ANNEXURE 21: WATER SCARCITY, CONSERVATION AND WATER DEMAND MANAGEMENT PLAN

WATER SCARCITY, CONSERVATION AND DEMAND MANAGEMENT PLAN FOR THE CAPE WINELANDS AIRPORT

Date: June 2026

Revision: Revision 1

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LIST OF ACRONYMS

AADD	Annual Average Daily Demand
AMR	Automated Meter Reading
BOCMA	Breede Olifants Catchment Management Agency
CMA	Catchment Management Agency
CMS	Catchment Management Strategy
CoCT	City of Cape Town
CWA	Cape Winelands Airport
DWS	Department of Water and Sanitation
IRP	Integrated Resource Planning
KPI's	Key Performance Indicators
Kl/month	Kiloliters per month
l/s	Liters per second
m^3/a	Cubic metres per annum
m^3/month	Cubic meters per month
m^3/s	Cubic meters per second
NEMA	National Environmental Management Act
NRW	Non-Revenue Water
NWA	National Water Act
NWRS	National Water Resource Strategy
MIS	Management Information System
UaW	Unaccounted for Water
WC	Water Conservation
WDM	Water Demand Management
WSI	Water Services Intermediary
WUL	Water Use Licence

WWTW Wastewater Treatment Works

KEY TERMS

Consumptive water use: The total water volume used within a development activity and which is permanently removed from its local source and not returned to the immediate water environment.

Demand-side management: Any measures or initiatives that will result in the reduction in the expected water usage or water demand.

Inefficient use of water: The waste, mismanagement, or excessive consumption of water resources where the same purpose or output could be achieved with less water.

Non-consumptive water use: Water that is utilised in open processes that generate wastewater and which can be recycled or discharged back into the water cycle for use by other users.

Potable water: Water as defined by SANS 241 as water with certain quality parameter limits that allows for the safe consumption by human beings.

Reticulation management: Any function relating to the management, maintenance and operation of any system of structures, pipes, valves, pumps, meters or other associated equipment, including all mains, connection pipes and water installations that are used or intended to be used in connection with the supply of water

Retrofitting: The modification, adaptation, or replacement of an existing device, fitting or appliance.

Supply-side management: Any measure or initiative that will increase the capacity of a water resource or water supply system to provide water.

Unaccounted for water: The difference between the measured volume of water put into the supply and reticulation system and the total volume of water consumed.

Water Conservation: The practice of using water efficiently, reducing waste, and managing water resources sustainably to ensure long-term availability for human and environmental needs.

Water Demand Management: The adaptation and implementation of a strategy by water institutions or consumers to influence the water demand and usage of water in order to meet any of the following objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services and political acceptability.

Water Demand: The total volume of water required to meet the needs of a development, community or ecosystem within a specific timeframe, including domestic, commercial, industrial, and public uses.

Water Scarcity: The lack of sufficient available freshwater and / or groundwater resources to meet the water demands within a region.

Water Services Intermediary Agreement: A formal agreement with the CoCT allowing private landowners, developers, or organizations to supply water or sanitation services to others—such as tenants or residents—where this service is incidental to their main business.

Water Supply: The available volume, means, or process of supplying water for a predetermined purpose, including the required infrastructure.

Water Wastage: Water lost through leaks or excessive water usage, which does not result in any direct benefit to a consumer or an user.

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1. INTRODUCTION AND BACKGROUND

1.1. Purpose and Scope

The proposed Cape Winelands Airport (CWA) development is located approximately 10.5km northeast of Durbanville, on the R312 and approximately 6km North of Joostenberg Vlakte, on the R304 (Figure 1). The landowner, Capewinelands Aero (Pty) Ltd, proposes the phased expansion and upgrade of the existing airport from a general flying airfield to a commercial airport capable of facilitating long-haul, wide body flights by airlines and unscheduled operators from across the world.

The CWA is proposed on Portion 23 of Farm 724, RE of Farm 724, Portion 10 of Farm 724, Portion 4 of Farm 474, Portion 11 of Farm 474, and Portion 7 of Farm 942, creating a combined area of 885ha (Figure 2). Of this area, approximately 421ha will be allocated for airport development, including an airside precinct, terminal precinct, services precinct and general aviation precinct (Figure 3). The remaining approximately 464ha will be retained as an agricultural precinct, incorporating dryland agricultural areas, conservation of botanically sensitive habitats, existing access roads, and wetland offset areas (Figure 3).



Figure 1: Regional location of current CWA indicated by yellow pin (PHS Consulting, 2026)

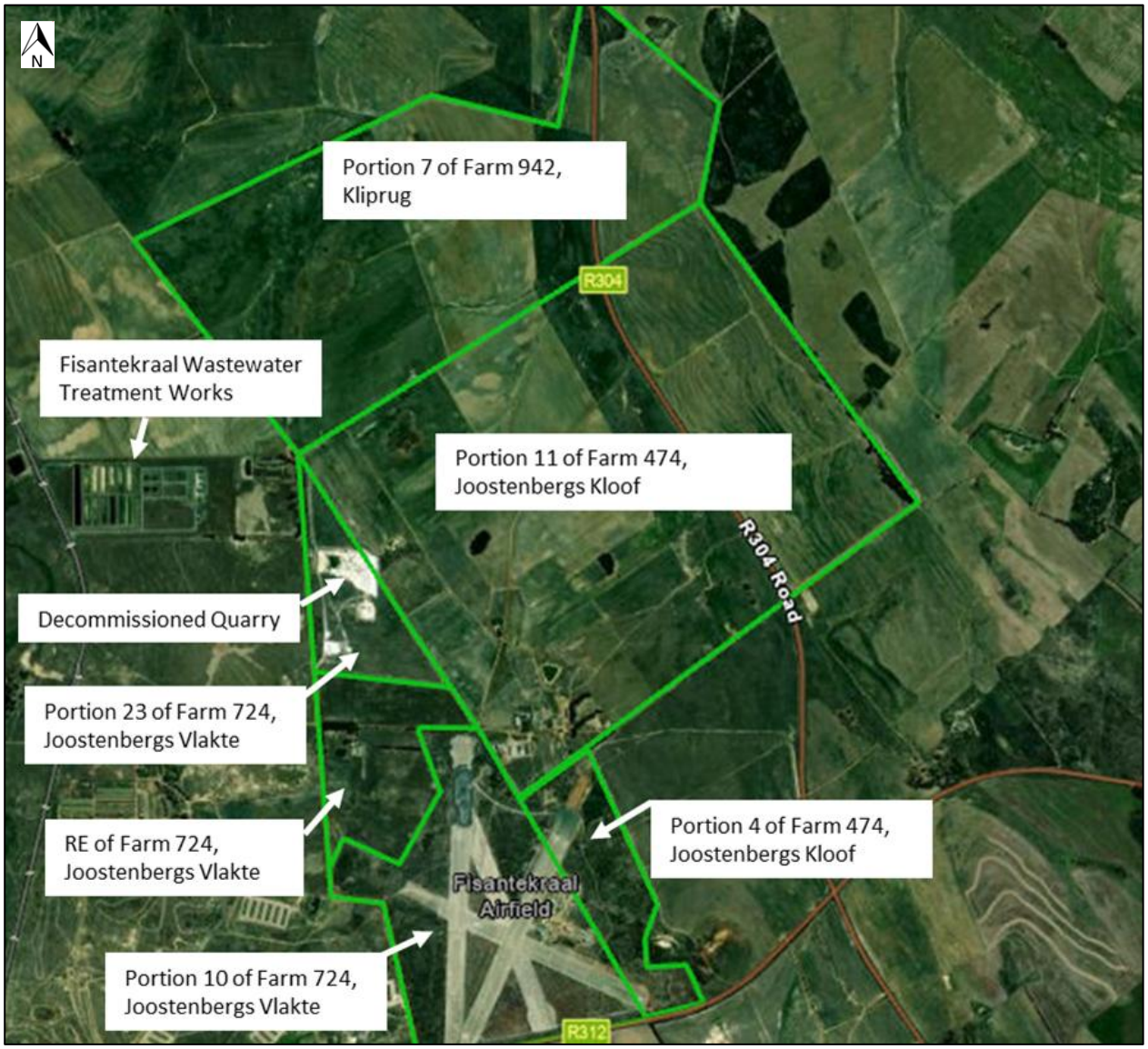


Figure 2: Cadastrals forming part of the CWA area indicated in green outline (PHS Consulting, February 2024)

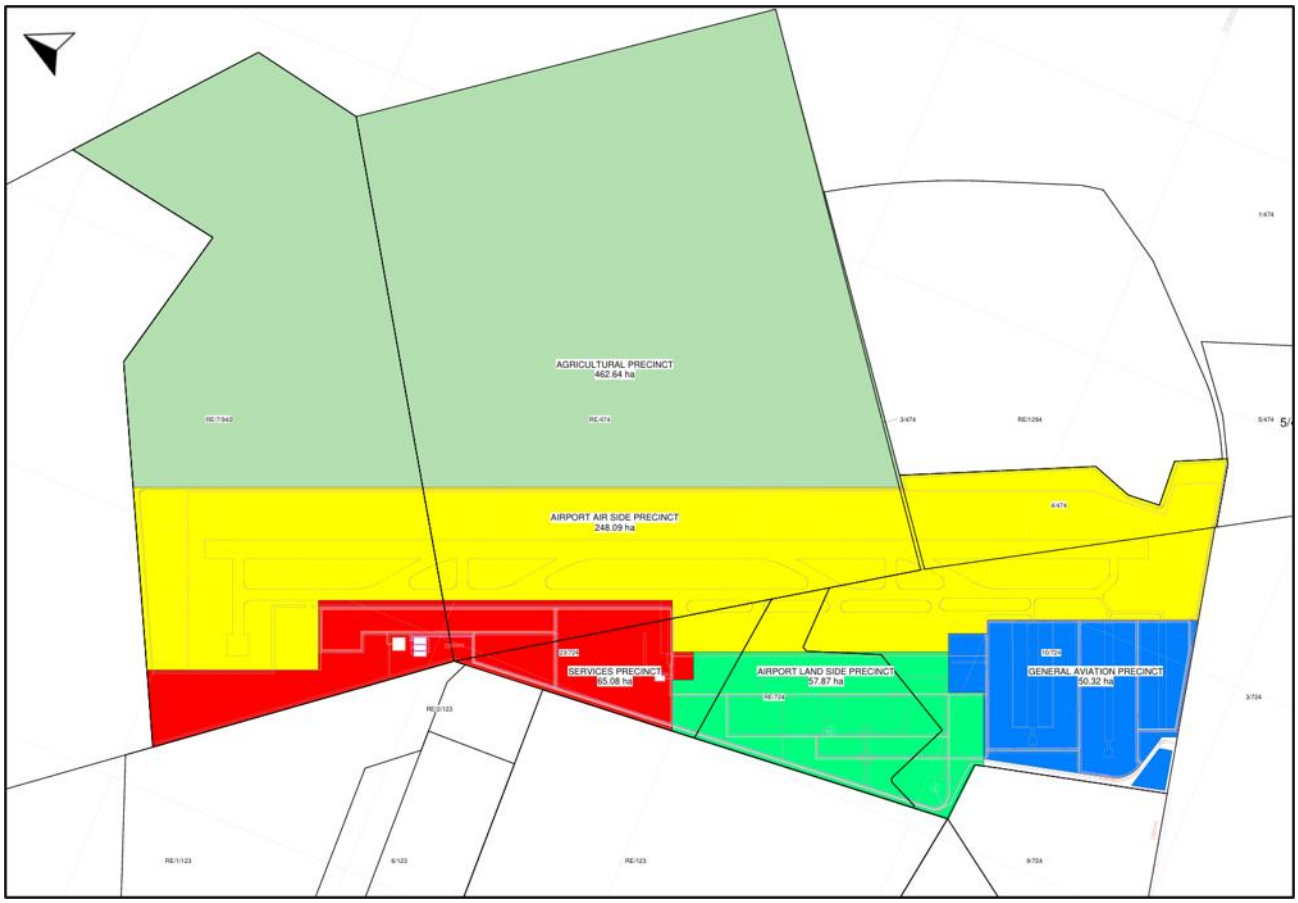


Figure 3: Proposed development area shown in relation to precincts and approximate sizes (Capewinelands Aero (Pty) Ltd, March 2025). The agricultural precinct is shown in green airside precinct in yellow, services precinct in red, landside precinct in green and general aviation precinct in blue.

Water resources are under increasing pressure globally, with water security emerging as a critical challenge driven by rising demand, rapid urbanisation, climate change and competing sectoral needs. In semi-arid regions such as South Africa, where water resources are unevenly distributed and inherently scarce, the efficient and responsible management of water is essential to ensure long-term environmental, social, and economic sustainability. Within this context, developments of significant scale such as the proposed CWA must incorporate appropriate water conservation and demand management measures to ensure that water use is optimised and aligned with sustainability principles.

As part of its Sustainability Strategy, CWA has adopted the vision of becoming “one of the greenest airports in the world.” To support this vision, five Strategic Pillars have been identified and aligned with eight thematic goals and associated certification approaches. Water is identified as a key pillar, with the objective of achieving zero net municipal water extraction by 2042 through a fully circular water cycle based on harvesting, treatment and reuse.

In line with this objective, Thematic Goal 3 within the CWA Sustainability Strategy aims for the airport to operate independently of municipal water supply infrastructure, recognising that reliance on external water resources presents a strategic risk for a development of this scale. CWA therefore commits to a resilient and

sustainable water management approach centred on long-term water security and circular water use principles.

Due to the nature and scale of the proposed development, and its potential impact on water resources and the environment, the project was required to obtain regulatory approvals in terms of the National Water Act, 1998 (Act No. 36 of 1998) and the National Environmental Management Act, 1998 (Act No. 107 of 1998). A Water Use Licence Application (WULA) was undertaken to authorise relevant water uses, while an Environmental Impact Assessment (EIA) process was completed to obtain Environmental Authorisation (EA) for the specific listed activities in terms of NEMA. The resultant authorisations include specific conditions requiring the development and implementation of water conservation and water demand management measures.

Key conditions relevant to this plan include:

- **Water Use Licence Authorisation (WULA)**
  [LICENCE NO: 01/G21E/ABCEGI/17483 dated 18 December 2025]
    - The licensee must develop and submit a Water Conservation and Water Demand Management (WSC/WDM) Plan to the Provincial Head/CEO within one (1) year from the date of issuance of the licence. The WSC/WDM Plan must:
        - quantify the water use efficiency of the activity;
        - contain industrial water management and water loss strategies and programmes;
        - set annual targets to improve water use efficiency for the industrial activity, beneficiation, and water disposal practices; and
        - stipulate the measures that will be implemented to achieve these targets.
    - The licensee must report annually on the implementation of the WSC/WDM Plan, including retrofitting of water-efficient technologies and devices, reduction of total water demand, and improvements in water use efficiency benchmarks and targets.
    - The WSC/WDM Plan must be reviewed and updated every five (5) years and submitted to the Provincial Head/CEO for approval.
- **Environmental Authorisation (NEMA):**

  [EIA REFERENCE: 16/3/3/2/A5/20/2046/24 dated 27 October 2025]
    - Condition E32: A Water Scarcity Management Plan must be developed by a suitably qualified specialist to mitigate water scarcity risks and must be implemented. The Water Scarcity Management Plan must be submitted to the relevant Directorate prior to the commencement of earthmoving and construction activities.

[APPEAL DECISION REFERENCE NO: 14/3/1/A5/20/0705/26 dated 21 May 2026]

- Condition E50: The registered Interested and Affected Parties including the Appellants must be afforded an opportunity to submit comments on all the post authorisation documents such as management plans and guidelines in terms of Conditions 29, 31, **32**, 40.1, 42.1 and 46 of the EA.

Given the scale, complexity, and phased nature of the development, the airport will generate a diverse and evolving water demand profile associated with ongoing construction, passengers, staff, commercial tenants, aviation operations, support services, landscaping and environmental management. A significant proportion of this demand is expected to be associated with non-potable uses, presenting opportunities for water conservation, efficiency improvements, and the use of alternative water sources.

This Water Scarcity, Conservation and Water Demand Management (WSC/WDM) Plan has therefore been developed to provide a structured framework for the sustainable management of water resources associated with the proposed development, in fulfilment of the conditions of the WULA, EA and Appeals Decision, while also supporting the achievement of the water-related sustainability objectives, certifications, and frameworks contributing towards the CWA's vision of becoming "one of the greenest airports in the world."

The WSC/WDM plan sets out measures to minimise water losses and wastage, optimise water use efficiency, and reduce overall water demand across all phases of the development. General objectives include reducing system losses (e.g. leakage), optimising water use, and promoting responsible water consumption practices, with targets to be refined based on baseline assessments and ongoing monitoring. The plan further promotes the use of alternative water sources, such as treated wastewater and greywater, for appropriate non-potable applications, where feasible and compliant with applicable standards. Rainwater capture from roof surface is not currently included in the design plan but remains an option for source development in the future and where design allows it will be included.

The scope of this plan includes all water use activities within the development footprint, encompassing the airside, landside, services, and general aviation precincts, and applies to both the construction and operational phases of the project. It addresses potable and non-potable water use across all user groups and activities, including water supply, distribution, storage, treatment, reuse, and demand management measures within the site.

This plan is intended as a dynamic management tool, subject to a 5-year (minimum) review and refinement based on monitoring data, operational experience, and any changes in water availability, or development design. The overarching intent is to ensure that water use within the airport is managed in a manner that supports long-term climate resilience and aligns with sustainability goals and principles.

1.2. Situational Analysis

1.2.1. Baseline Environment

1.2.1.1. Climatic Conditions

The proposed development site has a Mediterranean Climate with mild wet winters and warm dry summers. The long term (1950 – 2000) mean annual precipitation for the development area is approximately 532mm/annum. The rainfall typically exceeds evaporation rates in the winter months between May and August, and mists are common in winter. The peak groundwater recharge period will thus be in the winter. During the summer months, groundwater assists in meeting the water requirements for the area.

