Botanical Impact Assessment

Proposed farm dam on Portions 3 & 13 of Farm Klipheuvel 143, Mossel Bay

25 February 2026

Author details

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Mark Berry is an independent botanical specialist with over 25 years of experience mainly in the Western Cape, but also in the adjacent provinces, Free State and KwaZulu-Natal. Mark is also experienced in undertaking Environmental Impact Assessments (EIA's), Environmental Management Programmes, environmental audits, land use surveys, etc. He served as a nature conservation officer in the South African Air Force (1989-1990), an environmental specialist at the Planning Partners (Cape Town based town planning & landscape architecture firm) from 1997 to 2005, and as an examiner for the Board of Control for Landscape Architects (BOCLA), responsible for the setting up and marking of the Environmental Planning Section of exam paper (2000-2006).

References

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Declaration of Independence

I Mark Gerald Berry, as the appointed Specialist hereby declare/affirm the correctness of the information provided or to be provided as part of the application, and that I:

- in terms of the general requirement to be independent:
  - **other than fair remuneration for work performed in terms of this application, have no business, financial, personal or other interest in the development proposal or application and that there are no circumstances that may compromise my objectivity**; or
  - ~~am not independent, but another specialist (the "Review Specialist") that meets the general requirements set out in Regulation 13 has been appointed to review my work (Note: a declaration by the review specialist must be submitted)~~;
- in terms of the remainder of the general requirements for a specialist, have throughout this EIA process met all of the requirements;
- have disclosed to the applicant, the EAP, the Review EAP (if applicable), the Department and I&APs all material information that has or may have the potential to influence the decision of the Department or the objectivity of any report, plan or document prepared or to be prepared as part of the application; and
- am aware that a false declaration is an offence in terms of Regulation 48 of the EIA Regulations, 2014 (as amended).

Signature of the Specialist:	
Name of Company:	MB Botanical Surveys
Date:	25 February 2026

Table of Contents

1. Introduction

Proposed development and area assessed

This report investigates the botanical impacts of a proposed farm dam on Portions 3 and 13 of Farm Klipheuvel 143, northeast of Mossel Bay. The site is located in a hilly area 4 km north of Klein Brak River (**Figure 1-1**). Notable stretches of fynbos (mostly regrowth), renosterveld and embedded thicket were encountered on the site, as well as disturbances (fallow land & alien infestation) from farming activities. The aim of the study, which was requested by Louise-Mari van Zyl of Cape EAPrac (EAP) on behalf of Klipheuwel Trust, represented by Mr John Robertson, is to determine the botanical value of the affected area, the anticipated impacts imposed by the project, and to recommend mitigation measures.

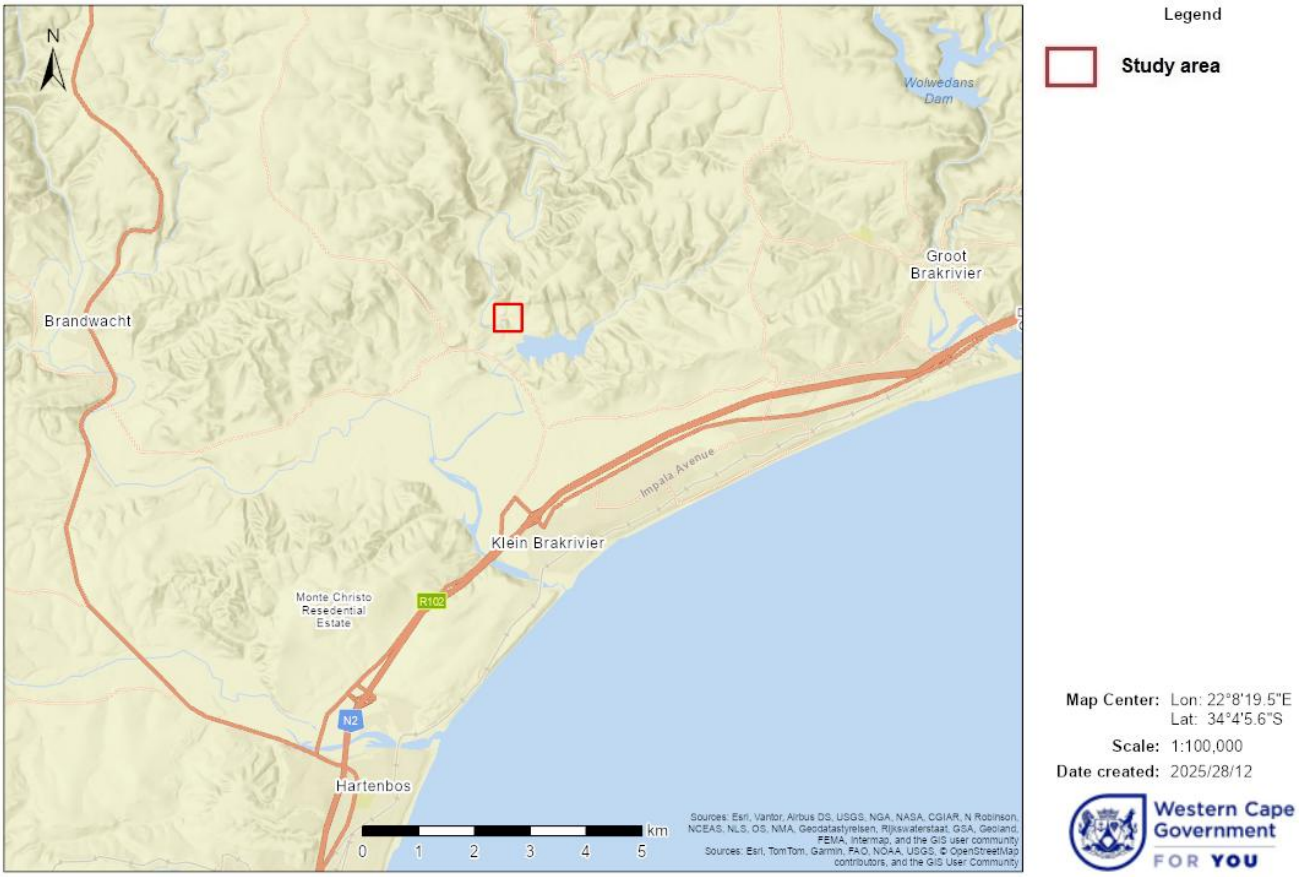

Figure 1-1: Location of the proposed dam site north of Klein Brak River in the Mossel Bay area.

It is proposed to establish a new farm dam (Oudrift Dam) on Portions 3 and 13 of Farm Klipheuvel 143. It will be location in a small, vegetated valley, fed by 3 seasonal watercourses. The Klipheuwel Dam is located close-by to the southeast. The dam will be primarily fed by water pumped from the Moordkuil River. In order to establish the dam, a ±110 m long earth wall will be constructed from material excavated from the dam area. Additional infrastructure includes a two-way (outlet & inlet) pipeline across the Moordkuil River, an overflow structure (spillway) and a V-notch gauging structure for overflow from

the Klipheuwel Dam. In summary, details of the dam are as follows (see **Figure 1-2** for preferred dam layout):

- Dam & dam wall footprint = ±5.6 ha
- Dam volume (when full) = ±300 000 m^3
- Wall height = ±18 m
- Spillway & energy dissipation structure = ±0.14 ha
- Outlet & inlet pipeline servitude = ±730 m x 3 m
- V-notch gauging structure = 46 m long & 1 m high

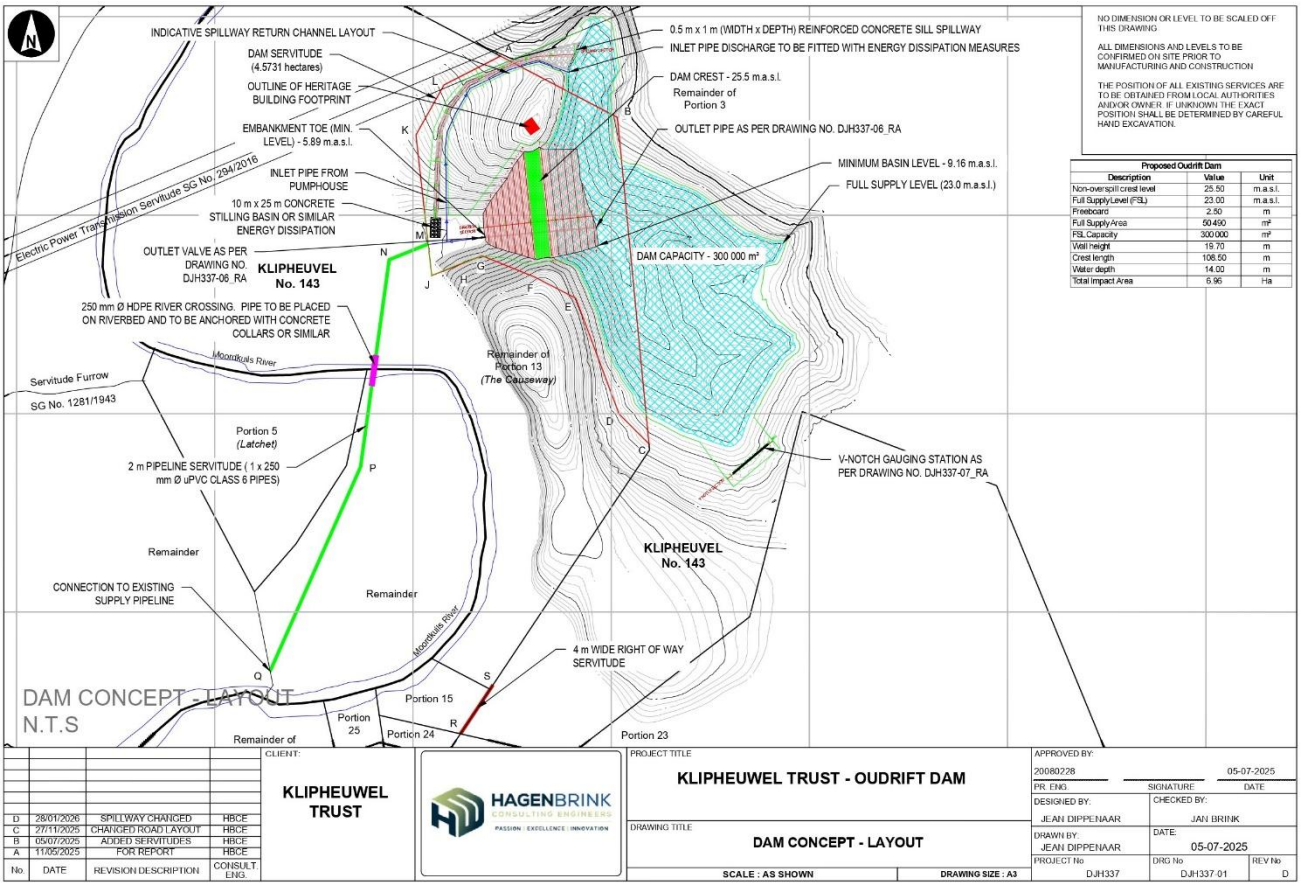

Figure 1-2: Proposed dam layout (preferred option) with smaller footprint.

According to the Screening Report, generated by the previous EAP on 25 November 2025 for the dam, the site has been mapped as Medium sensitive in the plant species theme, and Very High sensitive in the terrestrial biodiversity theme. The Very High sensitivity is ascribed to the possible presence of threatened vegetation types and the encroachment of the site on the biodiversity network. As a result, MB Botanical Surveys was contracted to undertake a botanical assessment of the project area.

