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SECTION 5.5: LAND AND WATER USE

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Name: T. Florence

Date: 15/03/2024

Peer Reviewer: I declare that this report has undergone independent peer review by myself, that comments were addressed to my satisfaction, and that as such, it is considered fit for publication.

Name: P. Smit

Date: 15/03/2024

Project Manager Authorisation:

Name: D. Holmes

Date: 15/03/2024

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Project Partner Authorisation:

Name: B. Engelsman

Date: 15/03/2024

SRK Consulting - Certified Electronic Signature

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Eskom NSS Technical Lead Acceptance

Name: A. Killian

Date: 15/03/2024

Eskom NSS Employer's Agent Acceptance

Name: F. van Mosseveld

Date: 15/03/2024

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AMENDMENT RECORD			
Rev	Draft	Date	Description
0		04/06/2015	New section, replacing KSSR Rev 0, original submission to the NNR
1		30/11/2021	Revised by SRK, accepted by Eskom
1a		05/09/2022	Revised to address NNR comments
1b		15/03/2024	Revised to address Eskom comments

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EXECUTIVE SUMMARY

The assessment of the land and water use characterisation for the site region and site vicinity is a partial update of the Duynefontyn Site Safety Report (DSSR) Section 5.5 to address comments of the National Nuclear Regulator (NNR). The assessment concluded the following:

- The site region is spatially dominated by natural areas (47.7 per cent of the land) and agricultural uses (39.5 per cent). Even though the Cape Town Metropolitan Area and major towns within the site region have high levels of urbanisation, spatially, urban development only constitutes 6.8 per cent of land cover within the site region.
- Agriculture occurs throughout the site region, with extensive farming practices undertaken in the area north-northeast to east-northeast of the site, and more intensive practices in the fertile valleys surrounding Stellenbosch, Franschhoek, Paarl, Wolseley and Grabouw. The dairy, chicken and wheat industries are prominent in the site region. Wine is extensively produced around Stellenbosch, Franschhoek, Paarl and Wellington. Deciduous fruit is cultivated in the Elgin area at Grabouw. Water for irrigation is obtained from groundwater sources and rivers in the site region, as well as from major dams (Voëlvlei, Theewaterskloof and Eikenhof) and smaller farm dams in the site region.
- Research undertaken on climate change vulnerability projections indicates that for the period 2021 to 2050 relative to the period 1961 to 1990, under low mitigation, temperature increases of 1 to 2.5 °C may plausibly occur over the southern coastal regions of South Africa (which includes the site region). This rise in temperature, as well as other changes to climatic conditions brought about by climate change, may have a significant impact on agricultural production (e.g. lower productivity levels and loss of harvest) in the site region in the future. Further, climate change is also likely to result in a reduction in the surface water availability in the site region.
- Future urban development is expected to remain relatively stable in the future, as urban growth is mostly expected to occur within the existing urban areas (assuming that the urban edges of the various settlements do not undergo major amendments). The existing Koeberg Nuclear Power Station's (KNPS) 5 km exclusion zone (Precautionary Active Zone, PAZ) also restricts any urban development within this zone, whilst the 16 km KNPS Urgent Protective Action Zone (UPZ) only permits urban development that can comply with the existing emergency evacuation plan. The Cape Town Municipal Spatial Development 2023 Framework, however, does permit some further urban development in the site vicinity. This may increase urban uses and the population in the site vicinity.
- Approximately 1.0 per cent of the site region accommodates surface water bodies. This water is used for irrigation purposes and potable water supply in the site region. The CCT is the largest water consumer in the site region.

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Groundwater, abstracted mainly from the central and western parts of the Berg River catchment component of the Berg-Oliphants Water Management Area (WMA), is currently an important water resource, particularly for the rural areas. The Atlantis residential area is partly reliant on groundwater for potable water supply.

- In the Berg-Oliphants WMA (which includes areas supplied by the Western Cape Water Supply System), water demand is expected to grow by 45 per cent by 2040 due to population increases and climate change. The CCT has strategies in place to meet the future water demand, which include water saving measures, additional water abstraction, water reuse and desalination.
- Large portions of the site region are dedicated or indicated for conservation purposes. The site is surrounded by the Koeberg Private Nature Reserve. The site also forms part of the Cape West Coast Biosphere Reserve. Furthermore, the Blaauwberg Nature Reserve is a private initiative that promotes the establishment of a large conservancy to the south-east and south-southeast of the site. The Spatial Development Frameworks (SDFs) applicable to the site region indicate that future development needs are to be directed at protecting valuable agricultural land, conserving natural resources and containing urban development within existing settlements as far as possible. Furthermore, there are existing restrictions on urban development within the 16 km area around KNPS. Given the above, it can be expected that land use in the site vicinity will not experience significant changes in the foreseeable future. Therefore, planned changes in the land and water use around the Duynefontyn site during the nuclear installation lifetime are not considered a threat to the nuclear installation safety in this timeframe.

The respective water and land use data have been presented for the site defined Emergency Planning Zones. This includes the 5 km PAZ, the 16 km UPZ and the 80 km Long Term Protective Action Planning Zone (LPZ), as required in terms of the Department of Energy siting regulations. The key water and land use characterisation in the EPZs is as follows:

- The characterisation determined that the predominant land use within the 0 to 5 km PAZ is nature conservation, but limited areas of fallow land and urban development (i.e. Duynefontein suburb) also occur within this EPZ.
- The characterisation determined that the predominant land use within the 5 to 16 km UPZ is agriculture and nature conservation. It is likely that elements of the food chain are present in this zone. This was confirmed in the agricultural survey, which indicates that dairy, cattle, wheat, chicken, egg, pigs, sheep, fruit (i.e. grapes and olives), honey, fodder and leaf vegetable production occur within this zone.
- The urban settlements of Atlantis, Philadelphia, Duynefontein and the northern portion of Bloubergstrand are located in the 16 km UPZ. Restrictions are in

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place to restrict the number of permanent residents within this zone and to ensure that the emergency plan remains feasible over the lifetime of the nuclear installation(s).

- Agricultural collection and processing facilities have been determined for the site region and are presented in terms of the EPZs for the site.
- Atlantis, excluding the industrial area, is the only settlement in the site region that is reliant on groundwater as a source of potable water. Groundwater is also used as irrigation on many farms within the site region. There are a few major dams in the site region, all located beyond the 16 km UPZ, that are important water sources for the communities living in the site region. Potential contamination of this water resource therefore has the potential to affect the public within the site region. The potential for such contamination is described in **Chapter 7** (Potential Radiological Impact on the Public and the Environment).

Monitoring of radionuclide concentrations in agricultural products and surface water and groundwater resources must be included in the nuclear installation monitoring programme that is informed by the potential radiological impact (see **Chapter 7**). Due to the potential risk of radiological exposure from agricultural products produced in the site vicinity and site region, regular monitoring of radionuclides from selected elements of the food chain needs to be implemented by Eskom in the operational stage of the nuclear installation(s). The monitoring programme should be informed by the conclusions of the potential radiological impact on the site region (see **Chapter 7**).

Aspects relevant to nuclear safety that have been determined also include the potential effects of the nuclear installation(s) on land use. The potential effects and their management include the following:

- Land use in the site region is relatively stable, with the focus remaining on agriculture, conservation and urban development within delineated urban edges (or in the case of Cape Town within the 'urban inner core' and 'incremental growth and consolidation areas' and not in the 'discouraged growth areas', where further urban development is disincentivised). It is therefore unlikely that the location of the nuclear installation(s) at the site will further restrict planned regional development at a regional strategic level.
- Land use in the site vicinity is also stable, due to the existing KNPS's 5 km and 16 m restriction zones. The future development potential in the site vicinity is therefore already limited.

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5.5 LAND AND WATER USE

5.5.1 Introduction

This section of the Duynefontyn Site Safety Report (DSSR) presents the results of the investigation and characterisation of the current and expected future use of land and water¹ for the Duynefontyn site (hereinafter referred to as ‘the site’) region (see **Drawing 5.5.1** for the site region). It aims to inform the demonstration of the suitability of the site for the location of a nuclear installation(s) in respect of risk to the public (International Atomic Energy Agency, 2019) and the off-site measures to meet regulatory requirements, in particular with reference to the implementation of a feasible emergency plan. This section is complemented by **Section 5.12** (Water Supply) that addresses in detail the fresh water supply to the site for nuclear installation purposes.

Note that this section has been developed with consideration to aspects relating to ecology covered in **Section 5.3** (Ecology), as well as demographic characteristics discussed in **Section 5.4** (Demography). This section also complements the discussion of activities relating to sea use that are discussed in **Section 5.6** (Adjacent Sea Use), as well as activities relating to transportation, industrial, civil and military facilities discussed in **Section 5.7** (Nearby Transportation, Industrial and Military Facilities). Further, this section provides input into the identification of the critical groups and to the evaluation of the public exposure during normal (**Chapter 7**, Potential Radiological Impact on the Public and Environment) and accident conditions (**Chapter 8**, Emergency Planning).

This is a partial update of the DSSR, Section 5.5, Rev 1a (Eskom, 2022a).

5.5.2 Purpose and Scope

The ultimate purpose of the description of land and water use is to present information (further referred to as “characterisation”) to be used as input in dose calculation, risk assessment and emergency planning in support of Koeberg Nuclear Power Station’s Periodic Safety Review and Long Term Operation, as well as the demonstration of the site suitability for the planned construction and operation of the nuclear installation(s) on the site, the decommissioning thereof and the planned reuse of the site as part of the strategic reserve in the future.

The characterisation of the current and future land and water use is

¹ Surface water and groundwater resources.

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conducted in order to assist in the assessment of the suitability of the site for the location of a nuclear installation(s), the potential effects of the nuclear installation(s) on the site region and will be used to demonstrate the feasibility of implementing emergency plans over the projected lifetime of the nuclear installation(s).

In accordance with the SSR Technical Specification (Eskom, 2022b), the regional evaluation covers the use of land and water on and around the site. The purpose of the characterisation of land and water use is to:

- describe the current and expected future land and inland water use characteristics, together with the associated uncertainties;
- provide input to the identification of the critical group and to the evaluation of the public exposure during normal (see **Chapter 7**) and accident conditions (see **Chapter 8**);
- provide input to the evaluation of the feasibility of the emergency plan for the new nuclear installation(s) on the proposed site;
- identify those site characteristics that require future monitoring during the nuclear installation(s) lifetime in order to provide the assurance that the viability of the site will not be compromised by possible changes in land and water use during the lifetime of the nuclear installation(s);
- provide the assurance that local and regional developments do not compromise the viability of the site over its lifetime.

This section of the DSSR shall therefore present the site-specific data and the conclusions with respect to:

- the current and expected future land and inland water use;
- the suitability of the site for the location of a nuclear installation(s);
- the existing and potential effects and hazards for the nuclear installation(s);
- the characteristics that will be needed to demonstrate the feasibility of implementing emergency plans over the projected lifetime of the nuclear installation(s).

5.5.3 Regulatory Framework

The legal and regulatory basis is outlined in **Chapter 2** (Legal and

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Regulatory Basis). The current national normative acts and associated regulations specifically relevant to aspects of land and water use with regard to the site are set out below, followed by a discussion of relevant international standards and guidelines.

5.5.3.1 Legal Requirements

The national regulations relevant to this section are The Regulations on Licensing of Sites for New Nuclear Installations, R927 (Department of Energy, 2011). The following is of specific relevance:

“5. A Site Safety Report referred to in Regulation 3(2)(a) must contain the following –

- (3) The characteristics of the site relevant to the design assessment, risk and dose calculations, including inter alia:*
 - (c) land use;*
 - (e) regional development;*
 - (f) projections of the above data commensurate with the design life of the nuclear installation(s).”*
- (7) The identification of emergency planning zones using the characteristics of the site...*

5.5.3.2 Requirements, Documents and Guidelines

Although not legal requirements, international standards and recommendations were also considered as guideline documents in order to ensure that the characterisation of the land and water use for the proposed site was performed and presented in line with best practice. In this regard, the following should be noted:

- The National Nuclear Regulator (NNR) Interim Guidance for the Siting of Nuclear Facilities RG-0011 (National Nuclear Regulator, 2016) requires *inter alia*: (refer to compliance matrix in **Table 5.5.52**):
 - Section 6.1(1)(b): *“Characteristics of the site and its environment which could influence the transfer of released radioactive materials to persons”;*
 - Section 6.1(4): *“Characteristics of the natural environment in the region that may be affected by potential radiological impacts in operational and accident conditions should be investigated”;*
 - Section 8.2(1): *“The uses of land and water should be characterised in order to assess the potential effects of the nuclear facility on the site region and particularly for the purpose of preparing emergency plans”;*

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- Section 8.2(2): *“The investigation should cover land and bodies of water that may be used by the population or may serve as habitat for organisms in the food chain”;*
- Section 8.2(3): *“Investigations of the land and water utilised in the region should cover:*
 - (a) land devoted to agricultural uses, its extent, and the main crops and their yields;*
 - (b) land devoted to dairy farming, its extent and yields;*
 - (c) land devoted to industrial, institutional and recreational purposes, its extent and the characteristics of its use;*
 - (d) bodies of water used for commercial, individual and recreational fishing, including details of the aquatic species fished, their abundance and yield;*
 - (e) bodies of water used for commercial purposes, including navigation, community water supply, irrigation and recreational purposes such as bathing and sailing;*
 - (f) land and bodies of water supporting wildlife and livestock;*
 - (g) direct and indirect pathways for potential radioactive contamination of the food chain;*
 - (h) products imported to or exported from the region which may form part of the food chain;*
 - (i) free foods such as mushrooms, berries and seaweed”.*
- Section 8.2(4): *“The present use of water which could be affected by changes in water temperature and by radioactive material discharged from the nuclear power plant, together with the location, nature and extent of usage, should be identified. Changes in the use of water in the region should also be considered.”*
- Section 8.2(5): *“The information presented should include:*
 - (a) Maps showing the location of the nearest residences, groundwater supply boreholes, and abandoned boreholes;*
 - (b) Types of water use both present and projected (life of the*

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facility), e.g. municipal, domestic, agricultural, livestock, and descriptions of the methodology and sources used to develop projections;

- (c) *Present and projected (life of facility) water use estimates by type for both groundwater and surface water, including present and projected withdrawal, and descriptions of the methodology and sources used to develop projections;*
 - (d) *Description of existing boreholes, borehole depth, groundwater elevations, boreholes, drawdowns, and description of the producing aquifer(s).²*
 - (e) *Descriptions of the nature and extent of projected land use (e.g. agriculture, recreation, industry, grazing and infrastructure) and descriptions of the methodology and sources used to develop projections;*
 - (f) *The location of any other nuclear and/or radiological facilities located or proposed within the vicinity of the site.”*
- *Section 8.2(6): “Recent agricultural production data should be tabulated for vegetables, meat, milk and other foodstuffs in addition to predictions for future production by government, industry or institutions within the region surrounding the planned facility. For nuclear facilities, site-specific data should be used based on land and water use and habitation study”.*
 - *Section 8.4.5(3): “A count and description should be provided of agricultural and domestic fauna, in particular cattle, sheep and other meat animals that may be involved in the exposure of man to radionuclides. Important game animals should receive similar treatment. A map showing the distribution of the principal plant communities should be provided”.*
- International Atomic Energy Agency (IAEA) Safety Standards No. SSR-1 on Site Evaluation for Nuclear Installations (International Atomic Energy Agency, 2019). This standard requires *inter alia*:
 - consideration of the characteristics of the natural environment in the region that could be affected by the potential radiological impact of the nuclear installation for all operational states and accident conditions and for all stages of the lifetime of the nuclear installation(s);

² These aspects are addressed in detail in **Section 5.11** (Geohydrology).

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- consideration of the characteristics of the site and its environment that could influence the transfer of radioactive material released from the nuclear installation(s) to people and to the environment;
 - collection of any data necessary to assess the impact of the nuclear installation(s) on the public and the environment for operational states and accident conditions;
 - an investigation of surface water characteristics in the site region;
 - an investigation of land and water (surface water and groundwater) resources that might be used by the population or that serve as a habitat for organisms in the food chain;
 - evaluation of the present and foreseeable future characteristics that could have an impact on the safety of the nuclear installation(s), including *inter alia* the present and future use of land and water that could affect the safety of the nuclear installation(s) or the feasibility of planning effective emergency response actions.
- IAEA Safety Guide No. NS-G-3.2, Dispersion of Radioactive Material in Air and Water and Consideration of Population Distribution in Site Evaluations for Nuclear Power Plants (International Atomic Energy Agency, 2002). This requires *inter alia*:
 - an investigation of the characteristics of the land and water utilised in the local and regional environment;
 - an investigation of:
 - land devoted to agricultural uses, its extent, the main crops and their yields;
 - land devoted to dairy farming, its extent and yields;
 - land devoted to industrial, institutional and recreational purposes, its extent and the characteristics of its use;
 - bodies of water used for commercial, individual and recreational freshwater fishing, including details of the aquatic species fished, their abundance and yield;
 - bodies of water used for commercial purposes, including navigation, community water supply, irrigation and recreational purposes such as bathing;
 - land and bodies of water supporting wildlife and livestock;
 - direct and indirect pathways for potential radioactive

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contamination of the food chain;

- products imported to or exported from the region which may form part of the food chain;
- free foods such as mushrooms and berries.
- an investigation of the current land and water uses in the local and regional environment that could be affected by changes in the water temperature and by radioactive material discharged from a nuclear installation(s), together with the location, nature and extent of usage. - Changes in uses of water in the site region, such as for irrigation, freshwater fishing and recreational activities, should also be considered.
- an investigation of population centres for which drinking water is obtained from water bodies, including groundwater, that may be affected by a nuclear installation(s) - Future water flow and water uses should be projected over the lifetime of the nuclear installation(s).
- collection of information on levels of background activity for environmentally relevant substances such as soils and for vegetables and other foodstuffs.
- United States Nuclear Regulatory Commission Regulatory Guide 4.7, General Site Suitability Criteria for Nuclear Power Stations (U.S. Nuclear Regulatory Commission, 2014). This requires, in particular, the identification of physical characteristics unique to the proposed site that could pose a significant impediment to the development of emergency plans.

5.5.4 Approach to Characterisation of Land and Water Use

On the basis of the Technical Specification for Site Safety Reports (Eskom, 2022b), the evaluation of land and water use was performed and is presented in this section in a way that:

- determines current and future characteristics and activities associated with the use of land and water at the site and in the site region and site vicinity;
- determines the current and future land and water use distribution;
- identifies the important land and water use characteristics to be used for the evaluation of the potential consequences to the public and the environment during normal and accidental nuclear installation conditions (to be addressed in **Chapter 7** and **Chapter 8**);

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- provides input into the identification of the critical groups and the main pathways for radiological exposure to the public presented in **Chapter 7**;
- presents the site-reference land and water use data in the surrounding region (National Nuclear Regulator, 2016);
- identifies areas of uncertainty;
- identifies critical/important features and characteristics, as well as required future actions, e.g. additional monitoring and confirmatory studies.

5.5.4.1 Area of Investigation

The characteristics of land and water use were investigated and evaluated for the site region of 80 km and site vicinity of 16 km around the site (as illustrated in **Drawing 5.5.1**).

The areas of investigation have been chosen on the basis of the existing emergency planning zone (EPZ³) sizes of Koeberg Nuclear Power Station (KNPS), which surround the site and are:

- the 5 km Precautionary Action Zone (PAZ⁴);
- the 16 km Urgent Protective Action Planning Zone (UPZ⁵), which coincides with the site vicinity;
- the 80 km Long Term Protective Action Planning Zone (LPZ⁶), which coincides with the overall EPZ and the site region.