Climate change is, however, altering the prevailing climatic conditions in the Western Cape. Observed trends indicate a gradual temperature increase of approximately 0.1°C per decade, resulting in more frequent extreme temperature events and fewer cold nights. Projections indicate that mean temperatures may increase by approximately 1–1.8°C, reaching 2–2.7°C in inland areas. In addition, increases in maximum temperatures are expected, with a higher frequency of hot days and heatwaves. These changes are associated with increased evapotranspiration, a greater likelihood of drought conditions, and an increased number of days exceeding 30°C per annum (Brundtland, Climate Change Impact Assessment, February 2025).

Rainfall projections for the region indicate high variability, with scenarios ranging from minimal reductions to decreases of up to 20%. Longer dry periods are expected during summer, potentially extending up to 20 consecutive days. The frequency of drought events is also projected to increase, with historical 1-in-10-year drought events potentially occurring as frequently as once every two years towards the end of the century (Brundtland, Climate Change Impact Assessment, February 2025). Overall, climate change is expected to result in reduced and more variable rainfall, together with shifts in rainfall seasonality. Increases in wind speed are also anticipated in the region.

These projected changes are expected to significantly affect the catchment, particularly through reduced rainfall reliability and increased evaporation rates, which may impact the viability and reliability of stored water resources. Increased variability in rainfall patterns is also likely to place additional pressure on both surface and groundwater resources.

Broader climate projections for the Western Cape present two potential future scenarios (South Africa's Third National Communication, 2018). The first scenario describes a drier, hotter, and windier future characterised by alternating dry and wet cycles, increased frequency of heatwaves, stronger summer winds, and reduced rainfall reliability, resulting in increased drought stress and higher irrigation demand. The second scenario describes a warmer and wetter climate, with increased rainfall over mountainous areas due to more intense winter storm systems and enhanced moisture transport, potentially increasing river flows and dam inflows.

However, even under this scenario, water demand pressures from agriculture and urban development are expected to remain significant.

1.2.1.2. Regional Hydrogeology

A Geohydrological Impact Assessment has been conducted for the proposed Cape Winelands Airport (GEOSS, 2025). The development site is underlain by alluvium, colluvium, and weathered bedrock of the Malmesbury Group and Cape Granite Suite (GEOSS, 2025) (Figure 4). The Malmesbury Group is known to yield relatively high groundwater volumes and represents an important regional aquifer within the region (GEOSS, 2025). A regional fault system, the Colenso Fault, is mapped along the north-eastern boundary of the Cape Winelands Airport and extends from Klapmuts to Langebaan on the West Coast (GEOSS, 2025) (Figure 4).

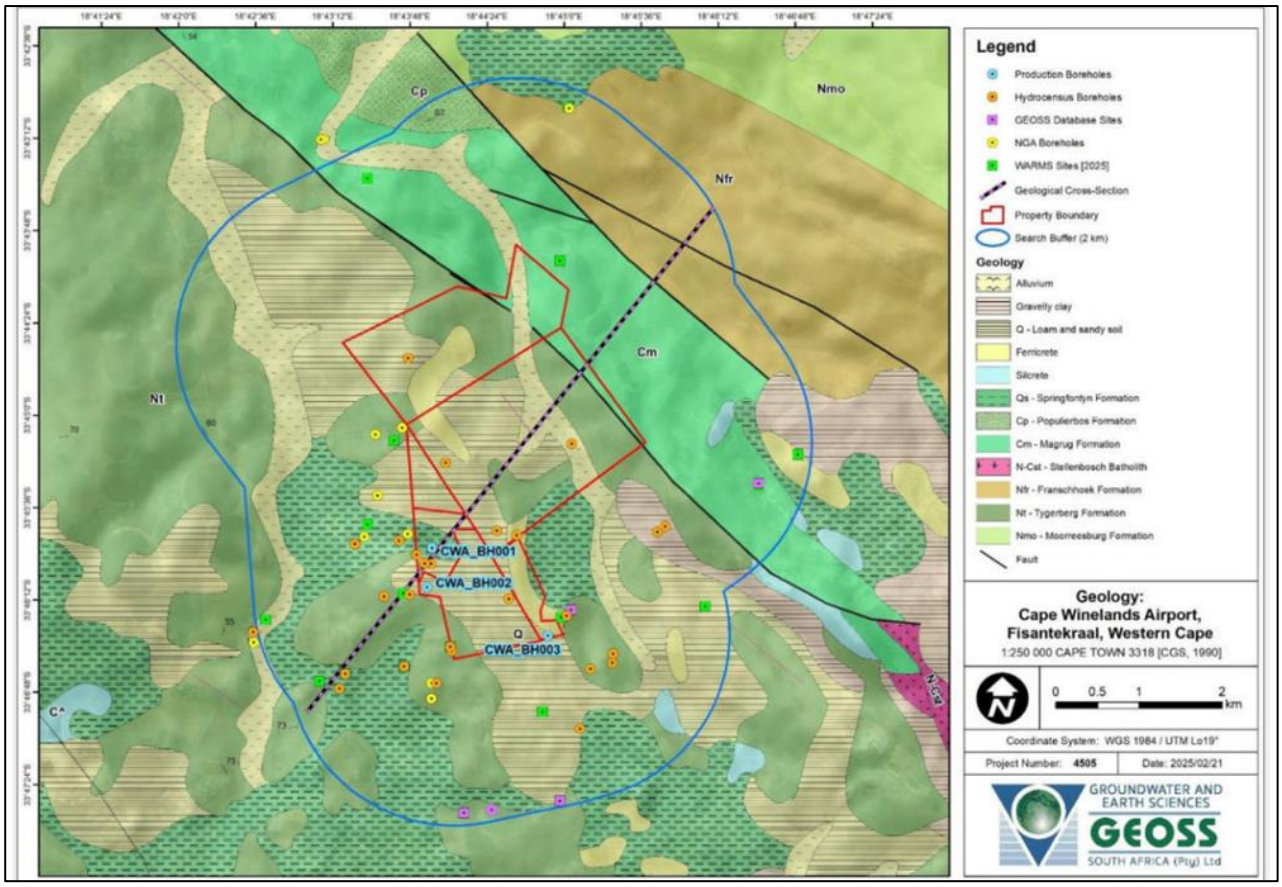


Figure 4: Geological setting of the area with the hydrocensus, NGA and WARMS boreholes and cross-section line indicated (3318 – Cape Town) (GEOSS, 2025)

The 1:500000 groundwater map of Cape Town indicates that the area comprises a fractured aquifer system, where groundwater occurs within fractures in the bedrock. These aquifers are known to be highly complex and potential contamination in these aquifers is more challenging to manage. Borehole yields in the area range from 0.5 L/s to 5.0 L/s (GEOSS, 2025). Groundwater quality ranges from good to dangerous in terms of domestic water use standards (DWAF, 1998).

The national-scale groundwater vulnerability indicates that the study area has low to moderate vulnerability to contamination from surface-derived pollutants (GEOSS, 2025) (Figure 5). This classification is because the Malmesbury Group rock, which underlies the area, weathers to a clay which reduces permeability and provides partial protection to the underlying fractured aquifer. However, groundwater vulnerability increases toward the northeast, where the Colenso Fault system is located (Figure 4). This area should therefore be regarded as hydrogeologically sensitive, requiring careful consideration in terms of groundwater protection and management.

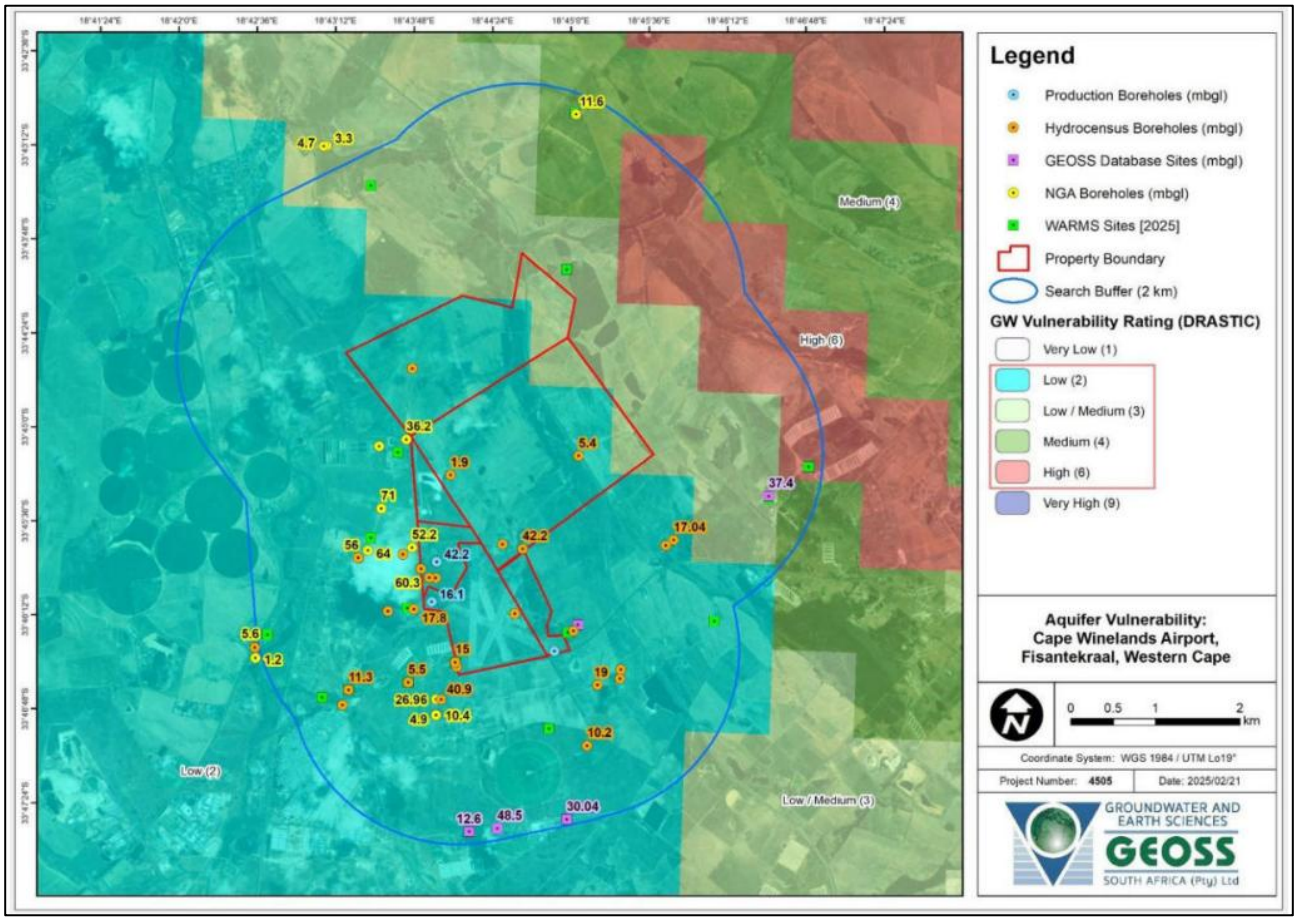


Figure 5: Regional groundwater vulnerability from Conrad and Munch (2007) showing locations and water levels of boreholes (GEOSS, 2025).

A hydrocensus conducted for the proposed development identified several existing groundwater users in the surrounding area, with most abstracting water from the fractured aquifer. The majority of water users in the area utilise the underlying groundwater resource for agricultural purposes. Recorded groundwater levels vary significantly, ranging from shallow depths of 1.24mbgl to deeper levels of 71.88mbgl. However, all water levels exceeding 20mbgl were sourced from the NGA database and do not align with the manually measured static (resting) groundwater levels recorded during the hydrocensus, which were consistently less than 20mbgl. It is therefore likely that the deeper NGA-reported levels represent pumping (dynamic) water levels rather than true static groundwater conditions.

Groundwater flow generally follows surface topography, flowing from areas of high elevation to areas of lower elevation. The groundwater locally flows northwest (perpendicular to the contour lines, from higher elevation to lower elevation). Due to the presence of existing groundwater users and the proximity of the Colenso Fault, the north-eastern section of the study area is identified as a no-go area for high-risk activities. Overall, the proposed development poses risk to groundwater in the area and as such appropriate protection, mitigation and monitoring measures must be implemented as outlined in Section 2.1.4.5. Management and monitoring of abstraction and protection of water quality remain fundamental to risk mitigation.

1.2.2. Current Water Supply System

1.2.2.1. Potable Water Supply

The proposed development site is situated along the CoCT urban edge, where water service provision is limited. The site falls within the Spes Bona Reservoir supply zone, however, there are no existing municipal potable water pipelines in close proximity. The nearest municipal water services are located within the Fisantekraal settlement (Figure 6). The closest bulk supply infrastructure is a 400mm diameter trunk main along the R312 (Lichtenburg Road), which terminates just beyond the railway crossing, approximately 3km southwest of the current CWA site (Figure 6).

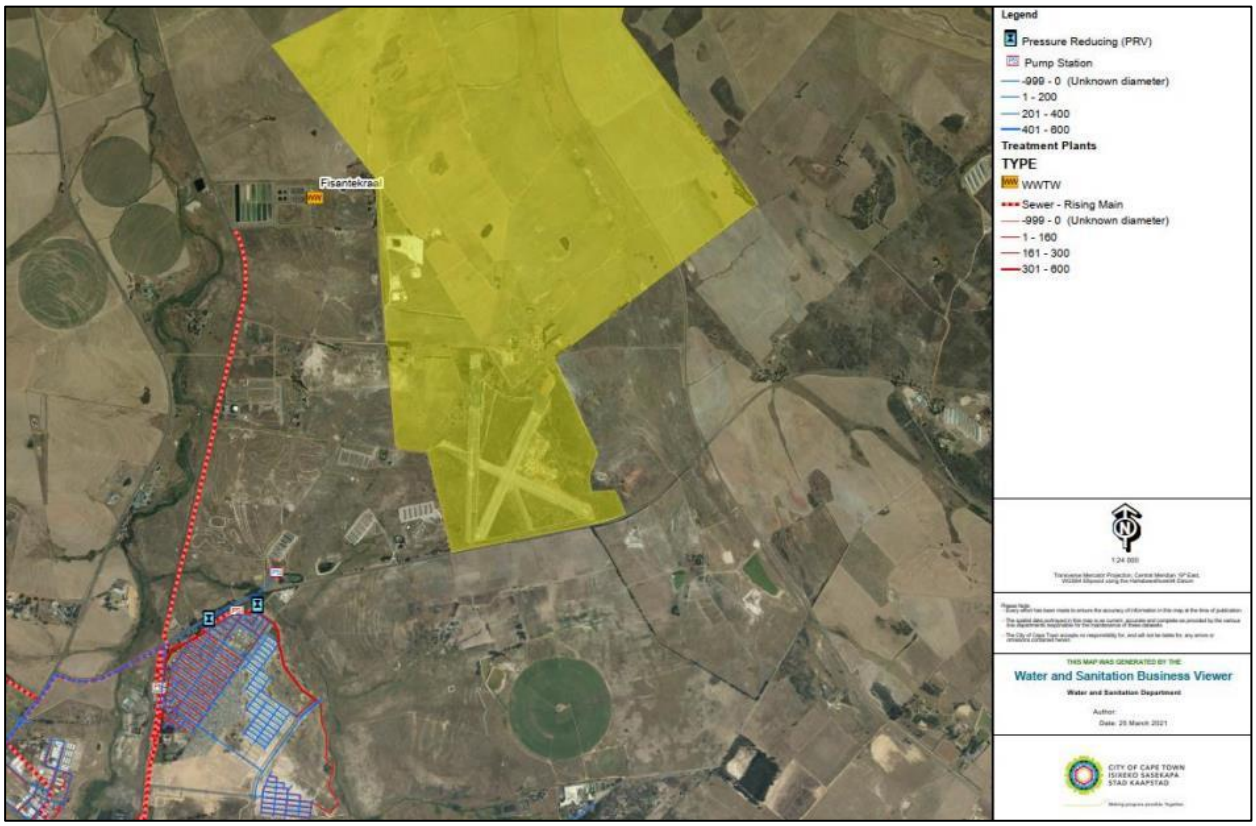


Figure 6: Existing potable water & Sewer Services (Zutari, Engineering Services Report, February 2025) CWA site indicated in yellow shading.

Consultation with the CoCT revealed that sufficient storage capacity exists in the Spes Bona reservoir to supply the short-term water requirements of the CWA development. However, the network infrastructure in

the area is limited and existing network pipe diameters are restricted and as a result should the CWA development connect to the network the flow velocities will exceed that which is acceptable. The CoCT indicated that the CWA development will only be able to obtain 25% (5.65l/s of the calculated demand of 22.52l/s) of its requested peak instantaneous demand capacity (Qp) from the municipal system. This would only be 9.6% of the current calculated peak instantaneous demand of 59l/s.

Due to the current constraints in the municipal system alternative potable water sources have been developed to support the CWA development in the short to medium term (Figure 7). The current water supply strategy for CWA is to provide the site with potable water through treating groundwater abstracted from boreholes on site in the short to medium term (Figure 8). A treatment facility will be established on site to treat the groundwater to potable standard. This supply will be supplemented by potable water from the CoCT in the short term. Over the longer term, however, municipal supply is expected to become the primary source of potable water, as illustrated in Figure 7. To facilitate this initial supply, a new potable water pipeline will need to be constructed to connect the development to the municipal network. The proposed pipeline route is illustrated in Figure 9.

At present, the Cape Winelands Airport site is reliant on groundwater due to the limited availability of municipal water connections. Effective groundwater management will therefore be critical to maintaining a sustainable and reliable water supply, particularly in the context of increasing climate variability and associated risks (Brundtland, Climate Change Impact Assessment, February 2025).