Terms of Reference

The terms of reference agreed upon for this botanical study include:

- Adhere to the EAP's terms of reference for the study, including a *status quo* assessment, followed by either a Compliance Statement or a Botanical

Assessment Report, depending on the outcome of the *status quo* assessment;
- Identify and describe biodiversity patterns at a community and ecosystem level (main vegetation type, plant communities & threatened/vulnerable ecosystems), at species level (Species of Conservation Concern & protected species) and in terms of significant landscape features;
- Describe the sensitivity of the site and its immediate surroundings;
- Map or describe the presence of invasive alien plants;
- Review the relevant biodiversity plans compiled in terms of the National Environmental Management Biodiversity Act (Act 10 of 2004);
- Make recommendations with regards to the protection/management of biodiversity; and
- Adhere to the NEMA and CapeNature protocols for biodiversity assessments.

Limitations and Assumptions

The following limitations and assumptions apply to the study:

- Fieldwork was carried out in autumn and late spring, considered to be suitable times for most flowering species in the Southern Cape. However, flowering plants that only flower at other times of the year (e.g. winter to early spring) may have been missed. Mossel Bay also experienced a very dry spring season in 2025, which may have affected certain spring flowering species (notably from the Iridaceae & Orchidaceae families). The overall confidence in the completeness and accuracy of the botanical findings is considered to be good.

Notwithstanding the above limitation and the fact that the vegetation is partly degraded or transformed, the specialist is of the opinion that the survey and findings are adequate to aid decision making.

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Any person using or referring to this report, do so at their own risk. The author will not accept liability for any loss or damage arising from this report or its content. This report reflects the professional judgment of its author. The information and recommendations presented in this report are specific to the project and site at hand and do not extend to future developments or neighbouring sites. Use of this report is therefore restricted.

2. Site Sensitivity Verification

The Department of Environmental Affairs online Environmental Screening Tool indicates that the plant species theme is of Medium sensitivity for the dam site (see Screening Report, generated by the EAP on 25 November 2025). **Annexure 1** lists the threatened species and their sensitivity from the Screening Report. The Screening Report further indicates that the terrestrial biodiversity theme is of Very High sensitivity. This rating is ascribed to the possible presence of a terrestrial critical biodiversity area (CBA), a

degraded terrestrial critical biodiversity area (CBA2) and two threatened vegetation types (i.e. Garden Route Granite Fynbos & Groot Brak Dune Strandveld).

In circumstances where the *status quo* assessment proves the contrary to the above (i.e. where the site is deemed to be of Low sensitivity in respect of both themes, the GN320 of 2020 requires that a Terrestrial Biodiversity Compliance Statement is submitted as set out by the National Environmental Management Act (NEMA) (Act No. 107 of 1998) Regulations of 2020 (as amended). If the above is confirmed, then a biodiversity assessment will be required.

3. Methodology

The methodology used in this botanical impact assessment, including a desktop background assessment and two site visits, is outlined in the subsections below.

Desktop assessment

A brief review of online (e.g. Google Earth, iNaturalist.org, posa.sanbi.org & CapeFarmMapper) and desktop resources (available literature & reports) was undertaken to determine the nature of the site, the expected vegetation type(s), the presence of natural vegetation remnants and species of conservation concern (SCC), hydrological features, and the significance of the site in terms of biodiversity planning.

Site survey

Botanical surveys of the site were undertaken on 21 and 22 March 2020, and 27 November 2025 by the author. A qualitative assessment of the type and condition of affected vegetation on site, disturbances and presence of alien species, SCC and protected tree species was carried out. The path walked during the 27 November 2025 survey is shown in **Figure 3-1**. Plant species not identified in the field, were collected and/or photographed and identified at the office and Compton (Kirstenbosch) Herbarium. The 2018 South African Vegetation Map and the latest floristic taxonomic literature and reference books were used for the purpose of this specialist study. Any plants classified as rare or endangered in the Red List of South African Plants online database[1] are highlighted. The assessment follows the relevant national guidelines/protocols for biodiversity assessments as listed in the Government Gazette No. 43110 on 20 March 2020.

The following information was recorded during the site visit:

1. The condition of the vegetation. Is the vegetation either disturbed or degraded? A disturbed or degraded area could range from agricultural fields (fallow land), or

[1] Threatened Species Programme | SANBI Red List of South African Plants

areas previously disturbed by mining activities, to an area that has been severely eroded or degraded as a result of bad land management or alien infestation.

2. Species diversity (alpha diversity). This refers to the numbers of different indigenous plant species occurring on site.
3. Species of Conservation Concern (SCC), endemics, as well as protected tree species occurring on site. This would include near threatened, rare, vulnerable, endangered or critically endangered species. SCC and protected tree species were mapped using GPS Tracks Pro v4.9.5 software on an iPhone 16 Pro. Accuracy is given as ±5 m.
4. Identification of the vegetation type(s) and communities (if discernible) on the site. This would include trying to establish the known range of a vegetation type and whether or not it is vulnerable, endangered or critically endangered.
5. Connectivity with (or isolation from) nearby natural vegetation.

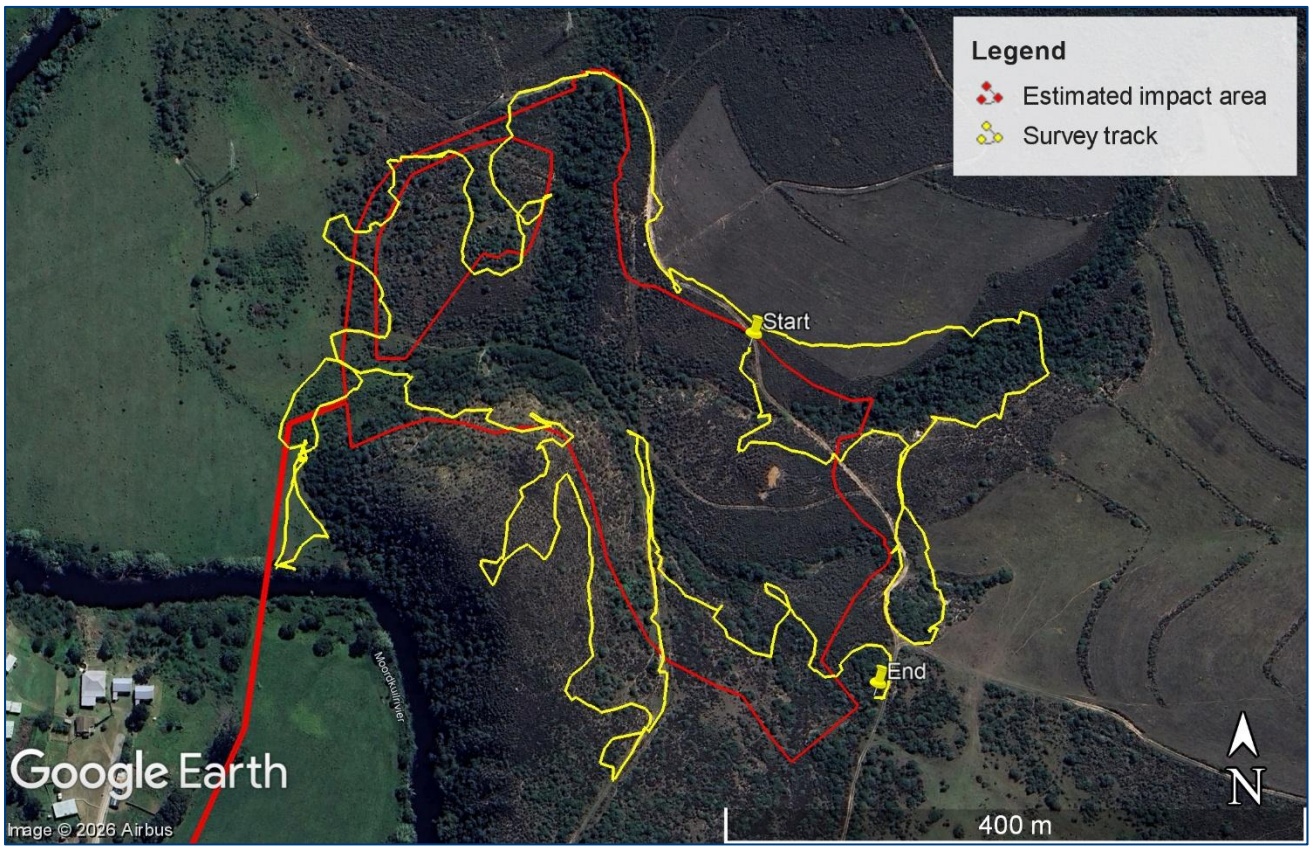

Figure 3-1: Satellite photo showing the survey track on site.

Data analysis

Site ecological importance (SEI) of the affected (receptor) area has been determined by applying the criteria described in the Species Environmental Assessment Guideline (SANBI, 2020). See **Annexure 2** for a description of the SEI methodology. The impact assessment methodology is described in **Annexure 3**.

4. Literature Study

A desktop literature review was undertaken during the botanical impact assessment using both online resources and existing maps and reports. A summary of the most relevant information to this assessment is presented below. Some of the information was ground-truthed during the site survey.

Location, topography & land use

The proposed dam site is located in a small side valley overlooking the southern entrance to the Moordkuil River valley (**Figure 4-1**). It forms part of a game fenced section of the farm comprising some 260 ha. It is bordered on the northern and eastern sides by Botlierskop Private Game Reserve. The Klipheuwel Dam is located a few hundred meters away to the southeast. The hillslopes above the site rise to 168 m above sea level, while the landscape flattens out downstream towards the south and the confluence with the Brandwag River. The site is covered by significant tracts of renosterveld, fynbos and embedded thicket, but also fallow land and previously alien (black wattle & gum) infested areas. Dairy farms have transformed much of the surrounding landscape north of the N2, with only the hilly areas and steeper slopes remaining untransformed (covered with vegetation). The coastal strip south of the N2 has been transformed by coastal residential developments.

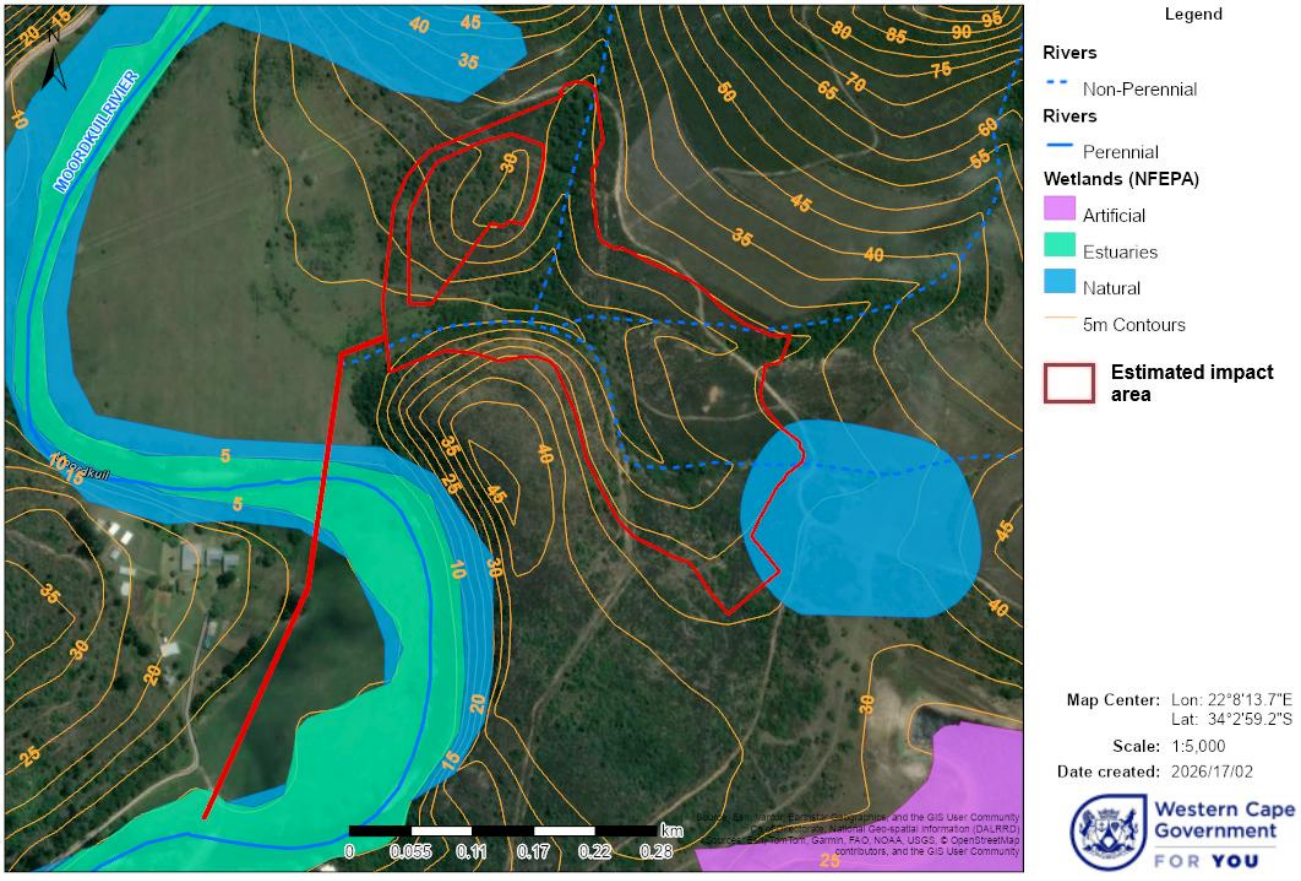

Figure 4-1: Combined topography and hydrology map.

