosa soil form is a combination of an Orthic A horizon overlying a lithocutanic B horizon (a mineral subsurface horizon which is a zone of accumulation through illuviation, alteration or weathering). The soil forms have an indirect impact on the development which is dealt with in **Section 5.6.**

According to Aurecon (2019), the cumulative thickness of the various soil strata varies between just less than 3 m to almost 8 m. Soil cover appears shallowest on the right flank, extending into the river section, while on the left flank soil thicknesses are generally between 7 m and 8 m. The soil thickness solely is therefore not reason alone to translate into the selection of a specific structure. Of significance in terms of the soil strata, however, is the presence of a gravel horizon at depth. This horizon blankets the entire site, including the dam and spillway footprint as well as the basin area, and has implications for the dam type and founding depths. As such, the geotechnical investigations recommended that the Coerney Dam be constructed as a homogeneous earth fill embankment rather than a zoned embankment. Subsequently, DWS proposed a homogeneous earth-fill embankment dam.

5.8 Geohydrology

The following geohydrological information is summarized and taken from the geotechnical investigation undertaken by Aurecon (2019), the chief concern regarding foundation permeability is linked to the presence of the gravel sand horizon, which is known to be present across the entire dam footprint. If left untreated, there would be a risk stratum functioning as a 'buried channel' or preferential seepage path beneath the embankment. The consequences could then potentially be manifested in the form of uncontrolled seepage and the inability of the reservoir to fill and, in the worst case, internal erosion and failure.

Natural groundwater levels appear to mirror topography to produce a groundwater flow direction downstream in a roughly southerly direction. The hydraulic gradient is steep, around 0.03 – 0.05 which shows that the permeability of the saturated rocks is very low, as one would expect from the Kirkwood Formation mudstones, siltstones and sandstones. Even with the steep hydraulic gradients, the flow rates will be very low.

The groundwater table lies below the alluvial gravel. However, after constructing the dam, water can be expected to leak through the upper, near-surface layers and saturate the gravel layer. The leakage may be slow due to the presence of clayey material in places, and with time it may reduce as additional clayey and silty material accumulates on the bottom of the dam. The hydraulic gradient, however, will be high and if the gravels are highly permeable, water will be able to flow relatively rapidly in this layer. The flow rate through the gravels, however, may not be a function of the permeability of the gravels but rather the leakage rate through the base of the dam, as this latter flow rate may be less than that of the gravels themselves.

The leakage to the gravels and the underlying hard-rock geology would only produce a very limited impact on the hydrogeology of the area. The underlying hard-rock's permeability is probably too low to receive much water, and therefore the effect of the dam will likely be localized and small. The gravels have been discussed above, but the net effect on these will likely also be small because they are unlikely to be continuous for a great distance, and even if there are it is unlikely that they will be highly permeable throughout their length. This however, is not known but 2D resistivity surveys can assist in mapping the gravel layer (Aurecon, 2019).

5.9 Seismicity

It was mentioned earlier that the Algoa basin is a half-graben structure in **Section 5.7**. Such a basin is defined by faulting, in this case, the northern boundary and the relative subsidence of the 'fault-defined' block (horst) in effect created the basin in which the sediments accumulated (Aurecon, 2019). The Algoa basin is known to be more complex than most, with diagonal faults cutting the horst block. Several other prominent faults are recognised in the general area, including the Coega Fault which extends from west of the Groendal Dam to beyond the mouth of the Coega River. This fault has a vertical displacement of over 2000 m.

These prominent NW to SE trending faults are as close as 35 - 40km from the proposed balancing dam sites. While the sediments within the Algoa Basin are not significantly deformed, and only display a

nominal shallow dip towards the present coast, these basins are located within the Cape Fold Belt and the older Table Mountain Group strata are intensely folded. These shallow dips of approximately 10 degrees are seemingly confirmed by detailed mapping of the Scheepersvlakte Dam foundations (Aurecon, 2019). The seismic hazard map of the study area is indicated in **Figure 37**.

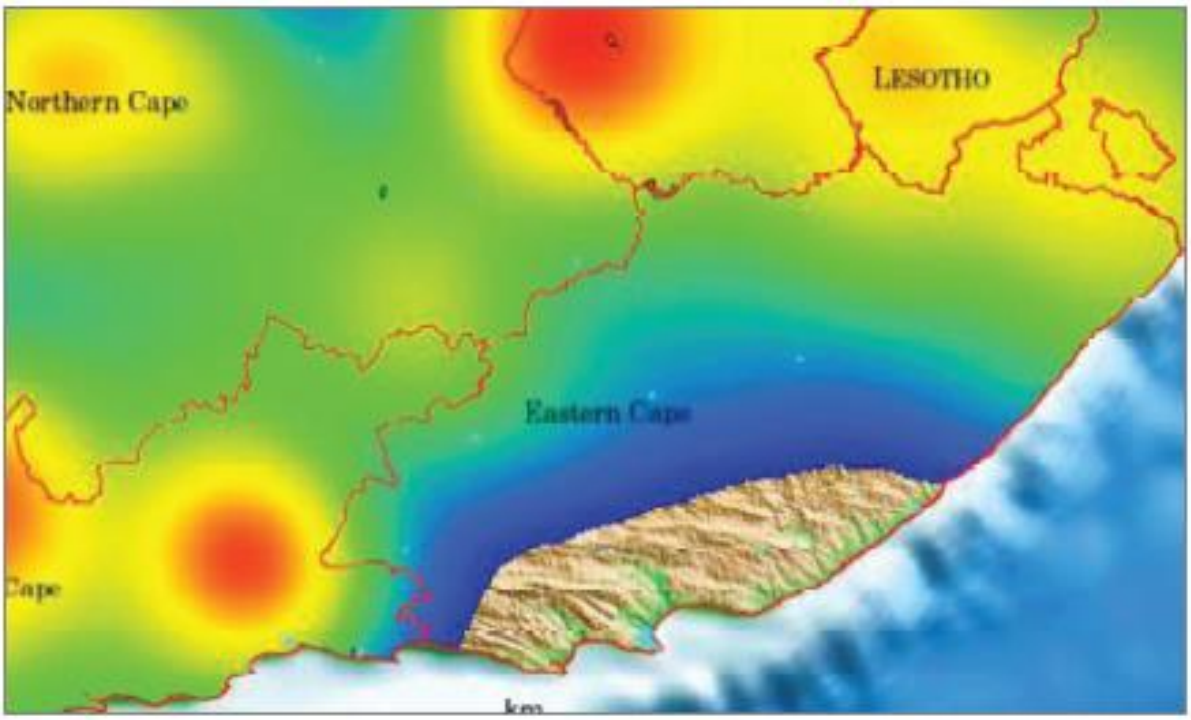


Figure 38: Excerpt of the seismic hazard map of South Africa (Aurecon, 2019)

Even though the very existence of the Algoa Basin is directly linked to faulting, and other regional scale faults are also recognized, the seismic hazard of the area is considered to be very low. **Figure 37** is an excerpt of the seismic hazard map (after Kijko, et al, 2003) which shows the Peak Ground Acceleration (PGA) values of less than 0.02g, where these are with a 10% probability of being exceeded in a 50-year period (Aurecon, 2019).

5.10 Archaeological and Cultural Heritage

According to the GIS dataset for Cultural Heritage Resources, there are no sensitive cultural heritage features situated within close proximity of the site. The Department of Forestry, Fisheries and the Environment, screening tool revealed that the proposed dam development will be located within an area of low archaeological and cultural heritage sensitivity (**Figure 38**). Although the site is located within a low Archaeological and Cultural Heritage Sensitivity theme, a compliance statement was undertaken to ensure no potential heritage features are impacted upon given the large footprint of the development as well as to ensure that Section 38(1) of the NHRA is catered for.

Figure 39: Archaeological and Heritage Sensitivity (DFFE Screening Tool, 2021)

A Phase I Archaeological Impact Assessment was undertaken in 2014 and revised in 2018 (**Appendix F5.2**) for the extended site assessment of approximately 516 ha on the Remainder of Portion 7 of the Farm Scheepersvlakte 98 (where the current development is being proposed), for the cultivation of annual crops (e.g. maize) and the establishment of a variety of citrus. Given the recent study within the same area, A Phase I Archaeological Impact Assessment Compliance Statement was undertaken by Eastern Cape Heritage Consultants (2022) attached as **Appendix F5.1**. Based on the Archaeological Reports, stone stools were the only archaeological material located and were mainly observed in areas where the river gravel is exposed and top soil has been disturbed (**Figure 39**). These stone tools are located in the reddish top soil and in the river gravels which cover the slopes overlooking the Sundays River, located ~2km to the south of the study area. Most of the Middle Stone Age stone tools were thick, small 'informal' flakes (with typical facetted striking platforms), cores and chunks with few of other typical Middle Stone Age tool types such as 'true' points and blades (Binneman, 2014).

Figure 40: Examples of the Early and Middle Stone Age stone tools in the dense Thicket vegetation (Binneman, 2014)

Regardless of the large areas investigated on foot, no other remains such as bone, ostrich eggshell or pottery were observed. However, it is possible that sites/ materials are covered by vegetation and soil. All the stone tools were in secondary context and not associated with any other archaeological material and of low cultural significance. No further action is required. There are no known graves or buildings older than 60 years on the property. In general, it would appear that the area is of low cultural sensitivity and that it is unlikely that any sensitive archaeological remains will be exposed during the development (Binneman, 2014).

According to Eastern Cape Heritage Consultants (2022) and Binneman (2014), the main impact on archaeological sites/ remains will be the physical disturbance of the material and its context. The clearing of vegetation to accommodate the proposed development and associated infrastructure (~77ha) may expose, disturb and destroy archaeological sites/ material. However, from the investigation and observations in adjacent areas, it would appear that the proposed area earmarked for development is of low archaeological sensitivity and the visual impact on the surrounding cultural landscape will also be low. It must be noted that, here is always a possibility that human remains, and/ or other archaeological and historical material may be uncovered during the construction and/or operational phase.

The Draft Scoping Report and Draft EIR were provided to the Eastern Cape Heritage Offices as well the South African Heritage Resources Agency (SAHRA) for comment (**Appendix E6**). During the compilation of this report, no comments from SAHRA or ECPHRA were received. All comments received during the Draft EIR Phase have been captured and addressed accordingly in the Comments and Responses Report (**Appendix E8).**

5.11 Palaeontology

According to the DFFE National Web-Based Screening Tool Report (**Appendix I**), the project area for the Lower Coerney Balancing Dam of Very High palaeosensitivity (**Figure 40**). In accordance with Appendix 6 of the National Environmental Management Act (Act 107 of 1998, as amended) EIA Regulations of 2014 as amended, a combined field-based and desktop site sensitivity verification was therefore undertaken in order to confirm or contest the environmental sensitivity of the proposed project area as identified by the DFFE National Web-Based Environmental Screening Tool.

Figure 41: Palaeontological Sensitivity (DFFE Screening Tool, 2021)

The geological context of the project area has already been covered in the illustration in **Section 5.7** and will not be repeated in detail in this section. The geology of the Addo area is shown on 1: 250 000 geological map 3324 Port Elizabeth (**Figure 36**). The area lies towards the northern edge of the extensive Algoa Basin that is infilled with a 3.5 km thick succession of alluvial fan, fluvial and estuarine to marine shelf sediments of Late Jurassic to Early Cretaceous age (c. 150-125 Ma) that are referred to the Uitenhage Group. According to the geological map, the southern portion of the project area on Scheepers Vlakte 7/98 is underlain by marine sediments of the Sundays River Formation that are mapped as passing palaeoshorewards into fluvial sediments of the Kirkwood Formation towards the north. It is likely that the continental and marine facies of the Uitenhage Group show an inter-fingering relationship along the basin margin. Since the Kirkwood beds, if they are indeed present, are not encountered at the surface within the project area and are unlikely to be significantly impacted by the proposed development (Natura Viva CC, 2022).

Based on information taken from the Palaeontological Impact Assessment (Natura Viva CC, 2022), early records of Cretaceous fossil remains from the Sundays River Formation of the Algoa Basin near Addo includes several reports of fossil molluscs (ammonites, bivalves, gastropods) as well as tubiculous serpulid worms. They include records of various molluscan taxa from The Look Out along the Sundays River just SW of the present study area (where a large petrified log is displayed) as well as a few sites to the northeast of Scheepersvlakte. It is noted that in a previous field-based PIA study covering the Remainder of Portion 7, Farm Scheepers Vlakte 98 by Almond (2018), there was no report of any new fossil occurrences from the Uitenhage Group or Late Caenozoic superficial sediments. Furthermore, no fossiliferous Kirkwood Formation exposures were identified in the project area. Selected fossil and subfossil material recorded in the area is illustrated in **Figures 41 to 44** below (Natura Viva CC, 2022).

Figure 42: Subfossil shell of the large land snail "Achatina"

Figure 43: Poorly-preserved segment of a petrified fossil log

Figure 44: Coarsely banded petrified wood

Figure 45: Mould of a woody plant axis

No marine fossils were observed within the few sandstone exposures provisionally assigned to the Sundays River Formation that were observed within or close to the present study area. However, the weathered sandstone bodies as well as some ex-situ blocks, do contain sparse moulds of woody plant axes (**Figure 44**). These are mostly casts with little or no original woody fabric preserved, but ill-defined growth rings are visible and coarse, woody textures are visible in some cases. Weathered-out log segments are locally present in surface float overlying the sandstone outcrop area. While more typical of the fluvial facies of the Kirkwood Formation, drifted logs and other plant material may also occur within the Sundays River beds and, as noted previously, it is likely that continental and marine facies of the Uitenhage Group interfinger along the Algoa Basin margin. None of the poorly-preserved fossil

wood material observed is considered to be of high scientific or conservation value while the majority of examples recorded lie outside the immediate project area.

Although the DFFE Screening Tool suggests that the project area is of Very High Palaeosensitivity. The study by Natura Viva CC (2022), found that Cretaceous bedrocks within or close to the site area are very poorly exposed. Within the dam basin, they are largely buried beneath thick sandy to gravelly alluvium of probable Quaternary to Recent age. The only fossils recorded here are sparse, poorly-preserved moulds and petrified blocks of fossil wood of low scientific and conservation value, while occasional subfossil land snail shells are found within the overlying mantle of Late Caenozoic alluvium. It is concluded that the project area is of *Low Palaeosensitivity* overall and the original DFFE sensitivity mapping is therefore *contested*. Anticipated impacts on local fossil heritage resources of scientific and conservation value due to the proposed dam development are likely to be of low significance and there are no objections on palaeontological heritage grounds to the proposed dam development. If any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol (Natura Viva CC, 2022).

The Draft Scoping Report and Draft EIR were provided to the Eastern Cape Heritage Offices as well the South African Heritage Resources Agency (SAHRA) for comment (**Appendix E6**). During the compilation of this report, no comments from SAHRA or ECPHRA were received. All comments received during the Draft EIR Phase have been captured and addressed accordingly in the Comments and Responses Report (**Appendix E8).**

5.12 Socio economic conditions

The Sundays River Valley Local Municipality (SRLM) is a local municipality in the Eastern Cape, South Africa. It has a total population of nearly 70,000 people. The SRLM is a Category B municipality situated within the Sarah Baartman District Municipality. It is approximately 50km from the COEGA Industrial Zone in the Nelson Mandela Bay Metro. It is one of seven municipalities in the district. The valley is characterised by harsh climate conditions, with summer temperatures rising more than 40°C. Rainfall is spread over the year and is between 250-500mm per annum. The valley is also characterised by wide, fertile flood plains and is associated with low-lying land and steep, less fertile slopes. The area outside the Sundays River Valley includes the Paterson area, the coastal belt, and the west of Alexandria. The municipality boasts ecotourism and agricultural potential. The Addo Elephant National Park and citrus production are two important economic drivers in the Sundays River Valley Municipality. SRLM consists of eight (8) municipal wards. The proposed development is located in Ward 8.

5.12.1 Population

Although Statistics South Africa recently undertook the Census 2022 data, the data is yet to be finalized and made available to the public. At the time of compilation of this report, the official Census data was from the outdated 2011 period. According to the 2011 census, the population of Ward 8 was only 9 327, less than 10% compared to the population of the district. The population consisted primarily of African and Coloured groups with 64% of the population being black African and 31% Coloureds. The gender distribution was evenly balanced with 52% male and 48% female (**Figure 45**).

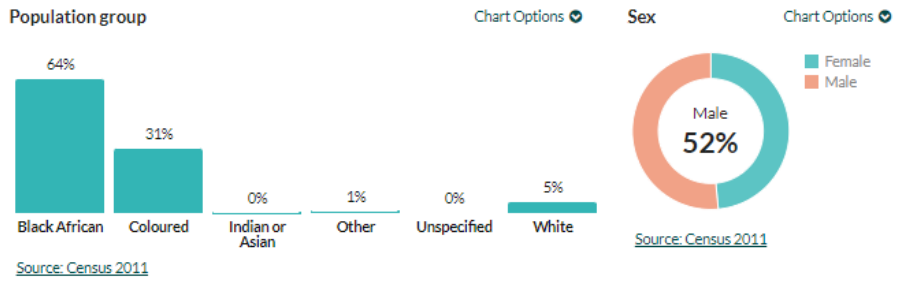


Figure 46: Madibeng Local Municipality Population Distribution (Wazimap, 2022)

5.12.2 Language dynamics

The Eastern Cape Province is known to be an area for the Xhosa Nation. According to Census 2011, IsiXhosa was the dominated language in the area with 57% of the population speaking IsiXhosa (**Figure 46**).

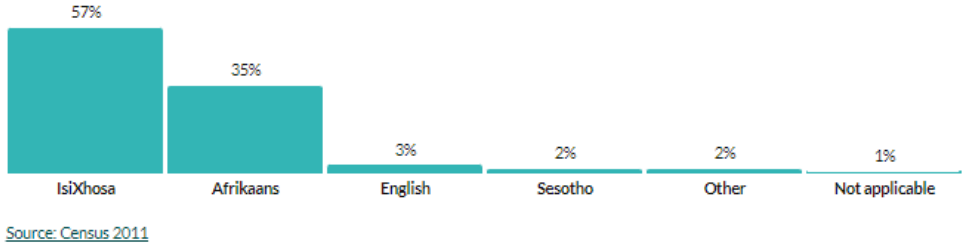


Figure 47: Population by language most spoken at home

5.12.3 Employment

Employment is a major concern for South African as a whole with the employment rate at record lows in recent years. According to the census 2011, the ward had just below 50% employment rate, 20% higher than that of the district municipality and nearly double the rate of the province. The employment rate for the ward was considerably high and may be attributed to by the citrus farms in the area. According to the same data, over 70% of the employed population was employed in the formal sector. A graph representing the characteristics of employment is provided in **Figure 47**.