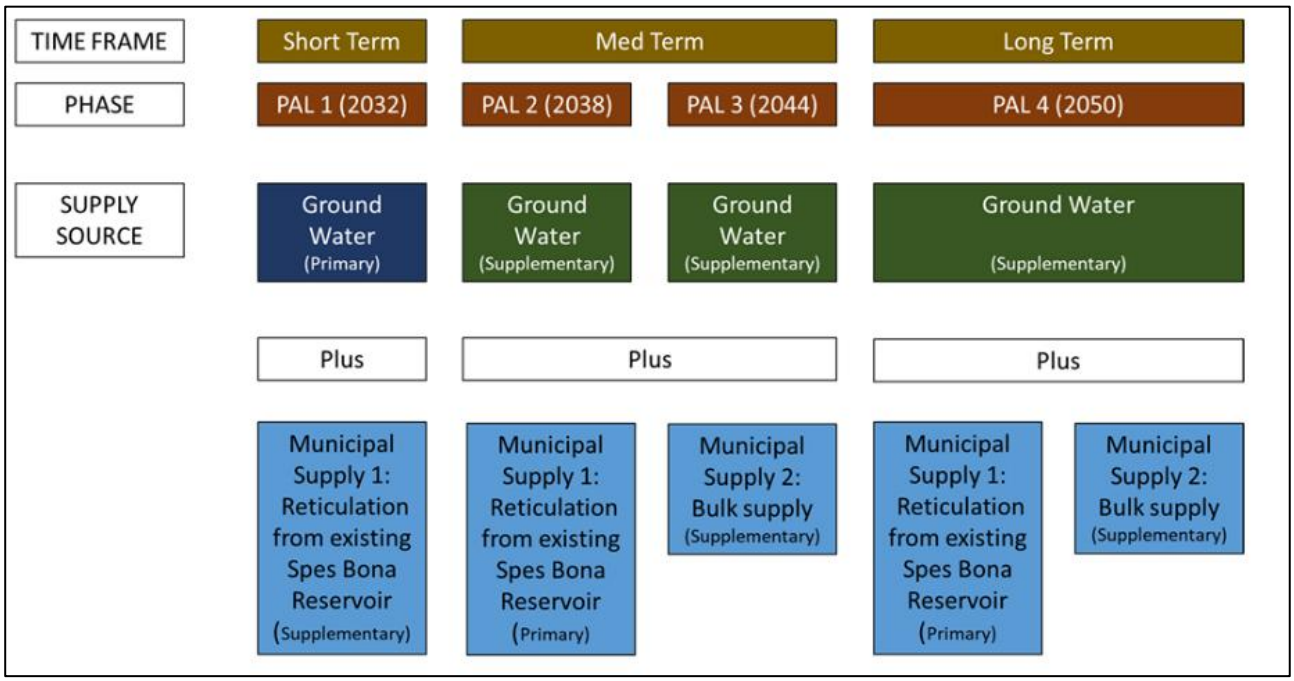


Figure 7: Potable water supply strategy (Zutari, Engineering Services Report, February 2025)



Figure 8: Three production boreholes developed within the CWA development area (PHS Consulting, February 2025).



Figure 9: Proposed potable supply line from municipal network (in yellow) (PHS Consulting, April 2025).

Phase 1: Borehole Supply:

Three production boreholes have been drilled onsite, namely CWA_BH001, CWA_BH002 and CWA_BH003 (Figure 8). All three production boreholes have been yield tested according to SANS 10299_4-2003. The test

results were used to determine the sustainable yield of each borehole. Borehole CWA_BH001 has a yield of 1.0L/s, CWA_BH002 yields 2.5L/s, and CWA_BH003 yields 1.69L/s. The calculated sustainable yields are consistent with the expected regional aquifer yields

The initial short-term groundwater requirement for the CWA airport facility is 155 488m^3/a. The Cape Winelands Airport has been authorised under the National Water Act to abstract and use a maximum sustainable yield of 163,671m^3/a from the three on-site production boreholes (CWA_BH001, CWA_BH002, and CWA_BH003) (Figure 8). These boreholes are capable of sustainably meeting groundwater demand during the initial phases of the proposed development (GEOSS, 2025). In addition, the Aquifer Firm Yield Model indicates that the regional Groundwater Resource Unit (GRU) has sufficient capacity to accommodate additional abstraction, should this be required for future phases of development (GEOSS, 2025).

In instances where a developer elects to supply potable water through the treatment of groundwater in lieu of municipal supply, a Water Services Intermediary (WSI) agreement with the CoCT is required. A WSI application for the provision of own potable water supply and sanitation services is currently in process with the CoCT.

Phase 2: Municipal Supply:

Phase 2 will be supplied primarily via a proposed connection to the municipal water supply along Lichtenberg Road. Once bulk water supply infrastructure is in place, the development will be connected directly to the municipal network.

Infrastructure & Reticulation Networks:

The proposed internal water reticulation network for the development will be supplied from a combination of groundwater and, in the longer term, municipal sources. These sources will feed into on-site storage tanks, from which water will be distributed throughout the development. No direct connection to the municipal supply network is proposed for reticulation purposes; instead, all supply will be routed via the on-site storage infrastructure. The storage tanks will be designed to provide adequate buffering capacity to accommodate peak demand and high-demand scenarios, thereby ensuring a reliable and consistent water supply. In addition, a separate set of dedicated fire storage tanks will be provided, with sufficient capacity to meet firefighting requirements without placing additional demand on the municipal system. The indicative layout of the proposed water supply infrastructure is presented in Figure 10.

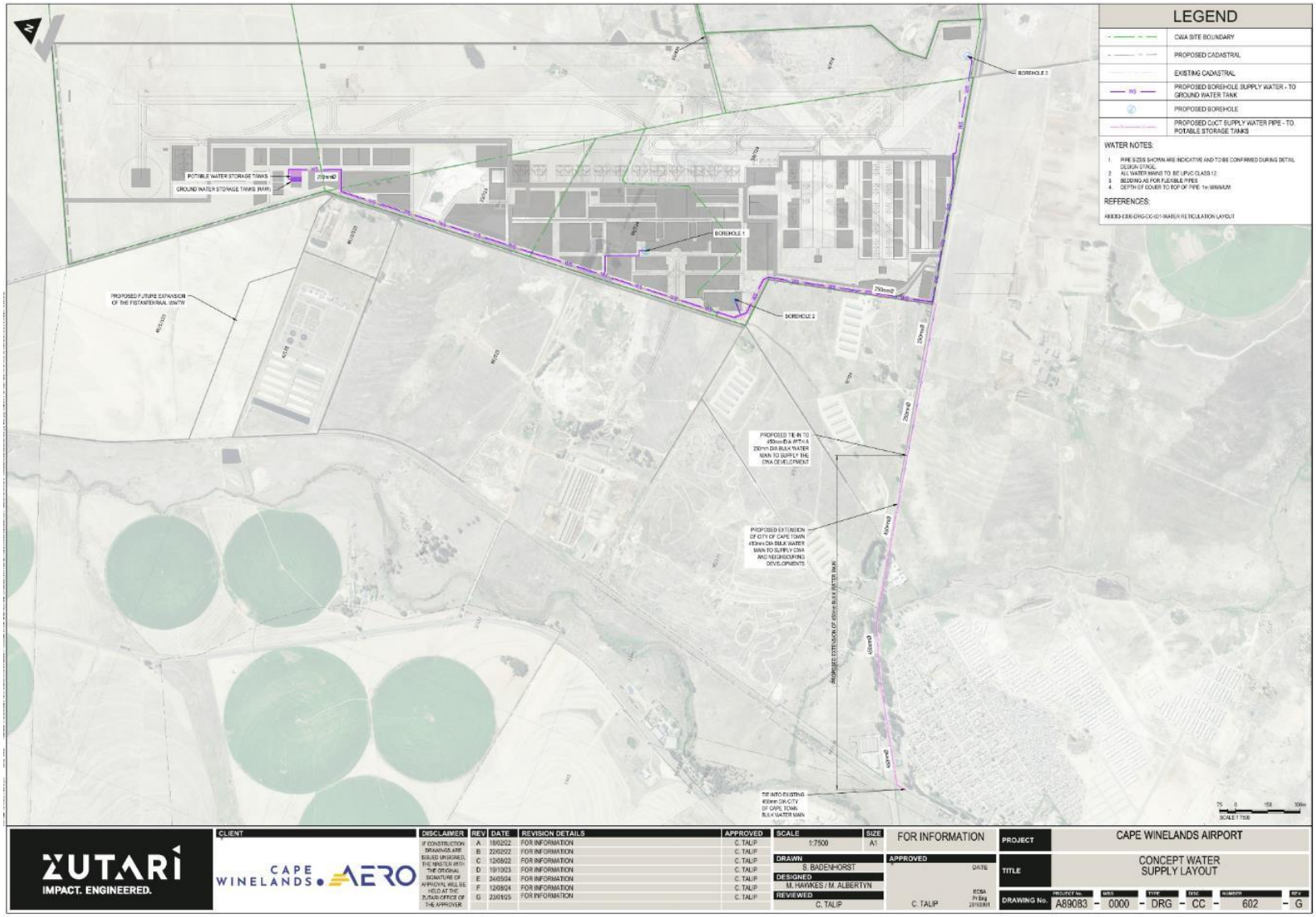


Figure 10: Concept water supply layout indicating the location of the three onsite production boreholes and the proposed CoCT supply line (Zutari, Engineering Services Report, January 2025

1.2.2.2. Non-potable Water Supply

To reduce reliance on groundwater abstraction and enhance climate resilience in the short to medium term, the development will utilise treated wastewater to meet its non-potable water requirements. This approach supports sustainable water management by integrating water reuse into the overall infrastructure design.

The site falls into the catchment area serviced by the Fisantekraal WWTW, but there is at present no link / service to the Fisantekraal WWTW. The proposed sewage management and treatment for the proposed development will comprise a dual-treatment approach which includes an on-site package wastewater treatment plant as well as a connection to the Fisantekraal WWTW.

Sewage from the development will be diverted through a pump system to a proposed on-site package treatment plant. This plant will treat the sewage to a standard suitable for non-potable water use, such as irrigation or toilet flushing, thereby addressing the development's internal non-potable water requirements. To avoid excessive effluent production and maintain compliance with wastewater discharge regulations, the remaining sewage will be directed to the nearby municipal wastewater Fisantekraal treatment works (WWTW) for further treatment and disposal. This approach aims to optimize effluent reuse, reduce pressure on the WWTW, as well as address environmental concerns with respect to excess treated effluent generated.

Key components of sewer network:

- An internal sewer network to convey sewage.
- A lifting station to divert a portion of sewage to a package sewage treatment plant to meet the non-potable demands of the development.
- A primary sewer pump station to direct the remaining sewage to the Fisantekraal Wastewater Treatment Works (WWTW) via a pump and rising main.
- A sludge processing area.
- An emergency overflow pond.
- An emergency overflow to the primary sewer pump station from the package treatment plant, directing all development demands to the Fisantekraal WWTW in case of failure.

The internal sewer network will collect sewage from various buildings and convey it to a lifting station. From here, the required sewage volume will be diverted to the proposed package sewage treatment plant. The treatment plant will process sewage to a quality suitable for applications such as irrigation and toilet flushing, in accordance with applicable municipal standards. The treated effluent will then be stored and utilized as a non-potable water supply. The package sewage treatment plant will be

designed as a closed system, with all waste generated handled in compliance with relevant city by-laws.

To prevent excessive effluent generation and maintain compliance with wastewater discharge requirements, sewage volumes exceeding on-site reuse demand will not be treated locally. Instead, surplus sewage will be directed to the nearby Fisantekraal wastewater treatment works (WWTW) for further treatment and disposal. This approach optimises reuse efficiency while reducing pressure on municipal infrastructure and minimising environmental risks associated with surplus treated effluent.

1.2.3. Development Demographic

1.2.3.1. Regional Context

The CWA is located in a rural area within the CoCT, which is the capital city of the Western Cape and serves as the legislative capital of South Africa. The municipality consists of 116 wards, with the CWA situated in the Northern District's Ward 105, approximately 10.5km northeast of Durbanville.

The immediate context is currently predominantly agricultural, characterised by dryland cultivation, feedlots (including large-scale operations such as Braam's Voerkrale), and equestrian activities. Commercial developments are, however, anticipated on adjacent land parcels. The site is bordered by the R312 to the South, with the previously proposed Garden Cities urban development further South of the R312, while agricultural activities occur to the East and North. The Fisantekraal Wastewater Treatment Works is located to the northwest of the site.

Directly West of the site are the proposed Bella Riva urban residential development and the existing County Fair Laying Farms, with Dirt & Dust recreational tracks and Braam's Voerkrale located further West. To the southwest lies the Fisantekraal residential area, which links with the previously proposed Greenville Garden Cities development. Additional surrounding land uses include previously mined sand areas to the northwest, and the Goedgeleven Estate venue located approximately 2,5km southeast.

The Fisantekraal settlement had a population of 12,369 in 2011, comprising 51.5% Black African and 46.9% Coloured residents. The area includes primary and secondary schools, sports grounds, and small businesses. It is characterised by high unemployment and a growing informal settlement. Unfortunately, no recent data from the 2022 Census is available for this settlement. Klipheuwel, a small rural village, located approximately 8km North of the site, had a population of 2,294 in 2011, with 54% Black African and 38.6% Coloured residents. Mikpunt, located approximately 6km North of the site, is a smallholding community. Joostenberg Vlakte is a community located approximately

6,5km South of the CWA and is home to several smallholdings, bordered by the N1 on the South, Canary Road to the West, and Lucullus Road cutting north-south through the middle. The area is well-known for equestrian activities, but several other small goods and services businesses are operated from the smallholdings.

Economic activities in the surrounding area include agriculture, feedlots such as Braam's Voerkrale, and poultry farming associated with County Fair. Recreational and event-based activities include Dirt & Dust racetrack and the Goedgeleven Estate venue. Joostenberg Vlakte consists of smallholdings and farming areas producing fresh vegetables.

The Northern District has experienced multiple development applications, including approved and proposed industrial, residential, and mixed-use developments. These include industrial and business developments on various farm portions, Groot Phesantekraal Phases 4 and 5 incorporating residential, retail, and institutional uses, the La Piron residential development, and the Bella Riva Lifestyle and Golf Estate. Additional proposals include the Apollo Bricks industrial park, Durbanville Industrial development, Lucullus Gardens mixed-use development, N1 Nooitgedacht warehousing development, N1 Gateway Business Park, and the Buhr Land industrial development.

1.2.3.2. Site-Specific Context

The proposed development entails the phased expansion of the CWA. The airport will comprise five precincts, namely, the airside precinct, landside precinct, services precinct, agricultural precinct and general aviation precinct. Landside and airside infrastructure will be phased based on market demand.

Given the scale and diversity of the proposed development, water demand will be generated by a broad range of user groups and activities. The WSC/WDM Plan therefore applies to a complex and dynamic user profile, which is expected to evolve over time as the airport expands through its phased development.

Construction activities associated with the phased development will generate water demand for dust suppression, construction processes, and worker facilities. The development comprises five precincts to be implemented in two primary phases; however, Phase 2 will be rolled out progressively in response to market demand. As such, construction is not a short-term or discrete activity for this development. Instead, it will occur continuously and incrementally over an extended period, with new aspects being developed while others are already operational. As such, there will be no clear distinction between a standalone construction phase and a subsequent operational phase. Accordingly, construction-related water use represents a long-term and ongoing component of total site demand. Water demand for the development will therefore comprise a combination of

construction and operational requirements for the foreseeable future. This necessitates an integrated and adaptive water conservation and demand management approach that accounts for sustained construction activities alongside operational water use.

From an operational perspective, water will be used by passengers and visitors making use of the passenger terminal buildings, VIP processing facilities, and associated amenities such as retail areas, restaurants, hotels, and public transport facilities. Airport staff and operational personnel, including airline staff, security, ground handling, maintenance, and administrative staff, will contribute to continuous water demand across all precincts for services such as ablution facilities.

Commercial and industrial users within the landside precinct will include offices, hospitality facilities, logistics and warehousing operations, light manufacturing, food processing, and aviation-related businesses which will all make use of water to some extent.

Airport support and services infrastructure will include aircraft rescue and firefighting facilities, cargo handling, maintenance and repair facilities, ground support equipment services, inflight catering, fuel storage and distribution, airport operations, and air traffic control. These activities will require both potable and non-potable water.

Water demand will also be associated with landscaped areas, RESA, and conservation management areas, including irrigation requirements. A landscaping design has been developed for the airport, incorporating endemic (fynbos & renosterveld) and water-resilient planting plans. The irrigation design and planting plan prioritise water conservation through the proposed reuse of treated effluent from the onsite wastewater treatment plant. Landscaping throughout the site will be designed to minimise irrigation demand by incorporating drought-tolerant species, climate resilient open spaces and pathways that reduce irrigated surface areas.

1.3. Policy and Regulatory Framework

1.3.1. Berg Catchment Management Strategy

The Berg Catchment is located in the Western Cape of South Africa and spans approximately 13 891km^2 (Figure 11). The geology of the Berg Catchment comprises rock types of the Klipheuwel and Malmesbury Groups. Most of the rivers in the water management area rise from the Table Mountain Group mountain catchments.