Hydrology

According to CapeFarmMapper, the dam site is drained by three seasonal watercourses, all of which were dry at the time of surveys (**Figure 4-1**). A NFEPA wetland (channelled valley-bottom wetland) was mapped on the south-eastern side of the site. However, no evidence of a wetland was found during the site survey. The mapped wetland area lies on a low saddle and watershed separating the proposed dam site from the Klipheuwel Dam. The National Freshwater Ecosystem Priority Areas (NFEPA) project provides strategic spatial priorities for conserving South Africa's freshwater ecosystems and supports sustainable use of water resources. These priority areas are referred to as NFEPA's. The proposed two-way pipeline also crosses the Moordkuil River, a perennial river located to the west of the dam site (**Figure 4-2**).

Figure 4-2: Moordkuil River as viewed from koppie south of the proposed dam wall.

Climate

The mean annual rainfall for the study area, which is located on the Garden Route coastal plain, is 444 mm (as per CapeFarmMapper climatic data for 1950 to 2000). The peak rainfall periods are the months of March and October-November (i.e. bimodal rainfall regime), while the driest periods are December to January and June to July. The study area lies in a transitional area between the winter and summer rainfall regions. Mean daily maximum and minimum temperatures are 23.4°C and 10.2°C for February and July,

respectively (as per CapeFarmMapper climatic data). The Köppen-Geiger climate classification for the area is BSh (arid, steppe, hot).

Geology

According to the 3422 AA Mossel Bay 1:50 000 geological map, the main geological formations underlying the site are the Enon Formation (reddish conglomerate) (**Figure 4-3**) in the western part and Kirkwood Formation (mudstone, sandstone with subordinate conglomerate lenses) in the eastern part. Both belong to the Uitenhage Group (Jurassic to Cretaceous age) of sediments. Also present on the southwest-facing slope on the northern side is quartzitic sandstone of the Peninsula Formation. The latter belong to Table Mountain Group. The cobblestones found in the local Enon conglomerate originate from the Table Mountain Group (Viljoen, 1993). Enon conglomerate is an important source of stone aggregate, which is mined at several quarries found in the area (Viljoen, 1993). The latter typically supports renosterveld in the Mossel Bay area.

Figure 4-3: Exposed Enon conglomerate on the koppie in the western part of site, covered with succulents such as *Euphorbia mauritanica*, *Crassula perforata* and *C. cultrata*.

Biodiversity Planning Context

The study site is located in a coastal fynbos-renosterveld-thicket environment on the Southern Cape coastal plain. The indigenous species recorded on site are typical fynbos, renosterveld and coastal thicket species, such as *Erica peltata, Leucadendron salignum, Dicerothamnus rhinocerotis, Eriocephalus africanus, Pterocelastrus tricuspidatus,*

Mystroxylon aethiopicum and *Cussonia thyrsiflora*. The 2018 SA Vegetation Map has incorrectly mapped the main vegetation type on site as Garden Route Granite Fynbos, with the northern tip extending into South Outeniqua Sandstone Fynbos (**Figure 4-4**). Vlok has mapped it as Brandwag Fynbos-Renoster-Thicket[2]. According to the SA Vegetation Map, the proposed two-way pipeline also crosses a strip of Groot Brak Dune Strandveld, associated with the Moordkuil River.

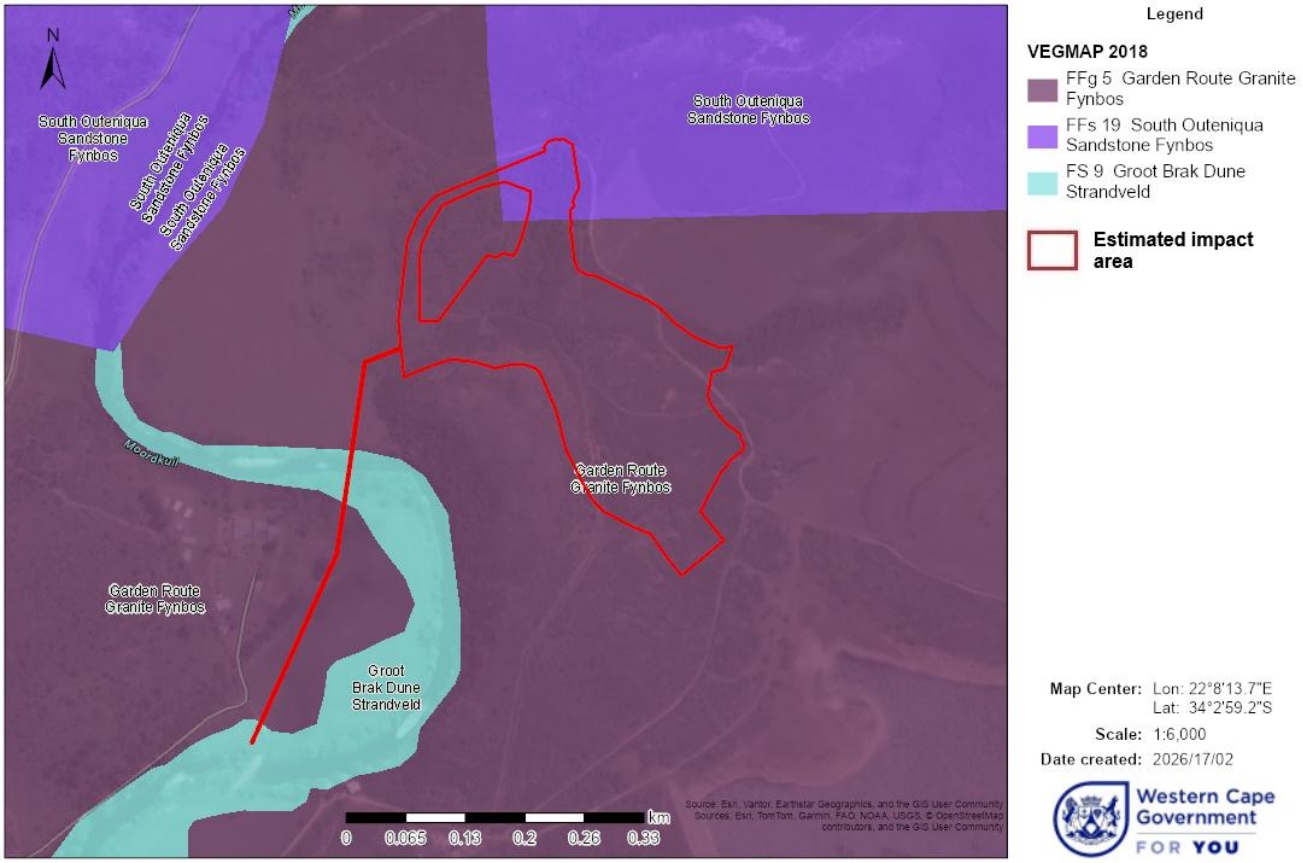

Figure 4-4: Extract of the 2018 SA Vegetation map.

While the South Outeniqua Sandstone Fynbos unit is correct, the rest of the vegetation on site should have been mapped as Mossel Bay Shale Renosterveld. This error is repeated in the 2024 beta version of the SA Vegetation Map. Mossel Bay Shale Renosterveld occurs on the undulating hills and valleys from the Kruisrivier near Riversdale to Botterberg, west of the Robinson Pass, centred on the Gouritz River (Mucina, 2006). The renosterveld is described as a medium dense, medium tall cupressoid-leaved shrubland dominated by renosterbos (Mucina, 2006). Thicket patches are common within the unit.

South Outeniqua Sandstone Fynbos occurs on the southern slopes of the Outeniquas from

[2] A composite vegetation map of the Riversdale, Little Karoo, Swartberg and Garden Route regions of the Southern Cape as classified by Jan Vlok, mapped at a scale of 1:50 000 for various projects and combined into one continuous layer.

Cloetesberg northeast of Albertinia in the west to the upper reaches of the Keurbooms River in the east (Mucina, 2006). It is described as a tall, open to medium dense shrubland with a medium dense, medium tall shrub understorey, mainly proteoid and restioid fynbos (Mucina, 2006). Being part of the Fynbos Biome, both Mossel Bay Shale Renosterveld and South Outeniqua Sandstone Fynbos are maintained by a regular fire regime. Unfortunately, landscape fragmentation is disrupting this 'maintenance' requirement, often leading to localised species loss and bush encroachment or alien infestation (pers. obs.).

Due to its transformed state, Mossel Bay Shale Renosterveld is currently listed as Critically Endangered in the Revised National List of Threatened Ecosystems (DEA, 2022). Only about 38% of Mossel Bay Shale Renosterveld is still left, while 0.2% is currently protected[3]. A large percentage of it has been transformed in the past for pastures and croplands (Mucina, 2006). The ecosystem is also degraded by erosion and overgrazing (Mucina, 2006). The unit is narrowly distributed with high rates of habitat loss in the past 30 years, placing it at risk of collapse[4]. South Outeniqua Sandstone Fynbos, on the other hand, is still reasonably well represented, with 67% remaining[5]. It is well protected, with 32% formally conserved in the Garden Route National Park, Doringrivier Wilderness Area and a few nature reserves (Mucina, 2006). Plantations, cultivation and alien invasive species are key pressures to this ecosystem (Mucina, 2006).

The proposed dam site falls inside the Western Cape biodiversity network, with almost the entire site mapped as a terrestrial critical biodiversity area (CBA) (**Figure 4-5**). The proposed two-way pipeline also crosses an aquatic (river) CBA associated with the Moordkuil. Reasons for the importance of the above mapped units include the presence of a climate adaption corridor, ecological processes (FEPA river corridor), threatened vegetation types, threatened vertebrate habitat (bontebok), wetland types (channelled & unchannelled valley bottom wetlands), estuary (Klein Brak Estuary), river types (permanent lower foothill river & ephemeral upper foothill river) and water resource protection (Southern Coastal Belt). It was previously noted that most of the intact vegetation in the Mossel Bay interior is found on the steeper hill slopes. These areas are thus considered of great value in the biodiversity network. The nearby Moordkuil River has been mapped as an aquatic CBA. The closest protected area to the site is the Doringrivier Wilderness Area, located 15 km away to the north.