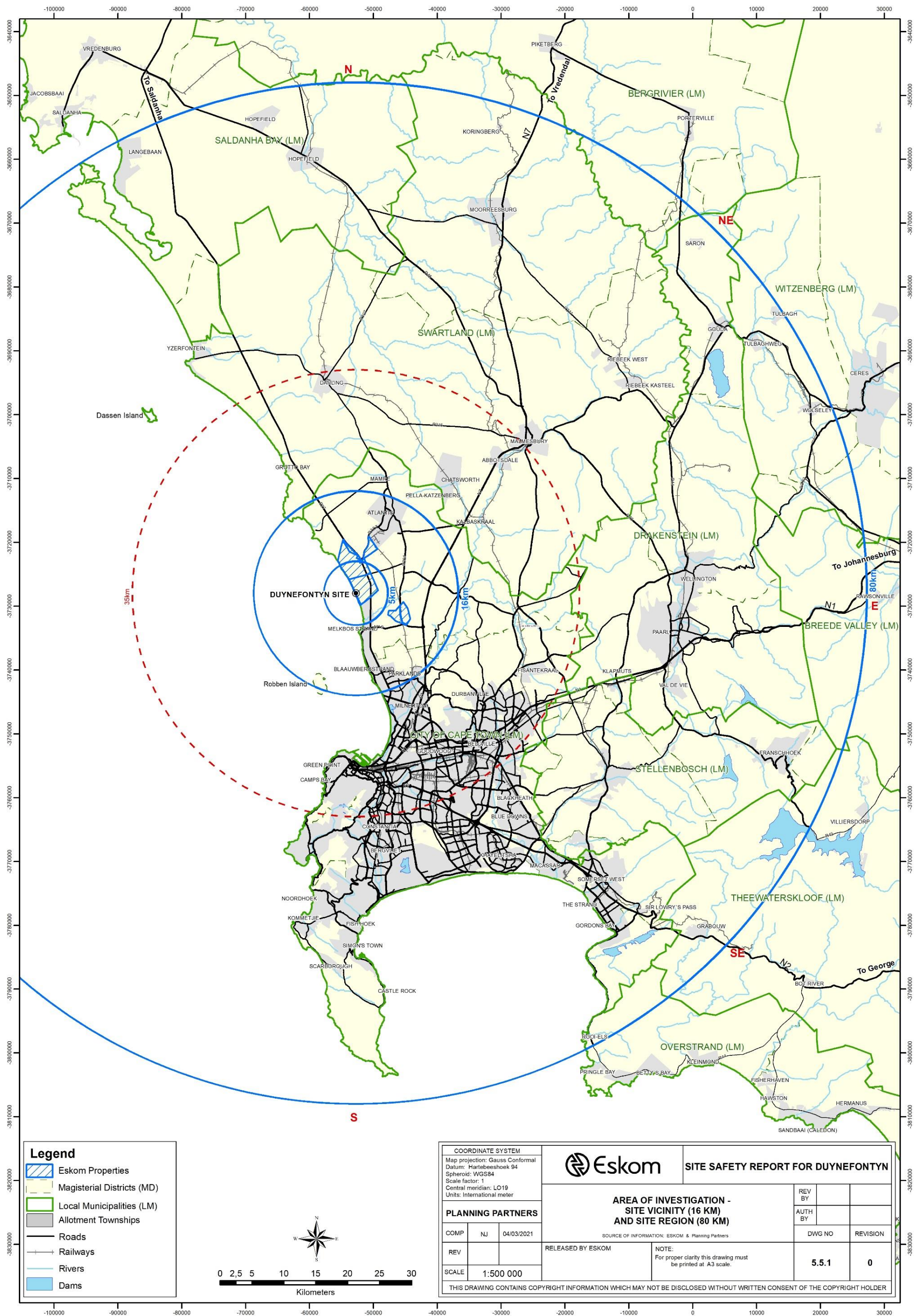
³ An overall Emergency Planning Zone (EPZ) of such size that emergency or remedial measures must be considered where the potential exists that any members of the public may receive more than an annual effective dose of 1mSv due to the source term (Department of Energy, 2011).

⁴ Precautionary Action Zone (PAZ), where the risk of deterministic effects is sufficiently high to warrant the establishment of plans for the implementation of pre-emptive protective actions based on plant conditions, before a release or shortly thereafter (National Nuclear Regulator, 2012).

⁵ Urgent Protective Action Planning Zone (UPZ), where the risk of stochastic effects is sufficiently high to warrant the establishment of plans to implement protective actions based on environmental monitoring or on plant conditions (National Nuclear Regulator, 2012).

⁶ Long Term Protective Action Planning Zone (LPZ), where preparations for effective implementation of protective actions to reduce the risk of deterministic and stochastic health effects from long term exposure to deposition and ingestion must be developed in advance (National Nuclear Regulator, 2012).

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The scope of the characterisation included the general land cover pattern⁷ in the site region. The general land cover description provided in this section therefore encompasses an area that includes the Regulations on Licensing of Sites' (Department of Energy, 2011) overall EPZ and the LPZ for the site. The description provides an understanding of the land cover types and an indication of land and water use in the region. The land cover analysis is presented in geospatial format (see **Drawing 5.5.2**).

The basis of the assessment and characterisation of regional land use is the South African National Land Cover (SANLC) Database (2018) (Department of Environmental Affairs, 2019), which presents land cover in terms of land cover 'classes' (Thompson, 2019).

For both the 1990 and 2013 to 2014 national land cover datasets, semi-automated spectral modelling procedures were used to generate the basic land cover components (i.e. water, tree, bush, grass and bare ground). However, the SANLC (2018) dataset, which is the dataset used to perform the analysis in this section of the DSSR, was generated using new technology, specifically 20 m multi-seasonal Sentinel 2 satellite imagery. Further, the SANLC (2018) dataset is based primarily on the new gazetted land cover classification standard (SANS 19144-2) with 73 classes of information and is comparable with the previous 1990 and 2013/2014 SANLC datasets (Thompson, 2019). In essence, the SANLC (2018) change assessments have been undertaken and reported using the same concept, method, and reporting principles and formats employed in the previous 1990 versus 2013/2014 SANLC change assessment, but modified in terms of information content (i.e. the legend or land cover 'classes') to that prescribed by the Department of Environmental Affairs (DEA) and the Department of Agriculture, Land Reform and Rural Development (DALRRD) as part of the new national land cover update project (Department of Environmental Affairs, 2019).

Information presented in **Drawing 5.5.2** utilises the 20 × class land cover change legend prescribed by Thompson (2019) in the 2018 South African National Land Cover Change Assessments (Planning Partners, 2020a). It is important to note that although the legend in the **Drawing 5.5.2** is different to the legend used in the SANLC map contained in the previous DSSR (2015) (i.e. **Drawing 5.5.1**) (Eskom, 2015a), as well as different to the list of "*land use categories in the site vicinity*" as presented in **Subsection 5.5.6** of the Technical Specification (Eskom, 2022b), the map does present the SANLC information using the prescribed format

⁷ "Land Cover" is the physical material that covers the earth surface and includes bare soil, grass, trees, asphalt, etc. "Land Use" is the human exploitation of land for agriculture, residential, industrial, recreational or other purposes (Eskom, 2009).

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provided by the DEA.

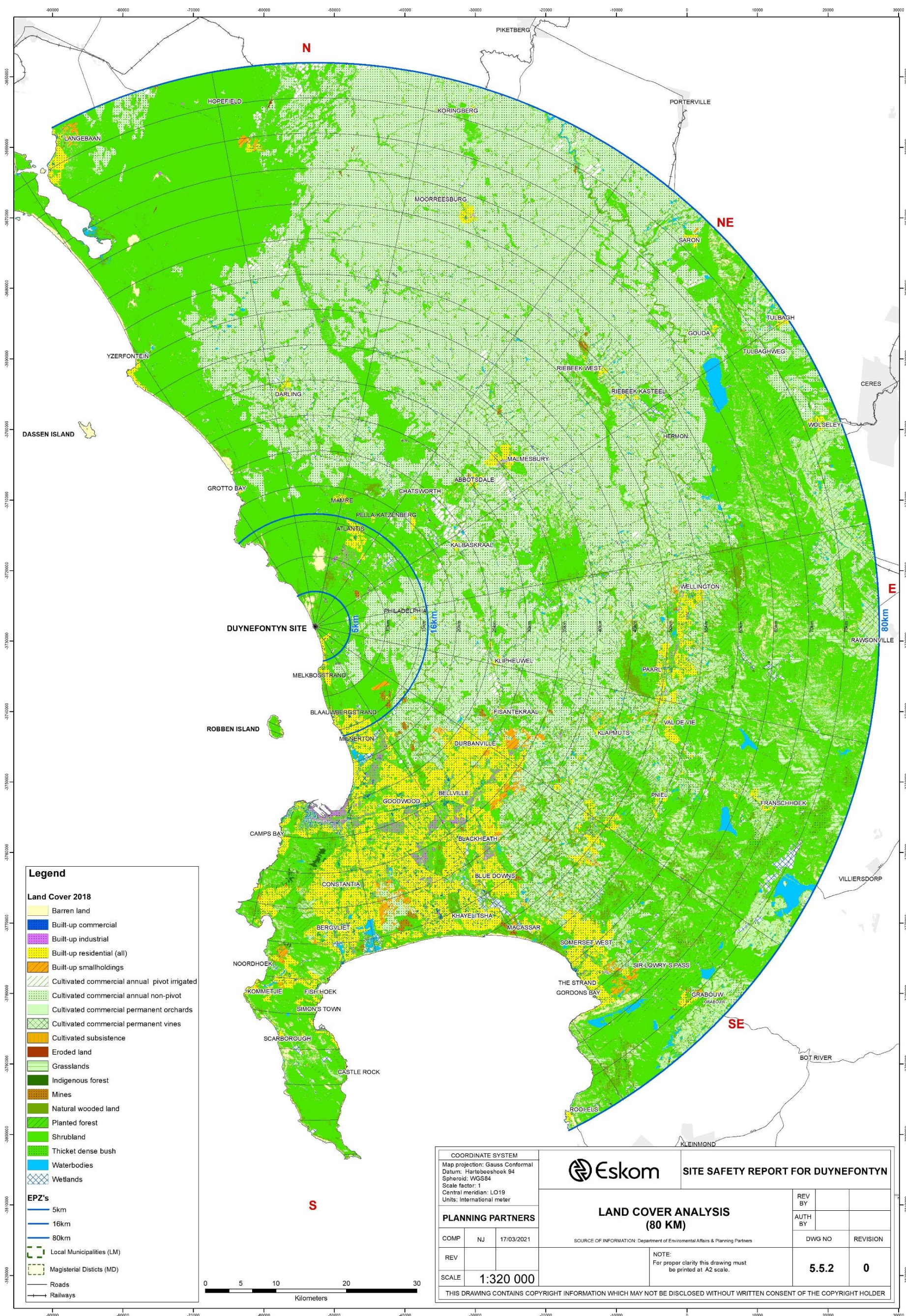
Following international standards and good practice (International Atomic Energy Agency, 2019), this section presents a detailed description of the agricultural land use and production in the site vicinity. Particular attention has been given to agricultural uses and their extent, as well as main crops and their yields in the site vicinity. The information was obtained through telephonic interviews with the landowners and managers, as well as from field inspections.

Information is also provided on the main collection points, processing and distribution facilities for agricultural produce in the site region.

The information presented forms the basis for determining the direct and indirect pathways for potential radioactive contamination of the food chain of the population around the site. The purpose of this information is to assist Eskom SOC Limited (further referred to as Eskom) and other relevant authorities and organisations in the rapid assessment of potential contamination of food associated with fallout of radioactive materials during an emergency situation (National Nuclear Regulator, 2016).

The land and water characteristics that must be observed and monitored throughout the lifetime of the nuclear installation(s) were identified on the basis of the requirements of the NNR Interim Guidance for the Siting of Nuclear Facilities RG-0011 (National Nuclear Regulator, 2016) as well as the SSR Technical Specification (Eskom, 2022b). The data presented in this section forms the baseline from which future studies will be conducted.

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5.5.4.2 Topics

The following main topics of characterisation of the site that were determined and evaluated are presented in this section:

- land devoted to agricultural uses, its extent, the main crops and their yields;
- land devoted to dairy farming, its extent and yields;
- land devoted to industrial, institutional and recreational purposes, its extent and the characteristics of its use;
- bodies of water used for commercial, individual and recreational freshwater fishing, including details of the aquatic species fished, their abundance and yield;
- bodies of water used for commercial purposes, including navigation, community water supply, irrigation and recreational purposes such as bathing;
- land and bodies of water supporting wildlife and livestock;
- direct and indirect pathways for potential radioactive contamination of the food chain;
- products imported to or exported from the region which may form part of the food chain;
- free foods such as mushrooms and berries.

5.5.4.3 Data Sources

The evaluation of the current and future land and water use was performed in the period 2017/2018 and 2020/2021, on the basis of information obtained from the following sources:

- current (2017/2018) cadastral information from the Surveyor General;
- the SANLC (2018) (Department of Environmental Affairs, 2019);
- aerial photography and South African 1:50 000 scale topo-cadastral sheets (City of Cape Town, 2020c), (ESRI, 2019), (Chief Directorate: National Geo-spatial Information, 2014);

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- national, provincial and local government departments, as well as government institutions (e.g. Statistics South Africa, Department of Water Affairs);
- field checks (Berry, 2020);
- telephonic/email surveys with landowners, managers and tenants in the site vicinity, supported by field checks (Planning Partners, 2020c);
- interviews with landowners, managers and tenants in the site region (Planning Partners, 2021);
- relevant strategic spatial planning reports at a regional and municipal level (e.g. Spatial Development Frameworks, SDFs);
- municipal records;
- the internet;
- site specific investigations conducted for the purpose of this section.

The respective SDFs applicable to the region guide the expected development in the site vicinity and site region (Planning Partners, 2020b). In addition to the high-level strategies and policy objectives contained in the SDFs, they also earmark specific land parcels and areas for specific types of development, such as residential, industrial or commercial development. The implementation of development projects generally takes place in accordance with the proposals of the SDFs and for this reason the estimated future land use in the site region and vicinity was based on the current SDFs. An SDF is supposed to be updated every five years, but this does not always happen, as is the case with the Breede Valley SDF (dated 2013), which was not updated in 2018. The status of each SDF needs to be confirmed during each review of the DSSR.

Each topic described in this section includes a description of data sources used.

5.5.4.4 Presentation of Data

The description of land and water use is provided in terms of segments, sectors and annuli. **Figure 5.5.1** illustrates these terms.

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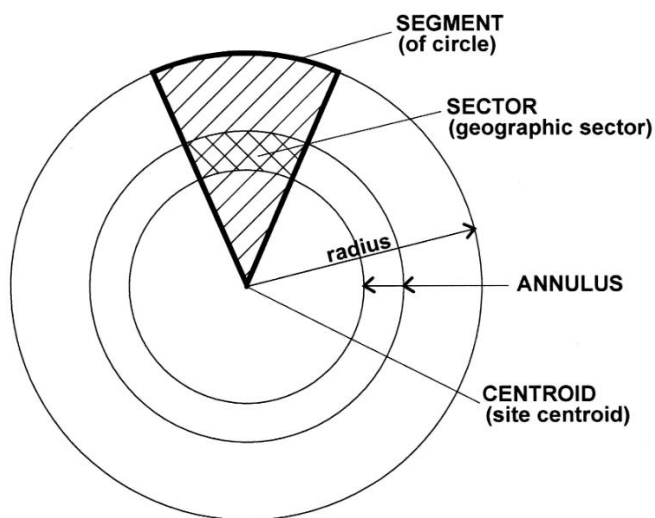


Figure 5.5.1
Illustration of Terms: Segment, Sector and Annulus

All distances in the drawings, figures and tables in this section are measured in a straight line from the co-ordinate below, i.e. the site centroid (unless otherwise stated), which is located at a central position on the site (see **Drawing 5.5.1**). The site co-ordinates (transverse Mercator 19 Hartbeeshoek) are:

- X (m): -52727.4000;
- Y (m): -3727966.6500.

In order to align the analysis and presentation of data of this section with **Section 5.4** (Demography), **Section 5.6** and its future use in **Chapter 7** and **Chapter 8**, data presented in this section are presented in terms of the following radial grids:

- 5 km radial interval and 22.5° grid for the site region;
- a 2.5 km, 5 km, 7.5 km, 10 km and 16 km radii and a 22.5° grid for the site vicinity.

The radial grid includes the representation of the existing EPZs that apply to the KNPS and the site, as defined in **Chapter 8**.

Land and water data were evaluated for the existing KNPS' EPZs, i.e. PAZ (5 km), UPZ (16 km) and LPZ (80 km), as defined in **Chapter 8**.

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5.5.5 Land and Water Use in the Site Region

The description of land and water use is presented for the site region (80 km) for the purposes of the Koeberg Nuclear Power Station's Periodic Safety Review and Long Term Operation, as well as in relation to where the new nuclear installation(s) is planned to be built.

5.5.5.1 Current Land Use

A regional land use analysis was undertaken, based on the SANLC (2018) (Department of Environmental Affairs, 2019). The land cover analysis is illustrated in **Drawing 5.5.2** and is based on the 20 x class land cover change legend (Thompson, 2019), the classes of which are listed below:

- barren land;
- built-up commercial;
- built-up industrial;
- built-up residential (all);
- built-up smallholdings;
- cultivated commercial annuals non-pivot;
- cultivated commercial annuals pivot irrigated;
- cultivated commercial permanent orchards;
- cultivated commercial permanent vines;
- cultivated subsistence;
- eroded land;
- grassland;
- indigenous forest;
- mines;
- natural wooded land;
- planted forest;

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- shrubland;
- thicket/dense bush;
- waterbodies;
- wetlands.

Drawing 5.5.2 illustrates land cover data for the 5 km by 22.5° grid covering the site region. The land cover distribution is summarised in 10 km bands extending from the site up to the site region (see **Appendix 5.5.A**), as required in terms of international best practice (Electric Power Research Institute, 2015).

The land area in the site region amounts to approximately 1 090 275 ha. The percentage land cover per category is as follows:

- natural areas: 47.7 per cent of the land (39.6 per cent shrubland; 4.2 per cent grassland; 3 per cent natural wooded land and 1 per cent thicket);
- forest areas: 1.5 per cent of the land (1.4 per cent planted forest and 0.1 per cent indigenous forest);
- agricultural areas: 39.5 per cent of the land (32.4 per cent cultivated commercial annual non-pivot; 4.9 per cent cultivated commercial permanent vines; 1.7 per cent cultivated commercial permanent orchards; and 0.5 per cent cultivated commercial annual pivot irrigated);
- urban areas: 6.8 per cent of the land (5.7 per cent residential, of which 3.5 per cent represents informal settlements; 0.5 per cent small holdings; 0.3 per cent industrial and 0.3 per cent commercial);
- waterbodies and wetlands: 2.7 per cent of the land (1.7 per cent wetlands and 1 per cent other waterbodies);
- mines and quarries: 0.2 per cent of the land;
- barren and eroded land: 1.7 per cent of the land (consisting of predominantly barren land).

Figure 5.5.2 provides a graphic illustration of the percentage cover per category listed above.

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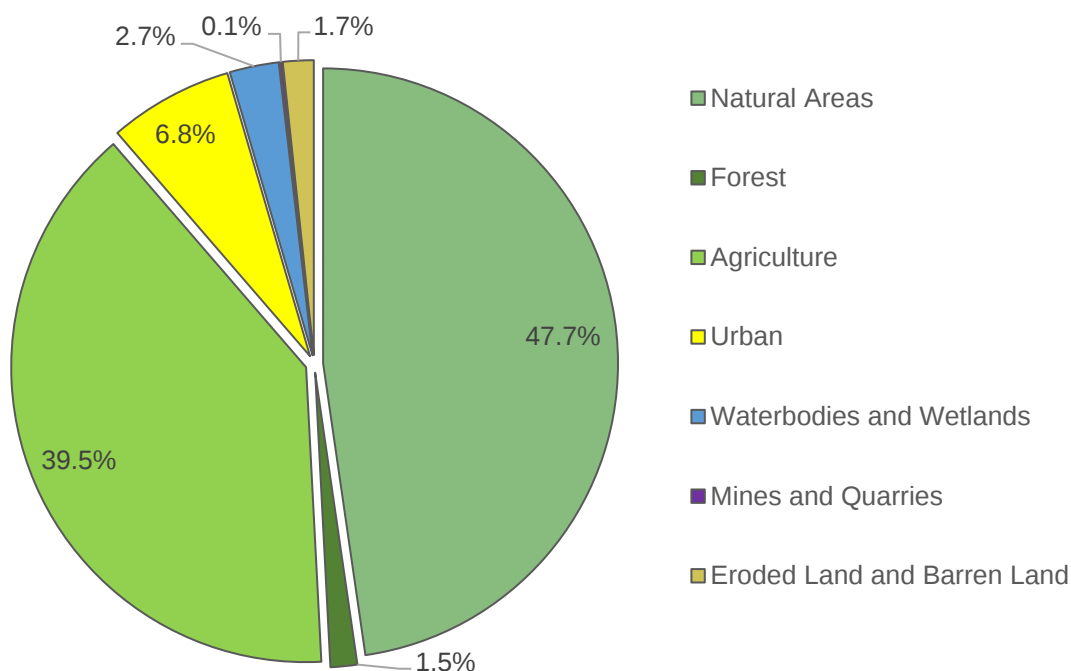


Figure 5.5.2
Percentage of Land Cover Categories in the Site Region⁸

As illustrated in **Figure 5.2.2**, land cover within the site region consists of predominantly natural and agricultural areas. The associated land use is predominantly conservation, grazing for livestock and pastures, extensive cultivation of dryland and intensive cultivation within the fertile valleys. Formally protected areas occupy large portions of the site region. Crops consist mainly of wheat, deciduous fruit and fodder crops.

The urban settlement pattern is dominated by the Cape Metropolitan Area (CMA), predominantly located in the south to southeastern segments of the region. There are also various other commercial, institutional, coastal and agricultural towns (i.e. towns associated with areas of intense agricultural cultivation) located in the site region.

a) Natural Areas

The site region contains portions of natural vegetation, covered by predominantly shrubland⁹ (431 787 ha), but also vast areas of grassland, natural wooded land and thicket. Only 605 ha of indigenous forest areas were identified in the region (Planning Partners, 2020a). It can be assumed that wildlife would exist within these areas that correspond with natural areas, as well as within forested areas (which includes

⁸ (Planning Partners, 2020a)

⁹ Including fynbos (Thompson, 2019).