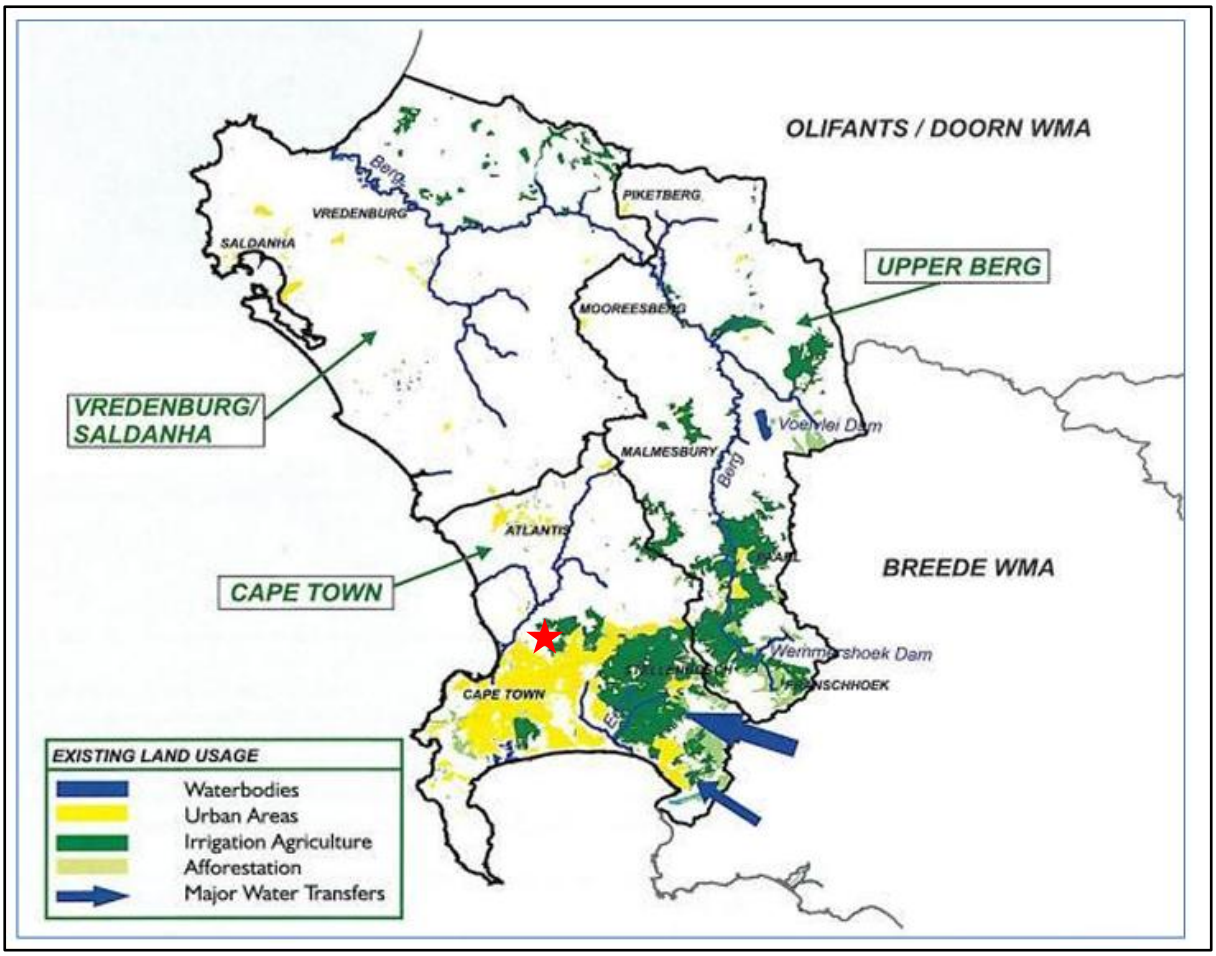


Figure 11: The Berg WMA (Western Cape IWRM Action Plan: Status Quo Report Final Draft).

The Berg WMA Internal Strategy 2004 was developed to provide detail on how the future catchment management agency will manage the water resources within the Berg WMA.

The main deliverables were:

- development of the Internal Strategic Perspectives (ISPs);
- verification of existing lawful use (through the V&V process);
- determination of water availability at acceptable confidence levels; and
- determination of Ecological Reserves at high confidence levels.

In 2017 the GreenCape Sector Development Agency prepared a report for the Water Research Commission and the Western Cape Government on "*Managing Water as a Constraint to Development with Decision-Support Tools That Promote Integrated Planning: The Case of the Berg Water Management Area*". This report notes that there is increasing recognition that the combined effects of climate change, population growth and continued urbanisation are exerting pressure on limited water resources. At the same time, economic growth remains vital for alleviating poverty (WRC, 2017).

Therefore, economic growth is required in spite of significant water resource constraints. At issue then is how to allocate water optimally to enable economic growth, while also ensuring that human needs are met, and ecological systems maintained. Economic development is mostly linked to access to water (WRC, 2017) - according to the GreenCape Sector Development Agency report the historic Berg Water Management Area is a "constrained catchment" where all readily available water has already been allocated (WRC, 2017). In cases such as this, additional water resources or reallocation from other users would be required to facilitate future development. However, the development of new water resources requires new infrastructure which has cost implications. These costs will likely need to be borne by the new users, and the cost of provision of water becomes a constraint to economic development.

The WRC report thus highlights the interdependency between economic development and water resources which needs to be considered. The CWA development is a large-scale private investment with the capacity to develop the infrastructure needed to supply the site with the necessary water requirements. The proposed CWA development is expected to facilitate substantial economic development within the region and aims to do this as sustainably as possible - the site aims to reduce its potable water demand by implementing efficient technologies to minimize consumption and maximizing water reuse where possible for example, an on-site package treatment plant will treat sewage for reuse in non-potable applications such as irrigation and flushing, reducing reliance on potable water sources and supporting sustainable water use.

1.3.1. Regulatory Framework (Legislation and Bylaws)

The following legislation is appliable to this plan and the long-term operational management of the airport. All activities on site must ensure compliance with the provisions of the legislation as applicable.

1.3.1.1. National Legislation

National Water Act (NWA)

The National Water Act (Act 36 of 1998) is South Africa's primary legislation governing water resources. It is designed to ensure the protection, sustainable management, and equitable allocation of water resources for beneficial use. The National Water Act recognises water conservation and water demand management as key principles in the sustainable management of South Africa's water resources. The National Water Act defines conservation in relation to a water resource as the efficient

use and saving of water, achieved through measures such as water-saving devices, water-efficient processes, water demand management, and water rationing.

The National Water Act contains several key provisions that directly support water conservation and water demand management. The most relevant clauses are outlined below:

Chapter 2 of the NWA provides for the development of strategies to ensure the effective management of water resources, including the National Water Resource Strategy (NWRS) and Catchment Management Strategies (CMSs).

- Clause 6 identifies water conservation as a key component of the NWRS. It states that: *"The National Water Resource Strategy must, subject to section 6(1), set out the strategies, objectives, plans, guidelines and procedures of the Minister and institutional arrangements relating to the protection, use, development, conservation, management and control of water resources within the framework of existing relevant government policy."*

  The NWRS-3 is currently in effect, and the proposed development is well aligned with the vision and objectives of this strategy. In particular, the development aims to promote sustainable water resource management through reduced water demand, and the implementation of alternative and circular water use practices, including the treatment and reuse of water where appropriate.

- Clause 8 establishes water conservation as a core requirement of Catchment Management Strategies: *"A Catchment Management Agency contemplated in Chapter 7 must, by notice in the Gazette, establish a Catchment Management Strategy for the protection, use, development, conservation, management and control of water resources within its water management area."*

Chapter 3 focuses on the protection and sustainable use of water resources.

- Clause 12 requires the classification of water resources to support appropriate management and protection measures: *"As soon as is reasonably practicable, the Minister must prescribe a system for classifying water resources. The system may provide for such other matters relating to the protection, use, development, conservation, management and control of water resources as the Minister considers necessary."*

  The proposed development complies with the intent of this clause through the implementation of mitigation and management measures for both the construction and operational phases, aimed at avoiding and minimising potential impacts on nearby watercourses.

Chapter 4 establishes the legal framework for regulating water use, including licensing and general authorisations.

- Clause 26 specifies that the Minister may make regulations requiring that the use of water from a water resource be monitored, measured and recorded. The Water Use Licence issued for the proposed development mandates the installation of flow meters to monitor abstraction rates and volumes, with daily abstraction volumes recorded and compiled into monthly records. Furthermore the licence requires that the Licensee keep record of all water taken and a copy of the records shall be forwarded to the Provinvial Head/CEO on or before 25 January and 25 July of each year.
- Clause 29 enables the inclusion of water conservation measures as enforceable conditions of water use authorisations: *"(1) A responsible authority may attach conditions to every general authorisation or licence*

    (a) relating to the protection of:

        (i) the water resource in question;

        (ii) the streamflow regime; and

        (iii) other existing and potential water users;

    (b) relating to water management by

        (iv) specifying management practices and general requirements for any water use, including water conservation measures."

    A Water Use Licence has been obtained for the proposed development, and all conditions and requirements of the licence, including the implementation of this WSC/WDM Plan, will be adhered to to ensure that water resource protection and management objectives are achieved.

Chapter 5 introduces financial mechanisms to support water resource management and conservation.

- Clause 56 provides for the inclusion of water conservation costs within national water pricing strategies:

    "(1) The Minister may, with the concurrence of the Minister of Finance, from time to time by notice in the Gazette, establish a pricing strategy for charges for any water use within the framework of existing relevant government policy.

    (2) The pricing strategy may contain a strategy for setting water use charges:

a) for funding water resource management, including the related costs of:

…. … …

(iv) water resource protection, including the discharge of waste and the protection of the Reserve; and

(v) water conservation."

Schedule 3 outlines the powers and duties of Catchment Management Agencies (CMAs).

- Clause 6 empowers CMAs to enforce water conservation measures during periods of water scarcity: *"If a Catchment Management Agency, on reasonable grounds, believes that a water shortage exists or is about to occur within an area, it may, despite anything to the contrary in any authorisation, by notice in the Gazette or by written notice to each of the water users in the area who are likely to be affected:*

  (i) limit or prohibit the use of water;

  (ii) require any person to release stored water under that person's control;

  (iii) prohibit the use of any waterwork; and

  (iv) require specified water conservation measures to be taken."

In addition to demand management, the NWA includes strong provisions for pollution prevention, recognising the link between water quality and water availability.

The Act defines pollution as:

"The direct or indirect alteration of the physical, chemical or biological properties of a water resource so as to make it less fit for any beneficial purpose for which it may reasonably be expected to be used, or harmful or potentially harmful to human health, aquatic or non-aquatic organisms, resource quality, or property."

In this context, the most relevant clauses related to pollution prevention are outlined below:

- Clause 19 specifies that

  "*(1) An owner of land, a person in control of land, or a person who occupies or uses land on which—*

  (a) any activity or process is or was performed or undertaken; or

  (b) any other situation exists,

  which causes, has caused, or is likely to cause pollution of a water resource, must take all reasonable measures to prevent such pollution from occurring, continuing, or recurring.

  (2) The measures referred to in subsection (1) may include measures to:

  a) cease, modify, or control any act or process causing the pollution;

b) *comply with any prescribed waste standard or management practice;*

c) *contain or prevent the movement of pollutants;*

d) *eliminate any source of pollution;*

e) *remedy the effects of pollution; and*

f) *remedy the effects of any disturbance to the bed and banks of a watercourse."*

Where such measures are not taken, the Catchment Management Agency may intervene to prevent or remedy pollution and recover associated costs from the responsible parties.

From a site-specific perspective, the proposed development was issued a Water Use Licence Authorisation (WULA) in terms of the National Water Act, 1998, which includes several conditions relevant to water conservation and water demand management. Most notably is the requirement for the development of this WSC/WDMP. In addition, the licence mandates the installation of flow meters to monitor abstraction rates and volumes, with daily abstraction volumes recorded and compiled into monthly records. The Licensee is also required to implement an ongoing awareness programme for employees and stakeholders to promote WSC/WDM initiatives. Furthermore, the licence requires that water be used efficiently by minimising total water intake, avoiding unnecessary use where possible, implementing best management and operational practices, and maximising the reuse and recycling of water. The Licensee must also continuously investigate and adopt new and emerging technologies, as well as water-efficient devices and techniques, to improve water use efficiency and support ongoing water conservation.

The water conservation principles and objectives contained within the National Water Act, together with the conditions of the WULA, have directly informed the development of this WSC/WDMP as an additional measure to support sustainable water use within the proposed development and to further align the development with the broader water conservation and resource protection objectives of the Act.

Water Services Act (Act 108 of 1997) (In process of being amended by means of the Water Services Amendment Bill - B24 of 2025)

The Water Services Act gives effect to the constitutional right of access to basic potable water supply and sanitation, recognising these as essential human rights. The Act regulates water services institutions, establishes national standards for service delivery and tariff setting, and mandates municipalities—acting as Water Services Authorities—to plan for and ensure the sustainable provision of water services. It also establishes national standards and norms and regulates institutional arrangements, including water boards and other service providers.

The following provisions of the Water Services Act are particularly relevant to water conservation and water demand management:

- Clause 2(j) identifies one of the primary objectives of the Act as: *"the promotion of effective water resource management and conservation."*
- Clause 4(2) sets conditions for water services providers and requires that: *"conditions must provide for … (vi) measures to promote water conservation and water demand management."*
- Clause 11 outlines the duty of Water Services Authorities to provide access to water services. It states that: *"Every Water Services Authority has a duty to all consumers or potential consumers in its area of jurisdiction to progressively ensure efficient, affordable, economical and sustainable access to water services."*

  This duty is further qualified by: "the duty to conserve water resources."
- Clause 13 specifies the required content of a Water Services Development Plan (WSDP), including: "*details of existing and proposed water conservation, recycling and environmental protection measures*."

As part of the proposed expansion of CWA, the short-term water supply strategy includes the abstraction and treatment of groundwater to provide potable water. Accordingly, the development is subject to the provisions of the Water Services Act, 1997, which regulates the provision of water services to consumers.

Where a developer elects to supply potable water through the abstraction and treatment of groundwater in lieu of a municipal supply, a Water Services Intermediary (WSI) agreement with the CoCT is required to enable such self-supply. A WSI application for the provision of an independent potable water supply and sanitation service is currently in process with the CoCT.

Regulations under the Water Services Act (published under Section 9 of the Water Services Act [Act No. 108 of 1997])

The regulations promulgated under the Water Services Act contain several requirements that directly support water conservation and water demand management. The most relevant clauses are outlined below:

- Clause 10(1) requires Water Services Authorities to monitor and report on water use efficiency through audits: *"A Water Services Authority must include a Water Services Audit in its annual report on the implementation of its Water Services Development Plan, as required in terms of section 18(1) of the Act."*

- Clause 11 focuses on water balance and loss management, requiring that: *"Within two years of the promulgation of these regulations, a Water Services Institution must, on a monthly basis, determine the quantity of unaccounted-for water."*
- Clause 12 addresses infrastructure maintenance and leakage control: *"A Water Services Institution must repair any major, visible or reported leak in its water services system within 48 hours of becoming aware thereof."*
- Clause 13 promotes accurate measurement and demand control: *"A Water Services Institution must, within two years, fit a suitable water volume measuring device or volume controlling device to all user connections provided with water supply services that existed at the time of commencement of these regulations."*
- Clause 15 relates to pressure management within distribution systems: *"A Water Services Institution must design and maintain every water reticulation system installed after the promulgation of these regulations to operate below a maximum pressure of 900 kPa."*

National Environmental Management Act (NEMA) (Act 107 of 1998)

The National Environmental Management Act (Act 107 of 1998) is South Africa's foundational environmental legislation, providing a legal framework for cooperative governance and environmental decision-making. It gives effect to Section 24 of the Constitution by promoting sustainable development, preventing pollution and environmental degradation, and ensuring the protection of natural resources for the benefit of present and future generations.

The key principles in NEMA relevant to water conservation and water demand management are outlined below.

<u>Sustainable Development:</u>

NEMA requires that all development be undertaken in accordance with the principles of sustainable development. These principles promote the efficient and responsible use of natural resources, including water, and require that development be socially, environmentally, and economically sustainable.

In the context of water scarcity, this principle implies that the water demand associated with a development should not exceed available supply, nor compromise the long-term availability and integrity of the resource.

NEMA defines sustainable development to include the requirement that: *"the use and exploitation of renewable resources and the ecosystems of which they are part do not exceed the level beyond which their integrity is jeopardised".*

Sustainable development under NEMA also incorporates the precautionary principle, which requires a risk-averse and cautious approach where there is uncertainty. In this regard, the Act states that *"a risk-averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions; and that negative impacts on the environment and on people's environmental rights be anticipated and prevented, and where they cannot be altogether prevented, are minimised and remedied."*

Pollution Prevention and Duty of Care

NEMA establishes a general duty of care for the prevention of environmental degradation, including the protection of water resources. In terms of Section 28 *"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided, to minimise and rectify such pollution or degradation."*

This duty applies to landowners, occupiers, and any person responsible for activities that may impact on the environment. The Act further specifies that reasonable measures may include:

- investigating and assessing environmental impacts;
- informing and educating employees on environmental risks;
- ceasing, modifying, or controlling polluting activities;
- containing or preventing the movement of pollutants;
- eliminating sources of pollution; and
- remedying the effects of environmental degradation.

Where such measures are not undertaken, the relevant authority may intervene and recover the associated costs from responsible parties.

Climate Change Act (Act 22 of 2024)

The Climate Change Act establishes a legal framework to support South Africa's transition to a low-carbon and climate-resilient economy and society within the context of sustainable development. The Act aims to enable an effective climate change response while strengthening resilience and reducing

vulnerability to the impacts of climate change. It further requires climate change considerations to be integrated into planning and decision-making processes and provides for the development of national and sectoral adaptation strategies and plans. The Act is particularly relevant to water resource management, as climate change is expected to affect water availability, water quality, drought frequency, and flood risk. Accordingly, the Act promotes the incorporation of climate adaptation measures into water resource planning and management to enhance long-term water security and the sustainable use of water resources. The WSC/WDM plan is aligned with the objectives of the Climate Change Act, 2024, by promoting the efficient use of water resources, reducing pressure on available water supplies, and supporting the sustainable and climate-resilient management of water resources.

1.3.1.2. Provincial Legislation

Western Cape Biodiversity Act (Act 6 of 2021)

The Western Cape Biodiversity Act, 2021 is a provincial law designed to provide a comprehensive framework for nature conservation, sustainable use, and management of biodiversity in the Western Cape, South Africa. It recognises the province's dependence on ecosystem services, the need for access and benefit sharing, and the importance of ensuring long-term ecological resilience. The objectives of the Act include *"ensure the long-term ecological sustainability and resilience of biodiversity, ecosystems, ecosystem services and ecological infrastructure through implementation of the principles of ecological sustainability contemplated in section 6 and the protection of priority biodiversity and ecological infrastructure; ensure human well-being and the long-term resilience of society and the economy through the conservation of protected areas, biodiversity, ecosystems, ecosystem services and ecological infrastructure".*

The Act is directly relevant to water scarcity and demand management planning, as it recognises the intrinsic link between healthy ecosystems and long-term water security.