CBA's are defined as areas in a natural condition that are required to meet biodiversity targets, for species, ecosystems or ecological processes and infrastructure (Pool-Stanvliet, 2017). These sites are selected for meeting national targets for species, habitats and ecological processes (Pool-Stanvliet, 2017). Many of these areas support known

[3] Ecosystem Detail - Biodiversity BGIS

[4] Ecosystem Detail - Biodiversity BGIS

[5] Ecosystem Detail - Biodiversity BGIS

occurrences of threatened plant species, and/or may be essential elements of designated ecological corridors. Loss of designated CBA's is therefore not recommended. ESA's, on the other hand, are supporting zones required to prevent the degradation of CBA's and Protected Areas.

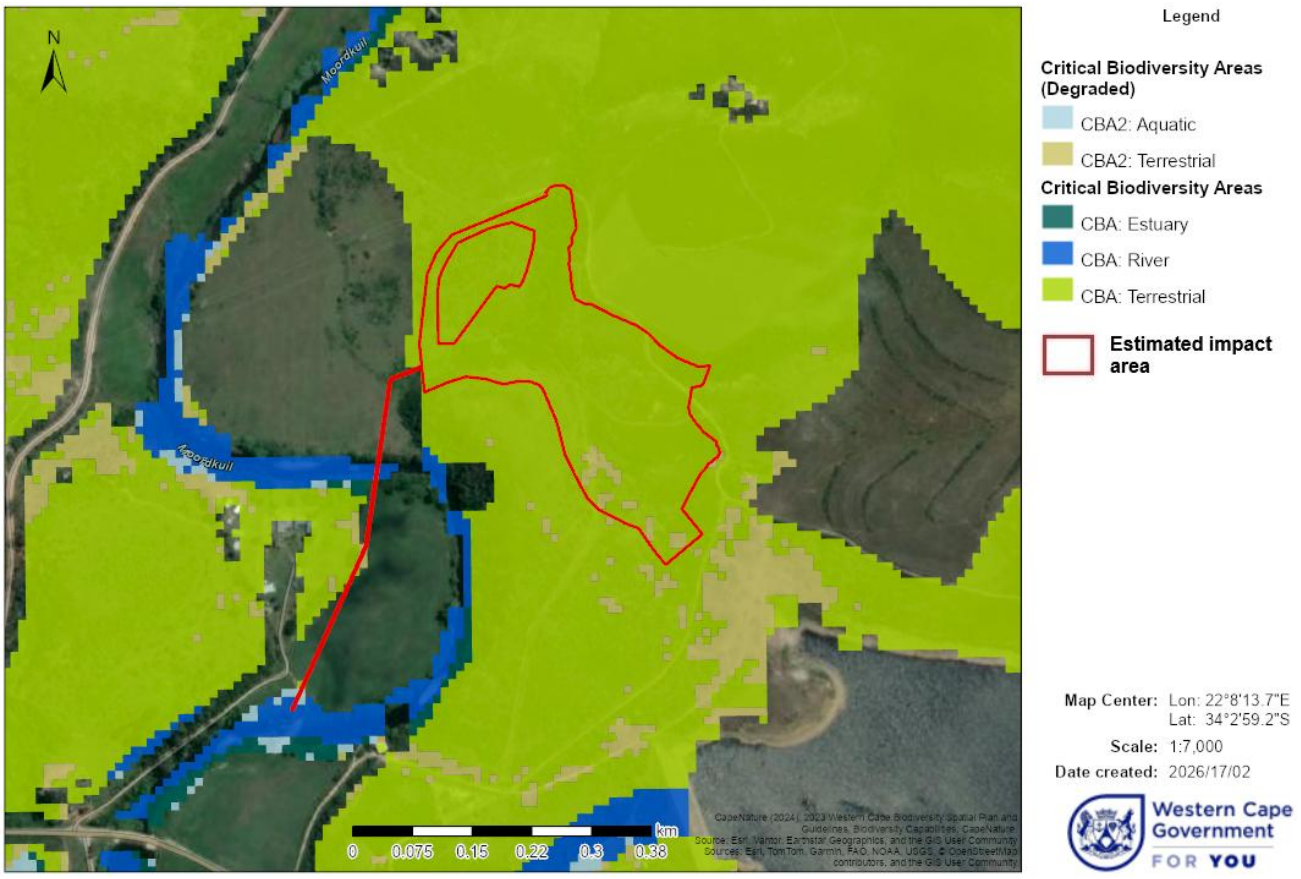

Figure 4-5: Extract of the Western Cape biodiversity network map.

5. Results

In order to fulfil in the requirements of the terrestrial biodiversity and plant species protocols, this section describes the vegetation (terrestrial biodiversity) and plant species encountered in two subsections. In the plant species subsection specific reference is made to species of conservation concern (SCC) and protected tree species.

Terrestrial biodiversity (vegetation)

The site lies on the boundary between South Outeniqua Sandstone Fynbos and Mossel Bay Shale Renosterveld (**Figures 5-1** & **5-2**). Embedded thicket is also present in the above units, mainly along the watercourses and smaller patches inside the renosterveld (**Figure 5-3**). South Outeniqua Sandstone Fynbos extends up the hillslope on the north-eastern side of the site, while the renosterveld covers most of the south-western part of the site. Typical fynbos species recorded inside the fynbos include *Erica peltata, E. unicolor* ssp. *mutica, Metalasia acuta* and *Bobartia robusta.* The renosterveld is mainly populated by

asteraceous shrubs, such as *Elytropappus rhinocerotis, Oedera squarrosa* and *Eriocephalus africanus*, and a variety of succulents, such as *Acrodon bellidiflorus, Ruschia tenella, Drosanthemum parvifolium, Trichodiadema burgeri, Euphorbia mauritanica* and *Crassula tetragona*. The thicket areas are populated by typical Albany thicket elements, such as *Searsia pterota, Pterocelastrus tricuspidatus, Sideroxylon inerme, Aloe ferox, Cotyledon orbiculata, Grewia occidentalis, Euclea undulata, Carissa bispinosa* and *Asparagus striatus.*

The area earmarked for the farm dam have been disturbed by past farming activities (**Figures 5-4** to **5-6**). Pastures and regrowth (secondary fynbos) were recorded on the site, notably on the southwest-facing slope on northern side. Historical Google Earth photographs also show significant alien infestation in the lower parts of the site (**Figure 5-7**). Most of the latter was subsequently cleared by the farmer. Despite the above past disturbances, significant tracts of renosterveld (albeit degraded) and fynbos (mostly regrowth) remain. The regrowth areas also show different stages of succession with the return of fynbos and renosterveld species. The proposed two-way pipeline runs mainly through farmland (pastures), with a short section crossing the Moordkuil River. The embankment of the latter is covered by *Searsia rehmanniana* var. *glabrata*, *Grewia occidentalis, Leonotis leonurus, Rubus pinnatus, Pteridium aquilinum, Arundo donax* and *Cyperus textilis*. *Arundo donax* is an invasive reed. The passage through the river is of little botanical interest. Remains of a small farm dwelling are also present on the koppie in the north-western corner of the site. The botanical attributes of the site are presented in **Figure 5-8**.

Figure 5-1: Koppie covered by renosterveld on the south-western side of dam site.

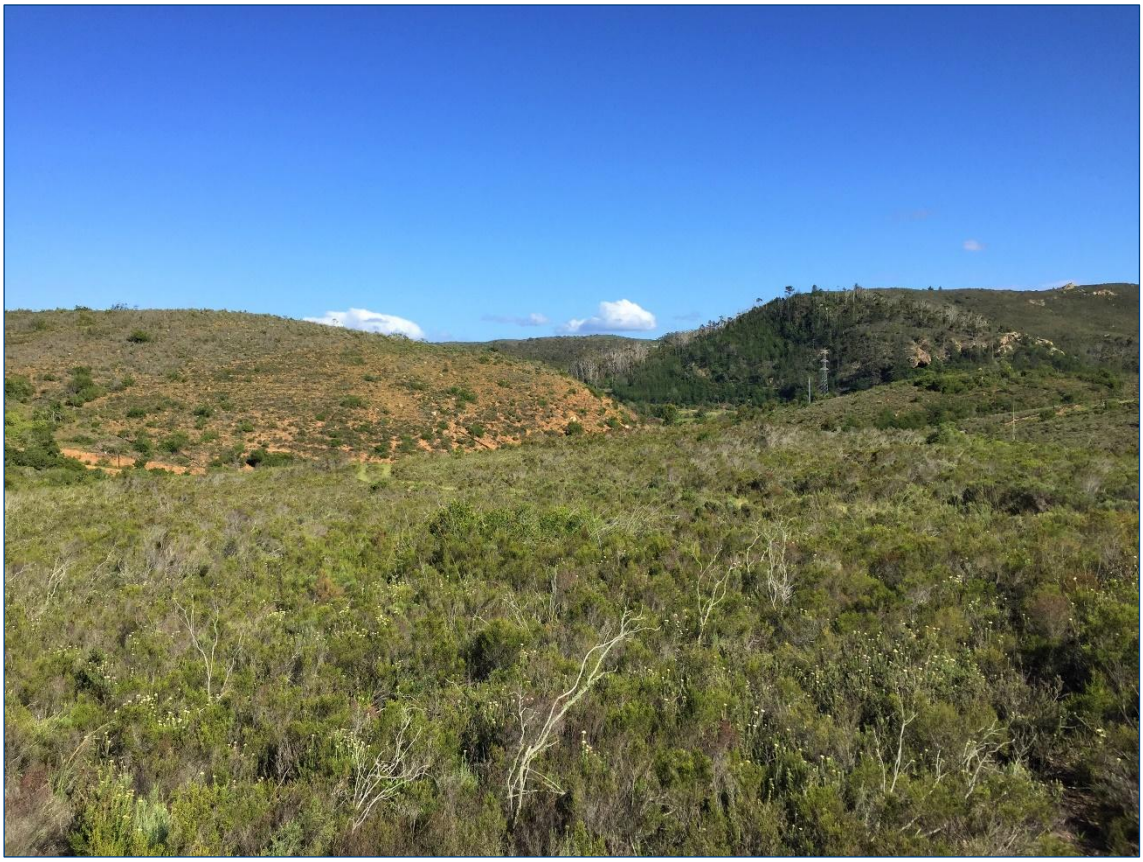

Figure 5-2: Fynbos (regrowth!) covered slope in the centre of site.

Figure 5-3: Thicket in a fire-protected kloof in the northern part of dam site.

Figure 5-4: Brush-cut pasture on the north-eastern side of dam site.

Figure 5-5: Degraded lower end of site and position of the proposed dam wall.

Figure 5-6: View from koppie eastwards across the proposed dam site.