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commercially planted forest areas). A detailed wildlife survey was not conducted to determine their numbers for the purpose of preparing this section. Natural areas are located within formalised conservation areas throughout the site region as described in **Subsection 5.5.5.2**, as well as formalised conservation areas in the site vicinity (refer to **Subsection 5.5.6.2**).

The site region contains 18 144 ha of barren land, representing predominantly the north-south trending sand dunes in the coastal area between the 7.5 km and 11.5 km in the northern segment, as well as at 53 km and 60 km in the north-northwest segment (Planning Partners, 2020a).

b) Forest Areas

In 2001 the South African Cabinet made the decision to phase out approximately 44 763 ha of forestry plantations in the Western Cape (the intention was to phase out forestry in specific locations and to repurpose land for alternative uses including conservation, community forestry, agriculture and housing). The Cabinet partially reversed the decision in 2008 whereby it was decided that approximately 22 000 ha of forestry plantations would be retained for forestry purposes (Planning Partners, 2020a). There are currently two commercially managed forested areas remaining in the site region, i.e. Cecilia and Tokai forests, south beyond the 35 km radius and Jonkershoek, east-southeast and southeast beyond the 50 km radius. These areas consist of predominantly pine plantations, accounting for approximately 90 per cent of the 'planted forest' area in the region (Planning Partners, 2020a). Other former commercial forest plantations in the site region (e.g. Grabouw, La Motte and Kluitjieskraal) are no longer commercially harvested but currently remain covered with forest plantations. The total extent of all forested areas in the region is 15 976 ha (Planning Partners, 2020a).

Afforested areas in the site region include the following (Planning Partners, 2020a):

- **Cecilia and Tokai forests**: Both forests are under the management of the South African National Parks, located within the Table Mountain National Park. The forests are located between 39 km and 44 km to the south. An area of 434 ha is leased by MTO Forestry (Pty) Ltd ("MTO Forestry") for use as pine plantations until 2024.
- **Newlands Forest**: The Newlands forest, 98 ha in extent, is located within the Table Mountain National Park and is under the management of the South African National Parks. The forest consists of eucalyptus and pine plantations. It is located beyond the 35 km

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radius to the south.

- Jonkershoek: The plantation is leased by MTO Forestry from the Department of Forestry, Fisheries and the Environment (DFFE), is 13 849 ha in extent and consists of pine plantations and is located in the Jonkershoek valley east of Stellenbosch (50 km east-southeast). The MTO Forestry lease runs until at least 2075.
- Hawequas: The Limietberg Nature Reserve contains the Hawequas State Forest, located east of Paarl beyond 55 km east.
- Wemmershoek: Wemmershoek forms part of the La Motte forestry operations. The Wemmershoek sawmill has however, ceased operations. The plantations are 17 996 ha in total, located 62 km east-southeast.
- La Motte: The La Motte forested area, located to the west of Franschhoek (62 km east-southeast), consists of pine plantations. However, the lease of the former forestry operator, MTO Forestry, has been 'exited' (i.e. the land has been handed back to the owner, the DFFE).
- Grabouw: The pine plantations, 773 ha in extent and located beyond the 70 km radius to the southeast, were formerly leased by MTO Forestry but are now back under the control of the DFFE after the MTO Forestry lease ended on 30 September 2019.
- Kluitjieskraal: A pine plantation near Wolseley (72 km east-northeast) that was formerly leased by MTO Forestry from the DFFE, but this lease was ended and the plantation is now back under the control of the DFFE.

c) Agricultural Areas

i. Regional Agricultural Distribution and Production

According to Statistics SA (Statistics South Africa, 2019), the Western Cape economy expanded by 1.2 per cent in 2016, down from 1.5 per cent in 2015. Leading growth in the region in 2016 was the finance, insurance, real estate and business services sector (+2.3 per cent), followed by the wholesale, retail trade, catering and accommodation sector (+2.2 per cent). In contrast, economic output in the agriculture sector declined by 24.5 per cent in 2016 on the back of a severe drought¹⁰ (Western Cape

¹⁰ During the 2014 to 2017 hydrological years, the Western Cape Province experienced its worst water shortage in 113 years (Botai, et al., 2017).

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Government Provincial Treasury, 2018). It rebounded in 2017 to record growth of 10.8 per cent, before contracting again in 2019 by an estimated 16.4 per cent (Western Cape Government Provincial Treasury, 2019). Going forward, agriculture and agri-processing are forecast to be the fastest growing sectors in the Western Cape economy between 2019 and 2023 as they recover from an average annual contraction recorded from 2014 to 2018 (Western Cape Government Provincial Treasury, 2019).

Agricultural land in the site region predominantly constitutes commercial dryland, cultivated on a temporary basis (i.e. 'cultivated commercial annuals non-pivot' shown on the SANLC map, see **Drawing 5.5.2**). The cultivated, temporary, commercial dryland in the site region is located in the north-northwest to northeast segments within the 20 km and 80 km radii, in the east-northeast segment between the 5 km and 80 km radii, in the east segment between the 5 km to 60 km radii, in the east-southeast segment within the 5 km to 45 km radii and in the southeast segment between the 16 km and 25 km radii (see **Drawing 5.5.2**). Cultivated, permanent commercial irrigated land is situated in the northeastern to eastern segments between the 70 km and 80 km radii and in the east-southeast and in the southeast segments between the 35 km and 70 km radii, as well as east-southeast and southeast segments between the 70 km and 80 km radii. The latter constitutes the Elgin deciduous fruit producing area located within the Theewaterskloof Municipality (see **Drawing 5.5.2**).

Using data produced by Statistics South Africa in the 2017 Census of Commercial Agriculture (CoCA) (Statistics South Africa, 2020a; Statistics South Africa, 2020b), an analysis of regional agricultural production was undertaken, with the purpose of contextualising agricultural activity and production in the site region (Planning Partners, 2020d). The following agricultural products form the basis of the regional agricultural production analysis (listed in alphabetical order):

- **Citrus**: The Western Cape is not a particularly important citrus producer within the national context. On a national scale, only naartjie production in the Western Cape (third largest producer in the country with 28.5 per cent of national production) is considered significant, with most of this production occurring beyond the site region in the Cederberg Municipality (192 945 t). In 2017, only 87 756 t of citrus fruit was produced in the site region and surrounding areas, with most of this occurring outside of the site region in the Bergrivier Municipality (31 183 t). However, the Stellenbosch Municipality produces the most grapefruits by volume in the Western Cape, with a total of 8 039 t produced in 2017.

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- *Deciduous fruit*: Deciduous fruit is another significant agricultural sector in the Western Cape and country as a whole. The Western Cape accounts for 86.1 per cent of apples, 88.7 per cent of pears and 59.1 per cent of table grapes produced in the entire country. Production in the site region and surrounding areas in 2017 included 725 783 t of apples, 290 588 t of pears, 69 173 t of peaches, 48 342 t of plums and 162 016 t of table grapes. It should however be noted that a large proportion of the volumes of apples, pears, peaches and plums originate from the Witzenberg, Theewaterskloof and Breede Valley municipalities and therefore fall outside of the site region (although the prodigious apple and pear producing area of Elgin in the Theewaterskloof Municipality does fall within the site region).
- *Eggs*: The Western Cape was the second largest producer of eggs in the country in 2017 (86 779 585 dozen) behind Gauteng (97 354 757 dozen). A total volume of 68 009 239 dozen eggs were produced in the site region and surrounding areas in 2017, with a large number originating within the Drakenstein (26 679 043 dozen), Swartland (21 972 255 dozen) and CCT (13 576 685 dozen) municipalities, the bulk of which are located in the site region. There were 10 472 952 egg laying chickens in the site region and surrounding areas as of 30 September 2018, however only 3 924 821 of those chickens occurred in the municipalities that fall entirely within the site region.
- *Fodder*: The Western Cape is the fourth largest producer of fodder in the country (282 169 t, which accounts for 12.8 per cent of national production). Fodder production in the site region is not substantial within the wider context of the Western Cape, with only 15.2 per cent of provincial production occurring within the municipalities falling within or partially within the site region (and most of this total falling outside of the site region in the Theewaterskloof Municipality). The most fodder produced in the site region comes from the Swartland Municipality (9 892 t).
- *Freshwater aquaculture*: In 2019, a total of 210 freshwater aquaculture farms were recorded from all nine provinces of South Africa. The Western Cape recorded the highest number of farms with a total of 68, followed by Mpumalanga (39), Gauteng (26), Limpopo (25), Kwa-Zulu Natal (20), the Eastern Cape (18), North West (6), the Free State (6) and the Northern Cape (3). Based on known available information, only 72 of these farms were operational at the time (Planning Partners, 2020e). The 2017 Western Cape CoCA (Statistics South Africa, 2020b) does not contain production data for freshwater aquaculture.

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- Grain crops / cereals: The Western Cape has the fourth largest area of land under cultivation for grain/cereal crops¹¹ in the country in 2017 (252 961 ha). Out of South Africa's nine provinces, the province ranked first in the production of wheat in 2017 (388 989 t or 38.5 per cent of national production), first in the production of barley (133 809 t or 91.8 per cent), first in the production of oats (43 851 t or 41.3 per cent), fifth in the production of sorghum (3 145 t or 3.9 per cent) and ninth in the production of maize (3 383 t or 0.03 per cent) (Statistics South Africa, 2020b). A further analysis of each category of grain production within the site region and surrounding areas is provided below (listed in alphabetical order):
 - Barley: 2 622 t of barley was produced within the site region and surrounds in 2017, which equates to 2.0 per cent of the total production in the Western Cape. Of this, 1 157 t was produced within the municipal areas falling largely within the site region (i.e. CCT, Drakenstein and Swartland) (Statistics South Africa, 2020b).
 - Maize: Negligible volumes of maize was produced within the site region and surrounds in 2017 (Statistics South Africa, 2020b).
 - Oats: 13 501 t of oats was produced within the site region and surrounds in 2017, which equates to 30.7 per cent of the total production in the Western Cape. Of this, 6 337 t was produced within the municipal areas falling largely within the site region (i.e. CCT, Drakenstein and Swartland) (Statistics South Africa, 2020b).
 - Sorghum: No sorghum was produced within the site region and surrounds in 2017 (Statistics South Africa, 2020b).
 - Wheat: The Swartland Municipality is one of the most important wheat producing areas within the Western Cape. 89 495 t of wheat was produced in this municipality during 2017, constituting 37.6 per cent of the wheat production within the site region (238 164 t) and 23.0 per cent of total production within the Western Cape. Other major wheat producing areas within the site region and surrounding areas in 2017 were the Theewaterskloof Municipality (55 316 t) and Bergrivier Municipality (37 919 t) (Statistics South Africa, 2020b), however the majority of this production will have fallen outside of the site region.

¹¹ Grains included in the CoCA 2017 are wheat, maize, barley, oats and sorghum (Statistics South Africa, 2020a; Statistics South Africa, 2020b).

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- Honey: The Western Cape (25 205 kg) is not a major producer of honey within the national context, and falls well behind the likes of KwaZulu-Natal (614 718 kg) and Limpopo (115 204 kg). 8 810 kg of honey was produced in the site region and surrounding areas during 2017 (35 per cent of total production in the province), with almost all of this production (99.9 per cent) occurring in the municipal areas falling almost exclusively outside of the site region (i.e. Witzenberg, Theewaterskloof and Overstrand municipalities). CCT is the only municipality falling wholly inside the site region that produces any honey, and even then it is a minimal amount (100 kg).
- Meat: Of the nine provinces in the country, the Western Cape ranks first in the production of ostrich (3 389 548 kg or 50.9 per cent of national production), second in the production of chicken (333 166 703 kg or 25.3 per cent), third in the production of goat meat (108 420 kg or 5.1 per cent), fourth in the production of mutton/lamb (6 055 668 kg or 17.8 per cent), fourth in the production of pork (13 596 576 kg or 14.5 per cent), ninth in the production of beef (5 983 551 kg or 2 per cent) and eighth in the production of offal, which is a by-product (2 248 kg or 0.03 per cent).

Meat production in the site region is categorised as follows (listed in alphabetical order):

- Beef: 2 144 945 kg of beef was produced in the site region and surrounding areas in 2017, which equates to 35.8 per cent of the total production in the Western Cape. Of this, 922 180 kg was produced within the Drakenstein (419 925 kg), Swartland (312 639 kg), CCT (157 562 kg) and Stellenbosch (32 054 kg) municipalities, of which the bulk of the areas fall in the site region. There was a total number of 50 273 meat producing cows in the site region and surrounding areas as of 30 September 2018, with many of these occurring in the site region in the CCT (13 641), Swartland (5 792) and Drakenstein (5 006) municipalities.
- Chicken: 245 464 362 kg of chicken meat was sold in the site region and surrounding areas in 2017, which equates to 73.7 per cent of total sales in the Western Cape (333 166 703 kg). Of this total, the areas where the chickens were produced were: CCT (91 404 536 kg), Stellenbosch (63 165 459 kg), Swartland (45 484 350 kg) and Drakenstein (45 410 017 kg) municipalities, which either fall entirely in, or the bulk of which fall in the site region. There were a total number of 21 850 232 broiler chickens in the site region and surrounding areas as of 30 September 2018, with the highest

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number being located in the Swartland Municipality (16 756 200).

- Game: Unlike the other meat production categories, the 2017 Western Cape CoCA (Statistics South Africa, 2020b) does not contain data pertaining to game meat production in kilograms. However, the 2017 Western Cape CoCA (Statistics South Africa, 2020b) does record the number of game animals within the various municipalities within the Western Cape. There was a total number of 1 508 game animals in the site region and surrounding areas as of 30 September 2018, with the species recorded as follows: Springbok (483); Wildebeest (4); Kudu (352); Zebra (119); Impala (176); and other (370). A total of 989 animals occurred in municipalities of which the areas fall in the site region, with the breakdown being: Springbok (97); Wildebeest (4); Kudu (352); Zebra (119); Impala (176) and other (238).
- Goat: According to the 2017 CoCA (Statistics South Africa, 2020b), no goat meat was produced in the site region in 2017¹². 1 338 kg was produced outside of the site region in the Bergrivier and Witzenberg municipalities. There were a total number of 370 meat producing goats in the site region and surrounding areas as of 30 September 2018, with 120 goats occurring in the Swartland Municipality.
- Mutton/lamb: 1 922 271 kg of mutton/lamb meat was produced in the site region and surrounding areas in 2017, which equates to 31.7 per cent of the total production in the Western Cape. Of this, 616 220 kg was produced within the Swartland (478 423 kg), Drakenstein (103 332 kg) and CCT (34 465 kg) municipalities, the bulk of the areas of which fall in the site region. There were a total number of 43 154 meat producing sheep in the site region and surrounding areas as of 30 September 2018, with 14 499 of those sheep occurring in the municipalities of which the bulk of the areas fall in the site region.
- Offal: CCT is the only municipality in the Western Cape that recorded offal production (2 248 kg).
- Ostrich: According to the 2017 CoCA (Statistics South Africa, 2020b), no ostrich meat was produced in the site region in 2017 (283 653 kg was produced outside of the site region in the

¹² It is estimated that only 0.55% of goats in South Africa are slaughtered in the commercial sector and therefore the meat is mainly marketed in the informal sector. Further, goat slaughtering figures are normally included in the slaughter figures for sheep and it is therefore difficult to obtain official statistics on goat slaughtering (Department of Agriculture, Forestry and Fisheries, 2018).

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Witzenberg and Theewaterskloof municipalities). However, data collection subsequent to the finalisation of the data analysis reports for Regional Agricultural Production (Planning Partners, 2020d) and Agricultural Collection, Processing and Distribution (80 km) (Planning Partners, 2021) has revealed that Roelcor Abattoir (35.2 km northeast) in Malmesbury has obtained environmental authorisation to permit the slaughter of 240 ostrich per day at the facility (Western Cape Department of Environmental Affairs & Development Planning, 2022), which indicates that ostrich meat is produced in the site region (specific quantities unknown). There were a total number of 10 717 commercially reared ostriches in the site region and surrounding areas as of 30 September 2018. Only 16 of those ostriches occurred in the municipalities of which the bulk of the municipal area falls within the site region, with the remainder being located in the Theewaterskloof, Witzenberg and Bergrivier municipalities.

- Pork: 12 397 823 kg of pork was produced in the site region and surrounding areas in 2017, which equates to 91.2 per cent of the total production in the Western Cape. Of this, a total volume of 7 831 865 kg was produced within the Drakenstein (5 190 500 kg), Swartland (1 678 540 kg), Stellenbosch (958 639 kg) and the CCT (4 186 kg) municipalities, of which the bulk of the areas fall in the site region. There were a total number of 153 749 pigs in the site region and surrounding areas as of 30 September 2018, with the majority of these occurring within the Swartland (42 583), CCT (42 245) and Drakenstein (33 211) municipalities.
- Milk: Growth in the Western Cape dairy industry has slowed in recent years to 24 per cent of national production, falling below KwaZulu-Natal (31 per cent) and the Eastern Cape (29.7 per cent), to be the third highest milk producer in South Africa. The site region and surrounding areas contained 46 295 dairy cows and produced approximately 204 064 000 l of milk in 2017. Dairy farming is therefore one of the main agricultural industries in the site region and occurs throughout the site region, with the largest concentration of milk production being located within the CCT (49 594 478 l) and Swartland (46 522 817 l) municipalities.
- Oil seed (canola): Canola is produced commercially mainly in the Western Cape province (98.7 per cent of the national total). 21 622 t of canola was produced in the site region and surrounding areas during 2017 (40 per cent of total production in the province), with the vast majority of this production (74.9 per cent) occurring outside of

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the site region in the Theewaterskloof, Saldanha Bay, Witzenberg, Bergrivier and Overstrand municipalities. CCT (1 992 t) and Swartland (1 602 t) produce the largest volumes of the municipalities falling wholly within the site region.

- Olives: With its Mediterranean climate, the Western Cape is ideal for growing olives. This is demonstrated by production data in South Africa, with the Western Cape accounting for 95% of total production in the country (SA Olive Industry Association, 2018). In the context of the site region, the Drakenstein Municipality has the most land under cultivation (1 292 ha), followed by Swartland (426 ha), Bergrivier (323 ha), Stellenbosch (295 ha), CCT (287ha), Witzenberg (282 ha) and Theewaterskloof (198 ha) (SA Olive Industry Association, 2018). The 2017 Western Cape CoCA (Statistics South Africa, 2020b) does not contain production data for table olives or olive oil.
- Subtropical fruits: Subtropical fruit production is not abundant in the Western Cape, although the province does produce the most berries by volume (10 624 t) in the country. 10 444 t of subtropical fruit was produced in the site region and surrounding area in 2017, with the majority being berries (6 542 t), 71 per cent of which were produced in the Drakenstein (2 954 t) and Stellenbosch (1 698 t) municipalities.
- Vegetables: The Western Cape is generally not an important producer of vegetables¹³ within the national context, however it is the province that produces the most onions in the country (216 211 t), which equates to 35.8 per cent of national production). 162 621 t of onions were produced in the site region and surrounding areas during 2017, with the vast majority of this production (96.5 per cent) occurring outside of the site region in the Witzenberg, Breede Valley and Bergrivier municipalities. Other vegetables produced in the site region and surrounding areas include potatoes (95 131 t), carrots (24 391 t), butternut (14 619 t), cabbages (9 080 t), tomatoes (8 834 t), sweet potatoes (7 050 t), beetroot (5 426 t), pumpkins (2 351 t), peppers (2 199 t) and green beans (154 t).
- Wine grapes: Wine grape production in the Western Cape is a significant agricultural sector within the national context, representing 86 per cent of the national wine grape output. The Cape Winelands is regarded as the major wine producing area within South Africa and includes the Breede Valley, Drakenstein and Stellenbosch municipalities. In 2017, 364 837 t of wine grapes were produced

¹³ Vegetables included in the CoCA 2017 are beetroots, butternut, cabbage, carrots, green beans, onions, peppers, potatoes, pumpkins, sweet potatoes and tomatoes (Statistics South Africa, 2020a; Statistics South Africa, 2020b).

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within these three municipalities (264 964 t in the Breede Valley Municipality, 62 081 t in the Stellenbosch Municipality and 37 792 t in the Drakenstein Municipality), which equates to 54 per cent of the total production in the Western Cape. Other significant contributors to wine grape production in 2017 were the CCT (24 560 t) and the Swartland Municipality (12 721 t).

ii. Products Imported to or Exported from the Site Region which may form part of the Food Chain

In the event of a nuclear incident or accident, contaminated crops and animal products could be taken to agricultural collection, processing and distribution facilities in the site region, and thereby enter the food chain. If eaten, the public could be exposed to radionuclides. It is therefore necessary to compile an up-to-date database of all entities/facilities that collect, process and/or distribute agricultural products in the site region (Eskom, 2022b; National Nuclear Regulator, 2016).