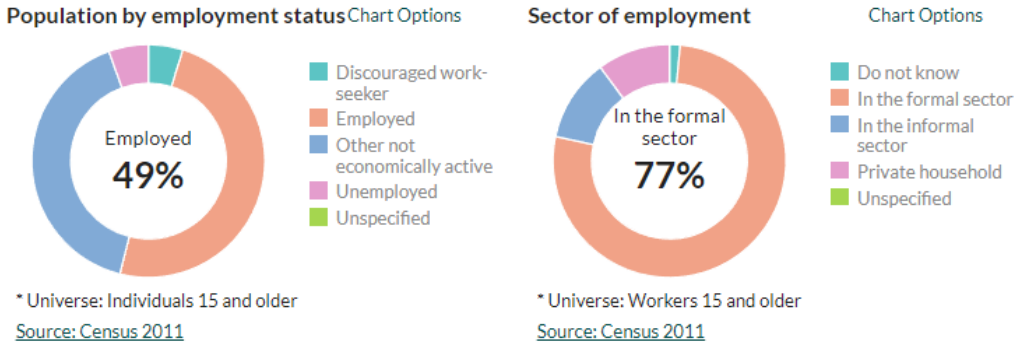


Figure 48: Population by employment

5.12.4 Annual Household Income

The average annual household income was R29 400.00, about the same as the amount in Sarah Baartman District Municipality and about double the amount in Eastern Cape which was R14 600. Majority (27%) of the households earned an average range of R20 000 – R40 000 followed by 25% ranging between R10 000 – R20 000. It must be noted that there was at least 10% of the households with no income (R0) and none of the households were over the threshold of R 600 000. Refer to **Figure 48**.

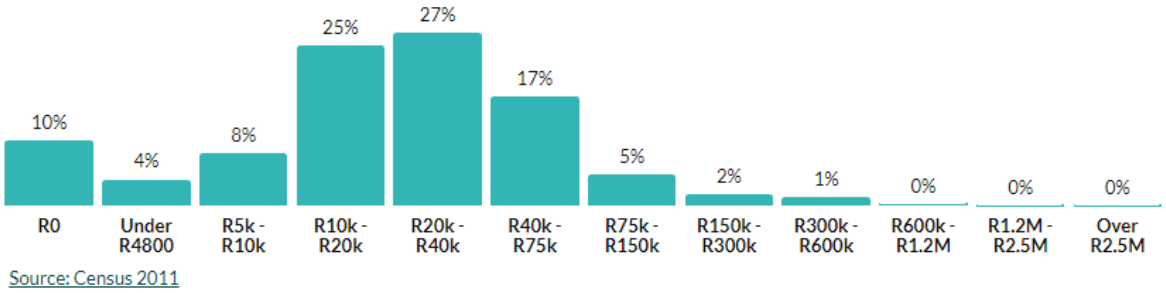


Figure 49: Annual Household Income

5.12.5 Educational Level

Education levels in society can be closely linked to the employment structure. It can be argued that an educated society will likely result in higher employment rates. According to the 2011 Census, the ward had a good education rate with only 7% of the population without any form of education. The educated population ranged between primary to undergrad level. Slightly over 50% of the population had secondary education. However, less than 20% of the population had matric or higher educational level and only 1% had a post-matric educational level. It must be noted that the data was based on individuals 20 years and older. Refer to **Figure 49** for the education level.

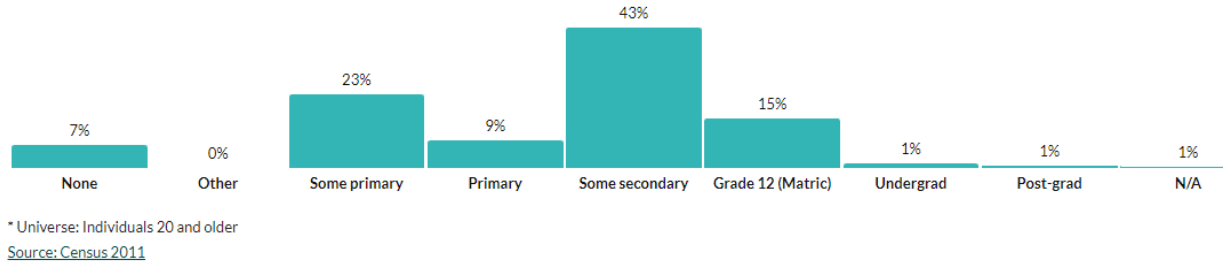
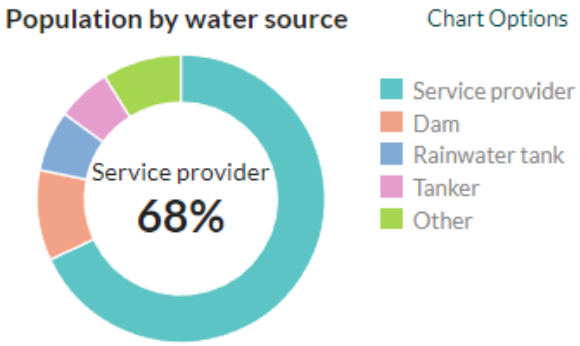


Figure 50: Educational Level

5.12.6 Access to Water

Comparable with low employment opportunities, South Africa has a major service delivery setback. Service delivery refers to the provision of basic services such as water and sanitation, electricity, etc. to communities by the corporate or governing body. Water is a basic human need and accessibility to water can be obtained by communities from various water sources. According to the 2011 census, 68% of the population within Ward 8 obtained their water from a service provider, the second most water source was in the form of dams (10%). It therefore important for the proposed dam to be

developed as there is a good portion of the population relies on dams for water. Refer to **Figure 50** for the water structure.



Population by water source (Table SOURCEOFWATER) Explore and download this data

Column	Sundays River Valley Ward 8 (21006008)		Sarah Baartman		Eastern Cape	
Service provider	68%	6,347	79.9%	360,010	56.9%	3,730,201
Dam	10.2%	947	4%	17,803	2.7%	180,096
Rainwater tank	6.8%	638	3.5%	15,946	4.9%	318,564
Tanker	6.1%	570	1.8%	8,080	2.8%	183,734
Other	8.9%	827	10.8%	48,745	32.8%	2,149,459

Figure 51: Population by Water Source

6 ALTERNATIVES

In terms of the EIA Regulations published in Government Notice (GN) R982 of 2014, as amended in 2017, feasible and reasonable alternatives must be identified and considered within the Environmental Scoping phase and will be assessed in greater detail during the EIA Phase as per Appendix 2 and Appendix 3 respectively.

According to GN R 982 of the EIA Regulations (2014), an alternative is defined as *"…in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the:*

(a) property on which or location where it is proposed to undertake the activity;
(b) type of activity to be undertaken
(c) design or layout of the activity;
(d) technology to be used in the activity;
(e) operational aspects of the activity; and
(f) Includes the option of not implementing the activity."

The purpose of alternatives as defined in the Department of Environmental Affairs and Tourism's (now The Department of Forestry, Fisheries and the Environment) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA, ' *is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts.'*

In terms of Section 24 of NEMA, the proponent is required to demonstrate that alternatives have been described and investigated in sufficient detail during the EIA process. It is important to highlight that alternatives must be practical, feasible, reasonable and viable to cater for an unbiased approach to the project and in turn to ensure environmental protection. The role of alternatives is to find the most effective way of meeting the need and purpose of the proposal, either through enhancing the environmental benefits of the proposed activity, and or through reducing or avoiding potentially significant negative impacts.

In order to ensure full disclosure of alternative activities, it is important that various role players contribute to their identification and evaluation. Stakeholders have an important contribution to make during the Scoping and Environmental Impact Assessment Process and each role is detailed as follows:

The role of the environmental practitioner is to:

- encourage the proponent to consider all feasible alternatives;
- provide opportunities for stakeholder input to the identification and evaluation of alternatives;
- document the process of identification and selection of alternatives;
- provide a comprehensive consideration of the impacts of each of the alternatives; and
- document the process of evaluation of alternatives.

The role of the proponent is to:

- assist in the identification of alternatives, particularly where these may be of a technical nature;
- disclose all information relevant to the identification and evaluation of alternatives;
- be open to the consideration of all reasonable alternatives; and
- be prepared for possible modifications to the project proposal before settling on a preferred option.

The role of the public is to:

- assist in the identification of alternatives, particularly where local knowledge is required;
- be open to the consideration of all reasonable alternatives; and
- recognise that there is rarely one favoured alternative that suits all stakeholders and that alternatives will be evaluated across a broad range of criteria, including environmental, social and economic aspects.

Several options associated with the construction of the dam and for improving the assurance of water supply were considered. The options (alternatives) for the development of the Scheepersvlakte Balancing Dam and water supply to the Nooitgedagt Water Treatment Works (WTW) were identified and undertaken by DWS during the prefeasibility and feasibility assessments in 2019 (Aurecon, 2019; DWS, 2019). The prefeasibility and feasibility options considered are discussed in this chapter.

The key factors which determined the reliability of the supply to Nooitgedagt WTW were as follows:

- A limited balancing capacity in Scheepersvlakte Dam, which is operated at a capacity of 550 000 m^3 to avoid spillages, although the dam has a total capacity of 820 000 m^3.
- There is a risk of failure of the aging upstream canal, syphon and weir infrastructure, such as the May 2017 failure of the main canal. Additional future balancing capacity should be provided to supply 210 Mℓ /day for 21 days (4.1 million m^3).

The following options were identified for providing improved assurance of supply to the WTW by various means, including balancing storage:

1. Balancing storage on the right bank of the Sundays River near the Nooitgedagt Water Treatment Works (Nooitgedagt WTW) in combination with a raised Scheepersvlakte Balancing Dam wall.

2. Diverting water from the existing Korhaansdrift Weir via a right bank pipeline to Nooitgedagt WTW for additional delivery of the NMBM's water allocation.

3. Increased balancing capacity at the Korhaansdrift Weir and diverting water via a right bank pipeline to Nooitgedagt WTW for full delivery of the NMBM's water allocation.

4. Releasing water from the existing Korhaansdrift Weir and diverting it closer to the Nooitgedagt WTW via a new pump station for full delivery of the NMBM's water allocation.

5. Increased balancing capacity at the Korhaansdrift Weir, with water releases to a new pump station downstream in the Sundays River, close to the Nooitgedagt WTW.

6. Constructing a larger dam near the present Scheepersvlakte Balancing Dam site and integrating this dam with the existing gravity pipeline to the Nooitgedagt WTW.

7. Constructing a large balancing dam on the right bank near the Nooitgedagt WTW.

Table 19 outlines the various alternative types that must be assessed for each development**.** The extent of the applicability of each of these is further presented. It must be highlighted that the alternatives presented in the table are derived from both the the EIA Regulations (2014) as amended as well as the the Department of Environmental Affairs and Tourism's (now Department of Forestry, Fisheries and the Environment) 2004 Integrated Environmental Information Series on the Criteria for determining alternatives in EIA. Where the alternative is applicable to the project, it will be further discussed in this EIR and are as follows.

- The No-Go Option;
- Activity alternatives;
- Property alternatives;
- Process alternatives;
- Operational alternatives; and
- Demand alternatives.

The brief background behind the discussion of these alternatives and the exclusion of others is presented in **Table 19.**

Table 19: Project alternatives types (DFFE IEM Series 11)

ALTERNATIVE	COMMENT
No-go Option	The 'no-go' alternative is sometimes referred to as the 'no-action' alternative (Glasson *et al.,* 1999) and at other times the 'zero-alternative'. It assumes that the activity does not go ahead, implying a continuation of the current situation or the status quo. This alternative must be discussed on all projects as it allows for an assessment of impacts should the activity not be undertaken. **This alternative is discussed in this report.**
Activity alternatives	These are sometimes referred to as project alternatives, although the term activity can be used in a broad sense to embrace policies, plans and programmes as well as projects. Consideration of such alternatives requires a change in the nature of the proposed activity. This would entail a process where a different project is proposed over the Lower Coerney Dam. **There is one activity alternative to the proposed Lower Coerney Balancing Dam which is discussed in this report.**
Location/ property alternatives	Location alternatives could be considered for the entire proposal or for a component of a proposal, for example the location of a processing plant. The latter is sometimes considered under site layout alternatives. A distinction should also be drawn between alternative locations that are geographically quite separate, and alternative locations that are in close proximity. In the case of the latter, alternative locations in the same geographic area are often referred to as alternative sites. Based on the prefeasibility studies by DWS, three (3) alternative dam locations were assessed near Scheepersvlakte Dam and four (4) possible sites for a balancing dam near the Nooitgedagt WTW were evaluated. **Based on the above, the location/property alternatives will be discussed in this report.**

ALTERNATIVE	COMMENT
Process alternatives	Various terms are used for this category, including technological alternative and equipment alternative. The purpose of considering such alternatives is to include the option of achieving the same goal by using a different method or process. An industrial process could be changed, or an alternative technology could be used. These are also known as technological and equipment alternative and will be discussed as they are applicable to the type of pipeline which will be used, and the removal of vegetation required. **These will be discussed in this report.**
Demand alternatives	Demand alternatives arise when a demand for a certain product or service can be met by some alternative means. This is applicable to the demand for a product or service. An example of this would be where there is a need to provide more drinking water. Examples of alternatives can be through managing demand through various methods or providing additional drinking water. Specific to the proposed project, alternatives regarding the demand for irrigation and potable water (emergency supply) will be discussed. These are linked exclusively to the volume (dam capacity). **These will be discussed in this report.**
Scheduling alternatives	These are sometimes known as sequencing or phasing alternatives. In this case an activity may comprise several components, which can be scheduled in a different order or at different times and as such produce different impacts. **These are not applicable to the project and will not be discussed.**
Input alternatives	By their nature, input alternatives are most applicable to industrial applications that may use different raw materials or energy sources in their processes. **Considering that the proposed development is a dam, input alternatives are not applicable to the project.**
Routing alternatives	Consideration of alternative routes generally applies to linear developments such as power lines, transport, and pipeline routes. The proposed project is a dam and will link to existing canals. **Therefore, routine alternatives are not applicable to this development.**
Site layout alternatives	Site layout alternatives permit consideration of different spatial configurations of an activity on a particular site. This may include particular components of a proposed development or may include the entire activity. Based on aim of the project on achieving maximum water capacity, one suitable layout has been proposed for the dam. **Based on this, site layout alternatives will not be covered in this report.**
Scale alternatives	In some cases, activities that can be broken down into smaller units can be undertaken on different scales. For example, a housing development within an overall mixed-used development could have the option of 1 000, 2 000 or 4 000 housing units. Each of these scale alternatives may have different impacts. However, the proposed dam cannot be broken down into smaller units. **For this reason, scale alternatives will not be discussed in this report.**
Design alternatives.	This entails the consideration of different designs for aesthetic purposes or different construction materials to optimise local benefits and sustainability would constitute design alternatives. Appropriate applications of design alternatives are communication towers. In such cases, all designs are assumed to have different impacts. Generally, the design alternatives could be incorporated into the project proposal and so be part of the project description and need not be evaluated as

ALTERNATIVE	COMMENT
	separate alternatives. **Based on project description and background information, no design alternatives were available and will therefore not be discussed in this FSR**.
Operational alternatives	The Operational Alternative is where you can specify controls on the operational aspects of the project such as pressure pipes, pumps, as well as valves. **Based on project description and background information, operational alternatives are applicable to the project and will be assessed in this report.**

6.1 Activity alternative

a. Improvements at Scheepersvlakte Dam

The DWS study undertaken by Naidu Consulting identified the following improvements that should be made at Scheepersvlakte Dam:

- Install an isolating valve and a non-return valve on the 1420 mm Nooitgedagt pipeline to prevent backflow from the cross-connection to the Scheepersvlakte Syphon.
- Modify the dam's outlet works, to enable future maintenance and repairs to be undertaken without requiring 3-day shutdowns and draining of the dam.
- Construct a direct connection between the Nooitgedagt pipeline and the main canal, to replace the existing Syphon and separate the operation of the Nooitgedagt pipeline from the operation of the Upper Coerney Canal.

The first option above would probably require that Scheepersvlakte Dam is taken out of service for a few days and the second option would require a considerable time. The last option could probably be undertaken by taking the Scheepersvlakte Dam out of service for a relatively short period of time. After implementation, this option would enable the Nooitgedagt WTW to be supplied directly from the canal for up to 4.5 days per week, while Scheepersvlakte Dam is taken out of service, or for longer if the canal is not emptied each weekend during the period that maintenance work is undertaken on Scheepersvlakte Dam. The provision of a direct offtake from the canal would provide the additional benefit that the deposition of silt in Scheepersvlakte Dam would probably be considerably reduced as the volume of sediment laden water that would flow through the reservoir would be reduced.

However, after careful analysis it was found that this option is not recommended. The main reason for the current operation of the canals for 4.5 days per week is because the canals have sufficient capacity to supply the full current allocation during this period and because of the additional costs and potential staffing problems that would arise if the canals were to be operated for 7 days per week. The filamentous algae which occur are reduced by drying out the canals for two days per week and only occasionally occur. These algae result in increased maintenance (cleaning) of the canal and could affect the operation of the Nooitgedagt WTW. In addition, it was suggested by DWS that if the balancing storage is sited near Scheepersvlakte Dam, then it would also be necessary to reduce the risk of failure of the pipeline from there to the Nooitgedagt WTW (1 400 mm x 9 300 m long steel pipeline). Duplication of the existing pipeline would probably rule out all options for balancing dams in the vicinity of Scheepersvlakte Dam because of the very high additional cost of approximately R240 million.

b. Raising of Scheepersvlakte Dam

If Scheepersvlakte Dam would be raised sufficiently to provide 21 days of balancing storage, then the dam wall would have to be raised by about 12 m to provide about 4.6 million m^3 of balancing storage for an emergency supply of about 220 Mℓ /day (210 Mℓ /day plus 3% losses). Therefore, the full supply level would have to be raised from 104.6 m to about 117 m. The raising of Scheepersvlakte Dam is, however, not feasible as the site is not suitable for raising the dam and spillway by the required 12 m. If the site was suitable, the raised dam would require that most of the stored water would have to be pumped due to the lower level of the long weir in the canal that supplies Scheepersvlakte Dam. The crest level of this weir is at RL 105.8 m, which is 11 m below the raised full supply level.

c. Development of a new 21 day emergency supply balancing dam (preferred)

This option is based on the construction of a dam near Scheepersvlakte Dam or Nooitgedagt WTW. A balancing storage of 21 days average daily demand (ADD) is recommended to limit the risk of shortfall in supply to the NMBM. Thus, the requirement of the development of a new dam with the design water requirement for NMBM of 76.6 million m^3/a or 210Ml/day. The main advantage of the chosen dam site is that it would be operated under gravity (no pumping will be required). Other advantages are that the new dam will consist of new infrastructure which will have a longer operational period and minimal (cost reduction) maintenance requirements. *This alternative is preferred due to ageing existing infrastructure making it unsuitable and unsafe for modifications to meet the higher demand. The new dam will provide water security for up to 21-days while also providing water for the citrus farms.*

6.2 Location/ property alternatives

Three possible sites for a balancing dam near the Scheepersvlakte Dam were evaluated (**Figure 51**), namely:

1. Upper Scheepersvlakte Dam site;
2. **Lower Coerney Dam site (preferred)**; and
3. Upper Coerney Dam site.

Additional four possible sites for a balancing dam near the Nooitgedagt WTW were evaluated (**Figure 51**), namely:

1. Nooitgedagt North Option 1 site;
2. Nooitgedagt North Option 2 site;
3. Nooitgedagt North Option 3 site; and
4. Nooitgedagt South site.