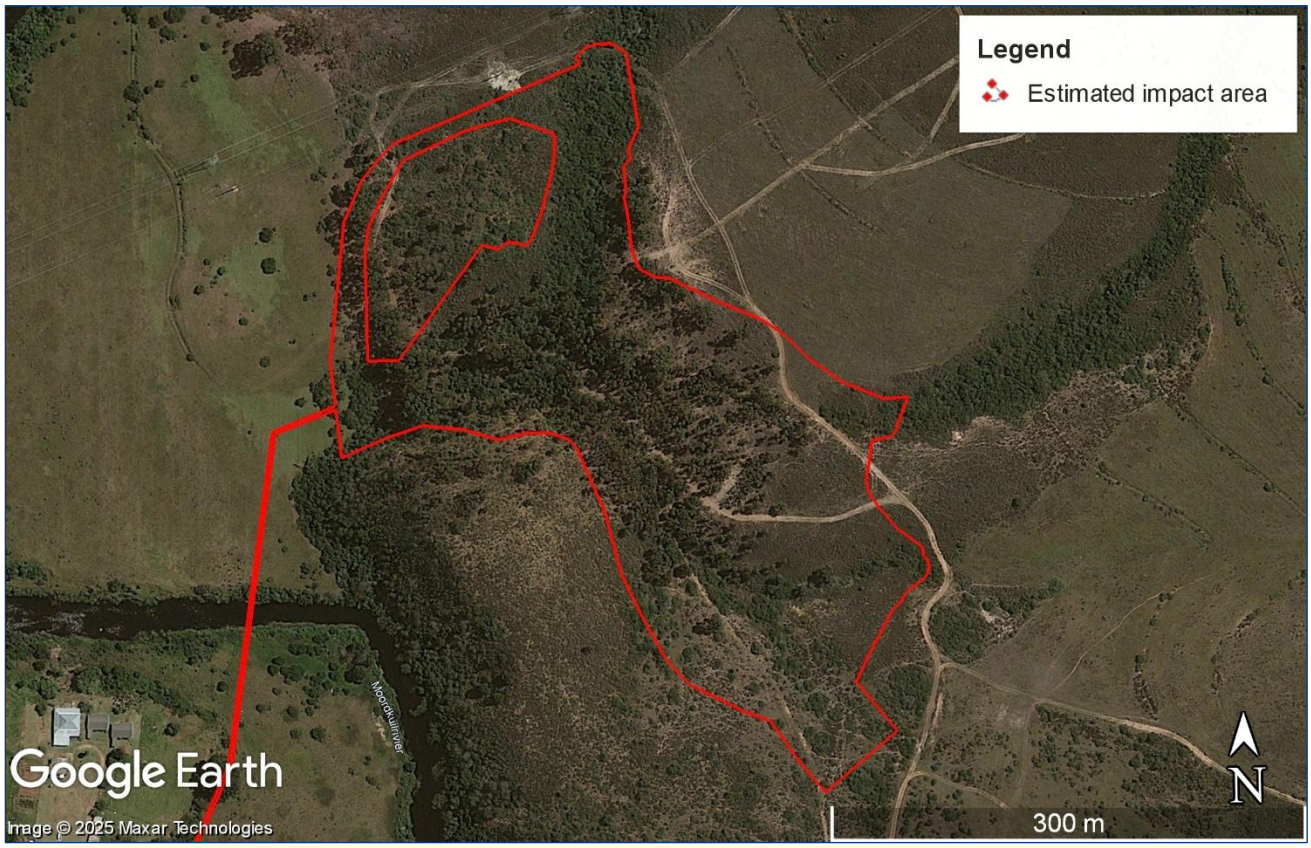

Figure 5-7: Historical 2011 Google Earth photograph illustrating past gum and black wattle infestation on the site.

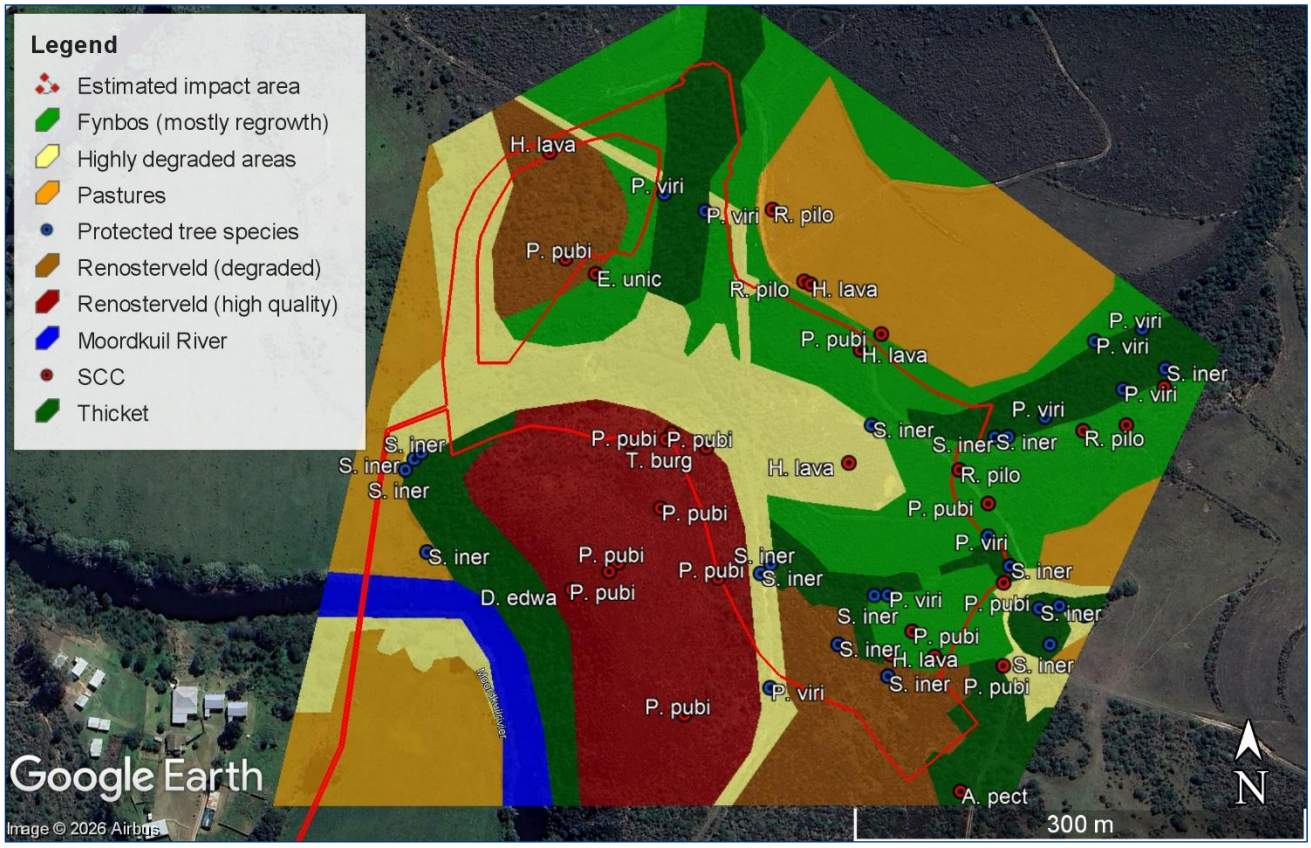

Figure 5-8: Botanical attributes of the proposed dam site.

Plant species

The following indigenous tree and shrub species were recorded on and around the proposed dam site, namely *Erica peltata, E. unicolor* ssp. *mutica, Dicerothamnus rhinocerotis, Metalasia acuta, Tarchonanthus littoralis, Athanasia trifurcata, A. pectinata, Oedera squarrosa, O. imbricata, O. pungens, O. genistifolia, Senecio rosmarinifolius, Helichrysum teretifolium, H. odoratissimum, Eriocephalus africanus, Nidorella ivifolia, Chrysocoma ciliata, Berkheya carlinoides, B. heterophylla, Osteospermum moniliferum, Pseudognaphalium undulatum, Vachellia karroo, Schotia afra, Aspalathus acuminata, A. asparagoides, Indigofera nigromontana, I. heterophylla, Rhynchosia caribaea, Searsia lucida, S. pallens, S. pterota, S. rehmanniana* var. *glabrata, Pterocelastrus tricuspidatus, Gymnosporia buxifolia, G. capitata, Mystroxylon aethiopicum, Lauridia tetragona, Buddleja saligna, Scolopia zeyheri, Pittosporum viridiflorum, Sideroxylon inerme, Azima tetracantha, Acrodon bellidiflorus, Ruschia tenella, Delosperma neethlingiae, D. litorale, Drosanthemum parvifolium, D. edwardsiae, Carpobrotus deliciosus, Trichodiadema burgeri, Anacampseros telephiastrum, Euphorbia mauritanica, Aloe ferox, Cotyledon orbiculata, Adromischus maculatus, Crassula mollis, C. perforata, C. ericoides, C. cultrata, C. capitella* ssp. *thyrsiflora, C. subulata, C. muscosa, C. biplanata, Grewia occidentalis, Abutilon sonneratianum, Anisodontea scabrosa, Hermannia lavandulifolia, H. holosericea, H. flammea, H. salviifolia, Hibiscus aethiopicus, Colpoon compressum, Polygala myrtifolia, P. pubiflora, Dodonaea viscosa, Olea europaea, Euclea undulata, E. crispa, Diospyros dichrophylla, Leonotis ocymifolia, Lobostemon echioides, Pelargonium candicans, P.*

capitatum, Phylica purpurea, Myrsine africana, Anthospermum aethiopicum, Gnidia squarrosa, Asparagus suaveolens, A. striatus, A. aethiopicus, A. mariae, Carissa bispinosa, Cussonia thyrsiflora, Agathosma ovata, Anginon swellendamense, Lycium tenue, Solanum linnaeanum, Rhoicissus digitata, Lobelia tomentosa, Monopsis unidentata, Exomis microphylla, Scabiosa columbaria, Selago cf nigrescens, Ruellia pilosa and *Barleria pungens*.

Figure 5-9: A few indigenous species recorded on site, with *Erica unicolor* ssp. *mutica* (top left), *Sideroxylon inerme* (top right), *Polygala pubiflora* (middle left), *Acrodon bellidiflorus* (middle right), *Trichodiadema burgeri* (bottom left) and *Aspalathus hirta* (bottom right).

The majority of the succulents were recorded on the koppie in the western part of the site. Hemicryptophytes and geophytes recorded include *Melinis nerviglumis, Eragrostis gummiflua, E. curvula, Digitaria cf eriantha, Cyperus textilis, Lanaria lanata, Commelina africana, Cheilanthes contracta, Hypoxis* sp, *Eriospermum pubescens, Oxalis ciliaris, Agapanthus praecox, Boophone disticha, Bonatea speciosa, Moraea polyanthos, Babiana cf fourcadei* and *Bobartia robusta*. Additional fynbos species recorded on the fynbos slope above the site, include *Achyranthemum paniculatum, Aspalathus hirta, Leucadendron salignum* and restios. The embankment of the Moordkuil River where the proposed pipeline crosses the river is covered by *Searsia rehmanniana* var. *glabrata*, *Grewia occidentalis, Leonotis leonurus, Rubus pinnatus, Pteridium aquilinum, Cyperus textilis* and *Arundo donax*. The latter is a highly invasive giant reed species. **Figure 5-9** above shows a few of the indigenous species.

Invasive aliens were recorded throughout the site especially in the lower, more disturbed parts, include *Acacia mearnsii* (black wattle, category 2), *A. cyclops* (rooikrans, 1b), *Eucalyptus* sp (gums), *Hakea sericea* (silky hakea, 1b), *Datura stramonium* (olieboom, 1b), *Ricinus communis* (caster-oil plant, 2), *Cestrum laevigatum* (inkberry, 1b), *Coleus barbatus* (woolly plectranthus, 1b), *Opuntia ficus-indica* (sweet prickly pear, 1b), *O. monacantha* (drooping prickly pear, 1b) and *Atriplex semibaccata* (Australian salt bush). The younger old lands are covered by grasses and weeds. As indicated above, nearly all are Category 1b and 2 invaders. In terms of the National Environmental Management: Biodiversity Act (NEMBA) (Act 10 of 2004) Alien and Invasive Species List (2016), category 1b invasive species require compulsory control as part of an invasive species control programme. Also, the harbouring of category 2 species, such as black wattle and caster-oil plant, is prohibited without a permit. Black wattle, which is indicative of past disturbances, is considered a serious threat to the environment and is very difficult to control. Woody aliens also present a fire risk. **Figure 5-10** shows a few of the alien species.