The following provisions of the Western Cape Biodiversity Act are particularly relevant to water conservation and water demand management:

1. **Clause 6** requires every organ of state whose decisions or actions may affect biodiversity or the environment in the Province to apply the principles of ecological sustainability, including the requirements to:

- *"ensure that development does not undermine the long-term persistence and resilience of biodiversity, ecosystems and ecological infrastructure";*
- *"ensure that the conservation and resilience of biodiversity for the benefit of present and future generations are given priority over the interests of any member or members of any community"; and*
- *"ensure that a risk-averse and cautious approach is applied, so that where there is insufficient evidence that an activity will not cause a long-term adverse effect, it should be avoided".*

The Act defines *ecological infrastructure* as: ''*the naturally functioning ecosystems, including mountain catchments, water resources, coastal dunes, wetlands and nodes and corridors of natural habitat that together form networks of interconnected structural elements in the landscape that generate or deliver valuable ecosystem services to people".*

This definition recognises that water resources form part of a broader network of interconnected ecological systems that provide essential ecosystem services. As such, these provisions reinforce the need for a precautionary and sustainability-driven approach to water use.

1.3.1.3. Municipal Bylaws

City of Cape Town: Water bylaw (2010) and City of Cape Town: Water Amendment bylaw (2018):

The City of Cape Town Water By-law, 2010 and City of Cape Town Water Amendment By-law, 2018 provide the regulatory framework for the management of potable water supply systems, as well as domestic wastewater and sewage disposal services within the jurisdiction of the City of Cape Town (CoCT). The objectives of these by-laws include regulating water use, plumbing, and water installations, while promoting water conservation as a fundamental principle. The By-law defines *water conservation* as *"the act of saving or using water in an efficient manner."*

Chapter 3 of the By-law outlines water restriction and water conservation measures. It provides for the management of water scarcity and drought conditions and enables CoCT to prohibit or restrict the consumption of water where necessary to protect supply. It further includes provisions prohibiting the negligent or intentional wastage of water.

Schedule 1 of the By-law sets out specific measures relating to water conservation and water demand management. In this regard, Section 38 provides that: *"Any owner or consumer must comply with the good water conservation and demand management practices as set out in Schedule 1."*

These provisions establish a clear regulatory requirement for the incorporation of water-efficient design and infrastructure at the planning and building approval stage. The By-law requires that: *"Full details of any proposed water conservation and demand management system such as a grey water system, air conditioner or bleed-off for flushing toilets must accompany the building plans."*

Where it is not reasonably possible or cost-effective for a municipality to supply water to a consumer within a particular area, the relevant authority may determine an alternative means of water provision. Within the CoCT water supply is typically governed by a formal agreement between the property owner and CoCT, in the form of a Water Services Intermediary (WSI) application.

The proposed development will partially supply itself with sanitation (sewage treatment) and wholly with potable (drinking water) services and will require a Water Services Intermediary (WSI) agreement with CoCT in terms of the Water Services Act to be able to perform these functions. The WSI application has been submitted to the CoCT.

In addition, any boreholes drilled within the municipal area must be registered with CoCT. However, authorisation for the abstraction and use of groundwater remains subject to approval by the Department of Water and Sanitation (DWS) in terms of Section 39 of the National Water Act, 1998. The three production boreholes located onsite have been registered with the CoCT and have been authorised for use in terms of the NWA.

City of Cape Town: Treated Effluent By-Law

The City of Cape Town Treated Effluent By-law, 2010 and its amendment (2015) regulate the supply, use, and management of treated effluent within the jurisdiction of the CoCT. Treated effluent refers to water that has been processed at a wastewater treatment works and is suitable for controlled reuse, typically for irrigation or certain industrial applications.

The By-law facilitates the safe reuse of treated effluent as part of a resource-efficient urban water management strategy, thereby reducing reliance on potable water supplies and minimising wastewater discharge impacts. This aligns with broader municipal objectives of reducing waste, improving water efficiency, and protecting environmental quality.

In line with these objectives, the proposed Cape Winelands Airport (CWA) development intends to implement a dual wastewater management approach. This includes the development of an on-site wastewater treatment system to treat a portion of the sewage generated by the development. The treated effluent will be reused on site for non-potable purposes, including irrigation and use within a biodigester system, thereby reducing the demand for potable water.

The remaining wastewater that cannot be treated or reused on site will be discharged to the Fisantekraal Wastewater Treatment Works (WWTW) for treatment. This integrated approach supports both resource efficiency and compliance with municipal wastewater management infrastructure capacity.

1.3.2. Policy Framework (Strategies and Guidelines)

1.3.2.1. The United Nations Sustainable Development Goals (SDG's)

The United Nations Sustainable Development Goals (SDGs) comprise 17 global objectives aimed at achieving a more sustainable and equitable future by addressing social, economic, and environmental challenges. These include: No Poverty (SDG 1), Zero Hunger (SDG 2), Good Health and Well-being (SDG 3), Quality Education (SDG 4), Gender Equality (SDG 5), Clean Water and Sanitation (SDG 6), Affordable and Clean Energy (SDG 7), Decent Work and Economic Growth (SDG 8), Industry, Innovation and Infrastructure (SDG 9), Reduced Inequalities (SDG 10), Sustainable Cities and Communities (SDG 11), Responsible Consumption and Production (SDG 12), Climate Action (SDG 13), Life Below Water (SDG 14), Life on Land (SDG 15), Peace, Justice and Strong Institutions (SDG 16), and Partnerships for the Goals (SDG 17).

The SDGs provide an important international policy framework that informs sustainable development planning, including water resource management. This WSC/WDM Plan is particularly aligned with SDG 6 (Clean Water and Sanitation), which promotes the sustainable management and efficient use of water resources. The Plan also supports SDG 12 (Responsible Consumption and Production) through the implementation of water conservation measures, demand management initiatives, and the reduction of water wastage. In addition, the use of alternative water sources, water reuse, and resource-efficient infrastructure contributes to SDG 13 (Climate Action) by enhancing resilience to climate-related water risks and reducing dependence on potable water supplies.

As part of its Sustainability Strategy, CWA has adopted the vision of becoming "one of the greenest airports in the world." This vision is supported by five Strategic Pillars aligned with eight thematic goals and associated certification approaches, which collectively contribute to the achievement of SDG 11 (Sustainable Cities and Communities). Through the promotion of water conservation, circular water use, resource efficiency, and climate resilience, the proposed development supports the broader objectives of sustainable urban development and responsible environmental stewardship.

1.3.2.2. National Policies and Strategies

National Water Resource Strategy (NWRS) (2023)

The National Water Resource Strategy (NWRS) has been developed in response to the requirement stipulated in the National Water Act (NWA) (Act 36 of 1998). The latest version thereof is version 3 which was finalised in 2023. The National Water Resource Strategy 3 (NWRS-3) (2023) provides the overarching national framework for the protection, use, development, conservation, management, and control of water resources in South Africa. It guides water resource management at national, regional, and catchment levels, with a strong emphasis on sustainability, equity, and resilience.

The vision of the NWRS-3 is: *"The protection and management of water resources to enable equitable and sustainable access to water and sanitation services in support of socio-economic growth and development for the well-being of current and future generations."*

A central focus of the NWRS-3 is the reduction of water demand, the augmentation of supply where necessary, and the equitable allocation of water resources. WSC/WDM is identified as a key strategic intervention to achieve long-term water security. In this context, the NWRS-3 emphasises that reducing water demand requires the implementation of appropriate conservation and demand management measures to meet South Africa's social and economic needs, both now and in the future.

The Strategy defines *water conservation* as the minimisation of loss or waste, the protection of water resources, and the efficient and effective use of water. *Water demand management* is defined as the adaptation and implementation of strategies or programmes by a water institution or consumer to influence water demand and usage in order to achieve objectives such as economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services, and political acceptability.

In addition to demand reduction, the NWRS-3 identifies the need to increase and diversify water supply, including ensuring that water resource infrastructure is properly operated and maintained. It further highlights the importance of managing water and sanitation in the context of a changing climate, requiring proactive planning and adaptive responses to climate variability and its impacts on water resources, service delivery, and overall socio-economic resilience.

The proposed CWA development is aligned with the vision of the NWRS-3 and seeks to implement an independent, fully circular water cycle based on water harvesting, treatment, and reuse. This approach will be supported through measures aimed at reducing water demand and minimising wastage, while also incorporating alternative water sources, such as the reuse of treated effluent for irrigation and other suitable non-potable applications.

The NWRS-3 also sets out the strategy to plan, develop, manage, protect, and control the use of South Africa's water resources effectively for the future. The latest Water Sector Priority Focus Areas 2020 to 2030 are:

- Reducing water demand and increasing supply
- Redistributing water for transformation,
- Managing water and sanitation services under a changing climate,
- Regulating the water and sanitation sector,
- Improving raw water quality,
- Protecting and restoring ecological infrastructure for the green economy,
- Creating effective water sector institutions,
- Promoting international cooperation,
- Building capacity for action,
- Ensuring financial sustainability,
- Managing data and information in line with 4IR and global knowledge,
- Enhancing research, development, and innovation,
- Addressing legislative and policy gaps.

The proposed development will align with the following priority focus areas in line with its aim to be sustainable and water resilient in the long term:

- Reducing water demand,
- Managing water and sanitation services under a changing climate,
- Protecting and restoring ecological infrastructure for the green economy.

National Water Conservation and Water Demand Management Strategy (2004)

The National Water Conservation and Water Demand Management Strategy is a key component of the broader National Water Resource Strategy 3 (NWRS-3) and provides a strategic framework for improving water use efficiency and reducing unnecessary demand across all sectors.

The Strategy is founded on three core principles:

- Efficient supply by water institutions: Water institutions should supply water in an efficient and effective manner by minimising losses, through the reduction of leakage within water and sanitation infrastructure, and by actively promoting WSC/WDM measures to consumers.

- Efficient use by consumers: All water users are expected to use water responsibly and efficiently. This includes avoiding wastage—defined as water use that yields no direct benefit—and reducing consumption to within appropriate benchmarks for specific uses.
- Integration of WSC/WDM into planning: Water conservation and demand management must form an integral part of water resource and service planning across all sectors, including domestic, agricultural, industrial, and energy use. The implementation of WSC/WDM measures is often more cost-effective than developing new infrastructure and can delay or reduce the need for capital-intensive interventions such as dams or treatment works.

National Climate Change Policy (2011)

Government's National Climate Change Response Policy (NCCRP) was approved in October 2011 and was formally published as a White Paper in GG 34695, Notice 757. The motivation was to effectively manage climate change impacts through interventions that build and sustain South Africa's social, economic and environmental resilience and emergency response capacity, whilst also making a fair contribution to the global effort to stabilize Greenhouse Gas (GHG) concentrations in the atmosphere at a level that avoids dangerous anthropogenic interference with the climate system within a timeframe that enables economic, social and environmental development to proceed in a sustainable manner.

Following on this the National Climate Change Adaptation Strategy (NCCAS) was released in 2020 to provide a common vision of climate change adaptation and climate resilience for the country. It is based on the National Development Plan, the National Strategy for Sustainable Development, the adaptation commitments included in its Nationally Determined Contributions, sector adaptation plans, provincial adaptation plans and municipality adaptation plans. The NCCAS serves as South Africa's National Adaptation Plan and fulfils South Africa's commitment to its international obligations as outlined in the Paris Agreement under the United Nations Framework Convention on Climate Change (UNFCCC).

The main objectives are:

- Build climate resilience and adaptive capacity to respond to climate change risk and vulnerability.
- Promote the integration of climate change adaptation response into development objectives, policy, planning and implementation.

- Improve understanding of climate change impacts and capacity to respond to these impacts.
- Ensure resources and systems are in place to enable implementation of climate change responses.

The CWA proposed expansion project has aligned itself with the National government vision and strategies of climate change and sustainable development. A Climate Change Impact Assessment has been undertaken for the proposed project, and relevant mitigation measures included in the EMPr.

1.3.2.3. Provincial Policies and Strategies

Provincial Climate Change Policy (2022)

The 2014 Western Cape Climate Change Response Strategy was replaced by the Western Cape Climate Change Response Strategy Vision 2050: A vision for a resilient Western Cape (dated March 2022) which provides policy direction in response to climate-related risks and potential opportunities on a local government level by either creating or leveraging systemic innovative response programmes that tackle the region's vulnerability to droughts, heat and floods and take advantage of opportunities that will enable climate resilient development which fosters economic growth that is low-carbon and further creates an advanced Green Economy.

The main objectives are:

1. Responding to the Climate Emergency – Focus mainly on disaster management response, ensuring that spatial planning and development planning reduces risks to people, infrastructure, and assets.
2. Transitioning in an Equitable and Inclusive Manner to Net Zero Emissions By 2050 - Two crucial transitions are (1) a shift from internal combustion engines to electric mobility, and (2) a massive shift from fossil fuel-based energy to renewable energy sources.
3. Reducing Climate Risks and Increasing Resilience - through adaptation measures (humans and nature) and through well-managed natural systems, that can cope with the increasing climate impacts.
4. Enabling A Just Transition Through Public Sector, Private Sector and Civil Society Collaboration

The CWA proposed expansion project has aligned itself with the Provincial government vision and strategies of climate change and sustainable development. A Climate Change Impact Assessment has been undertaken for the proposed project, with relevant mitigation measures included in the EMPr.

Western Cape Water Resilience Strategy (2025 – 2035)

The Western Cape Water Resilience Strategy provides a provincial framework for strengthening water security and resilience in response to climate variability and change, increasing water demand, infrastructure constraints, and institutional capacity challenges. The vision of the strategy is to *"futureproof the Western Cape by ensuring water security and equitable access to water that meets the needs of all users."*

The strategy is guided by six key principles:

1. Equity and Access
2. Resource Stewardship
3. Responsible Water Resource Management and Use
4. Sufficient Water for Growth
5. Governance and Accountability, and
6. Policy Coherence and Innovation.

The WCWRS is structured around four focus areas:

1. Water Conservation and Demand Management (WSC/WDM)
2. Water Augmentation
3. Infrastructure Management, Development and Maintenance
4. Governance.

The proposed WSC/WDM Plan aligns with these focus areas by promoting the efficient and responsible use of water resources, reducing water losses through effective infrastructure management, and supporting demand reduction initiatives. The Plan further contributes to the strategy's water augmentation objectives through the use of treated effluent for irrigation and other non-potable demands, thereby reducing reliance on potable water supplies. Through the implementation of water conservation measures, alternative water sources, and proactive infrastructure management, the Plan supports the broader objectives of enhancing water resilience and contributing towards the provincial water security targets set out in the WCWRS.

1.3.2.4. Municipal Policies and Strategies

City of Cape Town Water Strategy (2019)

The City of Cape Town Water Strategy is a high-level strategic document that sets out the City's approach to water management, identifies key priorities, and articulates a set of core commitments aimed at achieving long-term water security and resilience. The strategy outlines the City's approach

to ensuring a sufficient and reliable water supply while improving resilience to climate variability and other potential shocks.

The vision of the Cape Town Water Strategy is as follows: *"By 2040, Cape Town will be a water-sensitive city that optimises and integrates the management of water resources to improve resilience, competitiveness and liveability for the prosperity of its people."*

To achieve the vision of becoming a water-sensitive city, the strategy sets out the following 5 commitments:

1. Safe Access to Water and Sanitation
2. Wise Use
3. Sufficient, Reliable Water from Diverse Sources
4. Shared Benefits from Regional Water Resources
5. A Water Sensitive City

The proposed development aligns with the principles of the CoCT Water Strategy by promoting the Wise Use of water through water conservation awareness, the adoption of a fitness-for-use approach, and the effective management of the internal water network to minimise losses and reduce non-revenue water. The development will utilise water from diverse sources, including groundwater and treated effluent, to meet non-potable water demands such as irrigation. Furthermore, the airport's sustainability strategy includes a commitment to achieving zero net municipal water extraction by 2042 through the implementation of a fully circular water cycle based on water harvesting, treatment, and reuse. These measures support the strategic objectives of Wise Use, Water from Diverse Sources, and the transition towards a Water Sensitive City as promoted by the City of Cape Town Water Strategy.

City of Cape Town Climate Change Strategy (2021)

In 2019, the City of Cape Town (CoCT) Climate Change Policy (2017) was reviewed and substantively amended to form a strategy with supporting policies, by-laws, and action plans as subsidiary instruments. The City of Cape Town Climate Change Strategy (2021) identified 10 Strategic Focus Areas (SFAs) identified as being critical to ensuring the implementation of the CoCT climate change vision and principles. The following SFA's are associated with water conservation and water demand management:

- SFA 2: Water Security and Drought-Readiness
- SFA 3: Water Sensitivity, Flood-Readiness and Storm Management

The City of Cape Town Climate Change Action Plan (2022) provides the local context and details the actions required to fulfil this strategic vision, whilst enabling and supporting local innovative opportunities for environmentally sustainable economic and social development.