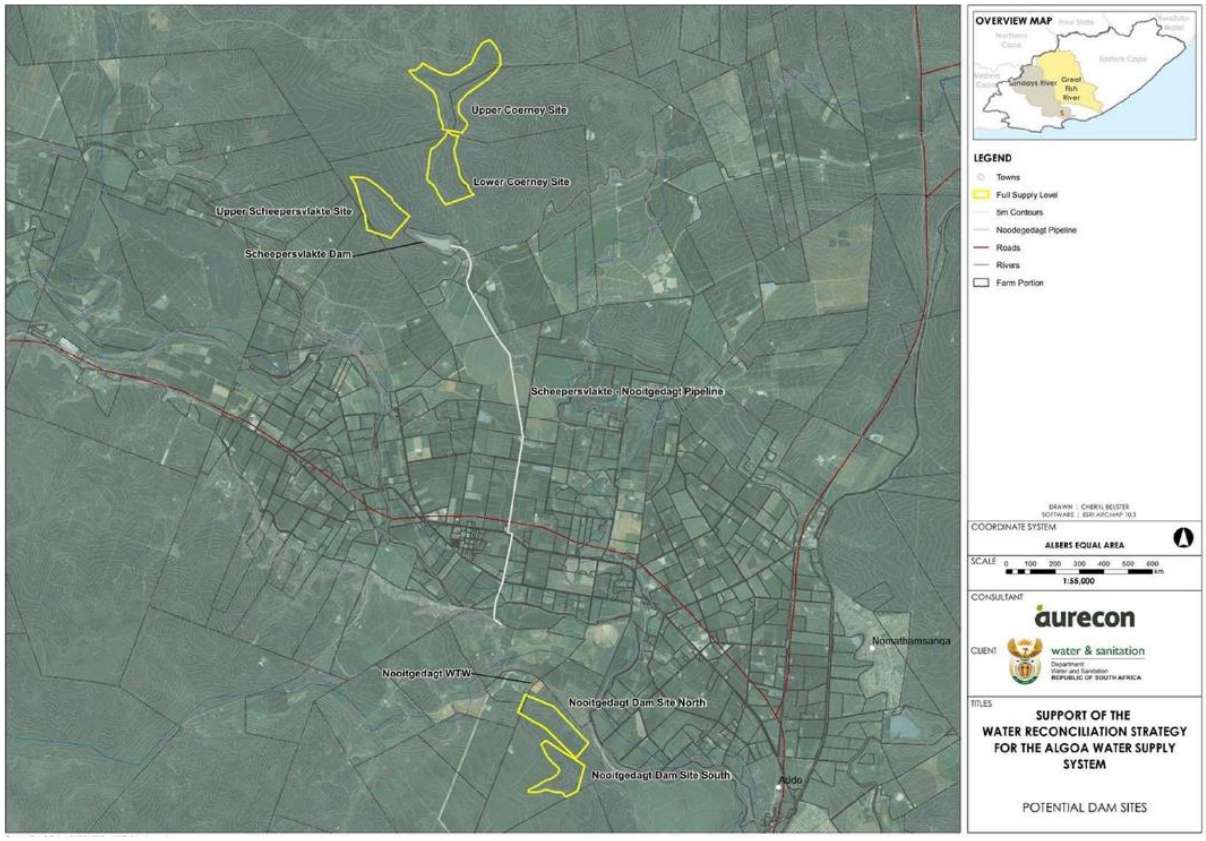


Figure 52: Options for Balancing Dams near Scheepersvlakte Dam and Nooitgedagt WTW (DWS, 2019)

The alternatives as described by DWS in the Options Analysis Report dated February 2019 are discussed as follows:

An Environmental Constraints Analysis was undertaken to provide a desktop overview and analysis of the environmental sensitivity of the short-listed sites for a new balancing dam, highlighting potential issues and constraints and outlining the requisite environmental legal compliance requirements for each option. This provided high-level input regarding the environmental issues / constraints and legal requirements of the five short-listed sub-options. From a terrestrial ecology perspective, the Upper Scheepersvlakte and Coerney sites were considered slightly more environmentally sensitive when compared to the Nooitgedagt sites, mostly due to an overlap with an Endangered Ecosystem. From an aquatic ecology perspective, the Coerney sites have a greater aquatic sensitivity due to the drainage line within which they are located. No fatal flaws were identified from heritage and palaeontology as well as a land use perspective. From a purely environmental sensitivity perspective, the Nooitgedagt sites were slightly preferred to the Upper Scheepersvlakte and Coerney sites. The aforementioned does not however qualify as “fatal flaws”, but merely something to take note of when evaluating the overall feasibility of the sites.

6.2.1 Scheepersvlakte Dam Sites

a. <u>Upper Scheepersvlakte Dam</u>

The Upper Scheepersvlakte Dam would be sited immediately upstream of the existing Scheepersvlakte Dam on Scheepersvlakte 98 Portion Number 7, as shown in **Figure 21**. This property is currently owned

by Scheepersvlakte Farms, which is currently developing the property for irrigated agriculture. The Scheepersvlakte 98 Citrus Development Trust plans to establish approximately 60 ha orchards in the area that would be occupied by the proposed dam wall and would be inundated by the reservoir basin.

The main features of the dam include:

- The full supply level of the proposed dam would be at 128 masl to provide a capacity of 4.6 million m^3. The lowest drawdown level would be at about 115 masl.
- The storage in the dam would only be utilized in an emergency and therefore over 50 years only about 4 000 m^3 of sediment from the catchment would be deposited in the dam.
- The reservoir footprint would be about 60 ha.
- The dam would have a catchment area of 3.5 km^2 and although the safety evaluation flood would be about 220 m^3/s, this could be accommodated by a relatively small 10 m wide side channel spillway, with 2.5 m of freeboard that would provide significant flood attenuation.
- As the existing nearby Scheepersvlakte Dam is an embankment dam, it is likely that suitable earthfill materials would be available in the vicinity to construct a zoned earthfill embankment dam with 1 in 3 upstream slope and 1 in 2 downstream slope, with cobblecrete upstream slope protection.

The main advantages of the dam would be as follows:

- The dam would be situated very close to the existing Scheepersvlakte Dam and associated conveyance infrastructure.
- The catchment area of the dam is small (3.5 km^2) and therefore a smaller spillway and less freeboard will be required.

The disadvantages of the dam would be as follows:

- All the water stored in the dam would have to be pumped from the canal, which would be an additional operational cost.
- The dam would be situated on private property to be developed as orchards by Scheepersvlakte Farms.
- The Developer may wish to share the use of the dam, which might complicate its operation.
- The pump station would be remote from the Nooitgedagt WTW and would have to be operated and maintained.
- The existing pipeline from Scheepersvlakte Dam to Nooitgedagt WTW may be vulnerable to damage by a major flood, although the risk would be significantly reduced by the proposed provision of a second Syphon crossing, as included in the estimate of the cost.

b. Lower Coerney Dam (Preferred)

The proposed Lower Coerney Dam (**Figure 51**) would be sited upstream of the Coerney Syphon on Scheepersvlakte 98 Portion Number 7 of Scheepersvlakte Farms Pty Ltd in the vicinity of the site proposed by Scheepersvlakte Farms for a balancing dam. The main advantage of the scheme is that it would provide a gravity supply to the WTW via the existing 1 400 mm Nooitgedagt pipeline, and it would also be filled by gravity flow via the proposed pipeline from the canal. The main characteristics of the proposed dam are indicated in **Table 20**.

Table 20: Main characteristics of the proposed Lower Coerney Dam (DWS, 2019)

Characteristic	Lower Coerney Dam
Type of dam	Zoned earthfill embankment
NOC (m amsl)	103.8
FSL (m amsl)	98.8
Freeboard (m)	5.0
Crest width (m)	5.0
DS Slope (1V:H)	2.0
US Slope (1V:H)	3.0
Embankment fill volume (m^3)	355,993
Core trench volume (m^3)	46,798
Crest length (m)	623
Total gross dam capacity (m^3)	4,600,000
Surface area at FSL (ha)	59.7
Maximum wall height (m)	19.0
Catchment area (km^2)	34
Unrouted SEF (m^3/s)	890
Spillway configuration description	Concrete-lined, 36 m wide, side channel spillway located on the left abutment. (Note: spillway position dependent on geotechnical conditions) with downstream concrete outlet chamber, 4x4x3m, with two valves for the two pipelines.
Outlet works description	Dry well tower (19m high) with inside dimensions of 4x4m. Three offtake levels controlled by valves.
Access road length (km)	1.0

The main advantages of the scheme would be as follows:

- The dam would be situated close to Scheepersvlakte Dam and associated conveyance infrastructure.
- The scheme would be a gravity supply to fill the dam and to deliver water to Nooitgedagt WTW (no pumping required).
- The comparative capital cost as well as the cost of operation for this option is the lowest of the five options investigated.
- The irrigation water that passes through the dam would probably be sufficient to maintain acceptable salinity for urban consumption, but may need to be managed to ensure that the quality would be acceptable for citrus.
- No electricity costs would be incurred if water needs to be abstracted and replaced to maintain acceptable salinity levels.

The possible disadvantages of the scheme would be as follows:

- The dam would be situated at the outlet of a relatively large catchment area (34 km^2) and a major flood could cause damage downstream of the spillway as there is no evidence of rock at the site.

- The reserve storage and infrastructure would be remote from Nooitgedagt WTW and an additional Syphon under the Sundays River would be required to reduce the risk of wash away of the existing 1 400 mm Syphon.
- The potential joint use of the dam's water by the Municipality and the private developer would need careful planning.

c. Upper Coerney Site

The Upper Coerney dam site is situated about 1.5 km upstream of the Lower Coerney Dam site and approximately 2.3 km upstream of the Coerney Syphon. The dam and its reservoir basin would extend across two privately owned properties: Enon Mission Station 40-0, which is owned by Enon Mission, and Uitenhage Road 713-0, which is owned by the Venter Wildlife Trust. The main features of the dam are described below:

- There is no geotechnical information available concerning materials in the reservoir basin, and therefore for this very preliminary assessment it has been assumed that the dam wall would comprise a zoned earth embankment, as suggested for the costing of the Lower Coerney Dam.
- The full supply level of the proposed dam would be at about 109.1 masl and the lowest drawdown level at about 95 masl to provide a capacity of 4.6 million m^3 for 21 days emergency supply. Pumping would be required to fill the dam.
- The proposed dam would have a catchment area of 30 km^2. Assuming a sediment load of 15 m3/km^2/annum, then about 23 000 m^3 of sediment from the catchment area would be deposited over a 50-year period.
- The safety evaluation flood for the 30 km^2 catchment area of approximately 820 m^3/s, would be attenuated to about 700 m^3/s by the reservoir. As there does not appear to be any rock at the site, it has been assumed that a concrete lined side channel spillway with a 32 m crest width and 5 m of freeboard would be provided.

The main advantages of the scheme would be as follows:

- The dam would provide a gravity supply to deliver water in an emergency to Nooitgedagt WTW.
- The dam would be situated relatively close to the Scheepersvlakte Dam and associated conveyance infrastructure.

The possible disadvantages of the scheme would be as follows:

- The dam would be situated at the outlet of a relatively large catchment area (30 km^2) and a major flood could cause damage downstream of the spillway, as there is no evidence of rock at the site.
- Water would have to be pumped into the dam.
- The reserve storage and infrastructure would be remote from Nooitgedagt WTW and an additional Syphon under the Sundays River would be required to reduce the risk of failure of the system.
- The dam and reservoir basin would extend across two properties.
- This option has the highest comparative capital cost of the three options investigated in the vicinity of Scheepersvlakte Dam. The Upper Coerney Dam does not offer any real advantage over the other two options.

The Lower Coerney Dam site is preferred over the Upper Scheepersvlakte and Upper Coerney Dam site as placing the same dam at the upper Scheepersvlakte or Coerney sites would reduce the structural integrity of the dam and a major dam wall collapse would likely occur. In addition, the Upper Scheepersvlakte and Coerney sites would be financially costly to operate as it would require a pump for water supply rather than the gravitational pipeline.

6.2.2 Alternative Nooitgedagt Dam Sites

Four possible sites for a balancing dam near the Nooitgedagt WTW were identified and assessed. The main advantages of these sites would be as follows:

- The balancing dam would be located very close to the Nooitgedagt WTW and therefore could be easily managed by the operating staff at the Works.
- The supply would not be vulnerable to a failure of the Scheepersvlakte to Nooitgedagt pipeline.

Four possible sites for a balancing dam, to provide 21 days of storage, were assessed. All the sites would be situated on Erf 119 Portion 1, which is owned by Rolust Sondagsrivierplase CC, according to Windeed (but may currently be owned by Wicklow Trust). This property is currently utilized as a game reserve; however, the owners have indicated that they are planning to develop some of the area for irrigation (DWS, 2019). They will be requesting the LSRWUA to approve the relocation of the point of abstraction of their existing water allocation, from the 1 420 mm pipeline to the vicinity of the Nooitgedagt WTW. Wicklow Trust has also advised in their letter dated the 12th of October 2017 that the construction of a dam at the Nooitgedagt North Option 1 site would not be acceptable and that only the Nooitgedagt South site would be acceptable (DWS, 2019).

a. Nooitgedagt North Option 1

The location of the proposed Nooitgedagt North Option 1 dam is shown in **Figure 51**. The dam would be located close to three 11 kV/ 22 kV transmission lines and close to the main 400 kV transmission line, which supplies power to NMBM. The limited geotechnical inspection of the site indicated that suitable material would probably be available for the construction of a cut to fill dam. The dam would have virtually no catchment area, other than the reservoir basin, and therefore only a nominal overflow channel, which would discharge into the adjacent valley, would be provided. This dam was assumed to be like that of the proposed Upper Scheepersvlakte Dam.

The main advantages of the scheme would be as follows:

- The dam would provide a gravity supply to deliver water in an emergency to Nooitgedagt WTW.
- The dam would be situated very close to the Nooitgedagt WTW and the pump station would be situated at the WTW site, which would facilitate maintenance and operation.
- This scheme has a lower risk of failure than those in the vicinity of Scheepersvlakte Dam as water is not supplied via a long pipeline and Syphon.
- The dam would have virtually no catchment area and therefore only a small unlined spillway channel and limited freeboard would be required.

The possible disadvantages of the scheme would be as follows:

- The embankment volume to capacity ratio is relatively high and accounts for the relatively high cost, which is more than the most expensive option in the vicinity of Scheepersvlakte Dam. This cost could, however, potentially be slightly reduced.
- The 2 m of freeboard provided is conservative and other refinements may be possible.
- Water would have to be pumped into the dam.
- The property owner has advised that this proposed site for the dam is not acceptable due to possible seepage water affecting downstream orchards. Lining of the dam may therefore be required, depending on the soil permeability, which will further increase the capital cost.

b. Nooitgedagt North Option 2

The location of the proposed Nooitgedagt North Option 2 dam is shown in **Figure 51**. The dam would require the relocation of three 11 kV/ 22 kV transmission lines and probably also the main 400 kV transmission line, which supplies power to NMBM. The main features of the dam would be similar to those for the Nooitgedagt North Option 1 and Upper Scheepersvlakte Dam, as described in Section 6.2.a.

The advantages and disadvantages of Nooitgedagt North Option 2 would be similar to those for Nooitgedagt North Option 1, as described earlier, but the dam would also have the following additional disadvantages:

- The 11/22 kV transmission lines and possibly also the 400 kV transmission line would have to be relocated.
- The capital cost would be significantly higher than that for Nooitgedagt North Option 1.

c. Nooitgedagt North Option 3

The main features of the dam would be similar to those for Nooitgedagt North Option 1. The advantages and disadvantages of Nooitgedagt North Option 3 would be similar to those for Nooitgedagt North Option 1, but the dam would also have the following additional disadvantage:

- The capital cost would be significantly higher than that for Nooitgedagt North Option 1.

d. Nooitgedagt South

The site of the proposed Nooitgedagt South Dam is shown in **Figure 21**. The embankment dam would be located upstream of the 400 kV transmission line so that the line would not be impacted on by the dam. This site is not optimal for the dam, resulting in high construction cost. The main features of the dam would be similar to those for the Nooitgedagt North Option 1 and Upper Scheepersvlakte Dam, as described in Section 6.2.a.

The main advantages of the dam would be that water could gravitate into the dam, and it is the favored site for the landowner, the Wicklow Trust. The main disadvantages would be as follows:

- Water would have to be pumped to the Nooitgedagt WTW.
- The capital cost of the dam would be high. This in part arises from the siting of the dam so that construction would not take place below the 400 kV transmission line and the need for a relatively high dam wall, which would provide a relatively small reservoir basin.

*The Nooitgedagt sites **are not** preferred over the Scheepersvlakte Site as the property which they would be situated is currently a game reserve, more environmentally sensitive and an important ecosystem for various species. In addition, within the Nooitgedagt sites, there are possible seepage water affecting downstream orchards which would require more funds to address and there are existing 11/22 kV transmission lines and possibly also the 400 kV transmission line which would have to be relocated for the dam to be developed.*

6.3 Process alternatives

a. *Option 1: Balancing storage on the right bank of the Sundays River near Nooitgedagt WTW in combination with a raised Scheepersvlakte Balancing Dam wall*

This option consists of off-channel balancing storage consisting of a small dam in the valley to the north-west of the Nooitgedagt WTW in combination with an on-site storage facility, which could fit inside the present Nooitgedagt WTW site boundaries. The total storage available is limited due to the lack of available land on the Nooitgedagt WTW site (about 150 Mℓ storage in a cut-to-fill dam) and a possible 250 to 300 Mℓ in the valley surrounded by developed irrigation farmland. Raising of the Scheepersvlakte Balancing Dam by 1.0 to 1.5m could add some 160 Mℓ storage to achieve some 850 Mℓ storage. The maximum combined effective storage is estimated at 1000 to 1100 Mℓ, which may offer some 6 to 7 times the average daily demand (ADD) storage. This option thus cannot meet the required balancing storage.

b. *Option 2: Diverting water from the existing Korhaansdrift Weir via a right-bank pipeline to Nooitgedagt WTW*

The balancing capacity of the Korhaansdrift Weir is roughly estimated at 100 to 120 Mℓ, of which 80% would be utilized for this option. The proposed pipe route will initially start on the left bank (due to steep rocky slopes on the right bank) and then cross over to the right bank at 1.5 km downstream. The new pipeline will be 36 km long and will tie into the existing 1.5 m diameter pipeline from the Scheepersvlakte Balancing Dam to the Nooitgedagt WTW.

c. *Option 3: Increased balancing capacity at Korhaansdrift Weir and diverting the water via a right-bank pipeline to Nooitgedagt WTW*

The operation of this option is similar to Option 2, but additional balancing capacity will be created at Korhaansdrift Weir to accommodate the variability in the NMBM's water requirements and to minimize possible spillages under the LSRWUA long distance releases from Darlington Dam. This option requires that the Korhaansdrift Weir be raised by 4.5 m to create an additional balancing capacity of 1 050 Mℓ. Given the age and history of the existing wall, raising the wall will require a new structure with the existing wall at best being used as a "shutter" to part of the new wall structure. The gravity pipeline will be 36 km long with a 1.5 m diameter.

d. *Option 4: Releasing water from the existing Korhaansdrift Weir into the river and diverting closer to the Nooitgedagt WTW via a new pump station*

This option is based on operating the existing Korhaansdrift Weir at present capacity, but install a new outlet valve(s) in the present structure to allow for immediate releases on a short-term basis. At a

distance, some 44 km downstream of Korhaansdrift Weir, a large "hippo pool" was identified in the Sundays River as a good point of abstraction for a proposed right bank raw water pump station. From the proposed pump station, a 1.4 m diameter pipeline will be tied into the existing 1.4 m diameter gravity pipeline from the Scheepersvlakte Balancing Dam.