Species of Conservation Concern (SCC) & protected tree species

Seven SCC were recorded on and around the site, namely *Erica unicolor* ssp. *mutica* (EN), *Athanasia pectinata* (VU), *Drosanthemum edwardsiae* (DDD), *Trichodiadema burgeri* (VU), *Hermannia lavandulifolia* (VU), *Polygala pubiflora* (VU) and *Ruellia pilosa* (VU). *Polygala pubiflora* occurs sporadically throughout the site, while *Erica unicolor* ssp. *mutica*, *Hermannia lavandulifolia* and *Ruellia pilosa* are mainly found in the fynbos areas. *Athanasia pectinata*, *Drosanthemum edwardsiae* and *Trichodiadema burgeri* are restricted to the renosterveld and thicket areas. Apart from *Athanasia pectinata* and *Drosanthemum edwardsiae*, all of them are still frequently encountered in suitable habitats in the Mossel Bay area. All the other recorded species are widespread and mostly common. The site occurs in the Type habitat for *Tulista kingiana* (Endangered), *Haworthia pygmaea, H. parksiana* (Critically Endangered) and *H. retusa*. The site has, however, previously been surveyed by botanists associated with CREW and no *Tulista* or *Haworthia* species were found (Mr John Robertson pers. comm). Other SCC recorded in similar habitats in the area (some close to the site), include *Brunsvigia josephinae, Gladiolus vaginatus, Freesia fergusoniae, Holothrix pilosa* and *Watsonia aletroides*.

Figure 5-10: Alien species recorded on site, with *Acacia mearnsii* (top left), *Hakea sericea* (top right), *Opuntia monacantha* (bottom left) and *Datura stramonium* (bottom right).

Two protected tree species (in terms of the National Forests Act 84 of 1998) were recorded (mainly inside the thicket areas), namely *Sideroxylon inerme* (milkwood) and *Pittosporum viridiflorum* (kasuur). These tree species are common in the thicket and forest areas of the Garden Route, but their removal requires a permit from the Department of Forestry.

Site Ecological Importance

In order to demonstrate the biodiversity sensitivity of the site, a site ecological importance (SEI) map was prepared (**Figure 5-11**). This map considers the biodiversity importance of the receptor area and its resilience to impacts. The receptor area is described as the affected habitats (i.e. fynbos, renosterveld, thicket, Moordkuil River, highly degraded areas & pastures), which may accommodate certain SCC. Very High and High SEI values were allocated to the good quality renosterveld and degraded renosterveld, respectively. A Medium value was allocated to the fynbos (and embedded thicket) areas, while the highly degraded areas and pastures scored Low and Very Low values. These values were influenced by the size of areas in question, presence of SCC, threat status and condition of the vegetation, and connectivity with the biodiversity network. The results of the SEI analysis are presented in **Table 5-1**.

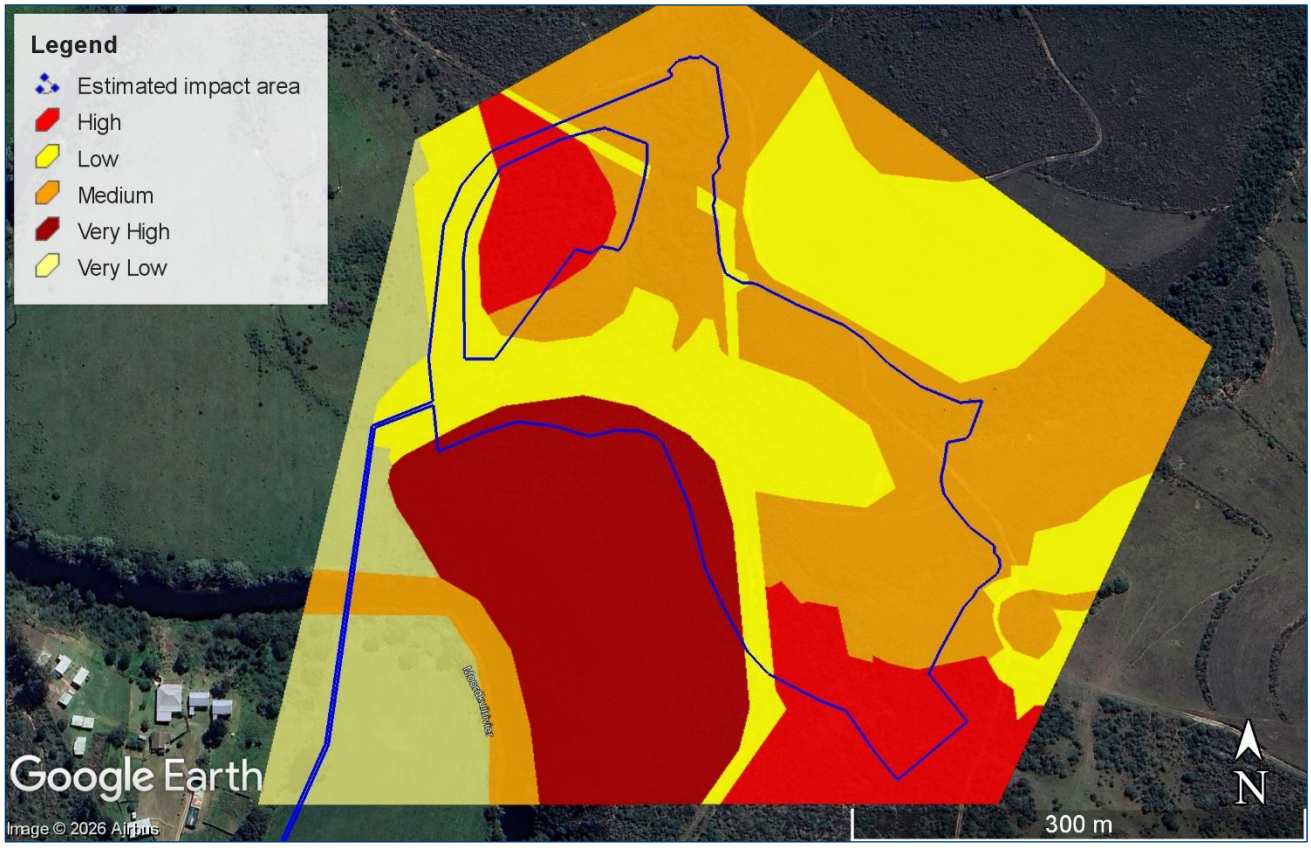

Figure 5-8: Site ecological importance (SEI) map of the proposed dam site.

Table 5-1: SEI analysis.

	CI	FI	BI	RR	SEI
High quality renosterveld & embedded thicket	Very High	High	Very High	Medium	Very High
Degraded renosterveld & embedded thicket	Very High	Medium	High	Medium	High
Fynbos & embedded thicket	High	Medium	Medium	Medium	Medium
Moordkuil River	High	High	High	High	Medium
Highly degraded areas & brush-cut pastures north & east of dam site	Low	Medium	Low	Medium	Low
Pastures	Low	Low	Low	High	Very Low

6. Potential Impacts

Terrestrial biodiversity (vegetation)

In the impact assessment, the current (preferred) alternative for the proposed dam is compared to the two previous alternatives (2024 & 2020), as well as a recent proposal which included a new farm road over the koppies on the north-western side and western sides of the dam (**Figure 6-1**). The preferred (2026) dam layout will result in the following

losses in terrestrial biodiversity:

- Good quality renosterveld = 0.47 ha
- Degraded renosterveld = 0.76 ha
- Fynbos (mostly regrowth) = 2.31 ha
- Thicket = 1.08 ha

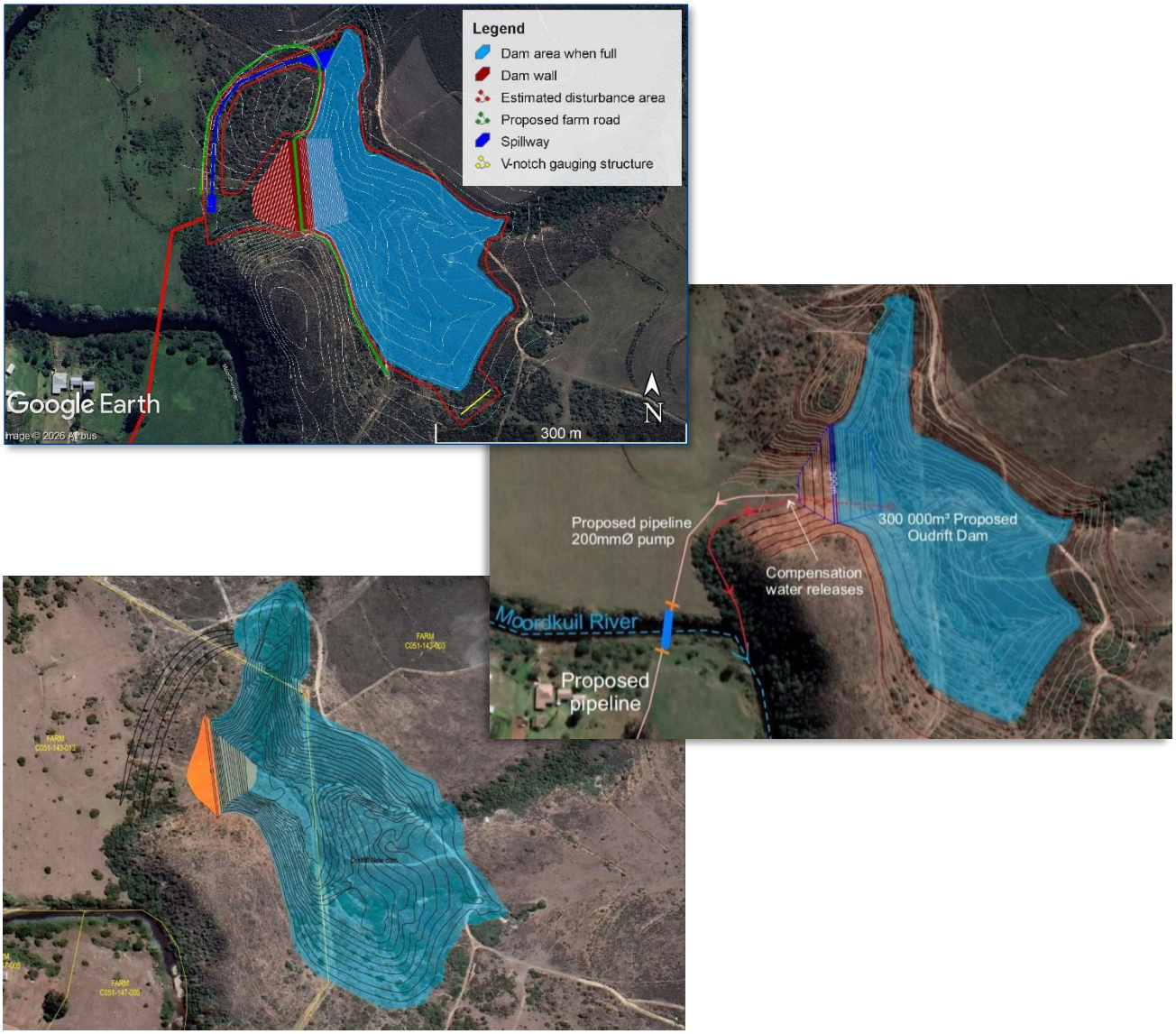

Figure 6-1: Layout alternatives for the farm dam, with the current 2026 layout (with farm road option) at the top, 2024 layout in the middle and original 2020 layout at the bottom.

Due to South Outeniqua Sandstone Fynbos still being well represented in the larger area and that regrowth will mostly be affected, the impact on fynbos is of a low to moderate concern. The impact on Mossel Bay Shale Renosterveld, on the other hand, is of a greater concern. Although not in a pristine state and degraded by past farming activities, the renosterveld it still conservation worthy. There is not a notable difference in the footprint of the dam between the 2024 and current 2026 layout. The main differences between them are the slight adjustment to the dam wall, the refinement of the spillway and the addition of infrastructure, such as the V-notch gauging structure. The difference between the 2024/2026 and 2020 layouts is more noticeable as the larger dam footprint in the

latter will result in the additional loss of 0.5 ha in good quality and degraded renosterveld, 1.0 ha in fynbos and 0.3 ha in thicket. Earthworks will involve the construction of the dam wall from material excavated from the dam site, the spillway, a two-way pipeline and a V-notch gauging structure. During this phase care must be exercised to avoid the unnecessary disturbance of the veld adjacent to the construction areas.