In order to compile the required databases, the Western Cape Department of Agriculture (WCDoA) was contacted to share their current electronic databases¹⁴ in relation to the various agricultural categories under investigation. Information pertaining to the vast majority of collection, processing and production entities/facilities presented in this report has been sourced from the WCDoA. The accuracy of the various databases received from WCDoA has been verified through internet searches, site visits and discussions with representatives from the local authorities. It should be noted, however, that WCDoA databases were supplemented with additional entities/facilities using a desktop study, as well as field surveys (Planning Partners, 2021).

The results of the distribution of major collection, processing and distribution facilities per sector are illustrated in **Drawing 5.5.3**. The drawing should be read in conjunction with **Appendix 5.5.B**, which provides the specific data for each facility and produce type, as well as distance and direction of the particular facility from the site. Each facility has a unique identifier which links the facility to the sector wherein it is located (see **Drawing 5.5.3**) and also identifies the record in the accompanying *Microsoft Excel* spreadsheet (Planning Partners, 2021). The results of the study (Planning Partners, 2021) can be summarised as follows:

- **Chicken and egg production**: Chicken broiler farms, abattoirs and hatcheries are distributed throughout the rural areas surrounding the CMA and the outer lying rural towns in the site region, with most

¹⁴ Including geo-referenced GIS shapefiles.

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facilities being located between the 10 km and 50 km radius in the northeast, east-northeast, east and east-southeast segments (refer to **Tables 5.5.B.1** and **Drawing 5.5.3**).

- **Milk and other dairy products:** Milk is collected from dairy farms throughout the site region and transported to various dairies and other processing facilities in the site region for further processing. Larger processing facilities include Joyce's Dairy (various, including 8.2 km southeast and 20 km east); Fair Cape (18 km east-southeast); Lausanne Dairies (19.2 km south-southeast); Parmalat (32.4 km south-southeast); Oakland Milk (40 km south-southeast) and Malan's Dairy (57.5 km east). These large processing facilities, as well as various dairy farms and smaller processing facilities (including cheese, cream and ice cream manufactures) located in the site region, are included in the dairy production data set (refer to **Table 5.5.B.2** and **Drawing 5.5.3**).
- **Fresh fruit and vegetables:** Fresh fruit and vegetables are generally collected from farms and taken to warehouses/cold storage facilities, from where they are either transported to processing facilities, wholesale distributors or markets (including retail supermarkets and shops) or the Port of Cape Town for export. **Table 5.5.B.3** lists fresh fruit and vegetable collection, processing and distribution facilities¹⁵ in the site region and **Drawing 5.5.3** shows their spatial location.

According to the 2017 Western Cape CoCA (Statistics South Africa, 2020b), fresh produce enters the distribution chain through various channels (e.g. produce markets; direct to retailers and chain stores; processing factories; direct sales from farmer to consumers and export). **Appendix 5.5.B** provides distribution data in relation to the municipalities located in and partly in the site region in respect to selected vegetables and fruit (refer to **Table 5.5.B.3** to **Table 5.5.B.5**).

- **Viticulture:** Vineyards and wine farms, as well as associated facilities (e.g. bottling plants), are distributed throughout the rural areas surrounding the CMA and the outer lying rural towns in the site region, with the majority of facilities being located around Stellenbosch, Paarl and Franschhoek between the 35 km and 75 km radius in the east, east-southeast and southeast segments (refer to

¹⁵ It must be noted that the DSSR 2015 (Eskom, 2015a) included retail supermarkets with fresh produce as part of the database. However, it is not considered necessary to include these supermarkets in the database because if fruit and/or vegetables originating from the site region are sold in these supermarkets then they would come from other collection, processing and distribution facilities already listed in the database.

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Table 5.5.B.6 and Drawing 5.5.3

- **Olives**: The Mediterranean climate in the Western Cape has led to olives becoming an increasingly popular crop. Olive production and olive presses in the site region are mainly concentrated around Wellington, Stellenbosch, Franschhoek and Somerset West (i.e. in the 35 km to 75 km radius in the east, east-southeast and southeast segments) (refer to **Table 5.5.B.7** and **Drawing 5.5.3**). It is evident from **Table 5.5.B.7** that olives are often grown together with grapes on established wine farms.
- **Grain / cereal crops**: The Swartland Municipality is one of the most important wheat producing areas within the Western Cape (Planning Partners, 2020b). It therefore follows that the majority of grain collection, processing and distribution facilities fall in proximity of this municipality (i.e. northern, north-northeastern, northeastern and east-northeastern segments between the 20 km and 80 km radius), as evidenced in **Table 5.5.B.8** and **Drawing 5.5.3**.
- **Meat**: The four major abattoirs in the site region are Winelands Pork (32.5 km southeast) in Bellville; Roelcor Abattoir (35.2 km northeast) in Malmesbury; Tomis Abattoir (63 km east-northeast) near Hermon and Groenland Abattoir in Grabouw (74.8 km southeast). These large abattoirs, as well as various smaller abattoirs and meat processing facilities (including wholesale suppliers)¹⁶ located in the site region are included in the meat production data set and are presented in **Table 5.5.B.9** and **Drawing 5.5.3**.
- **Freshwater aquaculture**: There are 17 freshwater aquaculture farms and processing facilities in the site region, with most being located in the rural areas outside of Stellenbosch, Paarl and Franschhoek between the 40 km and 70 km radius in the east, east-southeast and southeast segments. There is only one aquaculture farm located in the site vicinity at Little Stream Farm (4.51 km east-southeast) (refer to **Table 5.5.B.10** and **Drawing 5.5.3**). In addition, there are two known facilities where fish harvested at aquaculture farms in the site region are processed, namely at the Constantiaberg Emporium & Smokehouse (32.65 km south-southeast) and the Three Streams Smokehouse (73.13 km east-southeast) (Planning Partners, 2020e).
- **Free foods**: The collection of free foods such as mushrooms, berries

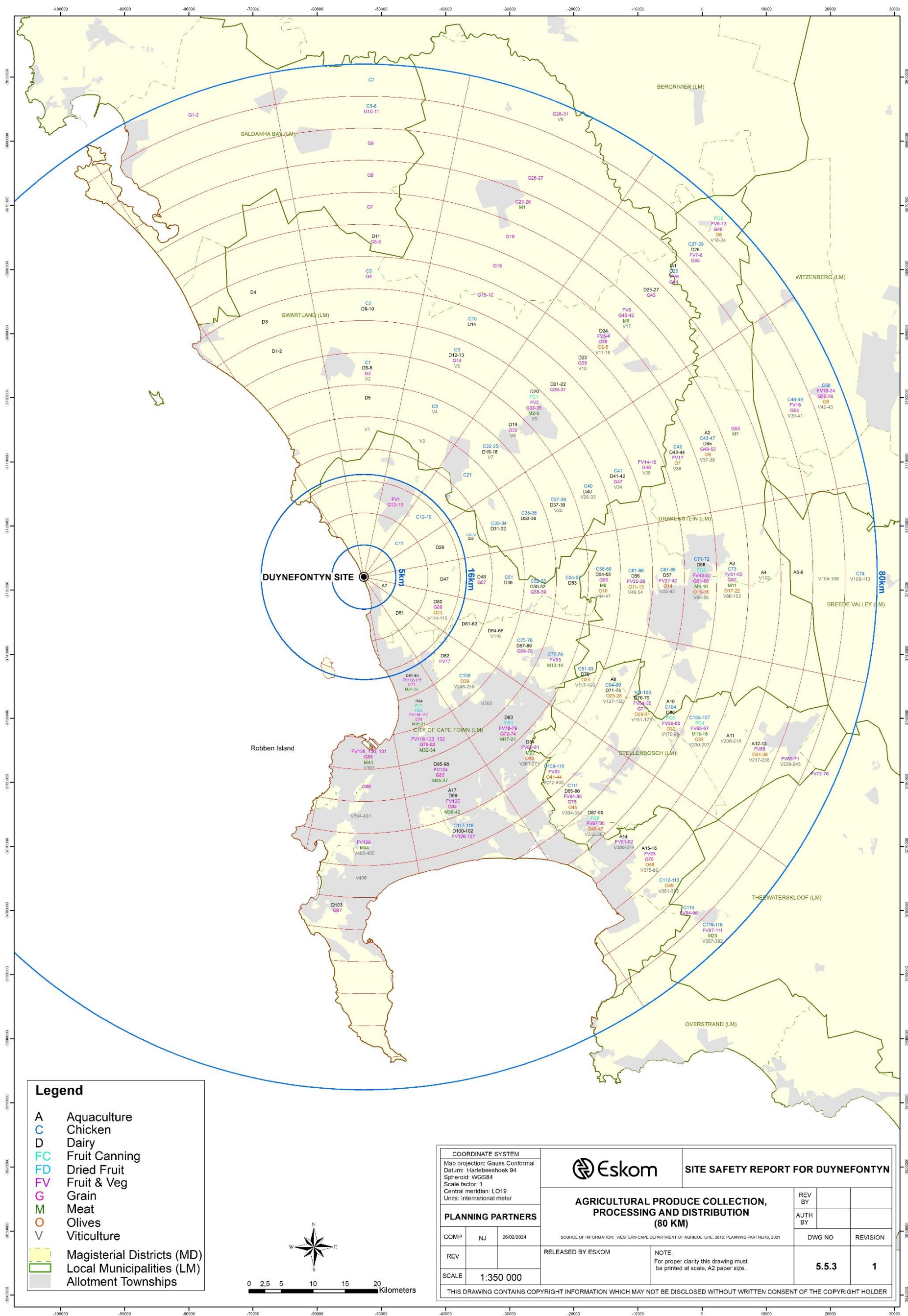
¹⁶ It must be noted that the DSSR 2015 (Eskom, 2015a) included butcheries (including supermarkets with in-house butcheries) as part of the database. However, it is not considered necessary to include these butcheries in the database because if meat originating from an abattoir within the site region is sold in these butcheries, then the point of origin has already been listed in the database. Meat suppliers and processing facilities are, however, included in the current database.

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and herbs is known to occur within the site region. A study on wild harvested species published in 2012 confirmed that free foods are harvested within the CMA. A total of 256 non-marine, separate species/items (flora, fauna, fungi, and inert) were harvested within the CMA. In addition, a further 121 species of wild mushrooms are harvested from outside the CMA and imported for retail sale. The overwhelming majority of flora and terrestrial fauna are illicitly harvested from formal protected areas within the CMA (Petersen, et al., 2012). Free foods associated with the coastline and maritime environment (e.g. seaweeds) are discussed in **Section 5.6**.

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iii. Market Distribution of Agricultural Produce

The CoCA 2017 contains data relating to distribution channels for selected vegetables and fruits when going to market. According to the CoCA 2017 (Statistics South Africa, 2020b), fresh produce enters the distribution chain through one of the following channels:

- Fresh produce markets;
- Direct to retailers and chain stores;
- Processing factories;
- Direct sales from farmer to consumers;
- Export.

The primary fresh produce markets within the site region are the Salt River Market (27.99 km south) and the Epping Market (29.64 km south-southeast), both of which are located in Cape Town. The main point of exports for agricultural produce (either fresh or processed) is the Port of Cape Town, which is located 26.41 km south of the site.

Exports of agricultural produce originating from the site region and surrounding areas are summarised below (agricultural products listed in alphabetical order):

- Barley: Based on the report prepared by the Department of Agriculture, Land Reform and Rural Development detailing the South African Barley Market Value Chain (2021a), barley produced in the Western Cape is exported from the Port of Cape Town. However, the exact origin and volumes of the exported produce is unknown.
- Beef: According to the report prepared by the Department of Agriculture, Land Reform and Rural Development detailing the South African Beef Market Value Chain (2022a), beef originating in the City of Cape Town and the Cape Winelands District Municipality was exported from the Port of Cape Town in 2022, however the volume of the produce exported is unknown. The main destination of South African beef in 2020 was China (33 per cent), followed by Kuwait (14 per cent), Jordan (12 per cent), Mozambique (10 per cent), UAE and Lesotho (both 7 per cent) (Department of Agriculture, Land Reform and Rural Development, 2022a).
- Chicken meat: The greatest share of broiler chicken meat exported from the Western Cape originates from the City of Cape Town,

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followed at a distance by the Cape Winelands District Municipality (volumes unknown). Most of the broiler chicken meat exported from South Africa in 2020 went to Lesotho (44 per cent), followed by Mozambique (27 per cent), Namibia (14 per cent) and Eswatini (4 per cent) share respectively, with the other Southern African Development Community (SADC) countries¹⁷ accounting for the remaining 11 per cent (Department of Agriculture, Land Reform and Rural Development, 2021b).

- *Citrus*: Volumes of citrus fruits distributed from the site region in 2017 are detailed in **Table 5.5.C.1** in **Appendix C** (Statistics South Africa, 2020b). It is evident that relatively large volumes of naartjies (20 830 t), soft citrus or other 'easy peelers' (20 028 t), oranges (12 640 t) and lemons (11 278 t) produced within the site region and surrounding areas was exported. According to the Department of Agriculture, Land Reform and Rural Development (2020b), citrus produced in South Africa for the export market is primarily exported to Asia and Europe, with some fruit also destined for local markets.
- *Deciduous fruit*: Volumes of deciduous fruits distributed from the site region in 2017 are detailed in **Table 5.5.C.2** in **Appendix C** (Statistics South Africa, 2020b) and it can be seen that relatively large volumes of apples (346 286 t), pears (158 756 t), table grapes (126 598 t), plums (28 852 t) and peaches (12 653 t) produced in the site region and surrounding areas were exported. According to the Department of Agriculture, Land Reform and Rural Development (2020a), apples produced in South Africa for the export market is primarily exported to countries in West Africa (e.g. Nigeria, Senegal and Ghana) and Europe, with some apples also destined for the Asian market. Most of the pears produced in South Africa for export purposes is sent to Europe and Asia (Department of Agriculture, Land Reform and Rural Development, 2020c).
- *Eggs*: According to the report prepared by the Department of Agriculture, Land Reform and Rural Development detailing the South African Egg Market Value Chain (2022b), eggs exported from the Western Cape represented only a fraction (approximately 0.5 per cent) of the total eggs exported from the country in 2021. Exports of eggs originating from the Western Cape are mainly from the City of Cape Town and to a lesser extent the West Coast and Cape Winelands District Municipalities, all three of which fall within the site region. Export markets for eggs are Mozambique

¹⁷ The SADC comprises 16 member states: Angola, Botswana, Comoros, Democratic Republic of Congo, Eswatini, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Tanzania, Zambia and Zimbabwe.

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(82 per cent), followed by Eswatini (13 per cent) and Botswana (3 per cent), with most of the remainder of eggs exported being distributed to other Southern African Development Community (SADC) countries (Department of Agriculture, Land Reform and Rural Development, 2022b).

- Milk / cream: Most of the milk and dairy products exported from the Western Cape is produced in the Cape Winelands District Municipality and the City of Cape Town, with fractional exports originating from the West Coast District Municipality. Exact volumes exported are, however, unknown. South African milk and dairy product export markets were SADC countries in 2020: Botswana commanded the greatest market share of the export market (41 per cent) followed by Namibia (13 per cent), Mozambique (13 per cent), Eswatini (13 per cent) and Lesotho (9 per cent), with the remaining 11 per cent being distributed to countries such as Zambia, Zimbabwe and Malawi (Department of Agriculture, Land Reform and Rural Development, 2021c).
- Mutton: Mutton exports from the Western Cape originate mainly from the City of Cape Town, followed at a distance by Cape Winelands District Municipality. Exact volumes exported are, however, unknown. Qatar was the largest market for South African mutton in 2020 with a market share of 40 per cent, followed by Kuwait and Lesotho (9 per cent each), Saint Helena (7 per cent), and Mozambique, UAE and Botswana (6 per cent each), with the remaining 13 per cent being shared mostly amongst the SADC countries (Department of Agriculture, Land Reform and Rural Development, 2022c).
- Oats: Based on the report prepared by the Department of Agriculture, Land Reform and Rural Development detailing the South African Oats Market Value Chain (2020d), oats produced in the Western Cape is exported from the Port of Cape Town, however the exact volumes of the exported produce is unknown. South Africa exports oats mainly to Africa and Asia, as well as marginal amounts to Europe (Department of Agriculture, Land Reform and Rural Development, 2020d).
- Olives: Olive oil and table olives produced in the Western Cape is exported to neighbouring African countries, particularly Namibia and Botswana (SA Olive Industry Association, 2018).
- Ostrich meat: The vast majority of ostrich meat produced in the Western Cape originates from the Eden District Municipality (i.e.

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outside of the site region), followed by the West Coast District Municipality (much of which is located outside of the site region) and City of Cape Town, however exact volumes are unknown. During 2020, the main destination of South African ostrich was the Netherlands (90 per cent), followed by Switzerland (6 per cent), France (2 per cent) and Germany and Qatar (both 1 per cent) (Department of Agriculture, Land Reform and Rural Development, 2021d).

- Pork: The greatest share of pork exported from the Western Cape originates from the City of Cape Town, followed at a distance by the Cape Winelands District Municipality (volumes unknown). Approximately 90% of South African pork exports goes to SADC countries, with most being exported to Mozambique (38 per cent), Namibia (26 per cent) and Lesotho (14 per cent) (Department of Agriculture, Land Reform and Rural Development, 2022d).
- Subtropical fruits: Volumes of subtropical fruits distributed from the site region in 2017 are detailed in **Table 5.5.C.3** in **Appendix C** (Statistics South Africa, 2020b) and it can be seen that minimal amounts of berries are exported from the municipal areas located wholly within the site region.
- Vegetables: Volumes of vegetables distributed from the site region in 2017 are detailed in **Table 5.5.C.4** in **Appendix C** (Statistics South Africa, 2020b). It is evident that relatively significant volumes of butternut (1 645 t) and sweet potatoes (4 715 t) produced in the Drakenstein and Swartland municipalities, respectively, were exported. All other significant volumes of vegetable exports (e.g. onions and potatoes) were produced in areas falling largely outside of the site region (e.g. Witzenberg Municipality).
- Wheat: Wheat exports from the Western Cape originate mainly from the Cape Winelands District Municipality and the City of Cape Town. This is due to the use of the Port of Cape Town as an exit point for the export of wheat. A record low value of wheat exports from the Western Cape was recorded in 2018 (however exact volumes exported is unknown). This can be attributed to lower production volumes due to drought conditions experienced during 2017. South Africa's wheat exports are mainly destined for neighbouring countries such as Namibia, Botswana, Lesotho, Eswatini and Zimbabwe (Department of Agriculture, Forestry and Fisheries, 2019).
- Wine: The Western Cape exports the vast majority of wine produced in South Africa (more than 90 per cent), which is attributed to the fact

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that the province is the leading wine producer in the country. Further, the registered exporters are based in the province and the province has the Port of Cape Town that serves as an exit point for wine products to Europe and other regions of the world. Wine exports mainly originate from the Cape Winelands District Municipality (including the Drakenstein and Stellenbosch municipalities, which both fall wholly within the site region), as well as the City of Cape Town. The major export market for wines made using fresh grapes from South Africa to the world in the period 2007-2016 was Africa (68 per cent), followed by Europe (17 per cent) and Asia (9 per cent), with minimal export volumes to the Americas (4 per cent) and Oceania (2 per cent). Natural wine as a category makes up almost 99 per cent of exports, with the rest accounted by sparkling wine and fortified wines (Department of Agriculture, Forestry and Fisheries, 2017).

d) Urban Areas

The entire CMA urban area is included in the site region, located between the 2.5 km and 70 km radii to the east-southeast, southeast, south-southeast, south and south-southwest, as well as between 7.5 km and 16 km north-northeast. It is the most important urban settlement in the site region and accounts for approximately 80 per cent (59 429 ha) of the urban land in the site region (Planning Partners, 2020a). The residential area of Duynefontein is the nearest settlement to the site (approximately 2 km south) (see **Drawing 5.5.2**).

The remaining urban settlement patterns in the site region are characterised by large towns and rural settlements, associated with areas of intense agricultural cultivation. The larger towns include the following (Planning Partners, 2020a):

- **Malmesbury** (33 km northeast): The town was established in 1827 and serves as a regional service centre, supplying the surrounding agricultural communities and coastal towns with commodities and services. The town also contains numerous commercial and industrial activities. Business activity in the town is concentrated along the main road.
- **Stellenbosch** (45 km southeast/east-southeast): Stellenbosch was established in 1679 and is the second oldest settlement, after Cape Town, in South Africa. The town is centred around the University of Stellenbosch, the wine industry, tourism and more recently large business. In recent years, the town has also experienced significant growth in the service-related sectors.

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- Paarl (45 km east): The town was founded in 1730 and is reliant on agriculture and agricultural-related industries, with fruit production (and processing) being the major agricultural product.
- Wellington (50 km east): The town is dependent on agriculture and agricultural-related industries.
- Moorreesburg (68 km north-northeast): Moorreesburg was established in 1898 and is renowned for its wheat-related activities and serves as a major service centre for the surrounding agricultural communities. Business activities are restricted to the central area along the two main roads.