The pump station will require an in-stream structure to maintain the present operating levels in the pool. Any permanent structure constructed above present "dry season" levels, will pose a flooding risk to adjacent irrigation land. The proposed structure would therefore be mass concrete or gabions, but not extend above the present water level. Total dissolved solids (TDS) levels at the proposed pump station could vary between 1 190 and 1 600 mg/ℓ.

e. Option 5: Increased balancing capacity at the Korhaansdrift Weir with releases to a new Pump Station downstream in the Sundays River

The operation of this option is similar to Option 4, but additional balancing capacity will be created at Korhaansdrift Weir to accommodate the variability in the water demands of NMBM and to minimize possible spillages under the LSRWUA long-distance releases from Darlington Dam. This option requires (as for Option 3) that the Korhaansdrift Weir be raised by 4.5 m to create an additional balancing capacity of 1 050 Mℓ. Given the age and history of the existing wall, raising of the wall will require a new structure with the existing wall at best being used as a "shutter" to part of the new wall structure.

As per Option 4, a downstream pump station will be required to abstract raw water from the "hippo pool" with level protection in the form of a low weir structure. From the proposed pump station, a 1.4 m diameter pipeline will be tied into the existing 1.4 m diameter gravity pipeline from the Scheepersvlakte Balancing Dam. The deterioration of water quality due to irrigation/return seepage/flows between the Korhaansdrift Weir and the proposed pump station, and the high risk of water losses over the abstraction weir, are real concerns for this option as well.

f. Option 6: A larger dam near the present Scheepersvlakte Balancing Dam to be integrated with the existing gravity pipeline to Nooitgedagt WTW (preferred)

This option is based on the construction of a dam in the valley north-east of the existing Scheepersvlakte Balancing Dam, as shown in **Figure 52**. Water will be abstracted just upstream of the last long weir in the main canal, but downstream of the Coerney syphon offtake. The supply pipeline between this main canal abstraction point and the proposed dam will be a 1.4 m diameter x 880 m long steel pipe. The gravity supply, between the dam and the existing gravity pipeline to the Nooitgedagt WTW, will be a 1.4 m diameter x 730 m long steel pipeline. The site falls largely on land being planned for development by the Scheepersvlakte 98 Citrus Development Trust (Scheepersvlakte Farms (Pty) Ltd (SVPL)).

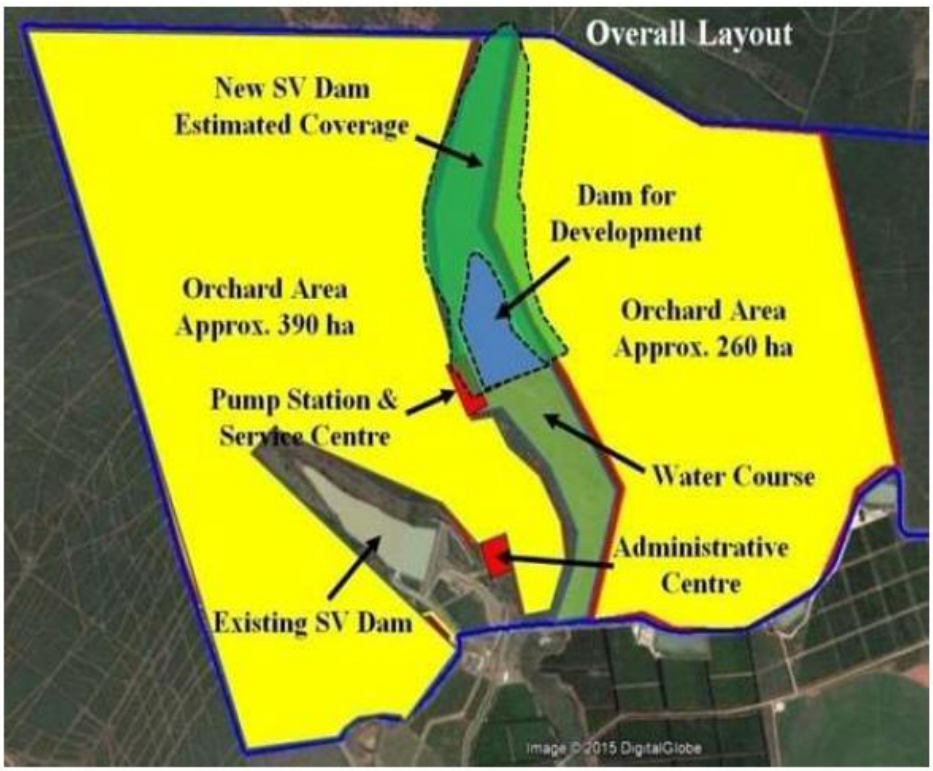


Figure 53: Scheepersvlakte 98 Citrus Development (DWS, 2019)

The Scheepersvlakte 98 Citrus Development Trust is currently constructing a small dam on the same site as that identified for the Coerney Balancing Dam. According to DWS (2019), a meeting was held with the Trustees and Engineers of the Trust in May 2016. The Trust agreed to co-operate with the DWS evaluation and possible future works, should this new dam option be pursued further. The Scheepersvlakte 98 Citrus Development has received a water use authorisation from the DWS for the abstraction of a maximum of 5 850 000 m^3/a, for the development of 650 ha of citrus. The Scheepersvlakte 98 Citrus Development Trust received their Environmental Impact Assessment for their development from the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEA) in August 2019.

g. Option 7: A large balancing dam on the right bank near the Nooitgedagt WTW

This option considered the possibility of providing additional storage near the Nooitgedagt WTW, which would have the following advantages:

- The storage would enable the works to continue to operate for a reasonable period while maintenance or repairs are done on the damaged components of the upstream sections of the supply system (all components are upstream).
- The proposed dam would supply the Nooitgedagt WTW by gravity, although it may be necessary to pump water into the dam.
- All future peak demands on the Nooitgedagt WTW could be supplied by gravity.

The existing 1.4 m diameter steel pipeline delivers water to a balancing tank located above the works at about related level (RL) 85 m. It may be possible to fill the dam by gravity when the Scheepersvlakte Balancing Dam is at or near full capacity. With the proposed full supply level (FSL) at RL 88 m and the

Scheepersvlakte Balancing Dam at lower levels, a booster pump station will be required near the northern boundary of the Nooitgedagt WTW site.

It is proposed that water should be supplied at one end of the proposed dam and abstracted from the other end to provide circulation and minimize the risk of algal growth. On the other hand, wind and wave action is likely to cause circulation within the water body and therefore it seems unlikely that there would be any significant benefit in separating the inlet and outlet. However, it would probably be desirable to provide a multi-level abstraction tower. A very small spillway would suffice. The electricity transmission line serving farms to the south-east of the Nooitgedagt WTW would have to be relocated for this option.

A Risk Matrix was compiled based on desktop conditions and site assessments to determine the feasibility of the above-mentioned options. **Table 21** is a Risk Matrix compiled for the seven options under consideration and is based on the discussions above.

Table 21: Risk Matrix for Preliminary Screening of Options (DWS, 2019)

Criteria Applied	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
Risk to supply during Construction	Low	Medium	High	Medium	High	Low	Low
Risk to NMBM during Operation	High	High	Medium	High	Medium	Low	Low
Operational risks for LSRWUA	High	High	Medium	High	Medium	Low	Low
Capital and Operational costs	Low	High	High	Low	Low	Medium	Medium
Environmental risks costs	Low	Medium	Medium	Low	Low	Medium	Medium
Water quality deterioration in operation	Low	Low	Low	High	High	Low	Low

Based on the Risk Matrix, Options 1 to 5 have high risks for the continuity of water supply, either during construction or during operation. The direct and indirect costs associated with the risk of interruptions in water supply for both urban and agricultural water users, have ruled these five options out for more detailed investigations and evaluation. ***Subsequently Options 1 to 5 are not preferred****. Options 6 and 7 have similar risk outcome, however* ***Option 6 is preferred over Option 7*** *as already indicated in* ***Section 6.2.2*** *that a dam within the Nooitgedagt sites would be situated within a game reserve, which is more environmentally sensitive and an important ecosystem for various species. In addition, Option 7 has more disadvantages and challenges including the possible seepage water affecting downstream orchards which would require more funds to address and there are existing 11/22 kV transmission lines and possibly also the 400 kV transmission line which would have to be relocated for the dam to be developed.*

6.4 Demand alternatives

a. <u>Option 1: A smaller balancing dam near the present Scheepersvlakte Balancing Dam</u>

The proposed dam is a Homogeneous Earth fill Embankment Dam (gravity), with a storage capacity of approximately 4.69 million m^3, which will be supplied by the Kirkwood Primary Canal via a new pipeline. A smaller balancing dam would entail development of a dam with a smaller capacity (less than 4.69 million m^3), which would have the following advantages:

- Reduced development footprint which requires lesser vegetation clearance;

- Minimal environmental impacts; and
- Reduced risk of dam integrity and structural failure or dam collapse due to reduced stress on the dam wall.

Regardless of the positive environmental aspects of this alternative, the smaller balancing dam option is not viable as this would entail a situation where the water shortages and required emergency water supply issues are not addressed and additional dams would still be required.

b. Option 2: A suitable balancing dam near the present Scheepersvlakte Balancing Dam (preferred)

This option comprises of the proposed suitable balancing dam with water capacity of approximately 4.69 million m^3 to will be supplied by the Kirkwood Primary Canal via a new pipeline. The dam will require approximately 74 ha of land to accommodate the desired water volume. The main advantages of this dam would be as follows:

- Although the dam footprint will be considerably big, the dam would be a gravity supply to fill the dam and to deliver water to Nooitgedagt WTW (no pumping required).
- The irrigation water that passes through the dam would probably be sufficient to maintain acceptable salinity for urban consumption, but may need to be managed to ensure that the quality would be acceptable for citrus; and
- The dam will cater for the citrus irrigation as well as provide emergency supply to NMBM for the required three weeks supply.

The possible disadvantages of the dam would be as follows:

- The larger dam has a high flood risk that could cause damage downstream of the spillway as there is no evidence of rock at the site; and
- The increased development footprint requires more vegetation clearance and has more environmental impacts;

This option is more viable and preferred as it is safer (less chance of dam wall failure) and it caters for the farmers while addressing the water shortages within the Nelson Mandela Bay Metropolitan Municipality and has provision for sustainability.

c. Option 3: A bigger balancing dam near the present Scheepersvlakte Balancing Dam

This option comprises of a bigger balancing dam with water capacity beyond 4.69 million m^3 to will be supplied by the Kirkwood Primary Canal via a new pipeline. The dam will require more than 74ha of land to accommodate the additional water volume. The main advantages of this dam would be as follows:

- Although the dam footprint will be considerably big, the dam would be a gravity supply to fill the dam and to deliver water to Nooitgedagt WTW (no pumping required).
- The irrigation water that passes through the dam would more than sufficient to maintain acceptable salinity for urban consumption, but would need to be managed to ensure that the quality would be acceptable for citrus; and
- The dam would cater for the citrus irrigation as well as provide emergency supply to NMBM for more than the required three weeks supply.

The possible disadvantages of the dam would be as follows:

- The larger dam would be a major high flood risk that could likely cause damage downstream of the spillway as there is no evidence of rock at the site; and

- The extended development footprint would require an extensive vegetation clearance and would result is severe environmental impacts.

Regardless of the positive capacity aspects of this alternative, the bigger balancing dam option is not viable as this would entail a situation where the dam and structural integrity would be significantly compromised and more likely to have a situation where the dam wall collapses.

6.5 Operational alternatives

The balancing dam would not be operated in the same way as normal water resource infrastructure as the water in the dam would only be abstracted in an emergency to supply the Nooitgedagt WTW. The dam would be filled over a certain filling period and would be topped up from time to time to make up evaporation and seepage losses, and possibly also operated to address water quality considerations. Because of this operation, the capital cost is more appropriate for comparing schemes rather than the unit reference value (URV). Refer to **Table 22** for the detailed prefeasibility comparison of the balancing dam options.

Table 22: Prefeasibility comparison of the balancing dam options (DWS, 2019)

	Potential Dam Sites				
EVALUATION FACTOR	**Upper Scheepersvlakte**	**Lower Scheepersvlakte**	**Upper Coerney**	**Nooitgedagt North – Option 1**	**Nooitgedagt South**
Capital Cost (R Million)	349	237	375	457	654
Capital Cost (cost of pumps reduced by 50%) (R Million)	282	231	309	403	600
Cost	2 – 2nd Lowest	1 - Lowest	3 – 3rd Lowest	4 - High	5 – Vey High
Pumping Required	**X**		**X**	**X**	**X**
Operational Complexity	**X**	**X**			
Strategic Location near WTW				**X**	**X**
Ecological considerations (Reserve)		**X** but likely easy to address	**X** but likely easy to address		
Considerations of floods					
Environmental & Social Impacts	Limited differentiation	Limited differentiation	Limited differentiation	Limited differentiation	Limited differentiation

Based on the capital cost comparison, operational costs, environmental sensitivities, and structural integrity amongst other aspects, the Nooitgedagt Dam sites were not recommended for feasibility assessments, because of their significantly higher costs and landowner objections. Although, the

Nooitgedagt sites would provide a strategic advantage when compared with the Upper Scheepersvlakte and Coerney dam sites due to their proximity to the Nooitgedagt WTW, the Scheepersvlakte sites are more economical viable and have lesser environmental impacts as the Nooitgedagt sites are located within a game reserve and have existing transmission powerlines which would have to be relocated.

It must be noted that the operational issues as discussed in the 2nd Focus Group Meeting (**Appendix E9.2**), the public meeting (**Appendix E9.3**) and Main Stakeholders Engagement Meeting (**Appendix E9.4**) relating to the possibility of pumping of water directly from Coerney Dam by Farm Scheepersvlakte Farming Community or the possibility of pumping water from the existing Scheepersvlakte Dam once the Coerney Dam operational should be addressed before the construction phase to eliminate potential operational issues associated with the proposed development.

6.6 The No-Go Option

The no-development alternative would entail continuing with the *status quo*, i.e., a situation where the proposed Lower Coerney Balancing Dam will not be developed. This option is not preferred as this would entail a situation where the water shortages and required emergency water supply issues are not addressed and additional dams would still be required. In addition, several smaller dams would be required for irrigation purposes as the citrus farming community is currently being expanded. Therefore, the proposed Lower Coerney Balancing Dam addresses both scenarios.

7 PUBLIC PARTICIPATION PROCESS

The NEMA (1998) EIA Regulations, 2014, as amended, prescribe that the Environmental Impact Assessment process must include the undertaking of public participation in accordance with Chapter 6 of the Regulations. The purpose of the Public Participation Process is to provide all potential and/or registered Interested and Affected Parties (I&APs), including the competent authority and any other stakeholder or organ of state, an opportunity to become involved in the EIA process and provide comments during the various phases of the project. Involvement by I&APs is critical, as it contributes to a better understanding of the proposed project among I&APs, raises important issues that need to be assessed and provides local insight that will enhance the EIA process.

This chapter of the report provides details on the Public Participation Process undertaken for the proposed Lower Coerney Balancing Dam.

7.1 Identification of Interested and Affected Parties

Interested and Affected Parties (I&APs) were identified through various means from the inception phase of the project. These means included the placement of an advertisement in a local newspaper, the placement of Site Notices and the distribution of Notification Letters. Each of these is discussed below.

- Initial site visit and engagement with the Scheepersvlakte Farm Representatives, the Lower Sundays River Water Users Association (LSRWUA) and Die Kooperasie Farm Development;
- A newspaper advertisement was placed on page 6 of the 30th of November 2021 edition of The Herald Newspaper distributed within the Port Elizabeth Region.
- On-site notices presenting the project were erected within the site, local shops, LSRWUA Irrigation Board, Municipal Library, along public roads, and areas visible to the public on the 30th of November and 1st of December 2021; and
- Notification letters were compiled and distributed to adjacent landowners and Kirkwood residential area on the 30th of November and 1st of December 2021.

7.2 Newspaper Advertisement

Regulation 41(2)(c) and (d) of the NEMA (1998) EIA Regulations, 2014, as amended requires that PPP includes the placement of a Newspaper Advertisement to notify all potential I&AP's about the proposed project and to invite them to register as I&APs and provide comments on the project. An advertisement was placed on page 6 of the 30th of November 2021 edition of The Herald Newspaper distributed throughout the Port Elizabeth Region. The proof of the placement of the Newspaper Advertisement is included in **Appendix E2.**

7.3 Notice Boards/Site Notices

In accordance with the NEMA (1998) EIA Regulations, 2014, as amended, a notice board detailing the proposed activity as well as the contact details of the EAP was placed on site. The size of the notice board was 60 cm by 42 cm (i.e., A2 Site Notices) as per 41(4)(a) the notice board. On-site notices presenting the project were erected within the site, local shops, LSRWUA Irrigation Board, Municipal Library, along public roads and areas visible to the public on the 30th of November and 1st of December

2021. The notice board and proof of its placement is included in **Appendix E4.**

- On site boundaries;
- Kirkwood Public Library;
- Kirkwood Spar;
- Lower Sundays River Water Use Association;
- Local shop along R336;
- Scheepers Vlakte Dam;
- Saint Colmcille Public S School; and
- Sundays River Valley Aided Hospital.