According to the CWA Climate Change Impact Assessment "*The Western Cape Climate Change Response Strategy (WCCCRS, 2022) reports on projections of future climate for the province. The findings are formulated from an assimilation of climate change projections from multiple global climate models compiled by CSAG (2022) for the Department of Agriculture's SmartAgri plan update. The finding presented are based on projections forced by the SSP2-4.5 shared socio-economic pathway. SSP2-4.5 represents a "middle of the road" global response to climate changes where some level of mitigation is achieved (CSAG, 2022). Projections for the Western Cape indicate that temperatures will continue to rise. Expected increases in mean temperature averaged over the entirety of the Western Cape are 1°C to 1.8°C by 2060, in comparison to the recent past (1981-2010). Increases in temperature are also expected to result in a greater number of hot days (days exceeding 30°C). Projected increases in the number of hot days for the Western Cape ranges from 5 more hot day per year to 30 more hot days per year for inland regions (CSAG, 2022). Higher uncertainty is associated with projected changes in annual precipitation over the Western Cape, with some models predicting minor decreases and others suggesting that a decrease of 20% can be expected (CSAG, 2022). Potential evapotranspiration (PET), an indicator of evaporation, is expected to increase and is largely driven by the expected temperature increase, while the frequency of droughts in the Western Cape is also expected to increase (CSAG, 2022). Thus, a decrease in rainfall is expected for most regions of the Western Cape, and even when reductions in rainfall are not predicted, increasing temperatures will result in water availability challenges for the province. Rising surface temperatures and changing precipitation patterns can be considered chronic climate related physical risks that the CWA expansion will be subjected to, due to its positioning within the Western Cape.*"

As it relates to water conservation and water demand management, the CWA proposed expansion project has aligned itself with the National, Provincial and Local government vision and strategies of climate change and sustainable development in the following areas:

SFA 2: WATER SECURITY AND DROUGHT-READINESS

The site is developing potable water supply from boreholes on site and aims to treat to potable standard and supply its potable needs in the short to medium term. Potable supply from CoCT will be added in the medium to long term. The non-potable needs will be supplied by treated sewage water. This approach allows for minimised abstraction from boreholes and increased drought resilience in the short to medium term. Landscaping on site will be water resilient and include pathways and open

areas to minimise the need for irrigation. The site will also implement water-saving technologies, such as rainwater harvesting, reuse of treated water, efficient irrigation systems, drought resistant landscaping, low use flushing systems and taps, to minimize water consumption and promote responsible water use.

SFA 3: WATER SENSITIVITY, FLOOD-READINESS AND STORM MANAGEMENT

The site has a proposed stormwater design that will focus on preventing flooding or inundation of the airside runway, taxi, and apron areas. The landside development footprint will rely on designs that can cope with extreme rain events. The stormwater management plan has been developed as part of the EIA and it includes planning for storm and flood events.

CoCT Climate Change Policy (2019), CoCT Climate Change Strategy (2021) & CoCT Climate Change Action Plan (2022)

In 2019, the City of Cape Town (CoCT) Climate Change Policy (2017) was reviewed and substantively amended to form a strategy with supporting policies, by-laws, and action plans as subsidiary instruments. The City of Cape Town Climate Change Strategy (2021) identified 10 Strategic Focus Areas (SFAs) identified as being critical to ensuring the implementation of the CoCT climate change vision and principles. SFA 1 to 5 are climate change adaptation focused, SFA 6 has elements of both climate change adaptation and mitigation, and SFA 7 to 10 are climate change mitigation focused. The City of Cape Town Climate Change Action Plan (2022) provides the local context and details the actions required to fulfil this strategic vision, whilst enabling and supporting local innovative opportunities for environmentally sustainable economic and social development

The CWA proposed expansion project has aligned itself with the Local government vision and strategies of climate change and sustainable development. A Climate Change Impact Assessment has been undertaken for the proposed project, with relevant mitigation measures included in the EMPr.

2. WATER AUDIT AND WATER BALANCE

2.1. Data Collection

2.1.1. Purpose of Data Collection

Data collection is a critical component of a WSC/WDM Plan. Accurate and reliable data enables water service providers to develop informed, practical, and measurable water management strategies aimed at improving water use efficiency and reducing water losses.

The collection and monitoring of water-related data help water service providers understand water supply needs, water use patterns, and how well the water system is operating. Effective data collection supports the development of accurate water balances, which are essential for identifying non-revenue water and quantifying physical losses, such as leaks or inefficient processing systems, as well as commercial losses, including metering inaccuracies and unauthorised consumption. Improved understanding of water use patterns assists in identifying opportunities for implementing appropriate water demand management and conservation interventions.

In addition, accurate data enables operators and water managers to:

- assess current and future water demand requirements
- evaluate fit-for-purpose water use applications
- determine the potential for water reuse and recycling initiatives
- reduce operational and treatment costs
- improve infrastructure planning and operational efficiency
- identify opportunities for improved water management and water savings
- support management reporting and regulatory compliance
- improve long-term forecasting and strategic planning

Reliable and up-to-date information is important for effective decision-making, monitoring, and reporting. Furthermore, ongoing data collection allows the effectiveness of implemented interventions to be monitored and reviewed over time, ensuring that water management planning remains adaptive, efficient, and aligned with operational and regulatory requirements. Ultimately, effective data collection contributes to sustainable water resource management and promotes the efficient and responsible use of available water resources.

2.1.2. Baseline Information

As the proposed development is currently still in the planning and design phase, no operational or site-measured water use data is available at this stage. The current water demand projections and associated calculations are therefore based on engineering design information, accepted industry methodologies, and applicable planning and infrastructure standards.

The consulting engineers developed the estimated potable and non-potable water demands using recognised engineering design practices and the following applicable standards and guidelines:

- *Guidelines for Human Settlement Planning and Design ("The Red Book", 2019)*, published by the CSIR;
- *Minimum Standards for Civil Engineering Services in Townships* (July 2013);

- *SANS 1200: Standardised Specification for Civil Engineering Construction*; and
- *SANS 241:2015*.

For water demand and sewer planning purposes, land use allocations were determined in accordance with the methodologies contained in *The Red Book (2019)*. In instances where specific land uses were not explicitly defined within the guideline documentation, such as airport hangars, a process of rationalizing an equivalent land use or combination of lands uses was undertaken with appropriate reductions if deemed necessary. Estimated water demands were divided into potable and non-potable demand components using the guidance provided in *The Red Book (2019)*. Landscaping irrigation requirements were determined in consultation with the landscape architect and based on the proposed planting and landscaping plan.

It is recognised that the current estimated allocations remain preliminary and will be refined during the implementation and operational phases. At this stage, the available data should therefore be regarded as planning-level and design-based information intended to support infrastructure sizing, system design, and preliminary water demand assessments. The current estimates do not represent actual operational water consumption.

Once the development becomes operational, a comprehensive onsite data collection and monitoring programme will be implemented. Actual water consumption data, meter readings, system performance information, and operational records will be collected to establish an accurate and site-specific water use database. This information will be used to verify design assumptions, identify consumption trends, support water conservation initiatives, and improve the accuracy of future demand projections.

The estimated values contained in this WSC/WDM Plan will therefore be reviewed and updated as measured operational data becomes available. Over time, the plan will transition from reliance on projected engineering values to actual monitored consumption data.

2.1.3. Methods for Data Collection & Storage

The data collection and monitoring system for the development should be designed to provide accurate, reliable, and continuous information on water abstraction, treatment, storage, distribution, and use. As part of the vision to develop a sustainable airport aligned with green building principles, the CWA team aims to incorporate technologies, including advanced monitoring systems, that support efficient resource management and minimise water usage across the site. Water meter's must be installed at the main incoming supply points as well as at all major use points. This is the minimum requirement

All main incoming supply points as well as all major use points, treatment systems and storage systems should be fitted with electronic flow meters capable of providing real-time or near real-time monitoring data. Real-time, site wide, leak detection and monitoring systems should be installed for all potable water sources. The real-time leak detection system must have an hourly assessment of the potable water supply and consumption to compare uses. It should also include methods of messaging and alarming when leaks are detected, to facilitate real-time responsive action.

Metering systems should be integrated into a central management platform to enable automated data collection, data analysis, reporting, and alarm notifications where abnormal conditions or water losses are detected. All meters must provide continual information up to 1-hour interval readings as a maximum. All meters in the system must be capable of reporting hourly, daily, monthly and annual energy and water use. The monitoring system must accurately and clearly present the metered data showing consumption trends over a daily, monthly and annual period per meter. All monitoring data should be automatically logged and securely stored with appropriate backup systems to support the development of a comprehensive long-term operational database. The data collection system must be capable of storing all meter data for at least 36 months. The date and time of each monitoring event or sample collected should be recorded together with the relevant monitoring or analytical results. Where required, water quality analysis should be undertaken by a recognised analytical laboratory accredited by the South African National Accreditation System (SANAS).

Electronic flow meters must be installed to monitor borehole abstraction rates and volume. Daily abstraction volume must be recorded and compiled into monthly records. Furthermore, groundwater levels within production boreholes must be monitored monthly through manual water level measurements and the use of automated data loggers. Automated water level loggers must also be installed to enable daily or continuous water level monitoring.

Flow measuring, recording, and monitoring equipment must be maintained in a good working condition and calibrated or verified at appropriate intervals by suitably qualified personnel in accordance with manufacturer specifications. This should include a formal programme for inspection, maintenance, calibration, and replacement of monitoring equipment where necessary. Calibration and verification certificates for all monitoring devices should be retained and made available for inspection by the relevant authority upon request.

2.1.4. Data to be Collected

The development of an effective WSC/WDM plan must be based on a thorough understanding of the water supply system, including the condition, performance, and operation of existing infrastructure, patterns of water use by consumers, and the extent of both physical and administrative water losses.

The following aspects should be monitored as part of the WSC/WDM Plan.

2.1.4.1. Water Sources

Borehole Water Supply

The onsite production boreholes should be monitored to assess the sustainability, performance, and quality of the groundwater resource. Monitoring for each borehole should include to following (but not be limited to):

- Pumping rates as per Table 1
- Groundwater volume abstracted as per Table 1
- Groundwater levels and borehole recovery rates as per Table 1
- Borehole yield and performance trends over time;
- Energy consumption associated with pumping;
- Raw groundwater quality
- Signs of borehole deterioration, clogging, or contamination

Flow meters must be installed to monitor abstraction rates and volume. The amount of water abstracted must me recorded prior use of water. All water taken from the resource shall be measures, recorded and reported as follows:

- The daily quantity of water taken must be metered or gauged and the total recorded at the last day of each month; and
- The water level measurements must be taken on a monthly basis and the date, time and geographical location should be recorded;
- The Licensee shall keep record of all water taken and a copy of the records shall be forwarded to the Provinvial Head/CEO on or before 25 January and 25 July of each year

Each production borehole must be operated according to the recommended pumping rates specified in Table 1. Borehole abstraction volumes must be monitored and reported in line with sustainable yield assessment with adaptive pumping schedules implemented to protect the aquifer. The groundwater level in each production borehole must not drop below the critical water levels as outlined in Table 1, should any of the water levels drop below the critical water, the total abstraction must be reduced by 10%, monitoring will persist and after 30 days, in the water level in the borehole does not recover, abstraction must be reduced by a further 10%. This process must continue until the water level in the borehole recovers. Groundwater levels must be monitored monthly through manual

water level measurements and the use of automated data loggers. Automated water level loggers must be installed to enable daily or continuous water level monitoring.

Groundwater quality monitoring must be conducted bi-annually for full SANS 241- 1:2015 parameters. The risk-based parameters (hydrocarbons) as listed in Table 2 must be monitored quarterly to allow for the early detection of any fuel leaks or spillages that may pose a risk to groundwater quality. The geohydrological assessment also requires several additional parameters to be monitored as outlined in Table 3.

Groundwater quality results must not show a deteriorating trend; the groundwater quality must be maintained at the baseline levels established in the water quality date. Should the monitoring data indicate a deterioration in groundwater quality due to elevated parameters linked to contamination from the fuel storage tanks, WWTW, evaporation and overflow ponds, appropriate remediation measures must be implemented immediately to prevent further migration of contaminants into the aquifer system.

Table 1: Recommended pump rate and pumping schedule for production borehole

Site ID	Abstraction Rate (l/s)	Pumping duration (hrs/d)	Critical water level (mbgl)	Abstraction volume (m^3/a)
CWA_BH001	1.0	24	85	31 536
CWA_BH002	2.5	24	61	78 840
CWA_BH003	1.69	24	101	53 295
			Total volume	163 671

Table 2: Water quality parameters and monitoring frequency

Risk-based organics	
Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)	Quarterly
Gasoline Range Organics (GROs)	Quarterly
Total Petroleum Hydrocarbons (TPH)	Quarterly

Table 3: Proposed groundwater monitoring parameters for production boreholes (GEOSS, 2025).

Parameter	Frequency
Groundwater Level	Monthly
Chemical parameters	

pH (at 25°C)	Quarterly (Field Chemistry)
Conductivity (mS/m) (at 25°C)	Quarterly (Field Chemistry)
Total Dissolved Solids (mg/L)	Quarterly (Field Chemistry)
Turbidity (NTU)	Quarterly*
Colour (mg/L as Pt)	Quarterly*
Sodium (mg/L as Na)	Quarterly*
Potassium (mg/L as K)	Quarterly*
Magnesium (mg/L as Mg)	Quarterly*
Calcium (mg/L as Ca)	Quarterly*
Chloride (mg/L as Cl)	Quarterly*
Sulphate (mg/L as SO4)	Quarterly*
Nitrate & Nitrite Nitrogen (mg/L as N)	Quarterly*
Nitrate Nitrogen (mg/L as N)	Quarterly*
Nitrite Nitrogen (mg/L as N)	Quarterly*
Ammonia Nitrogen (mg/L as N)	Quarterly*
Total Alkalinity (mg/L as CaCO3)	Quarterly*
Total Hardness (mg/L as CaCO3)	Quarterly*
Fluoride (mg/L as F)	Quarterly*
Aluminium (mg/L as Al)	Quarterly*
Total Chromium (mg/L as Cr)	Quarterly*
Manganese (mg/L as Mn)	Quarterly*
Iron (mg/L as Fe)	Quarterly*
Nickel (mg/L as Ni)	Quarterly*
Copper (mg/L as Cu)	Quarterly*
Zinc (mg/L as Zn)	Quarterly*
Arsenic (mg/L as As)	Quarterly*
Selenium (mg/L as Se)	Quarterly*
Cadmium (mg/L as Cd)	Quarterly*
Antimony (mg/L as Sb)	Quarterly*
Mercury (mg/L as Hg)	Quarterly*
Lead (mg/L as Pb)	Quarterly*
Uranium (mg/L as U)	Quarterly*
Cyanide (mg/L as CN-)	Quarterly*

Total Organic Carbon (mg/L as C)	Quarterly*
E. coli (count per 100 ml)	Quarterly*
Total Coliform Bacteria (count per 100 ml)	Quarterly*
Heterotrophic Plate Count (count per ml)	Quarterly*
Total Petroleum Hydrocarbons (TPH)	Quarterly*
*Can be reduced to bi-annually or annually if reviewed and deemed appropriate	

Monitoring Infrastructure for production boreholes:

1. An “observation pipe” needs to be installed (32 mm inner diameter, class 10) from the pump depth to the surface, closed at the bottom and slotted for the bottom 5 – 10 m, for the production borehole. This allows for a ‘window’ of access down the borehole which enables manual water level monitoring and can house an electronic water level logger.
2. Care has been taken to equip the borehole in such a way that contaminants cannot easily enter the borehole, but due to the high vulnerability of the primarily aquifer, it is also advices that due diligence is followed when storing fuel and other contaminants, such as pesticides on the site. Over-fertilization should also be avoided as these nutrients could leach into the groundwater.
3. Continuous monitoring of groundwater levels using pressure transducers in the borehole is ideal. The water level in the boreholes may not drop below the critical water level (Table 1). If the water level in the borehole drops below the critical water level, abstraction must be immediately reduced by 10 %. Monitoring must continue and after 30 days, if the water level in the borehole does not recover to above the critical water level, abstraction must be reduced by a further 10%. This process must continue until the water level in the borehole is stable. If the low levels persist for more than 60 days, abstraction be stopped until the levels have been restored.
4. Water quality monitoring which includes sampling and analysis of the groundwater at an accredited laboratory is important. A sampling interval of quarterly is recommended for the first year of monitoring, thereafter, the water quality monitoring should be reviewed and can potentially be reduced to bi-annual or annually.
5. The monitoring data should be reviewed on quarterly basis for the first 2 years and can then be scaled down to bi-annually.
6. Installation of a sampling tap at the production borehole (to monitor water quality) is essential.

7. Installation of a flow volume meter at the production borehole (to monitor abstraction rates and volumes) is also important. External flow (e.g., mag-flow) meters are recommended.
8. Abstraction volumes must be monitored and recorded by a designated person on site. Depending on the frequency of use, daily, weekly or monthly abstraction should be recorded.
9. The appropriate borehole pump must be installed, i.e., not an over-sized pump that is choked with a gate valve. If the monitoring shows that more water can be abstracted, then the duration of pumping time can be increased (not the flow rate).
10. If required, the pump and borehole casing (and associated infrastructure) can be serviced annually and cleaned.
11. A geohydrologist should review the above information at least annually to ensure optimal groundwater abstraction and management occurs.
12. The relevant DWS monitoring officer (as specified in the Water Use Licence) should be informed if water levels are dropping to critical level in Table 1 or if any parameters, as specified in Table 6, changes by 20%.
13. The groundwater abstraction should be reviewed to ensure that it is sustainable based on the monitoring data obtained.

Municipal Water Supply

Water supplied by the City of Cape Town should be monitored to verify supply reliability and water quality. Monitoring should include (but not be limited to):

- Bulk potable water volumes supplied to the site
- Peak demand periods and consumption trends
- Water quality (if identified as an operational risk)
- Supply interruptions or pressure fluctuations

2.1.4.2. Water Treatment Systems

Potable Water Treatment System

The treatment system used for borehole water should be monitored to ensure compliance with potable water standards and efficient operation. Monitoring should include (but not be limited to):

- Inflow from boreholes and outflow product water volumes
- Water quality of incoming supply
- Water quality of product water (The licensee must ensure that the drinking water quality supplied meets South African National Standards for Drinking Water: SANS 0241)
- Volume of brine generation from treatment processes

- System downtime, alarms, and maintenance requirements
- Operational energy and chemical usage.

Wastewater Treatment System

The onsite wastewater treatment system should be monitored to ensure effective treatment and safe reuse of treated effluent for irrigation. Monitoring should include (but not be limited to):

- influent and effluent volumes
- wastewater quality entering the plant

treated effluent quality and compliance with irrigation reuse standards (refer The quantity of water containing waste irrigated must be metered and recorded daily. Monitoring for the quantity and quality of the water containing waste for irrigation must be done at the point where the effluent is piped into the irrigation dam. The samples taken at outlet point of the WWTWs or at the point where the effluent is piped into the irrigation dam must be analysed for the variables at the required frequencies (Table 4). The quality of water irrigated must be monitored once every month by taking a grab sample from the point at which wastewater enters the irrgation system for all parameters listed under Table 4 and the results must be submitted to the Department during annual audit report submission. Effluent Reuse - Treated effleunt qulaity must consistently comply with SANS 241:2015 (for potable use) and the CoCT Treated Effluent By-Lay (2009) (for non-potable use) before reuse or disposal.