Numerous small towns or rural settlements are located throughout the rural area in the site region (see **Drawing 5.5.1**) and include Atlantis (13 km north-northeast); Philadelphia (14 km east); Chatsworth (19 km northeast); Kalbaskraal (23 km east-northeast); Klipheuwel (26 km east); Abbotsdale (30 km northeast); Darling (31 km north); Yzerfontein (41 km northwest); Klapmuts (43 km east-southeast); Riebeek Kasteel (52 km northeast); Riebeek West (52 km northeast); Pniel (54 km east-southeast); Hermon (56 km east-northeast); Franschhoek (67 km east-southeast); Gouda (68 km northeast); Grabouw (73 km southeast); Langebaan (73 km north-northwest); Wolseley (75 km east-northeast); Hopefield (76 km north); Saron (76 km northeast); Tulbagh (77 km east-northeast) and Koringberg (77 km north-northeast).

e) Industrial, Institutional and Recreational Land Use

The main industrial areas in the site region are located within the CMA urban area. Other important industrial areas are located in the towns of Paarl; Malmesbury, Stellenbosch, Moorreesburg, Wellington and Grabouw. The total extent of industrial land in the site region is approximately 3 354 ha (Planning Partners, 2020a).

Institutional uses (i.e. schools, hospitals, homes for the aged, prisons, etc.) are mostly located within urban areas (Planning Partners, 2020a).

The CMA and the coastal towns in the site region all contain popular recreational areas, including beaches which are used by local residents and tourists for recreational activities. The latter are discussed in more detail in **Section 5.4** and **Section 5.6**. The site region also contains popular nature areas, including mountainous areas, used for active and passive recreation (refer to **Subsection 5.5.5.2**).

f) Mines and Quarries

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Surface mining and quarries (1 623 ha), including dumping sites, are located throughout the site region between the 7.5 km and 80 km radii. The main quarries and surface-based mining in the site region include a brickfield at 7.6 km northeast, the Vissershok regional landfill site (15.1 km southeast); quarries at 16 km southeast, 18.5 km southeast, 18.7 km southeast and 29 km east-southeast; a brickworks southwest of Paarl (48 km east-southeast); a cement plant north of Riebeeck West (55 km northeast) and quarries at Seekoeivlei (45 km south) and east of Langebaan (77 km north-northwest) (Planning Partners, 2020a).

g) Water Bodies and Wetlands

Based on the SANLC (2018) (Department of Environmental Affairs, 2019), 11 070 ha of water bodies and 18 318 ha of wetlands occur in the site region. **Drawing 5.5.2** illustrates their distribution in relation to the site region and the site vicinity (also refer to **Drawing 5.5.4** and **Drawing 5.5.5**). Water bodies are made up of rivers and dams. The major rivers within the site region include the Berg River; Diep River; Liesbeek River; Black River; Kuils River; Disa River; Eerste River; Lourens River and Steenbras River. Major dams within the site region include the Wemmershoek Dam (63 km east-southeast); Bergrivier Dam (63 km east-southeast); Voëlvlei Dam (65 km east-northeast); Upper Steenbras Dam (68 km southeast); Lower Steenbras Dam (70 km southeast) and a portion of the Theewaterskloof Dam (75 km east-southeast) (Planning Partners, 2020a).

Major wetlands in the site region are located at the lower reaches of the Diep River in the Rietvlei Wetland Reserve (16 km southeast and south-southeast), Zoarvlei Wetland Reserve (25 km south); Edith Stephens Wetland Park (36 km south-southeast); Uitkamp Wetlands (35 km southeast); Rondevlei Nature Reserve (41 km south); Zeekoevlei Nature Reserve (45 km south); Glencairn Wetland (50 km south); to the northeast of Voëlvlei Dam (68 km east-northeast) and to the north of Theewaterskloof Dam (77 km east-southeast) (Planning Partners, 2020a).

5.5.5.2 Land and Water Bodies Supporting Wildlife

The site region is characterised by a significant amount of natural vegetation occurring within protected natural environments, afforested areas, dams, rivers or wetlands. In addition, the land cover analysis has demonstrated that natural areas are the most predominant land use in the site region (Planning Partners, 2020a). **Drawing 5.5.4** illustrates the distribution of protected natural areas in the site region.

The site region contains two world heritage sites: the Cape Floral Region

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(2004) and Robben Island (1999), two national parks: the Table Mountain National Park and the West Coast National Park, as well as several declared nature reserves and protected areas (Planning Partners, 2020a). The main protected areas that occur in the site region, but outside of the site vicinity, are discussed below (refer to **Subsection 5.5.6.2** for a description of protected nature areas in the site vicinity):

- **Cape Floral Region UNESCO World Heritage Site**: The Cape Floral Region is made up of thirteen protected area clusters covering an area of more than 1 million ha, and is one of the richest plant areas in the world, containing almost 9 000 plant species, with 1 736 species identified as threatened and 3 087 species of conservation concern. A large proportion of this floral region is located in the site region (see **Drawing 5.5.4**).
- **Kogelberg Biosphere Reserve**: Situated 40 km from Cape Town, the 103 629 ha biosphere reserve is part of UNESCO's Man and the Biosphere Programme. Approximately 80 per cent of the area consists of mountainous landscape, with high mountain peaks and deep valleys to gentle hills and lower mountain slopes, with the remaining area being made up of a gently rolling coastal plain, as well as areas of coastline. The area constitutes the floristic heart of the Cape Floral Kingdom and provides habitats for approximately 1 600 plant species of which an estimated 150 taxa are endemic to the area and characteristic of the fynbos biome.
- **Kogelberg Nature Reserve**: The nature reserve is included within the Kogelberg Biosphere Reserve and is often considered the heart of the Cape Floral Kingdom because of the exceptional quality of its fynbos. The reserve contains 1 800 plant species of which about 150 are endemic. Kogelberg also has three patches of relic indigenous forest: Louwsbos; Platbos and Oudebos. These forest patches are similar to the Knysna forests and include yellowwood, stinkwood and boekenhout trees. The reserve does not have many large animals, although leopards have been sighted and the Cape Clawless Otter may be seen in or near the Palmiet River. Smaller antelope include Grey Rhebuck, Klipspringer and Grysbok, while Baboons, Porcupine, Mongoose and Dassies are fairly common. Activities such as hiking, mountain biking, swimming and kayaking are permitted in the nature reserve's less sensitive areas. Tourist accommodation is available in the form of the Oudebosch Eco Cabins (five self-catering cabins with a capacity of 4 guests each and a honeymoon cabin for couples, meaning a total capacity of 22 guests). The Phase 2 expansion is underway and will add an additional 5 x two sleeper cabins and

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3 x six sleeper cabins. Camping and picnic facilities are not provided.

- Table Mountain National Park:** The Table Mountain National Park (TMNP) comprises 25 000 ha of mountainous terrain, as well as 100 000 ha of the sea and coastline around the peninsula. The TMNP has rich, diverse and unique fauna and flora. Mammals include the Klipspringer, Grysbok, Duiker, Grey Rhebok and Steenbok. Larger antelope include the Eland, Red Hartebeest and Bontebok. Other mammals include Cape Mountain Zebra, Caracal, Genet, Baboons, Water Mongoose, Small Grey Mongoose and the Cape Fox. The park is also habitat to numerous reptile species. The TMNP is an open-access park with only three points where conservation fees are payable. As the TMNP includes mountains, beaches, forests and oceans, there are a variety of popular recreational activities for outdoor enthusiasts, including hiking, mountain biking, paragliding, swimming and surfing. Tourist accommodation within the TMNP consists of the (i) Hoerikwaggo tented camps, which include four tented camps (Orankekloof, Silvermine, Slangkop and Smitswinkel), each with capacity for 12 guests in the camp (total of 48 guests); (ii) Platteklip Wash House with capacity for 24 guests; (iii) Overseers mountain cottage with capacity for 16 guests; (iv) Olifantsbos guesthouse with a capacity for 12 guests; (v) Eland family cottage with capacity for 6 guests; and (vi) Duiker family cottage with capacity for 6 people, giving a total capacity of 112 overnight guests. There are four restaurants and numerous day visitor picnic areas located throughout the TMNP.
- West Coast National Park:** The West Coast National Park (WCNP) comprises 35 000 ha of lagoon, islands, salt marshes, coastal dunes and strandveld. The WCNP stretches from Yzerfontein in the south to Langebaan in the north. Animal life includes numerous varieties of marine invertebrates, amphibians, reptiles and fish. Mammals in the park include 19 rodent, 11 insectivore, 13 carnivore and 10 ungulate species. The park is popular for bird watching and includes 255 species. The following tourist accommodation is offered in the WCNP: (i) Duinepos chalets with capacity for 66 guests; (ii) Geelbek stables with capacity for 62 guests; (iii) Kraalbaai house boats with capacity for 28 guests; (iv) Abrahamskraal Cottage with capacity for 10 guests; (v) Jo Anne's beach cottage with capacity for 6 guests; (vi) Van Breda cottage with capacity for 6 guests; (vii) Jo Anne's B cottage with capacity for 4 guests and (viii) Steytler cottage with capacity for 2 guests, giving a total capacity of 184 overnight guests. There is also a restaurant and numerous day visitor picnic areas located throughout the WCNP.

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- Hottentots Holland Nature Reserve: The 70 000 ha Hottentots Hollands Nature Reserve (HHNR) stretches from Elgin in the south to beyond Villiersdorp in the north and from Stellenbosch in the west to the Groenland mountains, and forms part of the Cape Floral Region UNESCO World Heritage Site. Approximately 1 300 species of Fynbos occur within the HHNR, including several rare and endemic plants. The HHNR is also home to Grey Rhebok, Klipspringer, Duiker and Grysbok. Leopards also live in the mountains, but they are rarely sighted. About 110 bird species are found on the reserve. The following tourist accommodation is offered in the HHNR: Landroskop with capacity for 30 guests and Boesmanskloof with capacity for 30 guests, giving a total capacity of 60 overnight guests.
- Jonkershoek Nature Reserve: The nature reserve, which includes the Assegaaibosch Nature Reserve, is situated outside of the town Stellenbosch and comprises 9 800 ha of the Jonkershoek Mountains and portions of the upper Jonkershoek Valley. The reserve is habitat to more than 1 100 plant species, predominantly fynbos species. Mammals include leopard, Honey Badger, Baboon, Klipspringer, Mongoose and numerous smaller species. The reserve has numerous hiking and mountain biking trails, but no overnight accommodation.
- Paarl Mountain Nature Reserve: The nature reserve is managed by the Drakenstein Municipality and covers the Paarlberg Mountain. It contains large granite rock formations. The reserve has several walking and biking trails and one braai/picnic site. No overnight accommodation is provided within the reserve.
- Limietberg Nature Reserve: Situated in the Du Toitskloof mountains to the east of Paarl, the Limietberg Nature Reserve covers approximately 11 000 ha of terrain. It is an important water catchment for the Breede and Berg rivers, which flow through the reserve and feed the Wemmershoek, Theewaterskloof and Voëlvelei dams. Limietberg is covered in mountain fynbos, with some indigenous forest vegetation in the wetter areas. Mammals include dassies, Klipspringers, baboons, as well as the seldom-seen Caracal and Leopard. Endemic bird species include Cape Sugarbird, Protea Canary and Black Eagle. Tourist accommodation in the reserve is provided in the Tweede Tol camp site, which offers 26 camp sites with a capacity of 6 people per site (i.e. total capacity of overnight 156 guests).

Smaller protected areas in the site region, but outside the site vicinity,

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include the following (listed in alphabetical order) (see **Drawing 5.5.4**):

- **Bracken Nature Reserve**: The nature reserve, 36 ha in extent, is a core botanical site, located in the heart of the Brackenfell residential and industrial area. The vegetation types conserved consist mainly of Swartland granite renosterveld and Cape sand fynbos, with more than 160 indigenous plants that form habitat to plenty of small mammals, birds and reptiles.
- **De Hel Nature Area**: The De Hel Nature Area is a 21 ha riverine valley adjoining Table Mountain, below Rhodes Drive and contains the upper reaches of the Spaanschemat River. The area contains 250 plant, 16 mammal, 72 bird and 17 reptile and amphibian species. Notable endangered species include the Knysna Warbler and the Western Leopard Toad. The land is owned by the CCT.
- **Dick Dent Bird Sanctuary**: The bird sanctuary was once a wastewater treatment works (WWTW) near the estuary of the Lourens River. Today, the site forms a habitat to many coastal and wetland birds. It is conserved as part of the Lourens River Protected Natural Environment.
- **Die Oog Conservation Area**: Die Oog Conservation Area has five different biodiversity areas, namely granite fynbos, a dam, an artificial island, a seasonal wetland and a sanctuary and recreational area. The site contains one of the few remaining breeding sites for the endangered Western Leopard Toad.
- **Diep River and Fynbos Corridor**: This tract of land spans north from the Blaauwberg Road bridge (between Parklands and Du Noon) towards Blaauwberg Hill. The river section of the corridor is owned by the CCT and forms a natural floodplain. The terrestrial area consists of privately owned land, which has been set aside to connect the Rietvlei Wetland Reserve with the Blaauwberg Conservation Area, forming a vital ecological linkage between these two nature reserves. The Diep River and fynbos corridor protects remnants of the critically endangered Cape Flats sand fynbos and the endangered Cape Flats dune strandveld vegetation types.
- **Durbanville Nature Reserve**: The six-hectare nature reserve is located next to the Durbanville Racecourse and contains critically endangered Swartland shale renosterveld and Cape Flats sand fynbos. There are about 130 plant species, 3 endemic to Cape Town and 10 threatened with extinction. Mammals include the Small Grey Mongoose, Angulate Tortoise and the endangered Cape Rain Frog.

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- *Edith Stephens Wetland Park*: Located in Philippi in Cape Town, the wetland park measures 39 ha in extent and includes a rare plant species called *Isoetes Capensis*, found nowhere else in the world. The vegetation type is a transition from Cape dune strandveld to Cape Flats sand fynbos. The park supports 7 Red Data plant species and 95 bird species. The large seasonal wetland provides an important habitat for breeding waterfowl, such as Cape Shoveller, Yellow-billed Duck and African Snipe. The Park has an environmental education centre, a wetland boardwalk trail, a picnic area, a medicinal garden and a bird hide.
- *Elandsberg Nature Reserve*: The 4 047 ha nature reserve is located north of Wellington and contains numerous animal and bird species. It also forms part of the Cape Floral Region. The reserve is a critical conservation area for two rare fynbos vegetation types: Swartland Alluvium fynbos and Swartland Alluvium renosterveld. The reserve has abundant herds of Eland, Springbuck, Black Wildebeest, Zebra and Bontebok. It is also home to the endangered Geometric Tortoise, one of the world's rarest reptiles.
- *False Bay Ecology Park*: The False Bay Ecology Park, 1 200 ha in extent, includes the Rondevlei and Zeekoevlei nature reserves, the coastal strip between Muizenberg and Strandfontein, the Cape Flats WWTW, the Cape Flats Development Association welfare grounds and the Coastal Park landfill site. The ecology park focuses on education of how ecosystems and social systems function interdependently. There are educational programmes during the day and two overnight camps.
- *Glencairn Wetland*: The wetland is located between the Glencairn Expressway (M6), Simon's Town Road (M4), Glen Road and Gordon's Camp. The area includes the Elsie River that transforms the area into a wetland as it approaches the sea. The wetland is home to several bird species, many of which return each year to breed. Mammals include Otter, Porcupine and Mongoose. The wetland is open to the public via footpaths.
- *Harmony Flats Nature Reserve*: The nine hectare Harmony Flats Nature Reserve is situated between Strand and Gordon's Bay. The reserve contains nearly 220 plant species, including critically endangered Lourensford alluvium fynbos. A variety of small mammals, reptiles and birds are present.
- *Helderberg Nature Reserve*: The nature reserve covers an area of 398 ha and extends up the Helderberg Mountain. The area contains

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predominantly Kogelberg sandstone fynbos, with around 600 plant species. Bontebok, Grey Duiker, Cape Grysbok, Steenbok, Small Grey Mongoose, Angulate and the Padloper Tortoise are present, as well as more than 170 bird species.

- Jan Marais Nature Reserve: The Jan Marais Nature Reserve is located in Stellenbosch and comprises 23 ha, which includes hiking, walking and to a lesser extent mountain biking trails.
- Kenilworth Racecourse Conservation Area: The conservation area, approximately 52 ha in extent, is considered the best protected example of Cape Flats sand fynbos in the Cape Peninsula. Being located within a racecourse, the vegetation has not been disturbed for over 100 years and contains 283 indigenous plant species, as well as small reptile, bird and mammal populations.
- Lourens River Protected Natural Environment: The Lourens River extends over 23 km and contains fynbos, alien plantations and farmland, as well as residential, commercial and light industrial areas along its course. The pristine mountain catchment area and upper reaches are not freely accessible, as they are located on private properties. The estuary at the mouth is also not accessible to the public.
- Lower Silvermine Wetland: The wetland, situated between Clovelly and Fish Hoek, is a rehabilitated floodplain, containing Hangklip sand fynbos, sand dunes and aquatic and wetland areas. The area is a breeding ground for the endangered Western Leopard Toad, the Arum Lily Frog, the Cape River Frog and the Clicking Stream Frog, as well as around 50 bird species. The area has a small mammal population of Otter, Porcupine and Cape Grysbok.
- Mamre Nature Garden: The nature garden is 254 ha in extent, with a core area of 13 ha. Vegetation types include endangered Atlantis sand fynbos and more than 150 other plant species. Small mammals are present, such as the Bat-eared Fox, Cape Grysbok, Caracal, Small Grey Mongoose and Porcupine, as well as many bird species, reptiles and amphibians.
- Macassar Dunes Conservation Area: The area is located on more than 1 000 ha of planned conservation land along the False Bay coastline near Macassar and contains 178 plant species, including the White Milkwood, which is protected by law. The site is used for environmental education purposes.

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- *Meadowridge Common*: The Meadowridge Common, 8 ha in extent, protects a remnant of the critically endangered Cape Flats sand fynbos and contains 137 flowering plant species, of which 4 are listed as endangered.
- *Milnerton Racecourse Nature Reserve*: The nature reserve is situated to the east of the residential area known as Royal Ascot and is primarily surrounded by a horseracing track. The area is approximately 19.4 ha in extent and is divided into two portions that are separated by a residential development. Public access to the northern section is via a boardwalk and a pathway system, whilst the southern area is enclosed within the racetrack and is not open to the public. The reserve contains Cape Flats sand fynbos and Cape Flats dune strandveld, with 232 plant species. Two small permanent wetlands are also found on the site. The area is habitat to more than 70 bird species.
- *Raapenberg Bird Sanctuary*: The bird sanctuary, forming part of the Two Rivers area, contains a section of the Liesbeek River, between the Hartleyvale sports grounds and the South African Astronomical Observatory and is an important breeding site for many duck species.
- *Rietvlei Wetland Reserve*: Rietvlei encompasses a large wetland in the floodplain of the Diep River between Milnerton and Table View. The reserve is 663 ha in extent and comprises mainly permanent and seasonal wetlands, surrounded by Cape Flats dune strandveld (more than 220 plant species). The reserve has a variety of habitats, including a permanent freshwater lake, shallow marshes, reed beds, a river and an estuarine lagoon with salt marshes that is open to the sea. More than 180 bird species have been recorded, including Pelicans, Flamingos, Ducks, Coots, Herons, Plovers, Weavers and Swallows. There are also small mammals, reptiles and insects present.
- *Riverlands Nature Reserve*: Located north of Chatsworth, the Riverlands Nature Reserve covers an area of 1 715 ha. The reserve forms part of a land to coast corridor named the Dassenberg Coastal Corridor Partnership and contains lowland coastal fynbos comprising Atlantis sand fynbos, critically endangered Swartland shale renosterveld and Swartland granite renosterveld.
- *Rondebosch Common*: The Rondebosch Common, 40 ha in extent, forms an open space for public use within a built-up area and supports a natural remnant of the critically endangered Cape Flats sand fynbos, with patches of renosterveld, as well as a seasonal

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wetland. The area has over 300 plant and 110 bird species. The common is used for jogging and dog walking.