Figure 54: Locations of placement of site notices

The proof of placement of Notice Boards and Site Notices is presented in **Appendix E4.**

7.4 Notification Letters

Regulation 41(2)(b) of the NEMA (1998) EIA Regulations, 2014, as amended requires that written notification be given to various parties who include the following:

> *(I) the occupiers of the site and, if the proponent or applicant is not the owner or person in control of the site on which the activity is to be undertaken, the owner or person in control of the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;*
> *(ii) owners, persons in control of, and occupiers of land adjacent to the site where the activity is or is to be undertaken and to any alternative site where the activity is to be undertaken;*
> *(iii) the municipal councillor of the ward in which the site and alternative site is*

situated and any organisation of ratepayers that represent the community in the area;
(iv) the municipality which has jurisdiction in the area;
(v) any organ of state having jurisdiction in respect of any aspect of the activity; and
(vi) any other party as required by the competent authority;

The Notification Letter that was compiled for the proposed Balancing Dam is attached as **Appendix E3.1.** The document provided a background on the Lower Coerney Balancing Dam, the proposed activities as well as information on how one can register as an Interested and Affected Party (I&AP) on the project to be able to be kept abreast with all developments. Notification letters were compiled and distributed to adjacent landowners and Kirkwood residential area on the 30th of November and 1st of December 2021 as indicated on the Knock & Drop Register (**Appendix E3.2**).

7.5 Draft Scoping Report (DSR)

The Draft Scoping Report was placed for public comment at the Kirkwood Library and the LSRWUA. Based on Regulation 40(1) of the NEMA (1998) EIA Regulations, 2014, as amended, the Report was placed at these facilities for the legislated period of at least 30 days. The Draft Scoping Report was issued out for public review from the **14th of October 2022 to the 14th of November 2022**. The placing of the Draft Scoping Report allowed I&APs adequate time to review the details of the project and provide, in writing, comments and concerns relating to the proposed Lower Coerney Balancing Dam. Hardcopies of the report were also provided to Ward Cllr, Sundays River Valley Local Municipality, Sarah Baartman District Municipality, Nelson Mandela Bay Metropolitan Municipality, and the Department of Economic Development, Environmental Affairs. The reports were also placed at the Kirkwood Public Library and Lower Sundays River Water Use Association for Public Access.

All registered I&APs were informed of the availability of the report through e-mails and proof of the notification was kept. An online SMS portal was used to send bulk SMSs to I&APs where email addresses were not made available. All comments received during the review of the Draft Scoping Report were captured and included in the Final Scoping Report. Please refer to **Appendix E** for Public Participation undertaken for the DSR.

7.6 Draft Environmental Impact Report

The Draft EIR was circulated for public review and comment for a period of 30 days (31st March to 4th May 2023). The hardcopy was provided to the following stakeholders for public review:

- Kirkwood Public Library and Lower Sundays River Water Use Association (Public Access);
- Sundays River Valley Local Municipality;
- Ward Cllr;
- Sarah Baartman District Municipality;
- Nelson Mandela Bay Metropolitan Municipality;
- Eastern Cape Department of Agricultural and Land Affairs; and
- The Department of Economic Development, Environmental Affairs.

The Draft EIR (softcopies) were circulated to the following Stakeholders:

- Department of Environment, Forestry and Fisheries: Biodiversity and Conservation Unit;
- Department of Agriculture, Forestry and Fisheries;
- Kirkwood Public Library;
- Lower Sundays River Water Use Association;
- Sundays River Valley Local Municipality;
- Ward Cllr;
- Sarah Baartman District Municipality;
- Nelson Mandela Bay Metropolitan Municipality;
- Eastern Cape Department of Agricultural And Land Affairs;
- The Department of Economic Development, Environmental Affairs;
- The Department of Water and Sanitation (Eastern Cape);
- Eastern Cape Provincial Heritage Resources Authority;
- South African Heritage Resources Agency;
- BirdLife South Africa;
- Endangered Wildlife Trust;
- Scheepersvlakte Farms / Die Kooperasie: Farming Development;
- Citrus Grower's Association: Community Development Forum; and
- Registered Interested and Affected Parties.

The softcopy of the Draft EIR was made available online at GA Environment Pty (Ltd) Shared Drive. All registered I&APs were informed of their availability and provided with a link (**Appendix E6**).

7.7 Public Open Day, Meeting and Focus Group Meetings

Based on the nature of the proposed development, the proposed site, the surrounding farming communities, the need for desirability for the dam and feedback received during the initial public participation, it was anticipated that a Public Open day will not be required for this project. However, the developer (DWS) requested for a public meeting to allow all I&APs an opportunity to be given information about the project and raise queries and concerns on the EA application. The public meeting was held on the 20th of April 2023 (**Appendix E9.4**). The first focus group meeting was held between the EAP (GA Environment), developer (DWS), LSRWUA and Scheepersvlakte Farms representatives on the 26th of May 2022 (**Appendix E9.2**), a second Focus Group meeting was held on the 14th of April 2023 (**Appendix E9.3**). A final Stakeholder Engagement Meeting was held on the 26th of April 2023 (**Appendix E9.5**). The attendance registers of the public meeting, focus group meetings and stakeholder engagement meeting and the minutes are provided **Appendix E9**.

7.8 Interested and Affected Parties Register and Comments on the project

From the onset of the project, a database of persons, organizations and organs of state identified as I&APs or registered as I&APs was opened and is constantly being maintained. The I&APs register is included in **Appendix E7**. Comments have been received from adjacent residents, commentary authorities, and the competent authority which has been captured in the Comments and Response

report (**Appendix E8**). The Comments and Response report was updated to reflect comments received during the Draft EIR Phase and has been submitted to DFFE for decision making.

7.9 Summary of Issues and concerns raised by I&APs

All comments received from stakeholders and responses provided have been captured in the comments and response report which is attached to **Appendix E8**. Key issues obtained during the Notification Phase and review of the Draft Scoping Report have been summarised as follows:

- **Engineering services**:
    - There were concerns raised the current bulk water supply to the NMBM.
    - There were recommendations that the small farm dam on Scheepersvlakte Farms (currently under construction) could be used by DWS for additional storage to the Coerney Dam since the dam has already been built.
- **Operational Phase:**
    - Concerns were raise on the implantation timeframes for the project due to the current water shortages in the region;
    - Questions were raised regarding the possibility of citrus farming community directly abstracting the water from the Lower Coerney Dam for irrigation; and
    - Questions were also raised regarding the feasibility of Farm Scheepersvlakte Farming Community abandoning the small Scheepersvlakte Dam and pumping water for the main Scheepervlakte Dam once Coerney Dam is in the operational phase.
- **Compensation for Landownership**:
    - There were concerns on the compensation process for obtaining the land rights to develop on the three directly affected properties, especially Farm Enon Mission property; and
    - It was identified that the proposed Coerney Dam footprint overlaps with approximately 36ha of planned agricultural land, DWS will have to negotiate with Farm Scheepersvlakte Farming Community for the overlapping agricultural land to be incorporated into the dam footprint.

It is the EAP's recommendation that the land negotiations and operational arrangements should be addressed before the construction phase to eliminate potential operational issues associated with the proposed development.

8 IMPACT ASSESSMENT METHODOLOGY

The main objective of this section is to provide independent and scientifically sound information on the impacts identified during the EIA phase. Based on the requirements of the impact assessment, impacts identified, and issues and concerns raised are assessed with regard to their significance. The impact assessment is aimed at determining the impacts associated with the proposed development and the prescription of mitigation measures. Other impacts associated with the proposed development are discussed in detail in this section. The significance of the potential impacts is described in terms of their *nature, extent, duration, intensity* and *probability*.

In this report, impacts with a low significance are considered to have no influence on the decision to proceed with the proposed development. Impacts with a moderate significance will influence the decision unless they can be effectively mitigated to a low significance, whereas impacts with a high significance - despite mitigation - would influence the decision to proceed with the proposed development.

8.1 Impact Mitigation Hierarchy

The Impact Mitigation Hierarchy provides steps that must be used in mitigating adverse impacts of a project and in turn ensuring environmental protection. There are various levels of preference for mitigation options with the most preferred method and the first step as avoidance and the least and final method as offset. Refer to **Figure 54** for an illustration of the Mitigation Hierarchy.

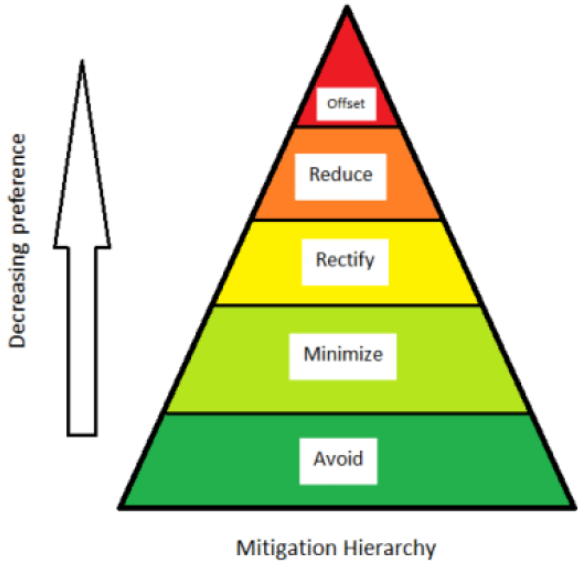


Figure 55: Mitigation hierarchy showing levels of preference (Eco Intelligent, 2016)

Each of the mitigation types will be discussed and contextualised to the proposed development.
Step 1: Avoidance - Although this is the most preferred form of mitigation on projects to avoid adverse environmental impacts as it will not result in the development.

Step 2: Minimisation - This entails the reduction of adverse environmental impacts through various means as it based on the recognition that environmental impacts cannot be fully avoided in the

proposed activity. The Mitigation measures proposed are discussed in **Chapter 8** of this report as well as in the Environmental Management Programme attached as **Appendix G.**

Step 3: Rectification - Where an impact has already taken place, rectification entails the implementation of corrective measures to avoid further adverse environmental impacts. Rectification will apply in cases where Contractors or maintenance employees may have erroneously undertaken construction activities outside the development.

Step 4: Reduction- This is applicable where the above-mentioned rectification is not possible. Rectification requires new management practices and/or changes in methodology to ensure environmental protection.

Step 5: Environmental Offset- although this does not occur on the proposed development, it is meant to cater for the effects of the development through compensation of biodiversity losses by measures such as the establishment of new plants on another area outside the study area where it is not possible to avoid the clearance of vegetation or rehabilitate the disturbed areas.

8.2 Impact Assessment Methodology

In accordance with the NEMA EIA regulations (Government Notice R.982, promulgated in terms of Section 24 of the National Environmental Management Act, 1998 (Act 107 of 1998), as amended the Environmental Assessment Practitioner (EAP) is required to assess the significance of potential impacts in terms of the following criteria as outlined in Appendix 1:

- cumulative impacts;
- nature, significance and consequences of the impact and risk;
- extent and duration of the impact and risk;
- probability of the impact and risk occurring;
- the degree to which the impact and risk can be reversed;
- the degree to which the impact and risk may cause irreplaceable loss of resources; and
- the degree to which the impact and risk can be avoided, managed or mitigated.

Activities within the framework of the proposed development and their respective construction and operational phases, give rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into three phases from which impacting activities can be identified, namely:

Construction phase:
This phase refers to all the pre-construction and construction related activities on site, until the Contractor leaves the site.

Operational phase:
This includes all post construction activities, including the operation and maintenance of the proposed development.

The assessment of the impacts will be conducted according to a synthesis of criteria required by the integrated environmental management procedure. The methodology that will be used comprises of the following four steps:

- Step 1: Identification of positive and negative impacts of the project;
- Step 2: Identification of the significance rating of the impact before mitigation;
- Step 3: Identification of the mitigation measure and the mitigation efficiency; and
- Step 4; Identification of the significance rating of the impact after mitigation;

Activities that will be undertaken to give effect to the proposed development gives rise to certain impacts. For the purpose of assessing these impacts, the project has been divided into the following phases discussed in **Table 23**.

Table 23: Project phases in a development

PHASES OF A PROJECT IN WHICH IMPACTS WILL OCCUR
Status Quo
The study area as it currently exists.
Pre-construction phase
All activities on site up to the start of construction, not including the transport of materials, but including the initial site preparations. This also includes the impacts that would be associated with planning.
Construction phase
All the construction and construction-related activities on site, until the contractor leaves the site.
Operational phase
All activities after construction, including the operation and maintenance of the proposed development.
The activities arising from each of the relevant phases have been included in the impact assessment tables. The assessment endeavours to identify activities that would require environmental management actions to mitigate the impacts arising from them. The criteria against which the activities were assessed are given in the next section.

8.3 Assessment Criteria

The assessment of the impacts has been conducted according to a synthesis of criteria required by the guideline documents to the EIA regulations (2006) and integrated environmental management series published by the Department of Environmental Affairs and Tourism (DEAT) currently Department of Environment, Forestry and Fisheries (DEFF). In addition to this, it is a requirement of the National Environmental Management Act (NEMA) 2014 Regulations as amended, Appendices 1 and 2 that an Impact and Risk Assessment process be undertaken for the Basic Assessments and Environmental Impact Reporting. Acronyms have been used in some of the tables to abbreviate some aspects of the assessment criteria. The Assessment Criteria is based on the following:

- Nature of impact;
- Extent **(E);**
- Duration **(D)**;
- Intensity **(I);**
- Consequence **(C);** *this will be a combination of Extent **(E)**+Duration **(D)** + Intensity **(I)***
- Probability **(P)**;
- Determination of significance (with or without mitigation); *and is a combination of consequence **(C)**x Probability **(P);***

- Reversibility of impact; and
- Irreplaceable loss of resources will be *defined as loss of resource for the purposes of the Impact Assessment Tables*

Each of these are explained in **Table 24** below.

Table 24: Assessment Criteria

ASSESSMENT CRITERIA	SCORING
a) Nature of Impact	
This is an appraisal of the type of effect the proposed activity would have on the affected environmental component. The description should include what is being affected, how and whether the impact is positive or negative	Scoring does not apply, impact will either be positive or negative
b) Extent (E)	
The physical and spatial size of the impact. This is classified as: **i) Site** The impact could affect the whole, or a measurable portion of the site. **ii) Local** The impacted area extends only as far as the activity, e.g. a footprint of the specific activity **iii) Regional** The impact could affect areas such as neighbouring farms, transport corridors and the adjoining towns. **iv) National** The impact could have an effect on South Africa.	**1** **2** **3** **4**
c) Duration (D)	
The lifetime of the impact; this is measured in the context of the lifetime of the proposed project. **i) Short term** The impact will either disappear with mitigation or will be mitigated through natural processes (less than 1 year). **ii) Medium term** The impact will last up to the end of the phases, thereafter it will be entirely negated (1 to 10 years). **iii) Long term** The impact will continue or last for the entire operational life of the development but will be mitigated by direct human action or by natural processes thereafter. **iv) Permanent** 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, thus beyond decommissioning.	**1** **2** **3** **4**
d) Intensity (I)	
Is the impact destructive or benign? Does it destroy the impacted environment, alter its functioning, or slightly alter it? These are rated as: **i) Low** The impact alters the affected environment in such a way that the natural	**1**

processes or functions are not affected. **ii) Medium (Moderate)** The affected environment is altered, but function and process continue, albeit in a modified way. **iii) High** Function or process of the affected environment is disturbed to the extent where it temporarily or permanently ceases. This will be a relative evaluation within the context of all the activities and the other impacts within the framework of the project.	**2** **3**
e) Consequence of Impact (C)	
The anticipated consequence of the impact is determined using the following formula: **Consequence = Duration + Extent + Intensity** Consequence is rated as: **i) Negligible** An acceptable impact on natural systems, patterns or processes. **ii) Low** A small impact on natural systems, patterns or processes, where the environment continues to function but in a modified manner and for which mitigation is desirable but not essential **iii) Moderate** A substantial alteration of natural systems, patterns or processes, where environmental functions and processes are altered such that they temporarily or permanently cease. Mitigation will be required. **iv) High** A serious alteration of natural systems, patterns or processes. Impacts may result in the irreversible damage to irreplaceable aspects if mitigation measures are not implemented. **v) Very High** Very high impact on natural systems, patterns or processes, where environmental functions and processes are altered such that could permanently cease, even with mitigation.	3 4-5 6-8 9-10 11-12
f) Probability (P)	
This describes the likelihood of the impacts actually occurring. The impact may occur for any length of time during the life cycle of the activity, and not at any given time. The classes are rated as follows: ***i) Improbable*** The possibility of the impact occurring is very low, due either to the circumstances, design or experience. ***ii) Probable*** There is a possibility that the impact will occur to the extent that provisions must be made. ***iii) Highly probable*** It is most likely that the impacts will occur at some or other stage of the development. Plans must be drawn up before the	1 2 3

undertaking of the activity. ***iv) Definite*** The impact will take place regardless of any prevention plans, and mitigation actions or contingency plans are relied on to contain the effect.	4
h) Significance of impact with or without mitigation	

Score		Significance = Consequence x Probability					
Probability	4	Definite	4	8	12	16	20
	3	Highly probable	3	6	9	12	15
	2	Probable	2	4	6	8	10
	1	Improbable	1	2	3	4	5
			Negligible	Low	Moderate	High	Very High
			1	2	3	4	5
		Consequence					

Significance is determined through a synthesis of impact characteristics. Significance 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. To determine significance of the potential impact/risk, the consequence is multiplied by probability. The classes are rated as follows:	
i) No significance The impact is not substantial and does not require any mitigation. Score 1-5	1-3
ii) Low The impact is of little importance but may require limited mitigation. Score 4-6	4-6
iii) Medium (Moderate) The impact is of importance and therefore considered to have a negative impact. Mitigation is required to reduce the negative impacts to acceptable levels. Score 8-10	8-10
iv) High The impact is of great importance. Failure to mitigate, with the objective of reducing the impact to acceptable levels, could render the entire development option or entire project proposal unacceptable. Score 12-16	12-16
v) Fatal Flaw The impact presents a fatal flaw and the entire development option or entire project proposal is unacceptable. Score 20	20
g) Reversibility of impact (R)	
The extent to which the impacts are reversible **(i) Yes** The impact is reversible within two years after construction. **(ii) No**	

The impact is reversible within 2 to 10 years after construction.	
g) The degree to which the impact can cause irreplaceable loss of resources	
(i) Low The impact results in the loss of resources but the natural, cultural and social processes/functions are not affected. **(ii) Medium** The loss of resources occurs but natural cultural and social processes continue, albeit in a modified manner. **(iii) High** The impact results in irreplaceable loss of resource.	

In order to maintain consistency, all potential impacts that have been identified during the EIA process will be listed in impact assessment tables. The assessment criteria used in the tables will be applied to all of the impacts and a brief descriptive review of the impacts and their significance provided in the text of the report. The overall significance of impacts will be determined by considering consequence and probability.