The new farm road, which was originally part of the 2026 layout, would result in the additional loss of 0.10 ha in good quality renosterveld and 600 m^2 in fynbos. It is the section of the road on the koppie west of the dam site which is of concern as it is positioned on a steep (1:1) slope. The resulting impact is likely to be greater than indicated above as it will involve a cut-to-fill operation. A realignment of an existing farm road on the north-eastern side of the dam was also considered as the existing road will be under water when the dam is at capacity. The position of this realignment is not certain, but it will pass through riverine thicket in a depression. The V-notch gauging structure, which is part of the latest layout, can be a berm or built wall. It is debatable which will result in the greatest impact, but the berm can potentially be planted with plant material sourced from the site. The resulting impact can then be reversed, but only if the soil for berm can be sourced from the dam and successfully established with indigenous species.

The proposed two-way pipeline runs mainly through pastures, with a short section (30 m) crossing the Moordkuil River. The embankment of the latter is covered by locally common shrubs and hemicryptophytes, some of which are invasive. As noted earlier, the passage through the river is of little botanical interest and the botanical impact will be of low significance with mitigation. The species currently present are expected to return to the embankment after construction.

As an indirect impact, earthworks during the construction of the dam wall and associated infrastructure will provide ideal conditions for the establishment of invasive alien species. The presence of aliens in the area, such as black wattle, rooikrans, gums and hakea, will exacerbate this impact. The farmer has already engaged in alien clearing. The veld on both the northern and southern sides of the Klipheuwel Dam was covered in large stands of gum and cluster pine in the past. Some black wattle and hakea were also present. About 15 years ago the alien trees and shrubs were cut down and the stumps treated with herbicide. Follow-up clearing was done in the following years. It is argued that the ability to control invasive alien species and keep this block of veld in its present condition can only be funded by agricultural activities and these require water storage.

The site is located inside a CBA corridor network that runs along the foothills of the Mossel Bay interior and connects with Outeniquas (Doringrivier Wilderness Area & Ruitersbos Nature Reserve) to the north. Apart from providing a backbone to the local biodiversity network, the corridor(s) serves as an important passage along which fauna can migrate between the mountain and the foothills and along the foothills itself. With the proposed dam located close to the southern edge of the corridor one can expect a moderate impact on its functionality. The only practical mitigation measures would be to rehabilitate the areas disturbed during the construction phase, encourage the establish of indigenous vegetation in previously disturbed areas (e.g. fallow land), and to continue

with the control of invasive aliens. **Table 6-1** summarises the impact on terrestrial biodiversity. There is no difference in the significance ratings between the layout options.

Table 6-1: Impact on terrestrial biodiversity.

Phase	Construction Phase	Operational Phase
Nature of impact(s)	2026 layout (preferred): - Clearing of 0.47 ha of good quality renosterveld. - Clearing of 0.76 ha of degraded renosterveld. - Clearing of 2.31 ha of fynbos. - Clearing of 1.08 ha of thicket. 2026 layout with new farm road: - An additional loss of 0.10 ha in good quality renosterveld and 600 m^2 in fynbos. 2020 layout: - Clearing of 0.7 ha of good quality renosterveld. - Clearing of 1.0 ha of degraded renosterveld. - Clearing of 3.2 ha of fynbos. - Clearing of 1.3 ha of thicket. In addition to the above: - Impact on the functionality of biodiversity network. - Increased opportunity for alien infestation.	- Increased alien infestation. - Erosion due to poor rehabilitation efforts and increased runoff.
Extent of impact	Proposed dam site & immediate surroundings	Proposed dam site & immediate surroundings
Duration	Permanent	Long term
Intensity	Medium	Low
Probability of occurrence	High	Medium
Degree of reversibility	Low-medium	High
Irreplaceability of resource	Medium	Medium-low
Mitigatory potential	Medium	High
Significance before mitigation	Medium-high	Medium-low
Significance after mitigation	Medium-low	Low

Plant species

The impact on plant species, including SCC and protected tree species, is also expected to be of medium-high significance, prior to mitigation. This is due to the presence of at

least seven SCC on and around the dam site, namely *Erica unicolor* ssp. *mutica* (EN), *Athanasia pectinata* (VU), *Drosanthemum edwardsiae* (DDD), *Trichodiadema burgeri* (VU), *Hermannia lavandulifolia* (VU), *Polygala pubiflora* (VU) and *Ruellia pilosa* (VU). Four of these species will be directly impacted by the project. Fortunately, all the affected species are also well represented in the veld outside the dam footprint and in suitable habitats elsewhere in the Mossel Bay area. *D. edwardsiae* should be safe from construction activities as it is habitat specific and was only recorded on the upper western slope of the koppie west of the dam site. **Table 6-2** summarises the impact on plant species. Although there is no difference in the significance ratings between the options, the 2026 layout presents the lowest impact on SCC and protected tree species.

Table 6-2: Impact of the project on flora, SCC & protected tree species.

Phase	Construction Phase	Operational Phase
Nature of impact(s)	Loss of indigenous flora, SCC & protected tree species. 2026 layout (preferred): - At least four SCC, seven milkwoods and four kasuur's directly impacted. 2026 layout with new farm road: - A greater impact on the *Trichodiadema burgeri* subpopulation, which is restricted to the koppie west of the dam site. 2020 layout: - At least five SCC, 11 milkwoods and six kasuur's directly impacted. Loss of a greater number of SCC and encroachment on a single record of *Athanasia pectinata* southeast of the dam site.	Alien infestation & resulting displacement of indigenous flora.
Extent of impact	Proposed dam site & immediate surroundings	Proposed dam site & immediate surroundings
Duration	Permanent	Long term
Intensity	Medium	Low
Probability of occurrence	High	Medium
Degree of reversibility	Low-medium	High
Irreplaceability of resource	Medium	Medium-low
Mitigatory potential	Medium	High
Significance before mitigation	Medium-high	Medium-low
Significance after mitigation	Medium-low	Low

Two protected tree species are also present on the site, namely *Sideroxylon inerme* and *Pittosporum viridiflorum*. They are mainly found inside the thicket patches. Despite being protected, both are still frequently encountered in the Mossel Bay area. Given their habitat preferences and known iNaturalist records, the probability of SCC listed in the Screening Report to occur on site is indicated in **Annexure 1**. To mitigate the impact, consideration could be given to search and rescue of suitable species (e.g. bulbs & succulents) in the affected area for use in the rehabilitation of disturbed areas after construction, as well as degraded areas elsewhere on the farm. Of course, any replanting of rescued plant material must be done in matching habitats from which the plants originate.

Cumulative impact & 'no-go' alternative

The cumulative impact of the project on terrestrial biodiversity is expected to be small given the degraded state of a large part of the site and the relatively large areas of Mossel Bay Shale Renosterveld (32927 ha) and South Outeniqua Sandstone Fynbos (105272 ha) still left.

In the case of the dam not being built ('no-go' alternative), the current situation will remain unchanged. The highly degraded areas are also unlikely to recover with continued farming (grazing) activities and alien infestation. However, the farmer is obliged to continue with alien control. There will also be no financial incentive for the rehabilitation of degraded areas on and around the dam site.

7. Recommended Mitigation Measures

The following mitigation measures are recommended to ensure that the impact on terrestrial biodiversity and plant species is minimised during the **construction phase**:

- Fence off the construction area(s). The renosterveld, fynbos and thicket outside the construction area(s) must be declared as 'no-go' areas and not be disturbed in any way. Restrict all construction activities, such as stockpiling, parking and office infrastructure, to already disturbed or highly degraded areas. The contractor(s) must be made aware of the sensitive surroundings.
- Search & Rescue (S&R) succulents and bulbs from the construction area(s) for replanting in identified rehabilitation areas after construction. Topsoil and seedbearing plant material can also be salvaged from the area to be flooded for this purpose. Bulbs should be removed along with some soil, placed in gel, bagged and then taken to a nursery for temporary storage or transplanted directly in the receiving area. S&R should be done at an appropriate time of the year, preferably when the soil is wet during the raining season. Ideally, bulbs should be salvaged during leaf fall, but before or after flowering. Please note that a CapeNature permit is needed for the relocation of indigenous plant species.

- It is recommended that the V-notch gauging structure be constructed as a berm and not as a brick wall. Soil for berm can be sourced from the dam. Furthermore, indigenous plant species also sourced from the dam must be planted on the berm.
- All disturbed areas outside the dam footprint must be rehabilitated. This includes areas along the spillway, the two-way pipeline and around the V-notch gauging structure. The constructed dam wall may also need stabilisation with plants to prevent erosion. Locally indigenous plant species should be used for this purpose.
- Allow at least 24 months for the monitoring of rehabilitation success and alien infestation around the dam site post construction.
- The mitigation measures listed above should suffice to prevent the need for a biodiversity offset. In addition, it is recommended that the degraded renosterveld be protected from further farming-related disturbances and grazing pressures. This can be achieved by erecting fences around the affected areas, which will allow the areas to recover.

Mitigation measures recommended for the **operational phase**:

- Monitor the dam wall and adjacent areas for erosion. Where needed, rehabilitate/revegetate disturbed surfaces. Erosion prevention measures may be needed on steep slopes, such as silt fences, logs or netting, to slow down runoff and potential erosion. Mulching and seeding with indigenous fynbos/renosterveld seed may also be needed.
- As a long-term maintenance requirement, continue with alien clearing on the farm, focussing on invasive species such as black wattle, rooikrans and silky hakea. These species are category 1b and 2 invaders that require compulsory control as part of an invasive species control programme. Please note that it is a legal requirement for landowners to clear alien vegetation on their land.

8. Conclusion & Recommendation

This report sets out the results from a desktop study, as well as field surveys conducted on 21 and 22 March 2020, and 27 November 2025, to ascertain terrestrial biodiversity and plant species constraints and possible impacts associated with the construction of a farm dam on Portions 3 and 13 of Farm Klipheuvel 143, northeast of Mossel Bay.

The site proposed for the dam lies on the boundary between South Outeniqua Sandstone Fynbos and Mossel Bay Shale Renosterveld. The latter is the most threatened vegetation type found here and is currently listed as Critically Endangered. South Outeniqua Sandstone Fynbos, on the other hand, is still well represented and protected. The site also encroaches on the biodiversity network (CBA corridor). At least four known threatened species (*Erica unicolor* ssp. *mutica, Trichodiadema burgeri, Hermannia lavandulifolia* & *Polygala pubiflora*) and two protected tree species (*Sideroxylon inerme* & *Pittosporum viridiflorum*) will be affected by the project. Given the degraded state of a large part of the site, the impact on terrestrial biodiversity and plant species is of medium-low significance,

with mitigation. Agricultural activities and alien infestation have contributed to the degradation of the site. However, it still accommodates significant renosterveld and fynbos elements with good rehabilitation potential. With mitigation, the impact can be lowered to an acceptable level without the need for a biodiversity offset. Furthermore, the preferred (2026) layout presents the smallest footprint and lower impact than the previous layouts.

It is therefore recommended that the preferred layout (without the new farm road option) be approved, subject to the proposed mitigation measures.