- *Rondevlei Nature Reserve*: The Rondelvei Nature Reserve, situated near Grassy Park in Cape Town, contains 290 ha of Cape Flats sand fynbos, Cape Flats dune strandveld and seasonal wetlands, which is habitat to 278 indigenous plant, 237 bird and 20 mammal species. The reserve has a museum, an auditorium, a network of footpaths and bird viewing towers and hides.
- *Silverboomkloof Natural Heritage Site*: This site is 4.9 ha in extent and situated at Somerset West, just northwest of the Helderberg Nature Reserve. The site conserves a fine forest of Silver Trees, as well as granite fynbos and renosterveld, containing 220 plant species.
- *Table Bay Nature Reserve*: The nature reserve comprises of seven management sections, including Rietvlei, Zoarvlei, Milnerton Lagoon, Milnerton Racecourse, Diep River and the Parklands Fynbos Corridor. The nature reserve lies on the Table Bay coastline, stretching from close to the city centre to the north of Parklands and covers about 880 ha of diverse habitats ranging from riverine floodplains, permanent and seasonal wetlands, open pans, a tidal estuary and coastal dunes. The vegetation consists mainly of endangered Cape Flats dune strandveld and critically endangered Cape Flats sand fynbos.
- *Tygerberg Nature Reserve*: The nature reserve, including the Van Schoorsdrift Conservation Area and the Bothasig Fynbos Nature Reserve, is 300 ha in extent and supports one of the last remnants of the highly threatened Swartland shale renosterveld vegetation. The reserve has 429 plant, 21 mammal, 131 bird, 22 reptile and 7 amphibian species. On the western side of the mountain, the Plattekloof Dam has been restored to a natural wetland with the addition of indigenous water plants and fish. No accommodation facilities are provided.
- *Uitkamp Wetlands*: The 32 ha wetland valley situated near Durbanville is located within a renosterveld region, with 140 different plants and many rare species. The wetland valley is also home to the Cape Caco Frog and the Cape Rain Frog, both of which are considered as threatened.
- *Wolfgat Nature Reserve*: The nature reserve, located along Baden Powell Drive, covers 248 ha of coastal limestone cliffs and contains

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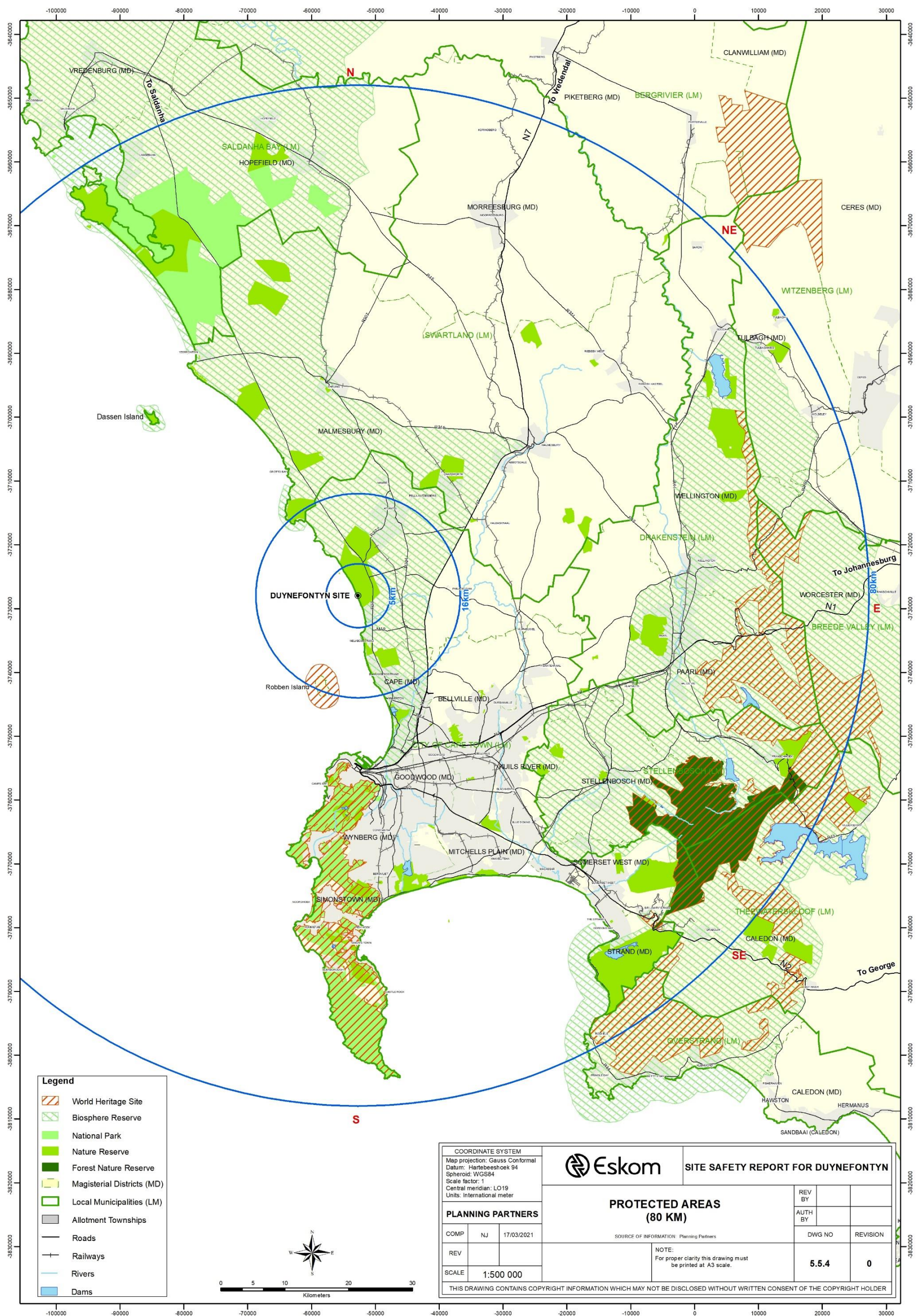
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Cape Flats dune strandveld, with 150 plant species.

- *Zandvlei Estuary Nature Reserve*: Zandvlei is a recreational environmental educational area, located at Lakeside, and is the only functioning estuary on the False Bay coast, providing a habitat for 150 bird and 18 reptile species.
- *Zeekoevlei Nature Reserve*: Zeekoevlei, which is situated near Grassy Park on the Cape Flats, is the largest natural inland water body in the CMA, covering an area of 344 ha, and is a popular picnicking, sailing, fishing and bird viewing spot. The vlei is used by 23 sporting clubs for recreational use and there are also 2 overnight environmental education centres.
- *Zoarvlei Wetland*: The wetland is situated between the Paarden Eiland industrial area and the residential suburbs to the east. The area is 140 ha in extent and is the habitat of 87 plant species and many bird species. Public access is from Donegal Road.

In addition to the above, there are various stewardship areas throughout the site region (as shown in **Drawing 5.5.4**). As most of the Western Cape's biodiversity is in private ownership, CapeNature initiated the Biodiversity Stewardship Programme in 2003. This programme facilitates conservation on privately owned land by setting up agreements between the landowners and CapeNature. Landowners undertake to protect and manage their properties or parts thereof according to sound conservation management principles. CapeNature undertakes to support this management by providing advice, management plans and assistance in planning invasive alien species clearing and fire management schedules (Planning Partners, 2020a).

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5.5.5.3 Current Water Use

a) Water Resources

Water bodies and resources in the site region consist of rivers, dams, groundwater (i.e. aquifers), reservoirs and wetlands. Water bodies in the site region are mapped in **Drawing 5.5.5**.

i. Rivers

The Berg River is the most prominent river in the site region. The Berg, Steenbras and Eerste rivers are the main riverine sources of potable water to the household and agricultural sectors in the site region (Planning Partners, 2020f). Other smaller rivers include the Black; Diep; Disa; Eerste; Kuils; Liesbeek; Lourens and Steenbras rivers (Planning Partners, 2020f). Drainage throughout the site region occurs from a generally northerly and north-easterly direction towards the sea in the west and south.

ii. Dams

There are 23 dams supplying water to the various water supply schemes in the site region (refer to **Table 5.5.1**), with six of these being considered 'major' dams, namely the Theewaterskloof, Voëlvlei; Berg River; Steenbras Upper; Steenbras Lower and Wemmershoek dams. The largest dam in the site region is the Voëlvlei Dam, with a capacity of $158.6 \times 10^6 \text{ m}^3$. The larger Theewaterskloof Dam is only partly situated within the site region and has a capacity of $479.3 \times 10^6 \text{ m}^3$ (Planning Partners, 2020f).

Fourteen dams in and around the CMA form part of the Western Cape Water Supply System (WCWSS), which is an integrated and collectively managed system of dams, pump stations, pipelines, and tunnels. Some of the dams are owned and operated by the Provincial Department of Water and Sanitation (DWS) and some by the CCT. In addition to servicing the CCT, the WCWSS supplies water to towns in the Drakenstein, Stellenbosch, Swartland, Overberg, Berg Rivier and Saldanha Bay municipalities, as well as providing irrigation water for the agricultural sector. Water supply systems in the Drakenstein and Stellenbosch Municipalities are further augmented by smaller dams in the site region, including Nantes, Bethel and Idas Valley Dams (Planning Partners, 2020f). Water supply in the site region is also covered in **Section 5.12** (Water Supply), in so far as it is relevant to water supply to the NIs.

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Table 5.5.1
Dams in the Site Region¹⁸

Code	Dam	Storage Capacity (1 × 10 ⁶ m ³)	Distance	Direction
D23	Theewaterskloof * (partly located in the site region)	479.26	79.9	ESE
D18	Voëlmei *	158.59	68.7	ENE
D16	Berg River *	127.05	67.8	ESE
D17	Wemmershoek *	58.71	67.8	ESE
D15	Steenbras Lower *	33.88	66.9	SE
D19	Steenbras Upper *	31.81	68.9	SE
D21	Eikenhof	28.86	74.7	SE
D20	Rockview	17.50	73.0	SE
D22	Kogelberg	17.30	76.0	SE
D6	Misverstand	5.68	36.7	ENE
D12	Idas Valley	2.04	52.9	ESE
D9	Kleinplaats (Simons Town) *	1.36	49.7	S
D2	Woodhead *	0.95	30.1	S
D1	Hely-Hutchinson *	0.92	30.0	S
D10	Nantes	0.77	50.8	E
D11	Bethel	0.54	52.1	E
D13	Land-en-Zeezicht *	0.45	58.9	SE
D14	Kleinplaas (Jonkershoek)	0.36	49.7	S
D5	De Villiers *	0.24	31.6	S
D7	Perdeberg	0.23	39.4	ENE
D8	Lewis Gay *	0.18	49.2	S
D4	Alexandra *	0.13	31.1	S

¹⁸ (Planning Partners, 2020f)

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Code	Dam	Storage Capacity (1 × 10 ⁶ m ³)	Distance	Direction
D3	Victoria *	0.13	31.0	S

* Dams forming part of the WCWSS

The various water supply dams in the site region are described below (listed in order of capacity) (Planning Partners, 2020f):

- *Theewaterskloof Dam*: The dam is located near Villiersdorp and is the largest dam supplying the CCT, with a capacity of 479.3 × 10⁶ m³. Theewaterskloof is connected to an extensive system of pipelines and tunnels that connects it to the broader WCWSS.
- *Voëlvlei Dam*: The dam, located near Gouda, is the CCT's second largest supply dam (capacity of 158.6 × 10⁶ m³), even though it is not built on any major river, it is instead supplied with water from two canals that divert water from the Klein Berg; Leeu, and Twenty-Four rivers, which have catchment areas in the Porterville and Tulbagh mountains.
- *Berg River Dam*: The Berg River Dam is located in the mountains near Franschhoek and has a capacity of 127.1 × 10⁶ m³. The dam collects runoff from the Upper Berg River.
- *Wemmershoek Dam*: Wemmershoek Dam is located along the Wemmershoek River near Franschhoek. The dam has a capacity of 58.7 × 10⁶ m³ and primarily supplies water for urban use.
- *Steenbras Lower Dam*: The dam is located in the mountains above Gordon's Bay and has a capacity of 33.9 × 10⁶ m³. It supplies water to the Steenbras Water Treatment Works (WTW).
- *Steenbras Upper Dam*: The Steenbras Upper Dam stores water from its own catchment as well as water transferred by the Palmiet Pumped Storage Scheme and has a capacity of 31.8 × 10⁶ m³. It is located just upstream of the Steenbras Lower Dam.
- *Eikenhof Dam*: Eikenhof Dam is a privately-owned dam that is primarily used to supply farms in the Grabouw and Elgin farming region with irrigation water, but also supplies potable water to the town of Grabouw. It has a capacity of 28.9 × 10⁶ m³.
- *Rockview Dam*: The dam is situated to the south-east of the Steenbras dams and has a full supply capacity of 17.5 × 10⁶ m³. This

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dam, along with the Kogelberg Dam, comprises Eskom's 400 MW dual purpose water transfer and hydro-electric Palmiet Pumped Storage Scheme.

- *Kogelberg Dam*: Kogelberg Dam is situated immediately south-east of the Rockview Dam and has a full supply capacity of $17.3 \times 10^6 \text{ m}^3$. The dam forms part of the hydro-electric Palmiet Pumped Storage Scheme, along with the Rockview Dam.
- *Misverstand Dam*: It is located along the Berg River near Koringberg and has a capacity of $5.7 \times 10^6 \text{ m}^3$.
- *Idas Valley dams*: There are two off-channel storage dams in Idas Valley with a combined capacity of approximately $2 \times 10^6 \text{ m}^3$. Water is supplied out of the Idas Valley Dam to a slow sand filtration WTW and into the town of Stellenbosch via the Idas Valley Reservoirs.
- *Kleinplaats and Lewis Gay dams*: The Kleinplaats Dam is the largest of two dams located in Simon's Town that supplies water to the WCWSS (the other being the Lewis Gay Dam). Kleinplaats Dam has a capacity of $1.4 \times 10^6 \text{ m}^3$, while the Lewis Gay Dam has a capacity of $0.2 \times 10^6 \text{ m}^3$.
- *Woodhead Dam*: The Woodhead Dam, with a capacity of approximately $1 \times 10^6 \text{ m}^3$, is located on Table Mountain. It was completed in 1897 and was one of the first dams to be built in South Africa. It is still in service and provides water to Camps Bay and the high-lying areas of the City Bowl.
- *Hely-Hutchinson Dam*: The dam, with a capacity of $0.9 \times 10^6 \text{ m}^3$, is situated on Table Mountain and was built upstream from Woodhead Dam along the Disa River.
- *Nantes and Bethel dams*: These two dams are located on Paarl Mountain and supply water to the Drakenstein Municipality via the Meulwater WTW. Nates Dam has a capacity of $0.8 \times 10^6 \text{ m}^3$, with Bethel Dam having a capacity of $0.5 \times 10^6 \text{ m}^3$.
- *Land-en-Zeezicht*: Land-en-Zeezicht dam is located near the Helderberg Nature Reserve and provides water to Somerset West via the Helderberg WTW. The dam has a capacity of approximately $0.5 \times 10^6 \text{ m}^3$.
- *Kleinplaas Dam (Jonkershoek)*: The dam, with a capacity of $0.4 \times 10^6 \text{ m}^3$, is located along the Eerste River in the Jonkershoek Valley. The Kleinplaas Dam, along with the two Idas Valley dams, is

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the most important source of water for the town of Stellenbosch.

- *Perdeberg Dam*: The dam is located on the Paardenberg Mountain to the southeast of Malmesbury and has a capacity of approximately $0.23 \times 10^6 \text{ m}^3$. It supplements the supply to Malmesbury, Abbotsdale, Kalbaskraal, Riverlands and Chatsworth from the Municipality's own local sources.
- *De Villiers, Victoria and Alexandra dams*: In addition to Woodhead and Hely-Hutchinson dams, there are three other smaller dams on Table Mountain, namely Victoria, Alexandra and De Villiers dams. The three dams are located closer to the Constantia Nek side of the mountain and water from these dams is treated at the Constantia Nek Water Treatment Works.

iii. Groundwater

Groundwater is an important water resource, particularly in areas with sandy soils such as the Cape Flats and the West Coast areas where rainwater infiltrates the porous soil to form aquifers. The three main aquifers in the site region are the Atlantis Aquifer, which is part of the West Coast aquifer to the north of the CMA; the Table Mountain Group Aquifer (TMG) in the Hottentots Holland Mountain range beyond Cape Town; and the Cape Flats Aquifer within the CMA (Planning Partners, 2020f). These aquifers can be described as follow (Planning Partners, 2020f):

- *Atlantis Aquifer*: The Atlantis Aquifer covers an area of approximately 130 km^2 , stretching inland from the Atlantic Ocean to Atlantis in the east. The thin aquifer slopes steeply in a south-westerly direction from a maximum elevation of about 160 m in the northeast down to sea level in the west. A small part of the aquifer extends below sea level in the Witzand and Silwerstroom areas. Due to the sandy surface over most of the area, recharge percentages of 15 to 30 per cent of the annual rainfall are generally experienced, with the higher recharge occurring in the unvegetated dune area. Since the 1970s, Atlantis has been supplied with groundwater via the Atlantis Water Supply Scheme, which operates on the basis of Managed Aquifer Recharge¹⁹. Treated domestic wastewater and stormwater is diverted to large basins, where it infiltrates into a sandy aquifer from where it is abstracted (Witzand and Silwerstroom Wellfields) and reused for municipal supplies. Approximately 30 per cent of Atlantis's

¹⁹ Managed Aquifer Recharge is defined by the transfer of surface water underground and the subsequent storage in an aquifer, either via infiltration from basins / dams / ponds or through injection boreholes (Planning Partners, 2020f).

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groundwater supply is augmented through artificial recharge.

- *Table Mountain Group Aquifer*: The Table Mountain Group (TMG) is a huge aquifer system that extends from the northwest of the Western Cape to the northeast of the Eastern Cape. The TMG has been the focus of much investigation as a significant potential source of water supply for southern South Africa, including the CMA and other towns in the site region, due to a large amount of stored high-quality water.
- *Cape Flats Aquifer*: The Cape Flats Aquifer (CFA) covers an area in excess of 400 km² and extends from False Bay in the south to Tygerberg Hills and Milnerton in the northeast and northwest, respectively. A characteristic of the CFA is that it recharges quickly and has a relatively low residence time. However, the nature of urban development (and persistent urban expansion) on top of this aquifer poses an ongoing pollution threat. As a result, this large groundwater resource has deteriorated over the past decades and is now non-potable in certain areas, with varying levels of contamination. The deterioration is due to a combination of pesticides and fertilizers from agricultural practices, WWTW, informal settlements, unlined or leaking canals, leaking sewerage pipes and stormwater runoff.

There are two aquifers present at the site, the upper intergranular Sandveld Aquifer and the lower fractured rock Malmesbury Aquifer. The former is a major aquifer to the north and east of the site where it is extensively exploited by the CCT as a water resource, e.g. the Witzand and Silwerstroom wellfields, supplying the nearby town of Atlantis. These two aquifers are discussed in detail in **Section 5.11** (Geohydrology).

The Atlantis Aquifer is a major primary aquifer with three production wellfields, namely the Witzand and Silwerstroom wellfields (both owned by the CCT) and the Aquarius Wellfield (owned by Eskom), tapping it. In the Aquarius and Witzand wellfields the nearest boreholes are located 1.2 and 3.0 km northeast of the site, respectively. The former wellfield supplies water to the KNPS (used for wildlife water currently, but potentially also for a desalination plant at the KNPS) whilst the latter supplies Atlantis. Similarly, the Silwerstroom Wellfield is located 9.7 km north-northwest and also supplies Atlantis. There are also many other existing privately-owned boreholes/wellpoints in the site vicinity. Refer to **Section 5.11** (Geohydrology) for more details on boreholes and well-points.

iv. Desalination

There is one desalination plants located in the site region at the V&A

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Waterfront (25 km south), which has a capacity of 2 Ml/day (WSP, 2020).

Note that the temporary desalination plants at Strandfontein (47 km south) and Monwabisi (49.9 km south southeast) were decommissioned in 2020 (City of Cape Town, 2020e; City of Cape Town, 2020g).

v. Reservoirs

Reservoirs are an important part of the water reticulation system in the site region, helping the water reticulation system to cope with periods of peak demand. Water is supplied to reservoirs at a fairly constant rate from the various WTWs situated throughout the site region. (Planning Partners, 2020f).

The CMA is serviced by 27 bulk reservoirs (refer to **Table 5.5.2** and **Drawing 5.5.5**), as well as more than 100 smaller distribution reservoirs (Planning Partners, 2020f). Numerous additional reservoirs are distributed throughout the towns located in the site region: Stellenbosch (28 reservoirs); Paarl/Wellington (21); Riebeek West (5); Malmesbury (3); Moorreesburg (3); Darling (3); Wolseley (3); Langebaan (3); Riebeek Kasteel (2); Gouda (2); Yzerfontein (2); Koringberg (1); Saron (1); Hermon (1) and Hopefield (1) (Planning Partners, 2020f).