9 DESCRIPTION AND ASSESSMENT OF ENVIRONMENTAL IMPACTS

9.1 Description and Assessment of Environmental Impacts

Potential impacts identified and elaborated on in this chapter has been presented as follows:

- Impact 1: Impacts on Floral Species
- Impact 2: Impacts on Fauna Species
- Impact 3: Impacts on Surface Water
- Impact 4: Impacts on Impacts on Groundwater
- Impact 5: Impacts on Agricultural Potential
- Impact 6: Erosion and Soil Disturbance Impacts
- Impact 7: Impacts on Heritage Resources
- Impact 8: Visual and Aesthetic Impacts
- Impact 9: Socioeconomic Impacts
- Impact 10: Impacts on Traffic
- Impact 11: Impacts on Air Quality
- Impact 12: Noise Impact
- Impact 13: Health and Safety Impacts
- Impact 14: Water Security

The impact assessment sections provided by overleaf include the *description* of the identified impacts based on the review of the specialist reports, *impact assessment* in line with the adopted impact assessment methodology, *cumulative impacts* based on the overall development and *mitigation measures* that can be considered to ameliorate the impacts that may emanate from the development. An EMPr detailing other measures has been compiled and is attached as **Appendix G** of this report.

9.2 The Impacts on Floral Species

9.2.1 Description of the Impacts

Localised loss of floral habitat and diversity may occur within areas of increased ecological sensitivity, **such as the Albany Alluvial and the Sundays Valley Thicket Habitats due to the clearance of indigenous vegetation for the proposed development**. Disturbance and mortalities of fauna species including species of conservation concern are anticipated. Clearing of vegetation for construction purposes as well as compaction of soils due to vehicular movement will result in reduced floral habitat availability and re-establishment success during the operational phase.

9.2.2 Impact Ratings

Table 25 presents impacts related to floral species.

Table 25: Assessments of Impacts Related to Floral Species

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P) Without Mitigation	Significance With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	4 Definite	Y	Low	12-16 High	8-10 Medium
Operational	Negative	1 Site	2 Medium	1 Low	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Cumulative	Negative	1 Site	2 Medium	1 Low	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low

9.2.3 Cumulative impacts

The development results in a loss of habitat supporting the floral species and results in less floral presence and diversity. However, the impacts are mainly anticipated during the construction phase and the floral species may recover during the operational phase. The cumulative impact for impact on floral species is, therefore, expected to be medium to low.

9.2.4 Mitigation Measures

The proposed mitigation measures to avoid adverse impacts associated with loss of faunal habitat are provided below:

- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further;
- Areas rated as High sensitivity outside of the direct development areas should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent development access to these areas from construction workers and machinery;
- Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;
- All activities must be restricted too within the very low sensitivity areas. No further loss of high sensitivity areas should be permitted;
- All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded;
- All construction/operational and access must make use of the existing roads;
- All laydown, chemical toilets etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded;
- Construction impacts associated with the proposed project must be contained within the

footprint of the demarcated areas as indicated on the final approved project layout plan;

- A pre-construction survey in the flowering season (July-September) should be conducted in order to ensure that a more comprehensive floral presence confirmation; and
- A search and rescue plan for the plants and animals within the proposed inundation zone must be undertaken.

9.3 The Impacts on Fauna Species

9.3.1 Description of Impacts

Localised loss of floral habitat and diversity may occur within areas of increased ecological sensitivity, **such as the Albany Alluvial and the Sundays Valley Thicket Habitats due to the clearance of indigenous vegetation for the proposed development**. The loss of habitat will directly result in the loss of the fauna community. Clearing of vegetation for construction purposes as well as compaction of soils due to vehicular movement will result in reduced fauna habitat availability and re-establishment success during the operational phase. Disturbance and mortalities of fauna species including species of conservation concern are anticipated. Loss of habitat also means loss of food and nesting resources, cover and movement corridors, which could lead to the disappearance of the affected species from the area. **Table 26** presents an assessment of the impacts associated with loss of faunal habitat due to the clearance of vegetation.

9.3.2 Impact Ratings

Table 26 presents impacts related to Faunal Species.

Table 26: Assessments of Impacts Related to Faunal Species

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	2 Medium	1 Low	4-5 Low	1 Improbable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.3.3 Cumulative Impacts

There were two (2) species of reptiles, three (3) mammal species and sixteen (16) Avifauna species were recorded in the project area during the survey. One of the mammal's species (*Raphicerus*

campestris, commonly owned as Steenbok) is provincially protected and fourteen avifauna species are listed as protected provincially. Although these species will be negatively impacted due to the construction of the dam, there is a high likelihood that they can easily relocate to the adjacent properties and may even resettle during the operational phase of the project. The cumulative impact for impact on fauna species is, therefore, expected to be low.

9.3.4 Mitigation Measures

The proposed mitigation measures to avoid adverse impacts associated with loss of faunal habitat due to the development of the proposed dam are provided below:

- Blasting on site must be limited as far as possible. Should any blasting be required, measures must be taken to reduce the impact on fauna;
- The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on fauna;
- Noise must be kept to an absolute minimum during the evenings and at night to minimize all possible disturbances to amphibian species and nocturnal mammals;
- No trapping, killing, or poisoning of any wildlife is to be permitted on site;
- Outside lighting should be designed and limited to minimize impacts on fauna;
- Areas of indigenous vegetation, even secondary communities outside of the direct project footprint, should under no circumstances be fragmented or disturbed further;
- Areas rated as High sensitivity outside of the direct development areas should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent development access to these areas from construction workers and machinery;
- Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;
- All activities must be restricted too within the very low sensitivity areas. No further loss of high sensitivity areas should be permitted;
- All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded;
- All construction/operational and access must make use of the existing roads;
- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan; and
- A search and rescue plan for the SCC animals within the proposed inundation zone must be undertaken.

9.4 Impacts on Surface Water

9.4.1 Description of the Impacts

Surface water will be impacted through the clearing of vegetation from construction works within the aquatic and riparian habitats. This will arise through the setting up of construction camps and storage areas, the movement of construction vehicles and personnel as well as the clearance and construction of the dam and associated infrastructure within the riparian and instream habitat. This disturbance

may also result in the proliferation of alien and invasive species within the surrounding watercourses. **Table 27** presents an assessment of the impacts associated with changes in the disturbance of aquatic and riparian habitat systems.

9.4.2 Impact Rating

Table 27 presents impacts related to Surface Water.

Table 27: Assessments of Impacts Related to Surface Water

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.4.3 Cumulative Impacts

The accumulative impact associated with the Coerney Dam along the tributary of the Coerney River and associated tributaries has the potential to degrade water and habitat quality and modify flow regimes within the system and thus affecting the diversity of the aquatic biota. However, the risks are associated with the physical construction of a dam wall, use of machinery/vehicles within a watercourse, earthworks and alteration of river banks during construction as well as the permanent inundation above the dam wall and channel, flow and bed modification during construction, can be easily be mitigated. Overall, the impacts will largely be limited to the construction phase and the dam once operational, will play a role in providing a habitat as well as improving downstream conditions and therefore, the cumulative impact on surface water is low.

9.4.4 Mitigation Measures

The proposed mitigation measures to avoid adverse impacts associated with loss of surface water due to the development of the proposed dam are provided below:

- Construction should be limited to the dry season when the channel is dry to limit potential modification to the system;
- All spillways must be regularly monitored and maintained/vegetated;
- These spillways must be fitted with infrastructure such as gabions or flow dissipation to remedy point source erosion at the end of the spillway;

- The designed dam should be built according to the capacity of a 1:100-year flood as dam collapse in this non-perennial system will result in extensive damage to downstream systems which include the highly sensitive estuary;
- A storm water management plan must be compiled for both the construction and operation of the dam;
- Revegetating eroded areas downstream of the dam with indigenous vegetation. Inundation will result in large scale vegetation loss. These species could be relocated downstream;
- If required, fertilizers should be responsibly applied to increase the rate of revegetation;
- The buffer zone of 18 m along the delineated riparian area must be established as a no-go area for all farming activities/clearing as well as associated aspects of the development which aren't directly related to the watercourse such as laydown yards;
- Alien vegetation management must take place in the established 18 m buffer zone during construction and thereby allow for the natural succession of native riparian species in the future. As construction ends all remaining disturbed land should be revegetated with indigenous species as outlined by TBC (2022), as disturbed land is easily invaded by invasive species;
- Stabilisation of banks and outlet channels through the use of gabions or Reno mattresses, and the re-vegetation of any disturbed areas will be required directly downstream of the dam wall;
- Dredging may be required and should be monitored on a long term basis to avoid the dam silting up, however due to the dam's catchment size is unlikely;
- Silt traps and fences must be placed in the preferential flow paths to prevent sedimentation of the watercourse and the proposed dam, these should be monitored and serviced regularly.
- No construction activities such as laydown yards may be placed within the delineated buffer zone along the riparian or wetland area which must be established as a no-go area;
- All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded;
- All construction/operational and access must make use of the existing roads;
- All laydown, chemical toilets etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded; and
- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan.

9.5 Impacts on Groundwater

9.5.1 Description of the Impacts

Groundwater will be impacted by construction activities such as excavation and layer work within areas of high-water table such as the aquatic and riparian habitats. Groundwater may also be impacted by contamination from leakages from plant machinery. **Table 28** presents an assessment of the impacts associated with changes in the disturbance of aquatic and riparian habitat systems.

9.2.2 Impact Rating

Table 28 presents impacts related to Groundwater.

Table 28: Assessments of Impacts Related to Groundwater

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.5.3 Cumulative Impacts

The accumulative impact on groundwater has the potential to degrade groundwater quality and quantity as well as modify flow regimes within the system. The potential risks can be easily avoided and easily mitigated. Overall, the impacts will largely be limited to the construction phase and the dam once operational will improve groundwater conditions as well as improve the overall water system and therefore, the cumulative impact on groundwater is low.

9.5.4 Mitigation Measures

The proposed mitigation measures to avoid adverse impacts associated with the loss of groundwater due to the development of the proposed dam are provided below:

- Construction should be limited to the dry season when the channel is dry to limit potential modification to the system;
- Groundwater monitoring must be undertaken on a regular basis;
- All excavations must be approved by the geohydrologist / resident engineer;
- Regular check-ups and monitoring of plant machinery to quickly identify and address spills;
- No servicing of machinery should be undertaken on site;
- Bunding and drip trays must be used for all hazardous and potential contaminants;
- All spillways must be regularly monitored and maintained/vegetated;
- These spillways must be fitted with infrastructure such as gabions or flow dissipation to remedy point source erosion at the end of the spillway;
- The designed dam should be built according to the capacity of a 1:100-year flood as dam collapse in this non-perennial system will result in extensive damage to downstream systems which include the highly sensitive estuary;

- A storm water management plan must be compiled for both the construction and operation of the dam;
- Revegetating eroded areas downstream of the dam with indigenous vegetation. Inundation will result in large scale vegetation loss. These species could be relocated downstream;
- If required, fertilizers should be responsibly applied to increase the rate of revegetation;
- The buffer zone of 18 m along the delineated riparian area must be established as a no-go area for all farming activities/clearing as well as associated aspects of the development which aren't directly related to the watercourse such as laydown yards;
- Dredging may be required and should be monitored on a long term basis to avoid the dam silting up, however due to the dam's catchment size is unlikely; and
- Silt traps and fences must be placed in the preferential flow paths to prevent sedimentation of the watercourse and the proposed dam, these should be monitored and serviced regularly.
- No construction activities such as laydown yards may be placed within the delineated buffer zone along the riparian or wetland area which must be established as a no-go area;
- All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded.
- All construction/operational and access must make use of the existing roads.
- All laydown, chemical toilets etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded.
- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan.

9.6 Impacts on Agricultural Potential

9.6.1 Description of Impacts

Based on information taken from the Agricultural Impact Assessment (The Biodiversity Company, 2023) attached as **Appendix F1**, the proposed project area is characterised by the Fc 362 and la 85 land types. The Fc 362 land types mainly have Mispah, Oakleaf, Valsrivier and Hutton soil forms according to the Soil classification working group, (2018), with the occurrence of other soils within the landscape. The soil types have been attributed to the agricultural activities on site and currently, the citrus farming community is expanding the citrus area to the flanks of the proposed dam. Clearing of vegetation, excavations and other construction activities which will result in the compaction of soils due to vehicular movement will reduce the agricultural potential of the soils. However, agricultural production requires water for irrigation and one of the objectives of the proposed dam is the provision of irrigation water to support the expanding citrus farming. The construction of the dam will overall require 77 ha of land which would otherwise be used as an agricultural field. **Table 29** presents an assessment of the impacts associated with changes in agricultural potential.

9.6.2 Impact Ratings

Table 29 presents the impact ratings related to agricultural potential.

Table 29: Assessments of Impacts Related to Agricultural Potential

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P) Without Mitigation	Significance With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Positive	1 Site	1 Short term	1 Low	4-5 Low	2 Probable	Y	Low	Positive	1-3 No Significance
Cumulative	Positive	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	Positive	1-3 No Significance

9.6.3 Cumulative Impacts

The Hutton and Oakleaf soil forms have “Low to Moderate” and “Moderate to High” sensitivity. The proposed activities for the Lower Coerney Balancing Dam and associated infrastructure will not result in the segregation of any high production agricultural land. Furthermore, it is the EAP’s opinion that the proposed balancing dam will have a net positive impact on agricultural production as the citrus farming community is constantly expanding and requires additional water supply for irrigation. It is the understanding of the EAP that the farming community will be able to abstract water from the Lower Coerney Balancing Dam for irrigation purposes through the Lower Sundays River Water Use Association as the controlling body. Therefore, the cumulative impact is net positive on agricultural potential.

9.6.4 Mitigation measures

The proposed mitigation measures to avoid adverse impacts associated with impact on agricultural potential due to the development of the proposed dam are provided below:

- Blasting on site must be limited as far as possible. Should any blasting be required, measures must be taken to reduce the impact on soils and citrus;
- The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on soils and citrus;
- Vegetate or cover all stockpiles after stripping/removing soils;
- Dust suppression must be undertaken on the project site and on the stockpiles;
- Agricultural fields outside the direct project footprint, should under no circumstances be disturbed;
- Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;
- All activities must be restricted too within the very low sensitivity areas. No further loss of high sensitivity areas should be permitted;

- All construction/operational and access must make use of the existing roads;
- All laydown, chemical toilets etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded;
- A storm water management plan must be compiled for both the construction and operation of the dam;
- Revegetating eroded areas downstream of the dam with indigenous vegetation;
- If required, fertilizers should be responsibly applied to increase the rate of revegetation;
- As construction ends all remaining disturbed land should be revegetated with indigenous species as outlined by TBC (2022), as disturbed land is easily invaded by invasive species;
- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan; and
- Stakeholder engagement must be undertaken during the project phases to investigate possible scenarios for appropriate compensation of landowners for high land capability areas where necessary.

9.7 Impacts on Soil Disturbance and Erosion

9.7.1 Description of Impacts

Based on information taken from the Agricultural Impact Assessment (The Biodiversity Company, 2023) attached as **Appendix F1**, the proposed project area is characterised by the Fc 362 and la 85 land types. The Fc 362 land types mainly have Mispah, Oakleaf, Valsrivier and Hutton soil forms according to the Soil classification working group, (2018), with the occurrence of other soils within the landscape. Clearing of vegetation, excavations and other construction activities which will result in compaction of soils due to vehicular movement will impact the soils and increase the rate of erosion, especially on sloping terrain. **Table 30** presents an assessment of the impacts associated with soil and erosion.

9.7.2 Impact Ratings

Table 30 presents the impact ratings related to soils and erosion.

Table 30: Assessments of Impacts Related to Soils and Erosion

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low

Operational	Positive	1 Site	1 Short term	1 Low	4-5 Low	2 Probable	Y	Low	Positive	1-3 No Significance
Cumulative	Positive	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.7.3 Cumulative Impacts

The Hutton and Oakleaf soil forms have “Low to Moderate” and “Moderate to High” sensitivity. The proposed activities for the Lower Coerney Balancing Dam and associated infrastructure will result in compaction and increased soil erosion during the construction phase and accumulatively increase the erosion rate in the area through the removal of the vegetation for the dam. However, it can be argued that the proposed infrastructure will actually reduce the rate of erosion as the dam will collect and store the water, releasing it at controlled rates preventing access downstream flow and loss of soil. Therefore, the cumulative impact on soil and erosion is low.

9.7.4 Mitigation measures

The proposed mitigation measures to avoid adverse impacts associated with impact on soil and erosion due to the development of the proposed dam are provided below:

- The Blasting on site must be limited as far as possible. Should any blasting be required, measures must be taken to reduce the impact on soils;
- The duration of the construction should be minimized to as short term as possible, to reduce the period of disturbance on soils;
- Vegetate or cover all stockpiles after stripping/removing soils;
- Dust suppression must be undertaken on the project site and on the stockpiles;
- Soil and erosion management plan developed for the project must be implemented;
- Rehabilitation of the disturbed areas must be made a priority. Any disturbed area must be re-vegetated with plant and grass species which are endemic to this vegetation type;
- All construction/operational and access must make use of the existing roads;
- All lay down, chemical toilets, etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded;
- A storm water management plan must be compiled for both the construction and operation of the dam;
- Revegetating eroded areas downstream of the dam with indigenous vegetation;
- If required, fertilizers should be responsibly applied to increase the rate of revegetation; and
- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan.

9.8 Impacts on Heritage Resources

9.8.1 Description of Impacts

Based on the Archaeological Reports (**Appendix F5**), stone stools were the only archaeological material located within the extended study area and were mainly observed in areas where the river gravel is exposed and top soil has been disturbed. Although there are no heritage features within the study area, heritage features immediately outside the boundary of the site as described in **Section 5.10** shall be noted and additional heritage features could be identified during any stage of the construction phase of the project. Construction activities such as excavations and grading could expose or damage features of heritage and cultural value beneath the surface. **Table 31** presents an assessment of the impacts associated with heritage resources.

9.8.2 Impact Ratings

Table 31 presents impacts related to Heritage Resources.

Table 31: Assessments of Impacts Related to Heritage Resources

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.8.3 Cumulative Impacts

The main impact on archaeological sites/ remains (if any) will be the physical disturbance of the material and its context. The clearing of vegetation for the proposed agricultural development will expose, disturb and displace archaeological sites / material. However, from the investigation it would appear that the proposed area earmarked for development is of *low archaeological sensitivity*. The Middle Stone Age stone tools observed in the extended study area (~516 ha) are considered to be of *low cultural significance*, because they are in secondary context and not associated with any other archaeological remains. Therefore, the cumulative impact on heritage resources is low.

9.8.4 Mitigation Measures

In order to mitigate the potential heritage impacts, the following measures are proposed:

- A suitably qualified ECO must be appointed and identify possible archaeological, cultural and historic sites within the proposed development areas;

- The Contractors and workers should be made aware of possible heritage and archaeological finds during the construction activities;
- Should any heritage features be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible and a Chance Find Protocol must be implemented. The responsible heritage resources authority (ECPHRA), as well as the South African Police Service (SAPS) are notified;
- All discoveries shall be reported immediately to a heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- The ECO must train the Contractor to recognise any heritage features. Should there be a sign of such objects, construction must halt in that area immediately and a suitably qualified heritage specialist must be called to investigate through the ECO;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Provide guideline measures to manage any impacts that might occur during the construction phase as well as the implementation phase.