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Annexure 1: Threatened plant species as listed in Screening Report (species in bold were recorded on site)

Sensitivity	Feature(s)	Probability of presence
Medium	*Lampranthus pauciflorus*	Low
Medium	*Lebeckia gracilis*	Low
Medium	*Freesia fergusoniae*	Medium
Medium	Sensitive species 700	Medium
Medium	***Erica unicolor* ssp. *mutica***	Recorded on site
Medium	*Erica glandulosa* ssp. *fourcadei*	Low
Medium	***Hermannia lavandulifolia***	Recorded on site
Medium	Sensitive species 633	Medium
Medium	Sensitive species 268	Medium
Medium	Sensitive species 1024	Low-medium
Medium	*Euchaetis albertiniana*	Low
Medium	*Muraltia knysnaensis*	Low
Medium	Sensitive species 516	Medium-high (recorded nearby)
Medium	Sensitive species 800	Medium-high (recorded nearby)
Medium	Sensitive species 500	Low
Medium	*Pachites bodkinii*	Low
Medium	*Diosma passerinoides*	Low-medium
Medium	*Agathosma microcarpa*	Medium

Annexure 2: Site Ecological Importance

Site Ecological Importance (SEI) is considered to be a function of the biodiversity importance (BI) of the receptor (e.g. SCC, the vegetation community or habitat type present on site) and its resilience to impacts (receptor resilience or RR) as follows:

SEI = BI + RR

BI in turn is a function of conservation importance (CI) and the functional integrity (FI) of the receptor as follows:

BI = CI + FI

Conservation importance (CI) is evaluated in accordance with recognised established internationally principles and criteria for the determination of biodiversity-related value, including the IUCN Red List of Species, Red List of Ecosystems and key biodiversity areas. CI is defined here as: "The importance of a site for supporting biodiversity features of conservation concern present, e.g. populations of SCC (CR, EN, VU & NT), Rare species, range-restricted species, and areas of threatened ecosystem types, through mainly natural processes". Fulfilling criteria to evaluate CI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation, providing a more robust evaluation of CI (Table 1).

Table 1: Conservation importance (CI) criteria.

CI	Criteria
Very high	Confirmed or highly likely occurrence of CR, EN, VU or Extremely Rare or Critically Rare species that have a global EOO of <10 km^2. Any area of natural habitat of a CR ecosystem type or large area (>0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type.
High	Confirmed or highly likely occurrence of CR, EN and VU species that have a global EOO of >10 km^2. IUCN threatened species (CR, EN & VU) must be listed under any criterion other than A. If listed as threatened only under Criterion A, include if there are less than 10 locations or <10 000 mature individuals remaining. Small area (>0.01% but <0.1% of the total ecosystem type extent) of natural habitat of EN ecosystem type or large area (>0.1%) of natural habitat of VU ecosystem type. Presence of Rare species.
Medium	Confirmed or highly likely occurrence of populations of NT species, threatened species (CR, EN & VU) listed under Criterion A only and which have more than 10 locations or more than 10 000 mature individuals. Any area of natural habitat of threatened ecosystem type with status of VU. Presence of range-restricted species.
Low	>50% of receptor contains natural habitat with potential to support SCC. No confirmed or highly likely populations of SCC. No confirmed or highly likely populations of range-restricted species.

CI	Criteria
	<50% of receptor contains natural habitat with limited potential to support SCC.
Very low	No confirmed and highly unlikely populations of SCC. No confirmed and highly unlikely populations of range-restricted species. No natural habitat remaining.

Functional integrity (FI) of the receptor (e.g. the vegetation community or habitat type) is defined here as the receptors' current ability to maintain the structure and functions that define it, compared to its known or predicted state under ideal conditions. Ecological processes can be considered to be mostly intact and functional if the receptor area has low levels of current ecological disruptors, has good connectivity to other areas and is a relatively large area. As for CI, the fulfilling criteria to evaluate FI do not rely on a single specific threshold for each of the above defining characteristics but can act in combination or in isolation (Table 2).

Table 2: Functional integrity (FI) criteria.

FI	Criteria
Very high	Very large (>100 ha) intact area for any conservation status of ecosystem type or >5 ha for CR ecosystem types. High habitat connectivity serving as functional ecological corridors, limited road network between intact habitat patches. No or minimal current negative ecological impacts with no signs of major past disturbance (e.g. ploughing).
High	Large (>20 ha but <100 ha) intact area for any conservation status of ecosystem type or >10 ha for EN ecosystem types. Good habitat connectivity with potentially functional ecological corridors and a regularly used road network between intact habitat patches. Only minor current negative ecological impacts (e.g. few livestock utilising area) with no signs of major past disturbance (e.g. ploughing) and good rehabilitation potential.
Medium	Medium (>5 ha but <20 ha) semi-intact area for any conservation status of ecosystem type or >20 ha for VU ecosystem types. Only narrow corridors of good habitat connectivity or larger areas of poor habitat connectivity and a busy used road network between intact habitat patches. Mostly minor current negative ecological impacts with some major impacts (e.g. established population of alien and invasive flora) and a few signs of minor past disturbance. Moderate rehabilitation potential.
Low	Small (>1 ha but <5 ha) area. Almost no habitat connectivity but migrations still possible across some modified or degraded natural habitat and a very busy used road network surrounds the area. Low rehabilitation potential. Several minor and major current negative ecological impacts.
Very low	Very small (<1 ha) area. No habitat connectivity except for flora with wind-dispersed seeds. Several major current negative ecological impacts

Recalling that biodiversity importance (BI) is a function of conservation importance (CI) and the functional integrity (FI) of a receptor, BI can be derived from a simple matrix of CI and FI as follows:

Biodiversity importance		**Conservation importance**				
		Very high	High	Medium	Low	Very low
Functional integrity	Very high	Very high	Very high	High	Medium	Low
	High	Very high	High	Medium	Medium	Low
	Medium	High	Medium	Medium	Low	Very low
	Low	Medium	Medium	Low	Low	Very low
	Very low	Medium	Low	Very low	Very low	Very low

Receptor resilience (RR) is defined here as: "The intrinsic capacity of the receptor to resist major damage from disturbance and/or to recover to its original state with limited or no human intervention." The fulfilling criteria to evaluate RR are based on the estimated recovery time required to restore an appreciable portion of functionality to the receptor (Table 3) and will require justification by the specialist.

Table 3: Receptor resilience (RR) criteria.

RR	Criteria
Very high	Habitat that can recover rapidly (<5 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a very high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a very high likelihood of returning to a site once the disturbance or impact has been removed.
High	Habitat that can recover relatively quickly (5-10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a high likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a high likelihood of returning to a site once the disturbance or impact has been removed.
Medium	Will recover slowly (>10 years) to restore >75% of the original species composition and functionality of the receptor functionality, or species that have a moderate likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a moderate likelihood of returning to a site once the disturbance or impact has been removed.
Low	Habitat that is unlikely to be able to recover fully after a relatively long period: >15 years required to restore ~ less than 50% of the original species composition and functionality of the receptor functionality, or species that have a low likelihood of remaining at a site even when a disturbance or impact is occurring, or species that have a low likelihood of returning to a site once the disturbance or impact has been removed.
Very low	Habitat that is unable to recover from major impacts, or species that are unlikely to remain at a site even when a disturbance or impact is occurring, or species that are unlikely to return to a site once the disturbance or impact has been removed.

Finally, after the successful evaluation of both BI and RR as described above, it is possible to evaluate the **site ecological importance (SEI)** from the final matrix as follows:

Site ecological importance		Biodiversity importance				
		Very high	High	Medium	Low	Very low
Receptor resilience	Very low	Very high	Very high	High	Medium	Low
	Low	Very high	Very high	High	Medium	Very low
	Medium	Very high	High	Medium	Low	Very low
	High	High	Medium	Low	Very low	Very low
	Very high	Medium	Low	Very low	Very low	Very low

Table 4: Guidelines for interpreting SEI in the context of the proposed development activities.

SEI	Interpretation in relation to proposed development activities
Very high	Avoidance mitigation - no destructive development activities should be considered. Offset mitigation not acceptable/not possible (i.e. last remaining populations of species, last remaining good condition patches of ecosystems/unique species assemblages). Destructive impacts for species/ecosystems where persistence target remains.
High	Avoidance mitigation wherever possible. Minimisation mitigation - changes to project infrastructure design to limit the amount of habitat impacted; limited development activities of low impact acceptable. Offset mitigation may be required for high impact activities.
Medium	Minimisation and restoration mitigation - development activities of medium impact acceptable followed by appropriate restoration activities.
Low	Minimisation and restoration mitigation - development activities of medium to high impact acceptable followed by appropriate restoration activities.
Very low	Minimisation mitigation - development activities of medium to high impact acceptable and restoration activities may not be required.

Annexure 3: Impact Assessment Methodology

Each issue that is identified consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project. In the EIA the significance of the potential impacts is considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term.

A description of the nature of the impact, any specific legal requirements and the stage (construction/decommissioning or operation) were given. The following criteria will be used to evaluate the significance of each issue that was identified:

Nature: This is an appraisal of the type of effect the activity is likely to have on the affected environment. The description includes what is being affected and how. The nature of the impact will be classified as positive or negative, and direct or indirect.

- **Extent and location**: This indicates the spatial area that may be affected (**Table 1**).

Table 1: Geographical extent of impact

Rating	Extent	Description
1	Site	Impacted area is only at the site – the actual extent of the activity.
2	Local	Impacted area is limited to the site and its immediate surrounding area
3	Regional	Impacted area extends to the surrounding area, the immediate and the neighbouring properties.
4	Provincial	Impact considered of provincial importance
5	National	Impact considered of national importance – will affect entire country.

- **Duration**: This measures the lifetime of the impact (**Table 2**).

Table 2: Duration of Impact

Rating	Duration	Description
1	Short term	0–3 years, or length of construction period
2	Medium term	3–10 years
3	Long term	>10 years, or entire operational life of project.
4	Permanent – mitigated	Mitigation measures of natural process will reduce impact – impact will remain after operational life of project.
5	Permanent – No mitigation	No mitigation measures of natural process will reduce the impact after implementation – impact will remain after operational life of project.

- **Intensity/severity**: This is the degree to which the project affects or changes the environment; it includes a measure of the reversibility of impacts (**Table 3**).

Table 3: Intensity of Impact

Rating	Intensity	Description
1	Negligible	Change is slight, often not noticeable, natural functioning of environment not affected.
2	Low	Natural functioning of environment is minimally affected. Natural processes can be reversed to their original state.
3	Medium	Environment remarkably altered, still functions, if in modified way. Negative impacts cannot be fully reversed.
4	High	Natural functions and processes disturbed – potentially ceasing to function temporarily.
5	Very high	Natural functions and processes permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. Negative impacts cannot be reversed.

- **Potential for irreplaceable loss of resources**: This is the degree to which the projectwill cause loss of resources that are irreplaceable (**Table 4**).

Table 4: Potential for irreplaceable loss of resources.

Rating	Potential for irreplaceable loss	Description
1	Low	No irreplaceable natural resources will be impacted.
3	Medium	Natural resources can be replaced, with effort.
5	High	There is no potential for replacing a particular vulnerable resource that will be impacted.

- **Probability**: This is the likelihood or the chances that the impact will occur (**Table 5**).

Table 5: Probability of Impact

Rating	Probability	Description
1	Improbable	Under normal conditions, no impacts expected.
2	Low	The probability of the impact to occur is low due to its design or historic experience.
3	Medium	There is a distinct probability of the impact occurring.
4	High	It is most likely that the impact will occur.
5	Definite	The impact will occur regardless of any prevention measures.

- **Confidence**: This is the level of knowledge or information available, the specialist had in his/her judgement (**Table 6**).

Table 6: Confidence in level of knowledge or information

Rating	Confidence	Description
	Low	Judgement based on intuition, not knowledge/information.
	Medium	Common sense and general knowledge inform decision.
	High	Scientific/proven information informs decision.

- **Consequence**: This is calculated as extent + duration + intensity + potential impact on irreplaceable resources.

- **Significance**: The significance will be rated by combining the consequence of the impact and the probability of occurrence (i.e. consequence x probability = significance). The maximum value which can be obtained is 100 significance points (**Table 7**).

Table 7: Significance of issues (based on parameters)

Rating	Significance	Description
1-14	Very low	No action required.
15-29	Low	Impacts are within the acceptable range.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.
45-59	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.
60-80	High	Impacts are of great importance, mitigation is crucial.
81-100	Very high	Impacts are unacceptable.

- **Cumulative Impacts**: This refers to the combined, incremental effects of the impact. The possible cumulative impacts will also be considered.