Table 5.5.2
Bulk Reservoirs Supplying the CCT²⁰

Code	Reservoir	Storage Capacity (1 × 10 ⁶ m ³)	Distance	Direction
WR28	Faure	61.4	50.0	SE
WR11	Platteklouf	58.3	24.9	SSE
WR27	Blackheath Lower	53.8	41.4	SE
WR16	Tygerberg No. 2	26.4	29.2	SE
WR15	Molteno	18.8	29.1	S
WR19	Glen Garry	14.9	30.1	SE
WR20	Newlands Upper	13.3	32.1	S
WR26	Blackheath Upper	4.8	40.9	SE
WR21	Newlands Lower	4.6	32.4	S
WR8	Pella 40	4.0	17.2	NNE
WR10	Spes Bona	3.5	24.2	ESE

²⁰ (Planning Partners, 2020f)

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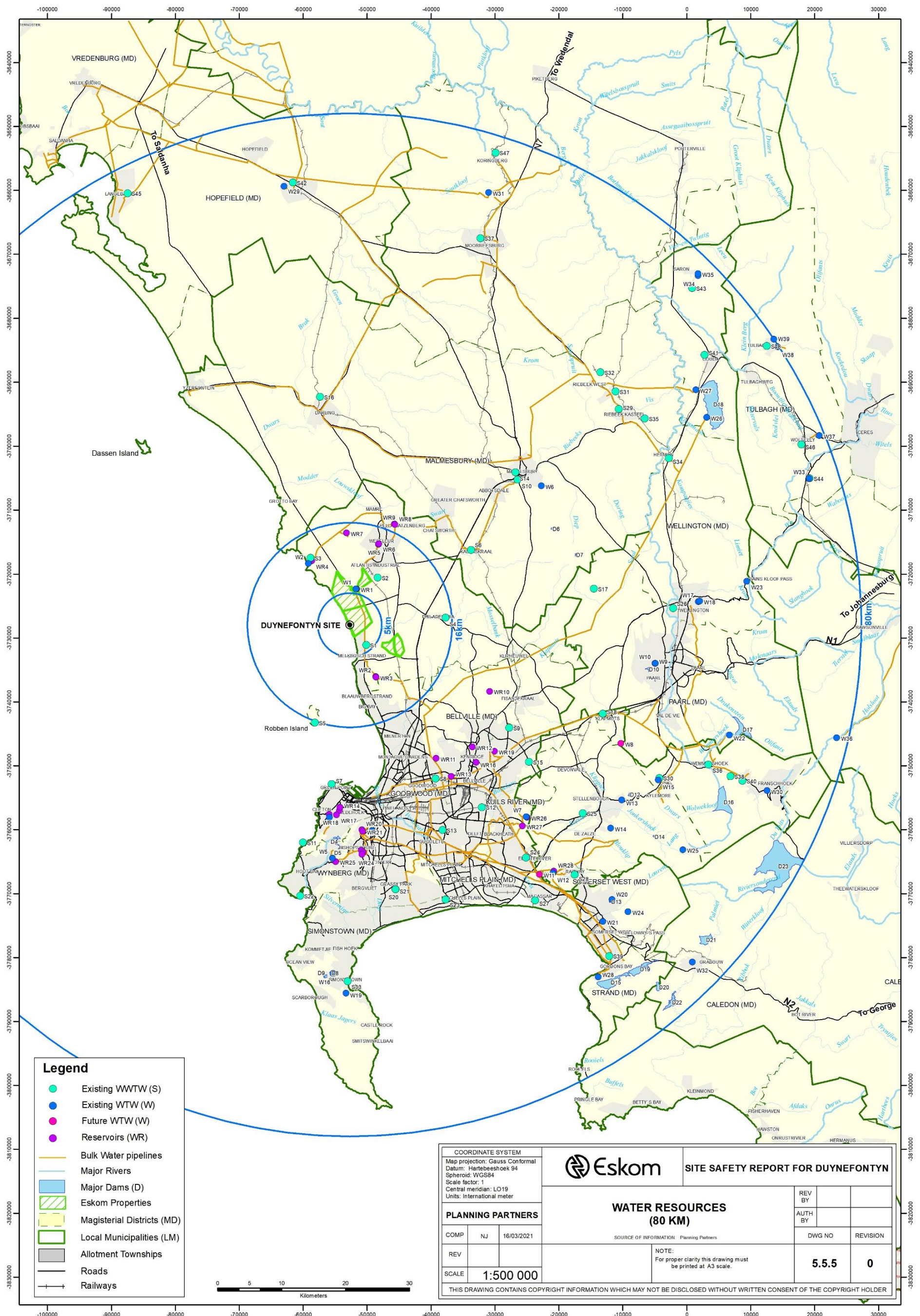
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Code	Reservoir	Storage Capacity (1 × 10 ⁶ m ³)	Distance	Direction
WR13	Tygerberg No. 1	3.3	28.5	SE
WR22	Monterey	2.9	35.3	S
WR12	Durbanville Hills	2.5	27.1	SE
WR23	Wynberg No. 2	2.2	35.6	S
WR6	Hospital Hill 2	2.0	13.5	NNE
WR2	Melkbos A	2.0	9.1	SSE
WR3	Melkbos B	2.0	9.2	SSE
WR14	Oranjezicht	1.6	28.6	S
WR18	Kloof Nek (Mocke)	1.4	29.8	S
WR9	Pella 10	1.0	17.3	NNE
WR5	Hospital Hill 1	1.0	13.4	NNE
WR7	Midlands	1.0	14.4	N
WR24	Wynberg No. 1	0.8	36.0	S
WR17	Eastern High Level	0.4	29.8	S
WR25	Constantia Nek	0.4	37.1	S
WR1	Atlantis/Witzands	Unknown	5.7	N
WR4	Silverstroom Resort	Unknown	11.6	NNW

vi. Wetlands

Major wetlands in the site region are located at the following locations: the lower reaches of the Diep River in the Rietvlei Wetland Reserve (16 km southeast and south-southeast); Zoarvlei Wetland Reserve (24 km south); Raapenberg Wetland (27 km south); Edith Stephens Wetland Park (36 km south-southeast); Uitkamp Wetlands (35 km southeast); Rondevlei Nature Reserve (41 km south); Princess Vlei (43 km south); Zeekoevlei Nature Reserve (45 km south); Glencairn Wetland (50 km south); to the northeast of Voëlvlei Dam (68 km east-northeast) and to the north of Theewaterskloof Dam (67 km east-southeast) (Planning Partners, 2020f).

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b) Water Bodies Used for Commercial and Recreational Freshwater Fishing and other Recreational Purposes

None of the rivers in the site region are used for commercial fishing purposes.

Recreational freshwater fishing does occur in some of the rivers in the site region. Smallmouth bass, carp, Mozambique tilapia and sharptooth catfish are targeted in the Berg River. Rainbow trout are common in the Eerste and Lourens rivers above Stellenbosch and Somerset West. Brown and rainbow trout are targeted in the Witte River; the Holsloot River and the Smalblaar/Molenaars River, all of which are located near the Du Toitskloof Mountains between 60 to 80 km east of the site. Recreational fishing also occurs in the Liesbeek River, targeting carp and sharptooth catfish. It is a requirement of the Western Cape Nature Conservation Ordinance that freshwater anglers over the age of six years are required to have an angling license to fish public waters. However, recreational fishing is not regulated and abundance and volumes of fish caught are not known (Planning Partners, 2020f).

Major dams in the site region where fishing is allowed include the Theewaterskloof; Voëlvlei and Misverstand dams. Largemouth bass, carp and sharptooth catfish are targeted in the Theewaterskloof Dam; carp and sharptooth catfish are targeted in the Voëlvlei Dam and carp, bass (smallmouth and largemouth) and Mozambique tilapia are found in the Misverstand Dam (Planning Partners, 2020f).

The Berg River is used for non-motorised recreation (canoeing and swimming) at a few locations in the site region, including Berg River Resort near Paarl (Planning Partners, 2020f).

Recreational fishing along the coast, in estuaries and offshore within the site region also occurs (refer to **Section 5.6**).

c) Water Management Areas

The National Water Act No. 36, 1998 (Republic of South Africa, 1998) requires the Minister of Water Affairs and Forestry to establish a national water resource strategy for the protection, use, development, conservation, management and control of water resources within South Africa. As part of the National Water Resource Strategy (Department of Water Affairs, 2013), nine Water Management Areas (WMAs) have been

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established across South Africa (refer to **Figure 5.5.3**)²¹.

The majority of the site region falls within the Berg-Olifants WMA, with a small portion falling within the Breede-Gouritz WMA (Planning Partners, 2020f).

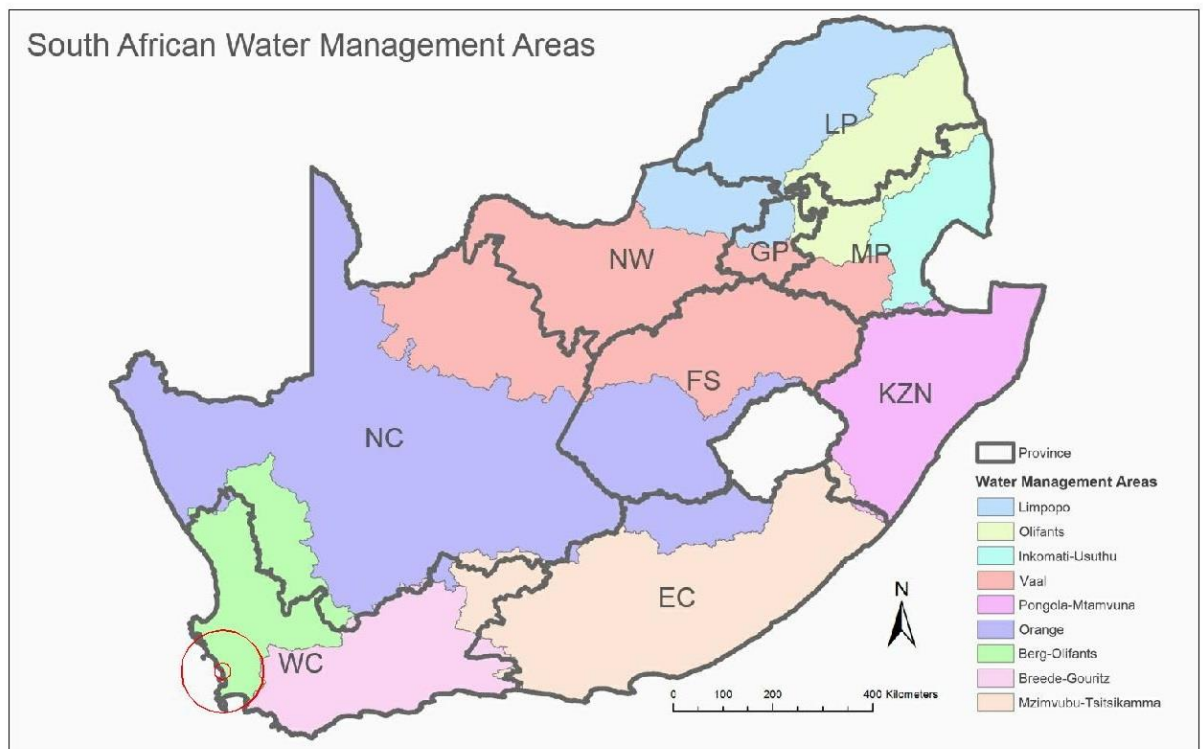


Figure 5.5.3
Water Management Areas in South Africa²²

i. Berg-Oliphants Water Management Area

The Berg-Oliphants WMA includes the CMA, as well as 45 towns situated within six local municipalities: Saldanha Bay Municipality; Swartland Municipality; Drakenstein Municipality; Stellenbosch Municipality; the southern half of the Bergrivier Municipality and the western corner of Witzenberg Municipality. It therefore encompasses the majority of the site region (only small portions of the Overberg Municipality and

²¹ South Africa's National Department of Water & Sanitation (DWS) previously divided the country into 19 Water Management Areas (WMAs). In 2012, the then Department of Water Affairs made a decision to reduce the number of WMAs from 19 to 9. This reduction included the amalgamation of the Berg WMA and Olifants/Doorn WMA into the Berg-Olifants WMA and the amalgamation of the Breede WMA and Gouritz WMA into the Breede-Gouritz WMA (Department of Water Affairs, 2013).

²² (Planning Partners, 2020f)

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Theewaterskloof Municipality fall outside of the Berg-Olifants WMA) (Planning Partners, 2020f).

Over 4.5 million people live in the Berg-Oliphants WMA, with 87 per cent being located in the CCT. In the Berg-Oliphants WMA, 79 per cent of people have access to piped water in their dwelling compared with the national figure of 46 per cent (Planning Partners, 2020f).

The WCWSS serves 74 per cent of the Berg-Olifants WMA requirements and facilitates water transfers between rivers, including from the Breede-Gouritz WMA to the Berg River (Planning Partners, 2020f).

The Berg River is the largest river catchment in the Berg-Olifants WMA, which also includes a number of smaller catchments within the CMA such as the Diep; Kuils; Eerste; Lourens; Sir Lowry's and Steenbras, as well as various small catchments on the Cape Peninsula and along the West Coast (Planning Partners, 2020f). A map showing the Berg River catchment component of the WMA within the context of the WCWSS, as well as within the context of the site region, is shown in **Figure 5.5.4**.

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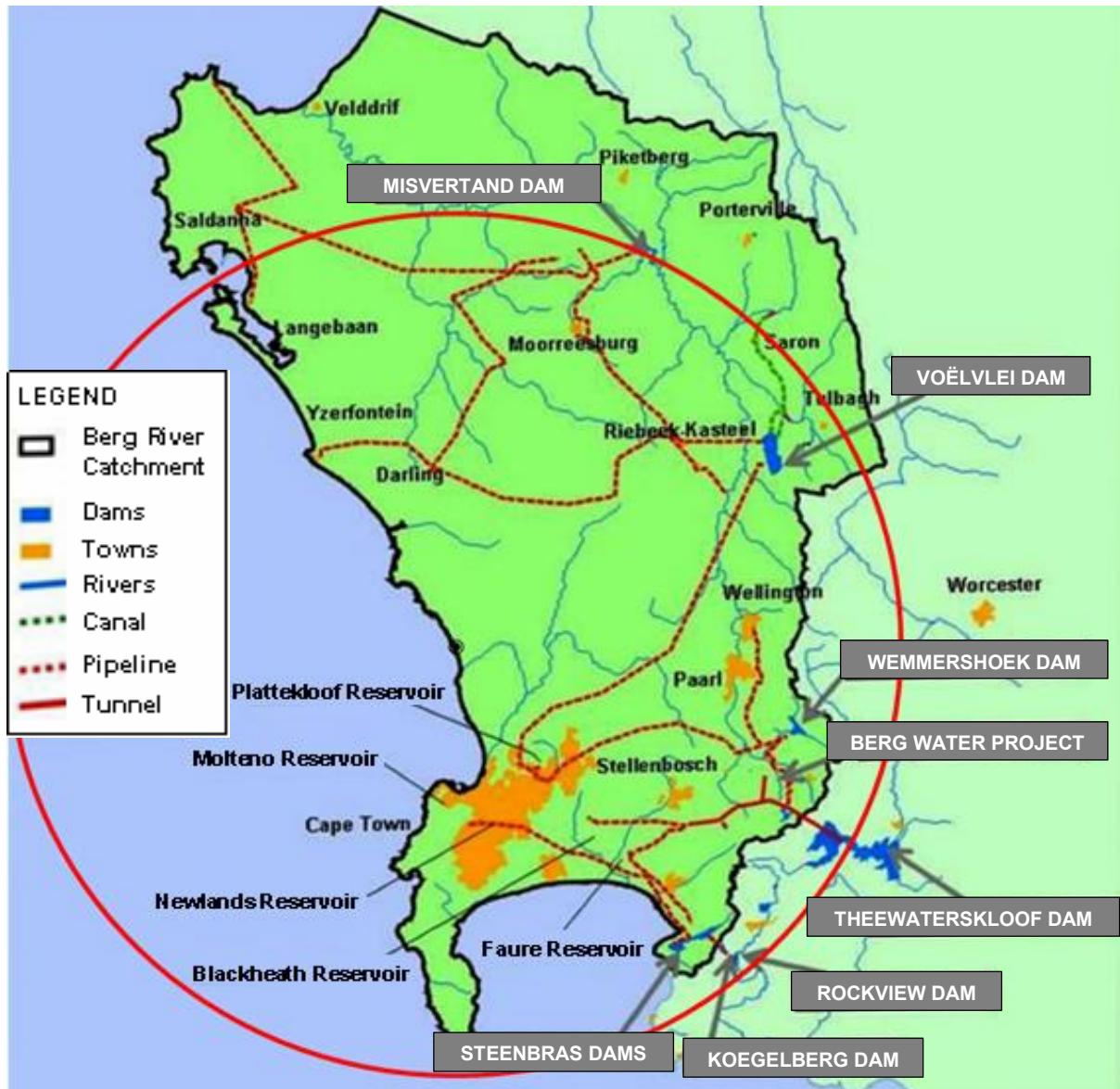


Figure 5.5.4
Berg River Catchment Area within the context of the
WCWSS23

ii. Breede-Gouritz Water Management Area

The Breede-Gouritz WMA extends across three provinces in South Africa (it largely falls within the Western Cape Province with small portions of the upper catchment of the Olifants River falling in the Eastern Cape

²³ (Planning Partners, 2020f)

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Province and tiny portions of the upper catchments of the Gamka and Groot Rivers falling in the Northern Cape (Planning Partners, 2020f)). However, only a small portion of this WMA falls within the site region (portions of the Overberg Municipality and Theewaterskloof Municipality).

There are two large rivers within the Breede-Gouritz WMA (Planning Partners, 2020f):

- the Breede River with its main tributary the Riviersonderend River discharging into the Indian Ocean;
- the Gouritz River, which has three main tributaries: the Groot, Gamka and Olifants rivers.

In terms of surface water management, the Gouritz and Breede catchment areas have been subdivided into eleven hydrological sub-areas (Planning Partners, 2020f):

- Breede catchments: Upper Breede; Central Breede; Lower Breede; Riviersonderend; Overberg West and the Overberg East;
- Gouritz catchments: Gamka; Groot; Olifants; Gouritz and Coastal sub-areas.

Only small portions of the Upper Breede, Riviersonderend and Overberg West sub-areas (all within the Breede catchment) fall in the site region. Nevertheless, the CCT is dependent on water exports from the Breede-Gouritz WMA and a portion of the CMA's needs can therefore be associated with the Breede-Gouritz WMA (Planning Partners, 2020f).

d) Current Water Supply Sources

i. Western Cape Water Supply System

Water supply in the site region is dominated by the WCWSS. Surface water in the WCWSS is sourced from the entire Berg River catchment of the Berg-Olifants WMA, but with significant contributions from impoundments within the Steenbras, Upper Riviersonderend and Palmiet Rivers (the latter two falling within the Breede River catchment component of the Breede-Gouritz WMA), as well as lesser contributions by the Eerste River and various dams on streams in the Cape Peninsula Mountains (Planning Partners, 2020f).

The WCWSS serves the CCT, urban water users and irrigators along the Berg, Eerste, Steenbras and Palmiet Rivers, domestic and industrial

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users on the West Coast, and irrigators and urban users in and beyond the Riviersonderend catchment of the Breede-Gouritz WMA. It comprises bulk infrastructure components owned and operated by both the CCT and the DWS and is supported by lesser bulk infrastructure owned by various district and local municipalities (Planning Partners, 2020f).

The WCWSS comprises six large dams: the Upper and Lower Steenbras and Wemmershoek Dams owned by CCT; the Voëlvlei and Theewaterskloof dams owned by DWS and the Berg River Dam (and associated supplement scheme) that is owned by the Trans-Caledon Tunnel Authority and operated by DWS. In addition, there are eight smaller dams making up the WCWSS (refer to **Table 5.5.1**) (Planning Partners, 2020f).

The bulk water transfer infrastructure of the WCWSS comprises the Riviersonderend-Berg River Tunnel System and various bulk pipelines from the dams supplying the CCT. This conveyance infrastructure, together with the CCT's bulk water reticulation system, which can distribute water from the various sources throughout most of the CMA, makes it possible to operate the WCWSS as one integrated system (Planning Partners, 2020f).

The primary bulk infrastructure components of the WCWSS are schematised in **Figure 5.5.5**.