- Table 4)

nutrient levels, salinity, microbiological quality and other parameters of treated effluent according to standards (refer The quantity of water containing waste irrigated must be metered and recorded daily. Monitoring for the quantity and quality of the water containing waste for irrigation must be done at the point where the effluent is piped into the irrigation dam. The samples taken at outlet point of the WWTWs or at the point where the effluent is piped into the irrigation dam must be analysed for the variables at the required frequencies (Table 4). The quality of water irrigated must be monitored once every month by taking a grab sample from the point at which wastewater enters the irrgation system for all parameters listed under Table 4 and the results must be submitted to the Department during annual audit report submission. Effluent Reuse - Treated effleunt qulaity must consistently comply with SANS 241:2015 (for potable use) and the CoCT Treated Effluent By-Lay (2009) (for non-potable use) before reuse or disposal.

- Table 4)
- volume of sludge production and disposal (method and disposal site to be confirmed)
- system failures, bypass events, or non-compliance incidents

- operational energy and chemical usage

The quantity of water containing waste irrigated must be metered and recorded daily. Monitoring for the quantity and quality of the water containing waste for irrigation must be done at the point where the effluent is piped into the irrigation dam. The samples taken at outlet point of the WWTWs or at the point where the effluent is piped into the irrigation dam must be analysed for the variables at the required frequencies (Table 4). The quality of water irrigated must be monitored once every month by taking a grab sample from the point at which wastewater enters the irrgation system for all parameters listed under Table 4 and the results must be submitted to the Department during annual audit report submission. Effluent Reuse - Treated effleunt qulaity must consistently comply with SANS 241:2015 (for potable use) and the CoCT Treated Effluent By-Lay (2009) (for non-potable use) before reuse or disposal.

Table 4: Quality of treated wastewater used for irrigation and variables to be monitored monthly (at point where treated wastewater enters irrigation dam / holding facility)

Variables	Baseline Limits
pH	5.5-9.5
Chemical Oxygen Demand (COD) (mg/l)	75
Electrical Conductivity (Ms/m)	150
Ammonia (mg/l)	3
Nitrate/Nitrate as Nitrogen (mg/l)	15
Suspended Solids (SS) (mg/l)	25
Soap, Oil & Grease (mg/l)	≤2.5
Chloride as Free Chlorine (mg/l)	0.25
Total coliform	Do not exceed 1000 per 100ml
E coli	Do not exceed 1000 per 100ml
Sodium Absorption Ration (SAR) (mg/l)	5

Effluent Discharge to Municipal Works

Where sewage is discharged to the nearby wastewater treatment works, monitoring should include:

- discharge volumes
- discharge quality where required
- reconciliation between wastewater generated onsite and wastewater treated or discharged
- system failures or non-compliance incidents

2.1.4.3. Water Distribution System

The internal potable and non-potable water reticulation systems should be monitored to identify losses, inefficiencies, and operational issues. Monitoring should include (but not be limited to):

- bulk water balances between supply, storage, treatment, and end use
- flow rates and pressures within the network
- storage tank levels and turnover rates
- leakage detection and unaccounted-for water
- meter accuracy and functionality
- consumption by precinct and user category

Furthermore, site-wide water metering systems for each building/lot and must be connected to a real-time leak detection system. Real-time leak detection must have an hourly (or more frequent) automatic assessment of the potable water supply and consumption to compare uses. It should also include methods of messaging and alarming when leaks are detected, to facilitate real-time responsive action.

2.1.4.4. Water Use and Demand Monitoring

Construction Phase

Construction-related water use should be monitored separately to distinguish temporary demand from long-term operational demand. Monitoring should include (but not be limited to):

- supply volume and sources available for construction
- quality of source water
- total construction water use
- water used for dust suppression, concrete works, cleaning, and temporary facilities
- potable water used for construction
- construction-related wastewater generation

Operational Phase

Operational water demand should be monitored by user category and activity to support demand management and efficiency initiatives. Monitoring should include (but not be limited to):

Passenger and Public Facilities:

- ablution and sanitation usage
- terminal building cleaning usage
- retail, restaurant, and hospitality water use

Airport Operations and Staff Facilities:

- ablution and sanitation usage
- office etc. cleaning usage
- maintenance facility water use
- firefighting system testing and reserve requirements
- aircraft-related operational water use

Commercial and Industrial Users

- office and commercial tenant consumption
- logistics, warehousing, and cargo water use
- cooling systems or specialised industrial uses

Irrigation and Environmental Areas

- irrigation water volumes - the quantity of water containing waste irrigated must be metered and recorded daily
- irrigation of rehabilitation areas during establishment
- irrigation scheduling and seasonal demand
- soil moisture and irrigation efficiency where applicable

2.1.4.5. Water Quality & Volume Monitoring

Water quality and quantity monitoring must be undertaken throughout the system to ensure the protection of the aquifer and stormwater environment, verify compliance with applicable water quality standards at end-use points, and assess potential risks at identified high-risk locations.

Aquifer Monitoring:

As per the conditions of the EA a detailed, standalone Groundwater Monitoring and Management Plan must be implemented. A copy of the detailed standalone Groundwater Monitoring and Management Plan approved by the DWS must be submitted to this Directorate for record purposes prior to the operation of Phase 1.

The detailed standalone plan must however be drafted prior to the construction and development phase. The groundwater monitoring programme must be maintained throughout the water use license period to safeguard groundwater resources, and a groundwater monitoring report must be submitted to DWS/BOCMA annually to ensure compliance and optimize groundwater management practices. The report must include records of the abstraction volume, monthly groundwater level recordings and water quality results.

Prior to the development of the required standalone plan, the following general management plan has been developed and will form the basis of the detailed Groundwater Monitoring and Management Plan:

It is recommended that several groundwater sites should be monitored at the proposed site during the construction and development phases on site. This will allow for monitoring of the groundwater quality and groundwater levels across the site. Monitoring sites need to be strategically placed, typically in the vicinity and downgradient of high-risk activities. Groundwater flow in the area generally mimics the topography, flowing towards topographical lows. It is recommended that several local monitoring sites be located across the site to identify any potential impact of the proposed land uses.

The preliminary suggested monitoring sites are presented in Table 5 and illustrated in Figure 12, however these monitoring points may change based on the final development layout within each approved precinct and will be finalised within the standalone plan. The monitoring boreholes will be installed during the construction phase. As and when each monitoring borehole is installed it should start to be monitored as per the developed monitoring plan.

Table 5: Details for the proposed monitoring sites (GEOSS, 2025) * [Subject to change]

Site_ID	Latitude	Longitude	Location	Depth (mbgl)
CWA_BH001	-33.76452	18.73271	Existing borehole	100.0
CWA_BH002	-33.76876	18.732067	Existing borehole	100.4
CWA_BH003	-33.774037	18.747742	Existing borehole	149.9
MBH1	-33.748832	18.727907	Proximal to the WWTW	Until the clay layer/bedrock is reached
MBH2	-33.751598	18.729944	Proximal to the Biogas plant and fuel farm	Until the clay layer/bedrock is reached
MBH3	-33.753503	18.732373	Proximal to the Biogas fuel farm	Until the clay layer/bedrock is reached
MBH4	-33.755629	18.730166	Proximal to the stormwater retention pond (quarry)	Until the clay layer/bedrock is reached
MBH5	-33.755713	18.736537	Airside activities	Until the clay layer/bedrock is reached
MBH6	-33.760356	18.734556	Airside activities	Until the clay layer/bedrock is reached

MBH7	-33.761442	18.730469	Proximal to the Energy Centre	Until the clay layer/bedrock is reached
MBH8	-33.764807	18.730847	Proximal to the retail service station	Until the clay layer/bedrock is reached
MBH9	-33.769336	18.731523	Boundary of the CWA, to screen potential contaminants upgradient of neighbour	Until the clay layer/bedrock is reached
MBH10	-33.773944	18.735199	Boundary of the CWA, to screen potential contaminants upgradient of neighbour	Until the clay layer/bedrock is reached
MBH11	-33.772721	18.747079	Airside activities	Until the clay layer/bedrock is reached
MBH12	-33.763444	18.742089	Airside activities	Until the clay layer/bedrock is reached
*Please note: The proposed monitoring points are subject to change based on final internal precinct layouts. The final location of monitoring points will be clarified in the detailed stand-alone plan and this WSC/WDM plan will be updated accordingly.				

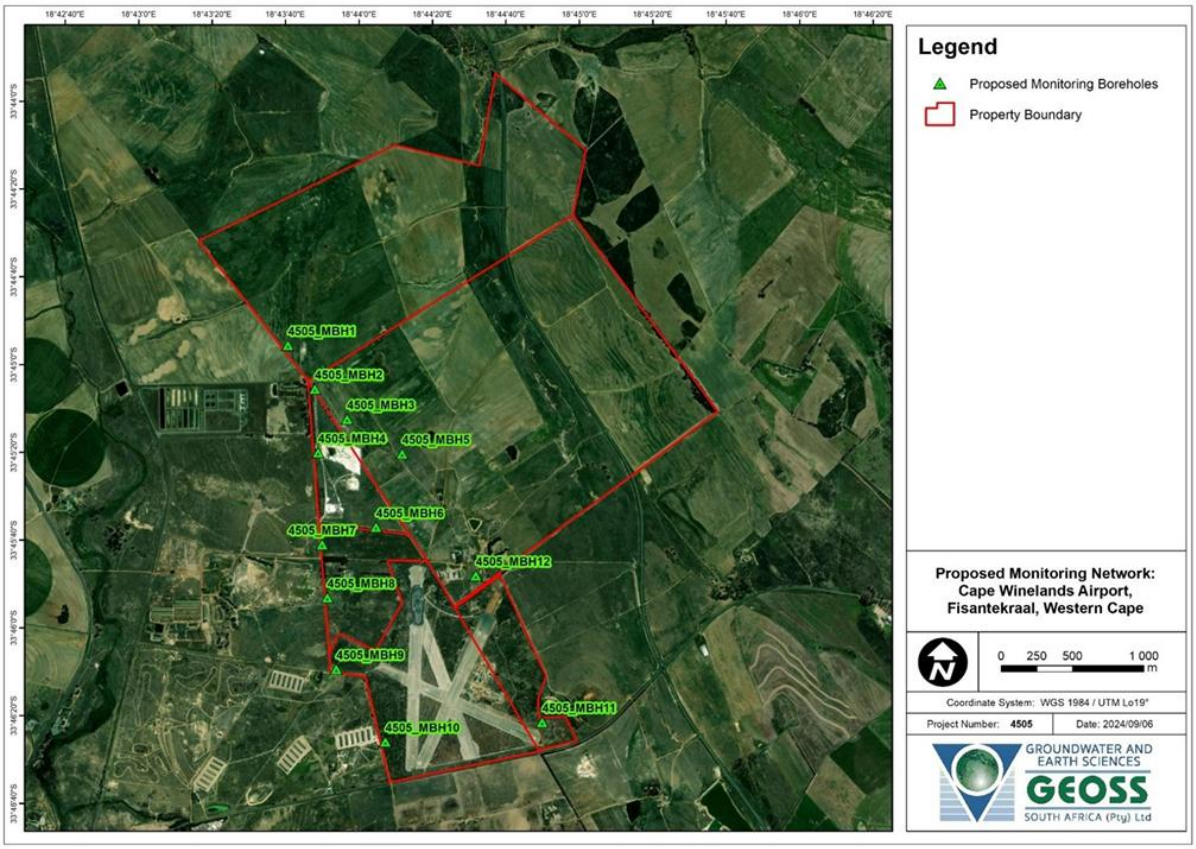


Figure 12: Proposed groundwater monitoring locations across the Cape Winelands Airport development (GEOSS, 2025) [*Please note: The proposed monitoring points are subject to change based on final internal precinct layouts. The final location of monitoring points will be clarified in the detailed stand-alone plan and this WSC/WDM plan will be updated accordingly.}

Construction Specifications:

The drilling of boreholes should be supervised by a hydrogeologist, and drill samples should be collected every 1 metre and logged. Additional information should also be collected such as the depth of water strikes, associated water strike yields and groundwater quality. This is crucial information for the optimal design of the boreholes. The driller should be supervised to ensure all site requirements are met.

A graphical representation of a proposed borehole construction is presented in Figure 13; the exact construction will, however, be unique for the borehole. The boreholes are to be drilled by means of rotary drilling until the clay layer or bedrock is reached. A gravel pack should be installed with an annulus of about 12 mm. The boreholes should be developed with compressed air for at least two hours upon completion along with an airlift test to estimate the yield of the borehole. Each borehole must be protected with a concrete block or a protected manhole if there is traffic in the area. Each borehole also needs a permanent plate glued to the lid containing the details pertaining to the borehole. A bentonite plug of at least 500 mm needs to be installed at the top of the hole to prevent ingress of surface water.

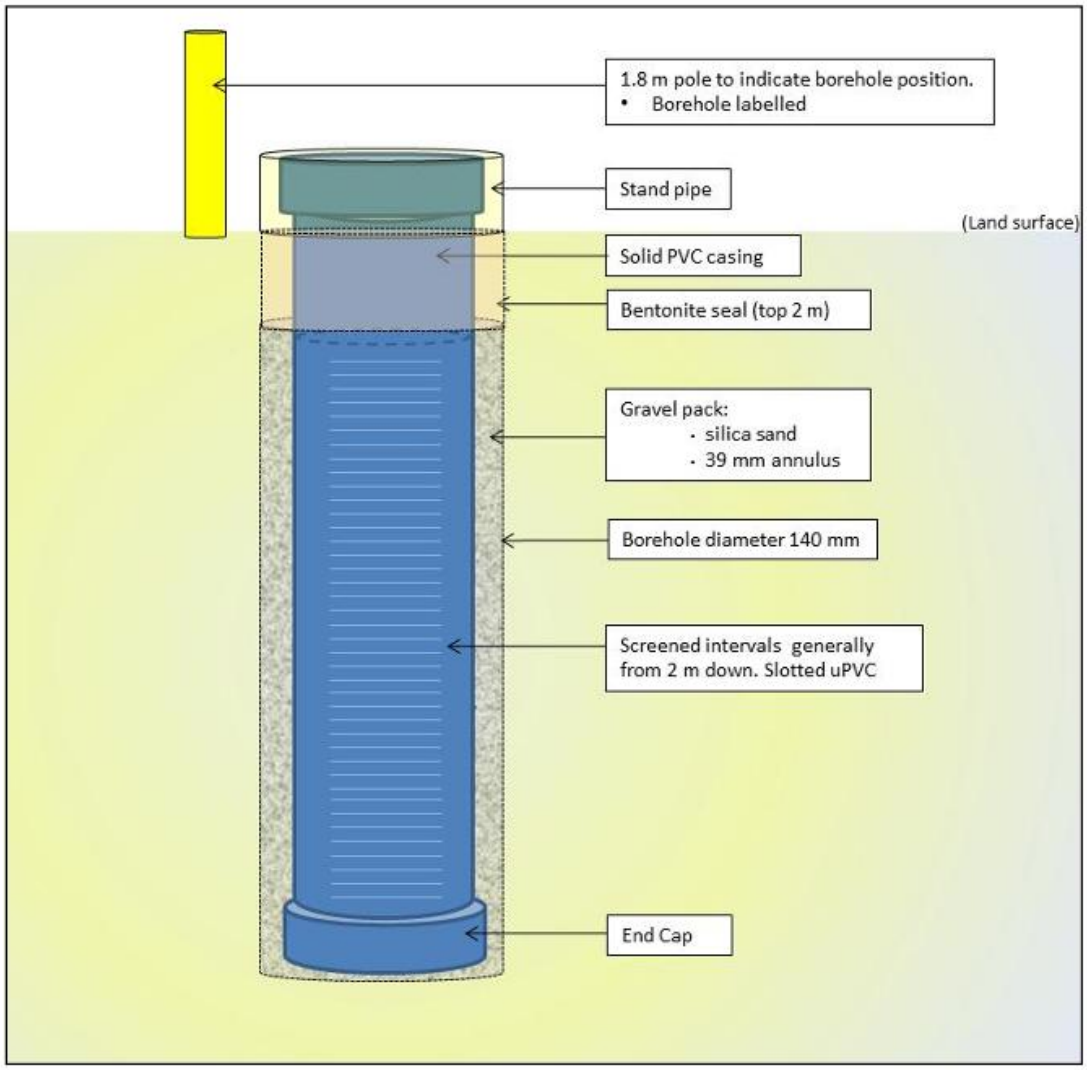


Figure 13: Schematic representation of the proposed general borehole construction (GEOSS, 2025).

Groundwater level monitoring:

It is recommended that monthly groundwater level measurements are taken at all recommended monitoring points to determine seasonal fluctuations. A dip meter can be used to measure the water level below the top of the borehole collar/casing height (mbch). The height of the collar/casing height must then also be measured (m). The water level (metres below ground level (mbgl)) can then be calculated by subtracting the collar/casing height from the water level (mbch). The value must be recorded along with the date and time of measurement.

Groundwater quality monitoring:

It is recommended that the water quality on site is monitored on a quarterly basis for the first year, after which the frequency can be reduced based on the first year's monitoring results. It is recommended that the monitoring wells be purged prior to sampling. A low volume sampling pump

can be used, or the site can be bailed and allowed to recover prior to sample collection. When using a low volume sampling pump, the groundwater should be pumped through a flow-through cell until field chemistry parameters have stabilised.

Sample Collection, Preservation and Submission:

Sample bottles must be labelled with the site name, borehole name and date. At the time of sampling, field chemistry parameters must be measured and recorded. These include electrical conductivity (EC), oxidation reduction potential (ORP), pH, temperature and dissolved oxygen (DO). During sampling, disposable nitrile gloves should be worn to minimise the transfer of any potential contaminants. Nitrile gloves should be dedicated to a sampling location and disposed of after use. Samples must be collected in an appropriate sampling container and preserved in the correct manner prior to submission to an accredited laboratory for the analysis parameters. The sample method and preservation must be discussed with the laboratory prior to sampling.