9.9 Impacts on Palaeontological Resources

9.9.1 Description of Impacts

Within the dam basin, they are largely buried beneath thick sandy to gravelly alluvium of probable Quaternary to Recent age. The only fossils recorded here are sparse, poorly-preserved *moulds* and petrified blocks of fossil wood of low scientific and conservation value, while occasional subfossil land snail shells are found within the overlying mantle of Late Caenozoic alluvium. The Palaeontological study concluded that the project area is of Low Palaeosensitivity overall.

The nature of the impact is the destruction of Fossil Heritage. Loss of fossil heritage will have a negative impact. Threats to palaeontological resources are earth moving equipment/machinery (for example haul trucks, front end loaders, excavators, graders, dozers) during construction, the sealing-in or destruction of the fossils by the development, vehicle traffic, and human disturbance. **Table 32** presents an assessment of the impacts associated with palaeontological resources.

9.9.2 Impact Ratings

Table 32 presents impacts related to palaeontological Resources.

Table 32: Assessments of Impacts Related to Palaeontological Resources

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										

Construction	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.9.3 Cumulative Impacts

The main impact on palaeontology remains (if any) will be the physical disturbance of the material and its context. The clearing of vegetation for the proposed development will expose, disturb and displace archaeological sites/material. The identified palaeontological features have low sensitivity and the proposed dam will overall not significantly impact on the regional palaeontology. Therefore, the cumulative impact on palaeontological resources is low.

9.9.4 Mitigation Measures

In order to mitigate the potential palaeontological Impacts, the following measures are proposed:

- A suitably qualified ECO must be appointed and identify possible archaeological, cultural and historic sites within the proposed development areas;
- The Contractors and workers should be made aware of possible heritage and archaeological finds during the construction activities;
- Should any palaeontological features be exposed during excavation, work on the area where the artefacts were discovered, shall cease immediately and the Environmental Control Officer shall be notified as soon as possible and a Chance Find Protocol must be implemented. The responsible heritage resources authority (ECPHRA), as well as the South African Police Service (SAPS) are notified;
- All discoveries shall be reported immediately to a Heritage practitioner so that an investigation and evaluation of the finds can be made. Acting upon advice from these specialists, the Environmental Control Officer will advise the necessary actions to be taken;
- The ECO must train the Contractor to recognise any palaeontological features. Should there be a sign of such objects, construction must halt in that area immediately and a suitably qualified heritage specialist must be called to investigate through the ECO;
- Recommend mitigation measures to ameliorate any negative impacts on areas of archaeological, cultural or historical importance; and
- Provide guideline measures to manage any impacts that might occur during the construction phase as well as the implementation phase.

9.10 Visual and Aesthetic Impacts

9.10.1 Description of Impacts

Construction sites are unsightly and can affect an area's sense of place. The clearance of indigenous vegetation will further result in adverse visual impact. The development of a 77ha footprint dam within the citrus farms will leave a scar on the landscape. However, the dam will blend in with the existing fabric of the landscape as there are existing dams within the area and the expansion of the citrus farms on each side of the dam will absorb the scar from the construction of the dam. **Table 33** presents an assessment of the impacts associated with visual impacts.

9.10.2 Impact Assessment

Table 33 presents the impacts related to visual intrusions.

Table 33: Assessments of Impacts Related to Visual Aesthetics

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.10.3 Cumulative Impacts

The clearance of indigenous vegetation will further result in adverse visual impact. The development of a 77ha footprint dam within the citrus farms will leave a significant scar in the landscape. However, the dam will blend in with the existing fabric of the landscape as there are existing dams within the area and the expansion of the citrus farms on each side of the dam will absorb the scar from the construction of the dam. The cumulative impact is therefore low.

9.10.4 Mitigation Measure

In order to mitigate the potential visual Impacts, the following measures are proposed:

- Construction impacts associated with the proposed project must be contained within the footprint of the demarcated areas as indicated on the final approved project layout plan;
- Remove all waste, including cleared vegetation from site as soon as possible unless the material will be reused on site. A dedicated area for the placement of waste that will either be removed or reused must be identified and demarcated;

- Domestic waste generated from the site camp must be kept in labelled bins with lids and removed every week or more often as the need arises and be disposed of at a registered landfill. Proof of disposal must be kept. Where waste is removed from the site through other means, e.g., arrangement with adjacent landowners, written confirmation of this arrangement must be obtained.
- Rehabilitation of the disturbed areas must be made a priority;
- All laydown, chemical toilets etc. should be restricted to medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction phase has been concluded;
- All construction/operational and access must make use of the existing roads; and
- All lay down, chemical toilets, etc. should be restricted to low/medium sensitivity areas. Any materials may not be stored for extended periods of time and must be removed from the project area once the construction/closure phase has been concluded.

9.11 Socio-economic Impacts

9.11.1 Description of Impacts

There is currently unreliability of supply from the Scheepersvlakte Balancing Dam to supply water to the Nooitgedagt WTW. The Scheepersvlakte Balancing Dam was designed and sized to balance irrigation supplies into the Lower Coerney canal only. The high demand and water shortages to the Nelson Mandela Bay Metropolitan Municipality (NMBM) as well as the expansion of citrus farms urgently require additional water supply in the region. The proposed development will have a positive impact within region as suppliers of construction materials will experience economic growth during the construction phase. During the construction phase, the creation of skilled and semiskilled jobs will be created. The use of local labour, as far as possible, is recommended as this would have a positive impact on the local economy and would prevent the influx of job seekers from outside the region. During the operational phase of the project, the municipality and farming community will benefit significantly from the water supply from the dam. The socio-economic impacts are considered to be positive and summarised in **Table 34.**

9.11.2 Impact Assessment

Table 34 presents the impacts related to socio-economic.

Table 34: Assessments of Impacts Related to Socio-Economic Aspects

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+D+I)	Probability	Reversibility	Loss of resources	Significance (C X P) Without Mitigation	Significance With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Positive	1 Site	2 Medium	2 Medium	4-5 Low	3 Highly probable	Y	Low	Positive	1-3 No Significance

Operational	Positive	1 Site	4 Permanent	1 Low	6-8 Moderate	3 Highly probable	Y	Low	Positive	1-3 No Significance
Cumulative	Positive	1 Site	3 Long term	1 Low	4-5 Low	3 Highly probable	Y	Low	Positive	1-3 No Significance

9.11.3 Cumulative Impacts

According to the 2011 census, 68% of the population within Ward 8 obtained their water from a service provider, the second most water source was in the form of dams (10%). It therefore important for the proposed dam to be developed as there is a good portion of the population relies on dams for water. The development of the dam will provide temporary employment during the construction phase and will provide the farming community, the region and the municipality as a whole with much needed water supply for irrigation and daily use respectively. Therefore, the cumulative impact will be a net positive on socio-economic impacts.

9.11.4 Mitigation Measure

Even though the impacts socio-economic related to development of the dam are positive, several measures should be put in place to ensure a success in the project including:

- A Project Liaison Committee (PLC) shall be established to assist with the recruitment of local labour;
- A community liaison officer should be appointed to ensure a smooth running of the project;
- Local suppliers and workers must be prioritised as far as possible for economic and professional growth; and
- Aspects related to the operational phase such as provision of water for irrigation must be addressed before the construction phase to allow for any adjustments and/or legal processes if necessary.

9.12 Impacts on Traffic

9.12.1 Description of Impacts

The movement of construction vehicles during the construction of the proposed roads can result in an increase in traffic congestion on local roads. Activities during the construction phase of the project such as the movement of abnormal loads of infrastructure in and out of the development area can impact on the overall traffic. However, during visits to the study area, it was noted that there is very little to no traffic in the area as it is located on the outskirts. The proposed development will have very little to no impact on traffic during the operational phase. The assessment of this impact is indicated in **Table 35**.

9.12.2 Impact Assessment

Table 35 presents the impacts related to traffic.

Table 35: Assessments of Impacts Related to traffic

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P) Without Mitigation	Significance With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	1-3 No Significance
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	1-3 No Significance
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.11.3 Cumulative Impacts

During the construction phase of the project, there is an anticipated increase in traffic levels from the movement of construction vehicles. However, the study area has very little to no traffic as it is located on the outskirts. The proposed development will therefore have a low cumulative impact on traffic.

9.11.4 Mitigation Measure

The proposed mitigation measures for the management of traffic brought about by construction activities are as follows:

- There must be an erection of signage warning motorists about the presence of construction vehicles;
- Construction activities must be limited to daytime hours where possible;
- Construction vehicles must not exceed speed limits of 40km/h within the construction site;
- Construction vehicles travelling on public roads must adhere to speed limits; and
- Construction vehicles must not dispose of soil or other material on roads. Where this occurs, the ECO and Contractor must ensure that the material must is removed before the end of the working day.

9.13 Impacts on Dust and Air Quality

9.13.1 Description of Impacts

The Clearance of vegetation, grading, excavation activities and increased traffic volumes will result in dust generation and impact on the local farming community and adjacent properties. Depending on the activities undertaken on site and the climatological conditions, the level of dust emissions will vary. An assessment of the potential dust and air quality impacts of all phases is shown in **Table 36.**

9.13.2 Impact Assessment

Table 36 presents impacts associated with dust and air quality.

Table 36: Assessments of Impacts Related to Dust and Air Quality

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	1-3 No Significance
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.13.3 Cumulative Impacts

Excessive dust and air quality impacts (if any) will be limited to the construction phase of the project and therefore, the cumulative impact on dust and air quality due to the proposed development is low.

9.13.4 Mitigation Measures

The proposed mitigation measures for dust and air quality are as follows:

- Implement dust suppression measures in all areas that will be affected by construction activities and where dust will be generated. Dust suppression must also be undertaken during windy and dry weather conditions;
- A continuous dust monitoring process needs to be undertaken during construction;
- Speed restriction of no more than 10km/h must be implemented for all construction vehicles within the construction site; and
- All vehicles transporting friable materials such as sand must be covered by a tarpaulin or wetted down.

9.14 Noise impacts

9.14.1 Description of Impacts

Construction sites are synonymous with noise impacts. High noise levels such as blasting, drilling and excavating can have an adverse impact on the farming community, adjacent landowners and fauna. Construction activities and traffic during the construction phase are anticipated to produce noise. Such noise is not considered to be excessive and will be for a short duration. Due to the location of the

development site within citrus farms and away from residential and businesses. An assessment of the potential noise impacts of all phases is shown in **Table 37.**

9.14.2 Impact Assessment

Table 37 presents impacts associated with noise pollution.

Table 37: Assessments of Impacts Related to Noise Pollution

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	2 Medium	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	1-3 No Significance
Cumulative	Negative	1 Site	1 Short term	1 Low	3 Negligible	2 Probable	Y	Low	4-6 Low	4-6 Low

9.14.3 Cumulative Impacts

The noise associated with the proposed development is not expected to be excessive in nature relative to the surrounding agricultural area. The location of the development site within citrus farms and away from residential and businesses also reduce noise pollution impacts. Excessive noise impacts (if any) will be limited to the construction phase of the project and therefore, the cumulative impact on noise pollution due to the proposed development is low.

9.14.4 Mitigation measures

The proposed mitigation measures for noise pollution are as follows:

- The working hours stipulated in the Construction permit, where applicable, must be adhered to. Where this is not applicable, the following working hours must be adhered to: Monday to Friday from sunrise to sunset and where applicable on a Saturday which must be agreed upon between DWS and the Contractor;
- All construction plant and other equipment must be in a good working order to reduce possible noise pollution;
- Noise reduction is essential, and Contractors must endeavour to limit unnecessary noise, especially loud talking, shouting or whistling, radios, sirens or hooters, motor revving, etc.;
- Should Blasting be undertaken on site:
    - All adjacent residents must be notified of the intention to undertake the initial blasting at least 7 working days in advance;

- Method Statements for blasting shall be approved by the ECO; and
- The survey of developments (buildings, etc.) should be conducted before the blasting takes place.

9.15 Health and Safety Impacts

9.15.1 Description of Impacts

The construction and maintenance work that will be required may have health and safety implications for the personnel that will be working on the project. The dam once completed and in operation, may break its banks and flood the downstream community. The overall assessment of this impact is summarised in **Table 38.**

9.15.2 Impact Assessment

Table 38 presents impacts associated with health and safety.

Table 38: Assessments of Impacts Related to Health and Safety Impacts

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P) Without Mitigation	Significance With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Operational	Negative	1 Site	1 Short term	3 High	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low
Cumulative	Negative	1 Site	1 Short term	2 Medium	4-5 Low	2 Probable	Y	Low	8-10 Medium	4-6 Low

9.15.3 Cumulative Impacts

The main health and safety impact associated with the proposed dam is that the dam may break its walls and flood downstream. There is therefore, an increased risk of flooding in the areas due to the additional dam. Subsequently, the cumulative impact is medium on health and safety.

9.15.4 Mitigation Measures

The proposed mitigation measures for dust and air quality are as follows:

- A Dam-break risk management and hazard mitigation must be undertaken and implemented for the project;
- Extensive geotechnical and seismic assessments must be undertaken prior final design of the dam;

- Contractor must appoint a Health and Safety Officer for the construction phase of the project;
- Suitable material and engineering designs must be implemented to ensure structural integrity of the dam;
- Suitable Personal Protective Equipment (PPE) must be worn at all times by all employees on site during the construction and maintenance phases of the project;
- With the exception of the project team members, no persons should be allowed to enter the construction site area;
- The site and crew are to be managed in strict accordance with the OHS Act;
- The Contractor must ensure that all emergency procedures are in place prior to commencing work. Emergency procedures must include (but not be limited to) fire, spills, contamination of soil, accidents to employees and limiting casual access to the construction site for workers, use of hazardous substances and materials, etc.; and
- The nearest emergency service provider must be identified during all phases of the project as well as its capacity and the magnitude of accidents it will be able to handle. The contact details of this emergency centre, including police and ambulance services must be available at prominent locations around the construction site.

9.16 Impact on Water Security

9.16.1 Description of Impacts

There is currently unreliability of supply from the Scheepersvlakte Balancing Dam to supply water to the Nooitgedagt WTW and subsequently water supply shortages to the Nelson Mandela Bay Metropolitan Municipality. The high demand and water shortages to the municipality as well as the expansion of citrus farms urgently require additional water supply in the region. The proposed development will have a positive impact within region as the municipality and farming community will benefit significantly from the water supply from the dam. The water security impacts are positive and summarised in **Table 39.**

9.16.2 Impact Assessment

Table 36 presents impacts associated with Water Security.

Table 39: Assessments of Impacts Related to Water Security

Project phase	Nature of impact	Extent	Duration	Intensity	Consequence (E+ D+I)	Probability	Reversibility	Loss of resources	Significance (C X P)	Significance
									Without Mitigation	With Mitigation
Preferred Activity, Location, Process and Demand of Lower Coerney Balancing Dam										
Construction	Positive	1 Site	2 Medium	2 Medium	4-5 Low	3 Highly probable	Y	Low	Positive	1-3 No Significance

Operational	Positive	1 Site	4 Permanent	1 Low	6-8 Moderate	3 Highly probable	Y	Low	Positive	1-3 No Significance
Cumulative	Positive	1 Site	3 Long term	1 Low	4-5 Low	3 Highly probable	Y	Low	Positive	1-3 No Significance

91.6.3 Cumulative Impacts

According to the 2011 census, 68% of the population within Ward 8 obtained their water from a service provider, the second most water source was in the form of dams (10%). It therefore important for the proposed dam to be developed as there is a good portion of the population relies on dams for water. The development of the dam will improve the water supply and overall water security for the farming community, the region and the municipality as a whole. Therefore, the cumulative impact will be a net positive on water security impacts.

9.16.4 Mitigation Measures

Even though the water security impacts related to development of the dam are positive, several measures should be put in place to ensure a success in the project including:

- The designs must be finalized as indicated with the capacity to supply the farming community and 21-day emergency supply to the Nelson Mandela Bay Metropolitan Municipality;
- Aspects related to the operational phase such as provision of water for irrigation must be addressed before the construction phase to allow for any adjustments and/or legal processes if necessary; and
- The structural integrity of the dam infrastructure must be maintained during the operational phase to avoid periods of no supply.

10 ENVIRONMENTAL IMPACT STATEMENT

Environmental Impact Statement (EIS) outlines how a proposed project might affect the natural environment. Among the items needed in an EIS is a summary, submitted alternatives, information, and analyses gathered from public comments and suggestions, the purpose and need of the EIS, and a list of environmental consequences. This Environmental Impact Statement is based on the following:

- Project information as provided by the client;
- Principal findings made by the specialists;
- Alternatives assessment; and
- Conclusive impact assessment as provided in the report.

10.1 Summary of project details

The Department of Water and Sanitation (DWS), intends to develop the Lower Coerney Balancing Dam which will require approximately 77 hectares of land, have a dam wall of 20.5 m high and have a capacity of 4.69 million m^3. The objectives of the balancing dam are to limit risks of shortfall in supply, remove potential operating system constraints and limit operational risks to acceptable levels. The need for a new balancing dam on the Scheepersvlakte Farm is due to the inadequate water supply owing to the smaller capacity of the existing Scheepersvlakte Dam to provide water supply during an emergency. The main purpose of the proposed new balancing dam at the Coerney site is to eliminate the operational and balancing storage limitations imposed by the Scheepersvlakte Dam. The main advantage of the dam site is that it will enable the dam to be operated under gravity. The dam will be filled from the Kirkwood Primary Canal via a new pipeline and the dam will supply the Nooitgedagt Water Treatment Works (WTW).

10.2 Principal findings made by the specialists

There were five specialist assessment undertaken to aid with this EIR;

- Agricultural Impact Assessment;
- The Terrestrial Biodiversity Impact Assessment;
- Aquatic Biodiversity Impact Assessment;
- Phase I Heritage Impact Assessment; and
- Palaeontology Impact Assessment.

The proposed development site is an area within the citrus farming community just outside of Addo. The proposed project area is characterised by the Fc 362 and la 85 land types. The Fc 362 land types mainly have Mispah, Oakleaf, Valsrivier and Hutton soil forms. The most sensitive soil forms that can be expected within the project area are the Hutton and Oakleaf soil forms with “Low to Moderate” and “Moderate to High” sensitivities. Although there will be approximately 77 ha of potential agricultural land, the proposed activities for the Lower Coerney Balancing Dam and associated infrastructure will not result in the segregation of any high production agricultural land. In addition, the proposed dam will provide irrigation water to the surrounding farming community aiding the current citrus farm expansion in the region. It is anticipated that the Environmental Management Programme and supporting management plans (Soil and Erosion, Rehabilitation and Invasive Species)

will be implementing tools used to avoid unnecessary loss of soil, nutrients and vegetation which supports the adjacent agricultural fields.