Monitoring Frequency and Parameter Analysis:

In order to best understand and monitor the site, it is recommended that monthly water level measurements be taken to determine seasonal fluctuation. It is further recommended that the water quality on site is monitored on a quarterly basis for the first year, after which the frequency can be reduced based on the first year's monitoring results. Groundwater monitoring needs to target the risk of the activity, i.e. organic and microbiological parameters need to be monitored in close proximity to the solid waste storage, and WWTW; BTEX, TPH and GROs need to be monitored in close proximity to fuel storage and dispensing operations, etc. Once the site is approved and the intricate details of the services are made available, a more detailed, standalone monitoring programme report will need to be developed prior to the construction and development phase. Table 6 indicates the potential parameters for ongoing monitoring, this will be revised upon approval and development of the CWA.

Table 6: Proposed groundwater monitoring parameters for production boreholes (GEOSS, 2025).

Parameter	Frequency*
Groundwater Level	Monthly
pH	Quarterly
Electrical conductivity (EC)	Quarterly
Total Dissolved Solids (TDS)	Quarterly
Inorganic parameters: K, Cl, NO3, NH4, P, Na, Ca, HCO3	Quarterly
Metals: Fe, Mn, Al, Ti, Cr, Cd, Pb, Ni	Quarterly

Total Organic Carbon (TOC)	Quarterly
Biological Oxygen Demand (BOD)	Quarterly
Chemical Oxygen Demand (COD)	Quarterly
Heterotrophic Plate Count	Quarterly
Total Coliforms	Quarterly
E. coli	Quarterly
BTEX	Quarterly
Gasoline Range Organics (GROs)	Quarterly
Total Petroleum Hydrocarbons (TPH)	Quarterly
* Frequency of chemistry sampling may be revised after one year of data has been collected but level monitoring should continue on a monthly basis.	

Stormwater Monitoring

Stormwater monitoring must be undertaken to verify the effectiveness of stormwater management measures and protect surface water, wetlands, and groundwater from contamination.

The approved Stormwater Management Plan must be implemented and maintained throughout the life of the project. Attenuation ponds, channels, drains, culverts, and other stormwater infrastructure must be routinely inspected and maintained to ensure their continued functionality and to prevent erosion, sediment accumulation, blockages, and uncontrolled discharges.

Clean and dirty water systems must remain separated. Clean stormwater must be diverted away from potentially contaminated areas and discharged in an attenuated and controlled manner. Dirty stormwater must be contained and routed to the appropriate treatment, storage, or attenuation facilities. Diversion channels and containment structures must be designed to accommodate at least the 1:50-year flood event.

Monitoring will focus on stormwater discharge points, attenuation facilities, and high-risk pollution sources, including fuel storage areas, underground tanks, service stations, and wastewater treatment facilities. Particular attention must be given to identifying contamination pathways that may facilitate infiltration into the subsurface via boreholes, service trenches, stormwater infrastructure, or other preferential flow paths. Any evidence of contamination, infrastructure failure, erosion, or non-compliance shall trigger corrective action to prevent impacts on receiving water resources.

Monitoring at points of use

Monitoring should include (but not be limited to):

- Potable water quality compliance at points of use – the licensee must ensure that the drinking water quality supplied meets South African National Standards for Drinking Water: SANS 0241 inclusive of WSI monitoring requirements which will be clarified once the WSI agreement has been finalised. The minimum monitoring requirements for potable water monitoring as outlined in the Service Infrastructure Management Plan (Zutari, 2026), must be implemented.

Preventative Monitoring

The preventative maintenance and monitoring schedule as outlined in the Service Infrastructure Management Plan (Zutari, 2026) must be implemented to ensure potential risks associated with wastewater and effluent management are suitable managed.

2.1.4.6. WSC/WDM Performance Monitoring

To evaluate the effectiveness of the WSC/WDM Plan, the following indicators should be monitored and reported on regularly:

- Total water demand vs supply (potable and non-potable)
- Percentage of water supplied from boreholes versus municipal supply
- Treated effluent reuse volumes
- Water losses and non-revenue water
- Compliance with water conservation targets
- Trends in water efficiency improvements
- Current use and target use volumes for the site (potable and non-potable), including benchmarks
- Measures implemented to improve water use efficiency on site, including retrofitting measures post implementation
- Reporting on awareness raising amongst staff, workers and stakeholders in terms of water conservation and water demand management initiatives.

2.1.5. Frequency of Data Collection & Storage

The following monitoring frequencies and reporting requirements represent the minimum compliance monitoring requirements for the development. In addition to these requirements, best practice monitoring frequencies and operational procedures will be implemented onsite as determined by the design engineer and operational specialists once the detailed infrastructure design, particularly the water and wastewater treatment systems, has been finalised and commissioned.

Daily water abstraction volumes shall be metered and the total quantity of water abstracted shall be recorded at the end of each month. The quantity of water containing waste that is irrigated onsite shall also be metered and recorded daily.

Groundwater level measurements shall be undertaken on a monthly basis. Each measurement shall include the date, time, and geographical location of the monitoring point. The Licensee shall maintain records of all water abstracted, and copies of these records shall be submitted to the Provincial Head, Chief Executive Officer, or authorised representative on or before 25 January and 25 July of each year.

Groundwater quality monitoring shall be conducted bi-annually for the full suite of applicable SANS 241-1:2015 parameters. In addition, risk-based parameters, including hydrocarbons and other contaminants associated with fuel storage and operational activities, shall be monitored quarterly to allow for the early detection of leaks, spillages, or contamination events that may impact groundwater quality. Please refer to Table 2, Table 3 and Table 6 for the proposed groundwater monitoring parameters and their associated monitoring frequency.

Groundwater quality results shall be reviewed regularly to identify any deteriorating trends. Groundwater quality shall be maintained at or better than the established baseline conditions. Should monitoring data indicate deterioration in groundwater quality associated with fuel storage tanks, wastewater treatment systems, evaporation ponds, overflow ponds, or any other operational source, appropriate remediation and containment measures shall be implemented immediately to prevent further migration of contaminants within the aquifer system.

The Licensee shall establish a wastewater quality monitoring programme to monitor the quality of treated effluent prior to irrigation reuse. Wastewater quality shall be monitored monthly through grab sampling at the point where treated effluent enters the irrigation system. Monitoring shall include all parameters specified in Table 4 and may not exceed the quality of the variables as outlined in Table 4. Monitoring results shall be submitted to the Department as part of the annual audit reporting process.

All monitoring data shall be recorded, stored, and managed within a centralised database system to support compliance reporting, operational management, trend analysis, and long-term water resource management.

2.2. CWA Water Balance

A water balance is a fundamental water management tool used to account for all water entering, being used within, and leaving a site. It provides a structured method of quantifying water use,

identifying losses, evaluating water use efficiency, and assessing compliance with authorised water use limits.

The water balance should outline all water sources supplying the site, including groundwater abstraction, municipal water supply, treated effluent and any other water sources utilised on site as well as all water uses onsite throughout the construction and operational phases. All water inputs and outputs shall be measured over time with measurements on a monthly basis and consolidated into an annual water balance. The water balance must facilitate the quantification of:

- Total incoming water volumes.
- Water used during construction activities.
- Water used for operational activities (broken down per activity)
- Water discharged, reused, recycled, or otherwise exported from the site.
- Water losses and unaccounted-for water.
- Verification that all water volumes are accounted for, including both authorised uses and losses.

The water balance must allow for the assessment of actual abstraction volumes against authorised abstraction limits to determine compliance with water use authorisations.

The consulting engineers for the proposed development have outlined a concept water balanced based on available supply and estimated demand values. As additional data are collected over time, the water balance should be progressively refined and compared against the concept water balance. The accumulation of reliable data over several years will enable trend analysis, validation of projected water demands, identification of inefficiencies, and reassessment of water management assumptions where necessary.

As a long-term objective, the Licensee should establish a comprehensive, preferably computerised, water balance system capable of determining:

- System Input Volume.
- Authorised Consumption.
- Non-Revenue Water (NRW).
- Apparent Losses (e.g. meter inaccuracies, unauthorised consumption, and theft).
- Real Losses (e.g. leaks and physical water losses from infrastructure).

The concept water balance in Table 7 serves as a template indicating the information that should ultimately be captured and monitored within the system.

The Licensee shall update the water balance annually and calculate the loads of waste emanating from site activities. The Licensee shall determine the contribution of its activities to the mass balance of the receiving water resource and, where applicable, cooperate with other water users within the catchment to determine the mass balance at the relevant water resource reserve compliance point.

Table 7: Concept Water Balance Outline

Concept Water Balance Strucutre																		
Months	Water Demand (m^3)								Supply (m^3)								Surplus/Deficit	
	PAL 1A Water Use (e.g., Industrial Use, Domestic Use etc)						Total Potable Demand (m^3/a)	Total Non-Potable Demand (m^3/a)	Municipal supply available	On Site Treated Sewer Effluent (m^3)	Groundwater abstracted (m^3)			Groundwater supply treated to potable levels	Total Potable Supply (m^3/a)	Total Non Potable Supply (m^3/a)	Total Potable Supply VS Demand (m^3/a)	Total Non-Potable Supply VS Demand (m^3/a)
	Demand Activity 1 (e.g Terminal Building)			Demand Activity 2 (e.g. Warehousing)							BH_001	BH_002	BH_003					
	Potable Use	Non Potable Use (Toilets)	Non Potable Use (Irrigation)	Potable Use	Non Potable Use (Toilets)	Non Potable Use (Irrigation)												
January																		
February																		
March																		
April																		
May																		
June																		
July																		
August																		
September																		
October																		
November																		
December																		
Total (m^3/a)																		

3. WATER CONSERVATION AND DEMAND MANAGEMENT OBJECTIVES

3.1. Strategic Objectives

The United Nations Sustainable Development Goals (SDG's) interconnect environmental, social and economic aspects of sustainable development by emphasizing sustainability.

The 17 SDGs are: No poverty (SDG 1), Zero hunger (SDG 2), Good health and well-being (SDG 3), Quality education (SDG 4), Gender equality (SDG 5), Clean water and sanitation (SDG 6), Affordable and clean energy (SDG 7), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG 9), Reduced inequalities (SDG 10), Sustainable cities and communities (SDG 11), Responsible consumption and production (SDG 12), Climate action (SDG 13), Life below water (SDG 14), Life on land (SDG 15), Peace, justice, and strong institutions (SDG 16), Partnerships for the goals (SDG 17). According to a preliminary study conducted by industry specialists the proposed CWA project is aligned with several of the above listed SDGs of which SDG 13 (Climate Action) drives the sustainable use of water on site.

The following objectives reflect the initial strategic approach to this plan:

- Environmental protection of resources on site and ensuring their sustainable use
- Economic efficiency of water uses on site in terms of volumes abstracted, their costs to treat and long-term conservation of the quality of the underlying aquifer
- Climate resilience through water conservation, decreasing the need for water where possible and enabling greater reuse over time
- Enabling staff and stakeholders' greater awareness to drive water conservation on all levels of operation and engagement
- Incorporating water sensitive urban design and irrigation layout to enable reduction in water demand
- Continuously exploring alternative water sources or the option of greater reuse of treated water to decrease the reliance on potable or groundwater sources

3.2. Specific Targets

The requirement for this plan is based on setting annual targets to improve water use efficiency, beneficiation and enabling greater alternative sources or reuse, and stipulating measures to achieve

these targets. Targets should be set as measurable, time bound and linked to industry benchmarks. Metering of consumption at various levels of intake, discharge and internal transfer stages enables the determination of the on-site performance.

Targets are set against the concept water balance for all water uses on site, and will be reported on an annual basis:

- Performance against targets set
- Retrofitting measures implemented over the last reporting period
- Reduction in total demand (potable and non-potable)
- Improvements in water use efficiency against benchmarks and targets set

Targets will be reviewed and further developed during the operational phase and evolve over time as new technologies are explored and strategic focus areas are further developed.

3.3. Key Performance Indicators

The determination of KPI's will initiate with the determination of performance benchmarks in industry and then setting internal performance goals over and above the benchmark value.

Linked to the KPI's will be various management aspects such as:

- Infrastructure maintenance to enable minimal to zero losses
- Retrofitting of water saving initiatives.
- Regular Groundwater user group Stakeholder engagement

KPI's will be developed with the CWA management team, based on internal strategic and economic goals and will be updated in the final report.

4. WATER CONSERVATION AND WATER DEMAND MANAGEMENT MEASURES

4.1. Technical Measures

The preventative maintenance and monitoring schedule as outlined in the Service Infrastructure Management Plan (Zutari, 2026) must be implemented to ensure suitable water and treated effluent management on site.

Proposed measures include:

- Pressure management (reducing excessive pressure to lower leakage risk).
- Pipe replacement and infrastructure repair schedule.
- Internal meter network management (installation and auditing), to allow early detection of leaks or losses, excessive usage by internal tenants and areas that need possible design or innovation intervention to enable lower usage.
- Retrofitting new technology to enable lower consumption

4.2. Management Measures

Internal management measures will allow the effective implementation of technical measures:

- Continuous improvement at a management level to introduce new technology and innovation to enable lower consumption on site.
- Implementing smart, cost-reflective internal water tariffs to tenants to discourage over consumption and to cover maintenance, pumping, abstraction costs.
- Budget provision to enable design interventions.
- Awareness creation with internal tenants regarding water consumption KPI's and encouraging tenants to highlight areas where additional savings can be put in place.
- On -site CoCT By-law enforcement regarding water waste.
- Landscaping design to remain indigenous and water smart where new areas are to be built or buildings reconfigured.
- Water savings initiatives to remain in place for buildings refurbished over time.
- Timeous maintenance on WWTW, sewer distribution system to enable treatment to DWS standards and no reliance on borehole water for irrigation
- Exploration of alternative water sources such as roof water to supplement water intake

4.3. Monitoring Measures

The CWA site should develop a staggered internal metering system to enable measurement at crucial points:

- Borehole abstraction meters
- Potable plant intake meter
- Potable plant outflow meter
- Potable intake from CoCT
- Intake meter for potable water per building
- Sub-meters per tenant within buildings
- WWTW intake meter
- WWTW treated water outflow meter to irrigation
- WWTW outflow meter to Fisantekraal WWTW

These measurements will be on quality and volume as required, and feed into the water balance for the site.

4.4. Education and Awareness

Effective awareness creation of staff and stakeholders will enable continuous innovation and drive down consumption, and in doing so foster a culture of water conservation.

This can be achieved through various measures:

- On-site awareness campaigns to create awareness with the public using the airport
- Formal communication to on-site tenants, service providers and contractors
- Adjacent landowner and other stakeholder engagement through existing forums

5. IMPLEMENTATION PLAN

5.1. Action Plan

This plan will become more detailed during the operational phases of the Cape Winelands Airport, with future revisions providing more detail.

The following action items are considered appropriate for the current development phase:

1) Develop concept water balance for site and include benchmark values. Concept water balance should include potable and non-potable needs for site.

2) Develop potable metering layout based on internal potable reticulation system

3) Develop sewer metering layout and treated sewer metering layout based on sewer layout, including sewer line to Fisantekraal WWTW.

4) Develop water quality monitoring programme, inclusive of the groundwater monitoring plan requirements and the WSI requirements.

5) Develop initial intervention or design initiatives based on initial benchmarks.

6) Develop initial communication for on-site, stakeholder and internal CWA awareness

The above action plan should form part of the provision in the annual operational budget for the site, be reviewed on an annual basis and should translate into projects to be initiated, completed and implemented on site.

5.2. Roles and Responsibilities

The action plan in section 5.2 above should be assigned to various responsible personnel within the CWA structure, with the implementing agent being the engineering department and the monitoring agent being the environmental department.

5.3. Resource Requirements

5.3.1. Financial

The success of this plan depends on the human and financial resources being assigned to the various departments (engineering, environmental and communication). Once the scope of each action item

is determined, a Terms of Reference will be compiled and determined whether the scope can be completed internal or to be outsourced to a technical specialist / company.

5.3.2. Human Resources

As mentioned in Section 5.3.1 the plan will not be effective if the various CWA internal departments are not enabled through making human resources available within the various departments (engineering, environmental and communication). An internal working team composed of representation from these departments can drive the initial development of action items, determine budget items and assign responsibilities for implementation.

This includes competent individuals within these departments or outsourcing where these skills do not exist and are only needed in the short term.

Where skills will be required longer term, technical skills should be developed within the various departments (engineering, environmental and communication).

6. MONITORING AND EVALUATION

6.1. Key Performance Indicators

KPI's will be developed with the CWA management team, based on internal strategic and economic goals and will be updated in the final plan.

KPI's should be incremental, achievable, and time linked, linked to the CWA strategic objectives and should be monitored and evaluated to establish applicability and performance.

6.2. Monitoring Framework

The monitoring framework will be based on the metering network as described in section 4.3. The network should be maintained and meters calibrated at the required annual interval and according to a set programme with records of maintenance and calibration kept for annual auditing and reporting purposes to DWS.

6.3. Reporting Structure

The following reporting should form part of the monitoring requirements:

- Checklist on maintenance of metering network
- Meter readings (automatic) on a daily basis (as a minimum)
- Quality records against set sample points (inclusive of groundwater network)
- Monthly performance reporting to CWA internal departments
- Reporting to DWS on groundwater use and quality
- Annual reporting to CWA management – targets set, performance against targets and areas of future focus

6.4. Performance Reviews

Review of strategies, approach, communication plans, design and overall performance in terms of water demand management, should be on a regular basis. The time period should be annual as a minimum, and be used to inform the planning for the next financial year.

6.5. Adaptive Management

This plan enables continuous improvement through constant monitoring, measurement, and corrective actions. Key performance strategies, KPI's and benchmarks should be amended as the operational phase unfolds over time. An adaptive management approach, where new solutions are sought when previous proposals are not efficient enough, should be the norm.