In terms of Terrestrial Biodiversity, the site is situated in the endangered Albany Alluvial Vegetation and the least threatened Sundays Valley Thicket vegetation type. The Albany Alluvial Vegetation conservation status is classified as endangered and the protection level is regarded as a 'Not Protected/Poorly Protected' Ecosystem. There are two natural habitats (Alluvial Vegetation and Valley Thicket). The Alluvial Vegetation habitat has high conservation importance and site ecological importance (SEI) while the Valley Thicket has medium and high conservation importance and SEI respectively. The distribution of the plant SCC within the assessment area may be regarded as spaced naturally and occurring abundantly throughout. There are at least four (4) protected floral species and twenty-one (21) fauna recorded on site. Portions of the current expected development would be considered to have a high negative impact as it would directly affect the habitat of threatened/protected plant species and expected listed faunal species that use these ecosystems. Although there are foreseen negative impacts on terrestrial biodiversity, there are founding solutions and mitigation measures to reduce the impacts and rehabilitation the area. In addition to the Search and Rescue Plan which will be followed by ECO Compliance Monitoring, the recommended biodiversity compensation strategy will reduce the impacts further.

With regards to Aquatic Biodiversity, the hydrological setting of the project area within the Mzimvubu - Tsitsikamma Water Management Area (WMA 7) and the Southeastern Coastal Belt aquatic ecoregion (Dallas, 2007). The watercourses which may potentially be impacted by the construction of the Coerney Dam include the N40D - 08561 Sub-Quaternary Reach (SQR) or Coerney River. The Present Ecological State (PES) of the Coerney River tributary across which the proposed dam will be constructed is considered largely modified (Class D). Furthermore, in situ water quality for the Coerney River system indicates modified water quality when compared to Target Water Quality Ranges. The aquatic biodiversity will be impacted through the clearing of vegetation from construction works within the aquatic and riparian habitats. It is anticipated that the recommended 18 m buffer zone for all activities except those directly within the riparian area will reduce the impacts. The independent ECO monitoring that will be undertaken during the construction phase will monitor compliance, impacts and rehabilitation along the riparian areas.

From an archaeological and paleontological perspective, stone stools were the only archaeological material located within the extended study while only moulds and petrified blocks of fossil wood of low scientific and conservation value were noted within the area. Although collectively, the area is of *Low* Archaeological *and Palaeosensitivity*, cultural significant features could be identified during any stage of the construction phase of the project. Construction activities such as excavations and grading could expose or damage the features of heritage and cultural value beneath the surface. The recommendations from the archaeologists including the implementation of a Chance Find Protocol are assessed to be useful guide tools to reduce and deal with any archaeological and paleontological features for the development.

In proceeding within the project, it is therefore important that integrated environmental management be considered. Each of the impacts identified in this report can be mitigated by the measures as outlined in **Chapter 9** of this report as well as in the Environmental Management Programme attached

as **Appendix G** of this report. These plans must be supplemented with additional conditions from the Environmental Authorization that will be issued by DFFE as the Competent Authority.

10.3 Alternatives assessment

Several options associated with the construction of the dam and for improving the assurance of water supply were considered. The options (alternatives) for the development of the Scheepersvlakte Balancing Dam and water supply to the Nooitgedagt Water Treatment Works (WTW) were identified and undertaken by DWS during the prefeasibility and feasibility assessments in 2019 (Aurecon, 2019; DWS, 2019). The following **pre-feasibility alternatives** were identified for providing improved assurance of supply to the WTW by various means, including balancing storage:

1. Balancing storage on the right bank of the Sundays River near the Nooitgedagt Water Treatment Works (Nooitgedagt WTW) in combination with a raised Scheepersvlakte Balancing Dam wall.

2. Diverting water from the existing Korhaansdrift Weir via a right bank pipeline to Nooitgedagt WTW for additional delivery of the NMBM's water allocation.

3. Increased balancing capacity at the Korhaansdrift Weir and diverting water via a right bank pipeline to Nooitgedagt WTW for full delivery of the NMBM's water allocation.

4. Releasing water from the existing Korhaansdrift Weir and diverting it closer to the Nooitgedagt WTW via a new pump station for full delivery of the NMBM's water allocation.

5. Increased balancing capacity at the Korhaansdrift Weir, with water releases to a new pump station downstream in the Sundays River, close to the Nooitgedagt WTW.

6. Constructing a larger dam near the present Scheepersvlakte Balancing Dam site and integrating this dam with the existing gravity pipeline to the Nooitgedagt WTW.

7. Constructing a large balancing dam on the right bank near the Nooitgedagt WTW.

The alternatives which were assessed as part of this EIR are:

- No-go Alternative
- Activity Alternatives
- Location/ property alternatives
    - **Option 1:** Three (3) alternative dam sites were assessed near Scheepersvlakte Dam
        - Option 1a: Upper Scheepersvlakte Site
        - **Option 1b:** Lower Coerney Site
        - Option 1c: Upper Coerney Site
    - Option 2: Four (4) possible sites for a balancing dam near the Nooitgedagt WTW
- Process Alternatives
    - **Option 1** - The mechanical clearing of vegetation can either be undertaken by uprooting (by hand or by machinery);
    - **Option 2** - Chemical methods for the clearance of vegetation through the application of chemicals such as herbicides by spraying, painting, injecting etc.
    - Option 3 - Biological methods for the clearance of vegetation through mites, insects,

and micro-organisms such as fungi or bacteria. They usually attack specific parts of the plant e.g., either reproductive organs such as (flower buds, flowers or fruit) or the seeds after they have dropped from the plant.

- Demand alternatives
    - Option 1: A smaller balancing dam near the present Scheepersvlakte Balancing Dam; or
    - **Option 2**: A suitable balancing dam near the present Scheepersvlakte Balancing
- Operational alternatives

The delimitations and limitations of each of these alternatives have been discussed in this **Chapter 6** of this EIR. Overall, the preferred option came out from a combination of activity alternatives, site location, process alternatives and operational alternatives. The Proposed Lower Coerney alternative is preferred due to ageing existing infrastructure making it unsuitable and unsafe for modifications to meet the higher demand and the new dam will provide water security for up to 21-days while also providing water for the citrus farms. The Lower Coerney Dam site is preferred over the Upper Scheepersvlakte and Upper Coerney Dam sites as placing the same dam at the upper Scheepersvlakte or Coerney sites would reduce the structural integrity of the dam and a major dam wall collapse would likely occur. In addition, the Upper Scheepersvlakte and Upper Coerney sites would be financially costly to operate as they would require a pump for water supply rather than the gravitational pipeline. Therefore, the Lower Coerney site option is more viable and preferred as it is safer (less chance of dam wall failure) and it caters for the farmers while addressing the water shortages within the Nelson Mandela Bay Metropolitan Municipality and has provision for sustainability.

10.4 Conclusive impact assessment as provided in the report

This Environmental Impact Assessment Report has taken into consideration background information, desktop information, alternatives, specialist impact assessment and recommendations. The study area is considered a sensitive environment as indicated in **Figure 55**. The proposed development will result in the loss of Species of Special Concern (flora and fauna) and reduce the species diversity through the change of environment from a natural and near-natural ecosystem to a dam. The development will also reduce the *in situ* water quality of the Coerney River as well as increase the risk of flooding due to the addition of the large water body onto an area already consisting of at least two other dams. However, it is of crucial importance for the proposed dam to be developed as there is a good portion of the population within the region that urgently needs the water. The development of the dam will improve the water supply and overall water security for the farming community, the region and municipality as a whole. Therefore, the overall impact will be a net positive on socio-economic and water security. It must also be noted that approximately 36 ha of the 77 ha proposed development area has already been cleared by the farming community in preparation for the new citrus fields.

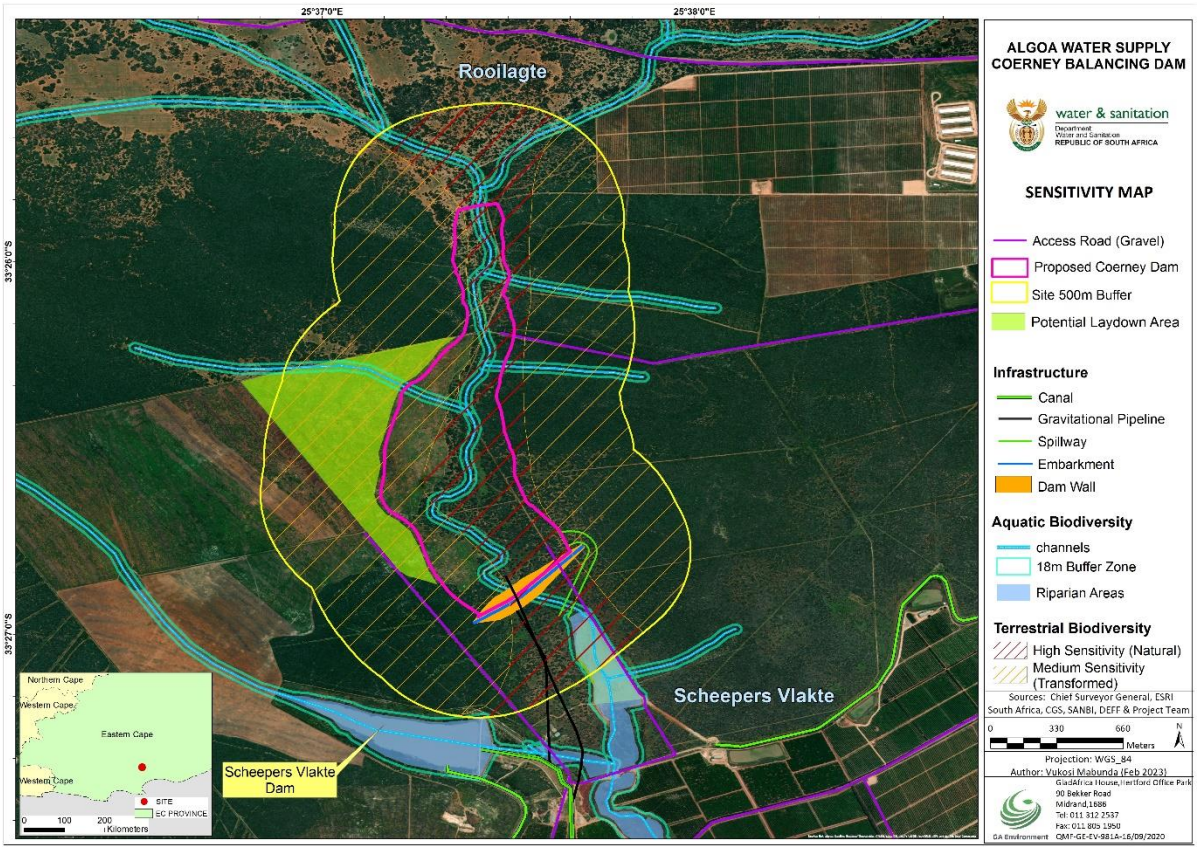


Figure 56: Layout sensitivity map

Based on information obtained from specialist assessments and site environmental assessments undertaken by the EAP, there is one potential construction camp and material storage area as indicated in **Figure 55**. It must be noted that the area was identified based on the review of environmental sensitivity assessments and site observations. The area is the most disturbed and less sensitive area within the vicinity of the development site. The area is by no means the final nor only potential construction camp area, but recommended as it is the least environmental sensitive area. It is recommended that the Contractor consider the area for construction camps and material storage areas. It must be noted that the final construction camp and material storage areas must be approved by the ECO prior site establishment.

Based on the summary of this EIR, it is a conclusion of this report that the proposed project will have moderate to low impacts on the bio-physical environment provided all mitigation measures detailed in this report as well as the EMPR in are adhered to. It is anticipated that the proposed project will have a positive impact on socio-economic and water security.

11 CONCLUSION, AND RECOMMENDATIONS

11.1 Conclusion

The Department of Water and Sanitation (DWS) is a state organ that exists to ensure equitable access to water for all South Africans as well as to protect, use, develop, conserve, manage and control water resources. In 2017, DWS undertook a feasibility study to assess five (5) potential dam sites for the Algoa Water Supply System (AWSS). The Lower Coerney site was eventually found to be the most feasible and most viable for the construction of the required balancing dam. The Water Use License Application process has been discontinued following consultation with DWS Eastern Cape Region Licensing Officials and based on the DWS Circular for Exclusions from Water Use Authorisation processes (**Appendix E7**) in October 2022. According to this notice, DWS is excluded from applying for WULA as there are no legal requirements in terms of Chapter 4 of the National Water Act of 1998 to compel the Department of Water and Sanitation to also obtain a Water Use License for the development of approved Government Waterworks.

This EIR has identified and assessed the impacts that may emanate from the proposed development. This includes issues ranging from public health & safety, groundwater and surface water contamination, & system design failure, etc. Based on the summary of this report, it is concluded that the impacts will range from medium to low significance on the public and bio-physical environment provided all mitigation measures detailed in this report as well as the EMPR are adhered to. Positive socio-economic and water security impacts such employment opportunities and provision of irrigation and potable water supply.

In the undertaking of any Environmental Impact Assessment Process, Public participation is a legislative requirement as set out in the NEMA EIA Regulations. The Public participation process involved sourcing comments from I&APs, particularly adjacent landowners, main stakeholders and commentary authorities. Consultation with all the key stakeholders was also undertaken to inform them about the proposed project. Public participation undertaken for this EIR is indicated in **Chapter 7**. **It must be noted that no objection were raised against the proposed development of the dam.**

In conclusion of this report, the proposed development will have Medium to Low impacts on the bio-physical environment and a positive impact on the socio-economic environment provided that the mitigation measures detailed in this report are adhered to.

11.2 EAPs Recommendations

This EIR has provided a comprehensive assessment of the potential environmental impacts associated with the proposed development. These impacts have been identified by the EAP and the specialist studies undertaken for the proposed development. The key findings of the EIA Process are discussed in this report. It is the recommendation of the EAP that the **Construction of Lower Coerney Balancing Dam** be approved to address the expanding citrus farming and the water supply shortages in the Nelson Mandela Bay Metropolitan Municipality. The impact assessment has revealed that the construction and operational phases of the proposed project will generate impacts of medium to low

after mitigation as well as positive socio-economic and water security impacts such as employment opportunities and provision of water.

Taking into consideration the findings of the environmental impact assessment, the project benefits outweigh the negative impacts identified provided that mitigation measures are applied effectively. Impacts of medium to low significance that have been identified and may be further reduced further once proper mitigation measures have been implemented. It is therefore recommended that the environmental authorities subject the proposed application to the following conditions:

a. Final land negotiations and operational arrangements as discussed during the public meeting and the Main Stakeholder Engagement Meeting should be addressed before the construction phase to eliminate potential operational issues associated with the proposed development.

b. The Contractor shall inform all adjacent landowners of the commencement of construction activities at least 30 days before commencement;

c. An Independent Environmental Control Officer must be appointed to monitor all construction activities and ensure the demarcation of all applicable areas and approve the locations of all infrastructure;

d. Monthly monitoring reports must be submitted to DFFE for the evaluation of the project's compliance to the EMPr and Environmental authorisation;

e. A Dam-break risk management and hazard mitigation must be undertaken and implemented for the project;

f. Contractor must appoint a Health and Safety Officer for the construction phase of the project;

g. Stakeholder engagement must be undertaken during the project phases to investigate possible scenarios for appropriate compensation of landowners for high land capability areas where necessary;

h. The designed dam should be built according to the capacity of a 1:100-year flood as dam collapse in this non-perennial system will result in extensive damage to downstream systems which include the highly sensitive estuary;

i. A storm water management plan must be compiled for both the construction and operation of the dam;

j. The buffer zone of 18 m along the delineated riparian area must be established as a no-go area for all farming activities/clearing as well as associated aspects of the development which aren't directly related to the watercourse;

k. A site walk through is recommended by a suitably qualified ecologist prior to any construction activities, preferably during the wet season to identify and mark any identified SSC and/or protected species as no go-areas.

l. Areas rated as High sensitivity outside of the direct development areas should be declared as 'no-go' areas during the life of the project, and all efforts must be made to prevent development access to these areas from construction workers and machinery.

m. Construction should be limited to the dry season when the channel is dry to limit potential modification to the system.

n. Clearing of vegetation should be minimized and avoided where possible. All activities must be restricted to within the very low sensitivity areas.

o. The spillway must be fitted with infrastructure such as gabions or flow dissipation to remedy point source erosion at the end of the spillway. The spillway must be regularly monitored and maintained/vegetated.

p. All declared alien plants must be identified and managed in accordance with The Alien and Invasive Species Regulations (GNR 599 of 2014), and the implementation of a monitoring programme in this regard is recommended.

q. The period for which the Environmental Authorisation is required is 10 years.

r. Drainage lines downslope of the project must also be checked regularly for erosion during the operational phase of the project and any erosion noted must be treated immediately using soft engineering techniques.

s. If any human remains or any other concentrations of archaeological heritage material are exposed during construction, all work must cease, and it must be reported immediately to the archaeologist at the Albany Museum and the Eastern Cape Provincial Heritage Resources Authority. Sufficient time should be allowed to investigate and remove such material.

t. It is recommended that if any fossiliferous deposits are exposed by surface clearance or excavations during the construction phase of the development, the Chance Fossils Finds Protocol outlined in Appendix 3 of the Palaeontological Impact Assessment Report must be implemented.

u. Continued consultation and engagement with all relevant stakeholders - especially property owners, neighbouring and local communities, and respective municipalities during labour recruitment and procurement for services and supplies during construction phase.

v. Prior to construction, the development footprint area must be demarcated on site to ensure that construction impacts are contained within this area. If necessary, these areas may be fenced or, alternatively, nearby sensitive areas are to be fenced to prevent access.

w. Adhere to all conditions of the Environmental Authorisation issued by DFFE as well as any conditions of permits that may be required thereafter; and

x. Adhere to all recommendations outlined in the specialist Reports**,** and the Environmental Management Programme**.**

In terms of Section 31 (n) of NEMA, the EAP is required to provide an opinion as to whether the activity should or should not be authorised. In this section, a qualified opinion is ventured and in this regard. GA Environment believes that sufficient information is available for DFFE to make a decision.

Based on the environmental assessment of the site conditions, and the potential impact of the proposed development, ***The Construction of the Lower Coerney Balancing Dam*** *in this report has*

emerged as the most viable option from the environmental perspective subject to adherence to mitigation measures outlined in this report and the EMPr.

It is therefore strongly advised that the alternative highlighted in this section be authorised. It is GA Environment's recommendation that the Applicant, the Department of Water and Sanitation, be granted an Environmental Authorisation for the proposed development subject to the conditions stipulated in the preceding section and that all Mitigation Measures provided in this report be strictly adhered to and closely monitored by an independent EAP to avoid adverse environmental Impacts. Since the set construction dates cannot be confirmed, it is recommended that the period of validity for the Environmental Authorisation be stipulated as 10 years post Environmental Authorisation.

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