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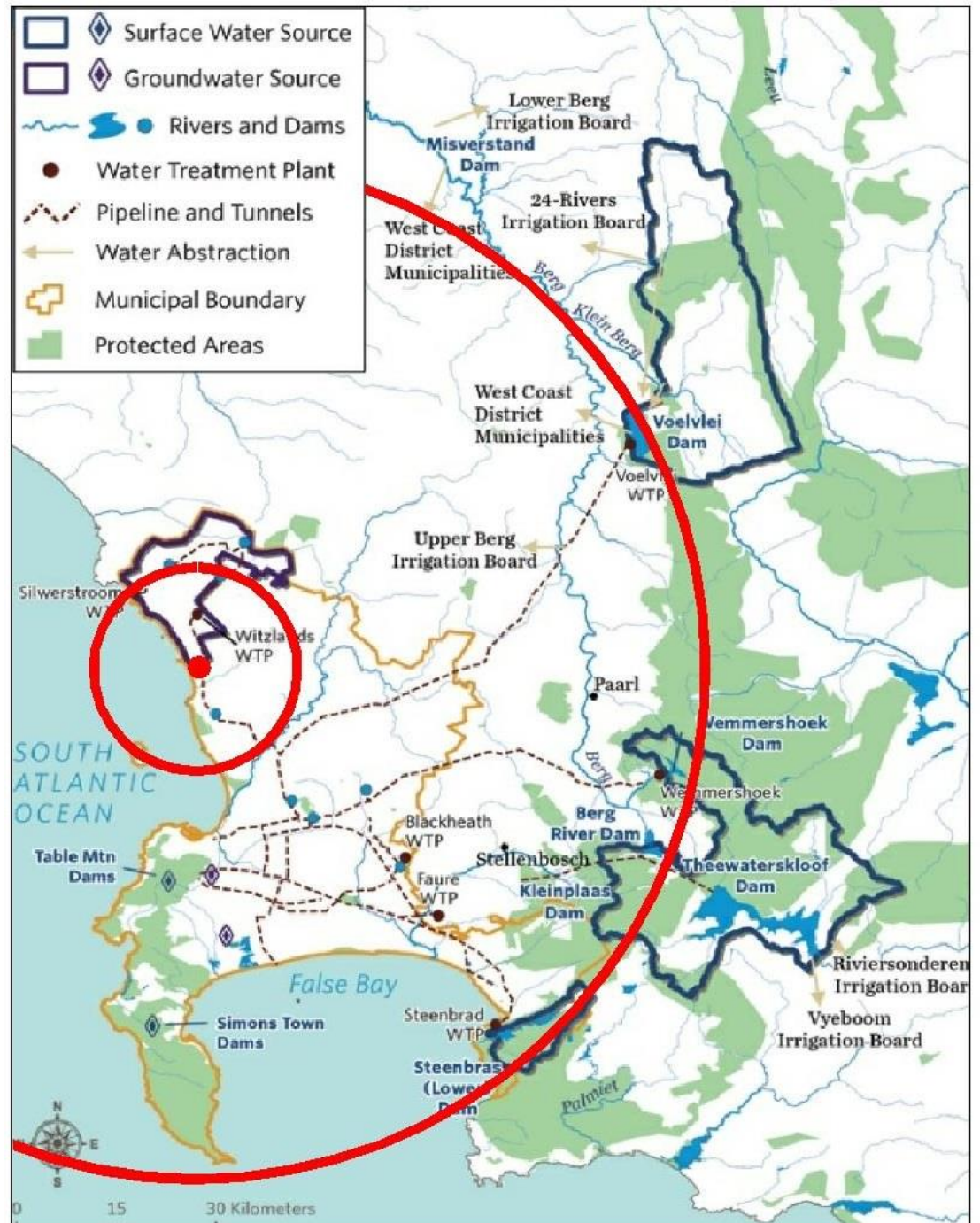


Figure 5.5.5
Western Cape Water Supply System²⁴

From an operational perspective, the WCWSS can be subdivided into

²⁴ (Planning Partners, 2020f)

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three sub-systems and six schemes, as summarised in **Table 5.5.3** and described below (Planning Partners, 2020f).

Table 5.5.3
Sub-systems and Schemes of the WCWSS²⁵

Sub-system	Scheme
Riviersonderend-Upper Berg-Eerste River	Riviersonderend-Berg River Government Water Scheme
	Berg Water Supplement Scheme
	Wemmershoek Scheme
Lower Berg River	Voëlvlei Government Water Scheme
Palmiet-Steenbras	Palmiet Government Water Scheme
	Steenbras Scheme

ii. Riviersonderend-Upper Berg-Eerste River Sub-system

The Riviersonderend-Upper Berg-Eerste River sub-system comprises the Riviersonderend-Berg River Government Water Scheme, the Berg Water Supplement Scheme and the Wemmershoek Scheme. The key components of these three schemes are described below (Planning Partners, 2020f):

Riviersonderend-Berg River Government Water Scheme

- **Theewaterskloof Dam:** The Theewaterskloof Dam near Villiersdorp is the largest storage dam in the WCWSS. The dam is filled by runoff from the catchment by the diversions during the winter months of the Wolwekloof and Banhoek rivers and by water pumped during the winter months from the Berg River Dam into the Riviersonderend Berg River Tunnel System. The demands on Theewaterskloof Dam include direct abstractions from the dam by riparian irrigators, releases into the Riviersonderend River for downstream irrigators and Overberg Water and releases to irrigators in the Berg and Eerste rivers, as well as for community water use by the CCT and Stellenbosch municipalities.

²⁵ (Planning Partners, 2020f)

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- Theewaterskloof WTW: The WTW (located outside of the site region) distributes potable water via a bulk pipeline to the Kleinplaas Dam.
- Kleinplaas Dam: The dam is primarily a balancing dam for the regulation of flow releases from Theewaterskloof Dam en-route to Cape Town (Faure and Blackheath reservoirs) via the Franschhoek/Jonkershoek Tunnel component of the Riviersonderend-Berg River Tunnel System. Kleinplaas Dam also enables the diversion of flow from the Jonkershoek River into the Stellenboschberg Tunnel and river releases are made for downstream irrigators.
- Diversion structures: The Wolwekloof and Banhoek diversion structures divert water into the Franschhoek/Jonkershoek Tunnel component of the Riviersonderend-Berg River tunnel system. There is also a diversion structure on the Eerste River upstream of Kleinplaas Dam, which supplies water to Stellenbosch.

Berg Water Supplement Scheme

- Berg River Dam: The Berg River Dam near Franschhoek is the third largest dam in the WCWSS.
- Drakenstein Pump Station: During the winter months, the Drakenstein Pump Station delivers up to 6 m³/s into the Berg River Dam from the Berg River at Bien Donne about 10 km downstream of the Berg River Dam and immediately downstream of the Dwars River confluence. During the summer months water for use by downstream irrigators is released from the Berg River Dam into the Berg River via the Supplement Scheme pipeline.
- Dasbos Pump Station: This pump station delivers up to 4 m³/s from the Berg River Dam to the Dasbos Portal of the Dasbos Tunnel of the Riviersonderend-Berg River Tunnel System.

Wemmershoek Scheme

- Wemmershoek Dam: The Wemmershoek Dam near Franschhoek is the fourth largest dam in the WCWSS.
- Wemmershoek WTW: From the Wemmershoek WTW below Wemmershoek Dam, a pipeline supplies treated water to bulk potable water service dams at Tygerberg for use by the CCT, with branch pipelines supplying Paarl and Wellington in the Drakenstein

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Municipality.

iii. Lower Berg Sub-system

The Lower Berg River sub-system comprises the Voëlvlei Government Water Scheme, which in turn comprises of the following components (Planning Partners, 2020f):

- Voëlvlei Dam: The off-channel Voëlvlei Dam is the second largest dam in the WCWSS and provides water to the CCT and the West Coast District Municipality, with the latter distributing water to local authorities and other consumers in the area from Malmesbury to St. Helena Bay.
- Weirs and canal diversions: During winter, the weirs on the Twenty-Four Rivers and on the Leeu River divert up to 34 m³/s into Voëlvlei Dam. Similarly, a weir on the Klein Berg River diverts up to 20 m³/s of water into Voëlvlei Dam. Both diversions are via canals. The Twenty-Four Rivers canal is also used for supplying irrigators along the canal during summer. Water is released from Voëlvlei Dam into a canal which discharges into the Berg River downstream of Sonqwasdrift to supply irrigators during the summer months and also to supply the West Coast District Municipality's Withoogte WTW, which abstracts water at Misverstand Dam.
- Misverstand Dam: The main purpose of Misverstand Dam is to divert water to the West Coast District Municipality's pump station which delivers water to the Withoogte WTW and then to the Vredenburg/Saldanha area. The dam also provides limited regulation of the summer releases from Voëlvlei Dam, which are re-released at Misverstand to downstream irrigators.
- Voëlvlei WTW: Water is conveyed from the CCT's high-lift pumpstation at the Voëlvlei WTW to the Platteklouf Reservoir on the outskirts of Cape Town.
- Swartland WTW: Water is also released from the outlet of Voëlvlei Dam to the Swartland WTW of the West Coast District Municipality, from where the water is distributed to various towns in the West Coast District Municipality.

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iv. Palmiet-Steenbras Sub-system

The schemes which constitute the Palmiet-Steenbras sub-system include the Palmiet River Government Water Scheme and the Steenbras Scheme. Key components of these two schemes are described below (Planning Partners, 2020f):

Palmiet River Government Water Scheme

- Kogelberg and Rockview Dams: The Palmiet River Government Water Scheme comprises the Kogelberg and Rockview dams, which respectively serve as the lower and upper dams of Eskom's 400 MW dual purpose water transfer and hydro-electric Palmiet Pumped Storage Scheme. The scheme supplements the Steenbras Scheme by pumping water into Rockview Dam that is in excess of the ecological water requirements of the Palmiet River and of the weekly operating requirements of the Pumped Storage Scheme.

Steenbras Scheme

- Upper Steenbras Dam: The dam stores water from its own catchment as well as water transferred by the Palmiet Pumped Storage Scheme. Its primary purpose is to provide the upper dam for the CCT's Steenbras Pumped Storage Scheme, but it also provides storage for water that is subsequently released to the Lower Steenbras Dam.
- Lower Steenbras Dam: The dam supplies water to the Steenbras WTW.
- Steenbras WTW: From the Steenbras WTW, three major pipelines (known as the Steenbras Pipelines) convey water by gravity to the CCT's Faure WTW and other higher lying zones of the CCT.

v. Minor Schemes

The major schemes of the WCWSS described above are operated in an integrated manner, whereas the minor schemes supply individual municipalities, and/or limited areas of the CMA and/or irrigators. **Table 5.5.4** outlines details of towns in the site region that are either entirely dependent on their own supplies or partially dependent on the major WCWSS schemes described above. **Table 5.5.5** outlines details of minor schemes which supply limited areas within the CMA.

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Table 5.5.4
Municipal-owned Schemes in the WCWSS that fall in the
Site Region²⁶

Town	Raw Water Source	Areas Supplied	Scheme Capacity (1 × 10 ⁶ m ³)
Paarl	Nantes Dam; Bethel Dam; Berg River Pump Station	Paarl	2.8
Wellington	Antoniesvlei (supplementing supply from Wemmershoek)	Wellington	0.5
Stellenbosch	Eerste River at Jonkershoek	Stellenbosch	5.5
Tulbagh	Local Sources	4 700 people	0.6
Franschhoek	Local Sources	4 500 people	0.6
Pniel	Local Sources	2 150 people	0.6
Saron	Twenty-four Rivers Canal	Saron	0.04

²⁶ (Planning Partners, 2020f)

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Table 5.5.5
Minor Supply Schemes in the WCWSS that Supply the
CCT²⁷

Scheme Name	Raw Water Source	Areas Supplied	Scheme Capacity (1 × 10 ⁶ m ³)
Table Mountain and Southern Peninsula Water Supply Scheme	Hely-Hutchinson Dam; De Villiers Dam; Victoria Dam; Alexandra Dam; Woodhead Dam	CMA	5.0
	Kleinplaas Dam; Lewis Gay Dam	Simon's Town	1.8
Atlantis Water Supply Scheme	Atlantis Aquifer	Atlantis; Mamre	6.0
Somerset West	Land-en-Zeezicht Dam; Boreholes	Somerset West	2.0
Strand	Lourens River	Strand	0.8

vi. Swartland Regional Water Supply Scheme

The Swartland Regional Water Supply Scheme is dependent on the Voëlvlei Dam, with water treated at the Swartland WTW. The scheme supplies water to Malmesbury, Yzerfontein, Riebeek West and Riebeek Kasteel, Darling and Gouda, as well as many farms along the route for household and stock watering. The supply from the Swartland Regional Scheme to Malmesbury is supplemented by the Perdeberg Dam (Planning Partners, 2020f).

vii. Withoogte Regional Water Supply Scheme

The Withoogte Regional Scheme provides water to the Saldanha Bay Municipality (including Langebaan and Hopefield in the site region); Dwarskersbos and Veldrif in the Berg River Municipality (outside of the

²⁷ (Planning Partners, 2020f)

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site region); Koringberg and Moorreesburg in Swartland Municipality (within the site region) and numerous farms for stock watering and human domestic requirements (Planning Partners, 2020f).

Water is released from the Voëlvlei Dam into a canal, which flows into the Berg River to the Misverstand Dam. Water is then pumped from the Misverstand Pump Station to the Withoogte WTW, before being distributed to the reservoirs supplying the various towns in the scheme (Planning Partners, 2020f).

e) Community Water Use

Since the site region is located within a winter rainfall region, it can be assumed that agricultural water consumption will be higher in summer months (September to May) than in winter months (June to August). Domestic water consumption would also be expected to be higher during summer holiday periods (December to February and April) when international and domestic tourists typically travel to Cape Town and the surrounding towns, and water is used to irrigate gardens (depending on prevailing water restrictions).

The Western Cape experienced overall below average rainfall over the period 2015 to 2017. This led to the worst drought since 1904 and an unprecedented water shortage in the region. As a result, the local authorities were forced to enforce strict water restrictions on users (Planning Partners, 2020f).

i. Berg River Catchment

There is currently a lack of detailed information pertaining to water use in the Berg-Olifants WMA. However, a consolidation of both sectoral and total present-day demands from surface water and groundwater sources has been undertaken for the Berg River Catchment component of the Berg-Olifants WMA, including demands from local sources outside the WCWSS (refer to **Table 5.5.6**) (Planning Partners, 2020f).

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Table 5.5.6
Current Water Demands in the Berg River Catchment per
Primary Sector ²⁸

Demand	Urban / Industrial	Irrigation	Afforestation and Alien Plants	Total
Total Demand (per annum) (1 × 10 ⁶ m ³)	348	363	40	750

ii. WCWSS

In 2014/2015 (pre-drought, without any water restrictions imposed) the total annual consumption within the WCWSS was estimated to be 547 x 10⁶ m³. The total water allocation for the system is 609 x 10⁶ m³ per year, which is allocated to various end users (refer to **Figure 5.5.6**) (GreenCape, 2019).

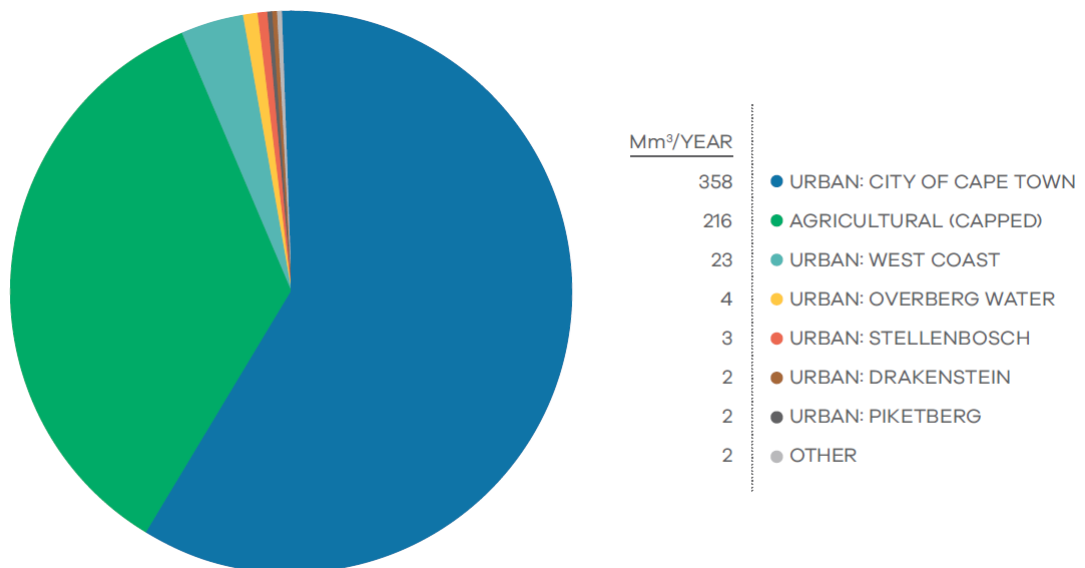


Figure 5.5.6
WCWSS Water Allocation per Use Type²⁹

It is evident that approximately two-thirds of the WCWSS allocation is for

²⁸ (Planning Partners, 2020f)

²⁹ (GreenCape, 2019)

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urban use (including residential, commercial, and industrial use) and the remainder is allocated for irrigation, which is used in the summer months.

iii. City of Cape Town (CCT)

The CCT is the major water user within the site region. Water use data for the CCT for the period 2016/2017 to 2017/2018 provides an indication of the split between the various water use sectors (see **Table 5.5.7**). Domestic consumption represents the highest water use. The data show a relatively constant water usage for all the use sectors within this period (in terms of percentage). **Figure 5.5.7** illustrates the overall water consumption for the CCT for the period 2007/2008 to 2017/2018. The graph shows a marked decrease in consumption during 2016/2017 and continued decline in consumption in 2017/2018 as a consequence of frequently enhanced water restrictions being imposed by the CCT due to the severe drought experienced between 2015 and 2017 (Planning Partners, 2020f).

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Table 5.5.7
Water Consumption for the CCT (2016/2017 and 2017/2018)³⁰

Category	Per Cent	Water Usage 2016/2017 (× 10 ⁶ m ³)	Per Cent	Water Usage 2017/2018 (× 10 ⁶ m ³)
Commercial and Industrial	17	33.5	19	26.2
Departmental Cluster	2	3.4	2	2.9
Domestic Cluster	10	18.7	9	12.7
Domestic Full	55	108.3	51	71.3
Government	2	4.3	2	2.4
Miscellaneous	4	7.1	4	5.0
Municipal	5	9.7	6	7.8
Schools and Sportsfields	2	4.4	2	3.1
Unbilled	4	7.1	5	7.1
Sub-total	100	196.5	100	138.5
Non-revenue Water (17 per cent)³¹	-	33.4	-	23.5
TOTAL		229.9		162.0

³⁰ (City of Cape Town, 2020a)

³¹ Non-revenue water in the context of this report refers to water losses. Non-revenue consumption was not supplied by the CCT, however the CCT's Water Outlook 2018 Report (City of Cape Town, 2018b) states that water losses between March 2017 and March 2018 were 16.9 per cent, and that water losses include losses through leaks, as well as water lost through theft and meter inaccuracies.

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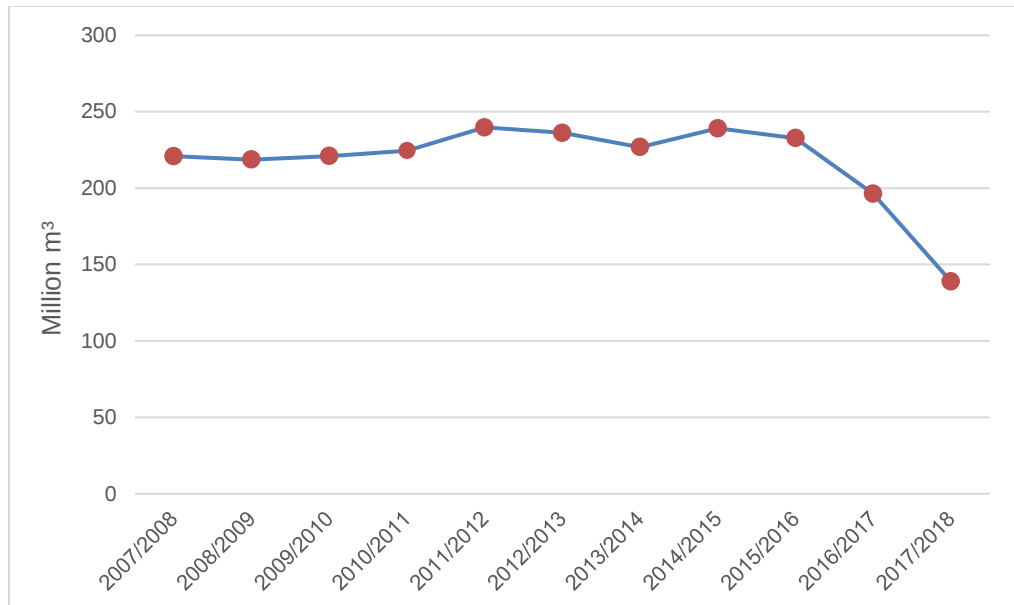


Figure 5.5.7
Water Consumption for the CCT (2007/2008 to 2017/2018)³²

iv. Other Local Municipalities within the Site Region

Drakenstein Municipality

Water use data for the Drakenstein Municipality for the period 2016/2017 to 2017/2018 provides an indication of the split between the various water use sectors (see **Table 5.5.8**). Domestic consumption represents the highest water use. **Figure 5.5.8** illustrates the overall water consumption for the Drakenstein Municipality for the period 2007/2008 to 2017/2018. The graph shows a marked decrease in consumption during 2016/2017 and continued decline in consumption in 2017/2018 as a consequence of frequently enhanced water restrictions being imposed by the Drakenstein Municipality due to the severe drought (Planning Partners, 2020f).

³² (City of Cape Town, 2020a)

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Table 5.5.8
Water Consumption for the Drakenstein Municipality
(2016/2017 and 2017/2018)³³

Category	Per Cent	Water Usage 2016/2017 (× 10 ⁶ m ³)	Per Cent	Water Usage 2017/2018 (× 10 ⁶ m ³)
Domestic	49	7.3	41	4.2
Commercial and Industrial	11	1.6	12	1.2
Other	30	4.4	32	3.3
Unbilled	-	0.1	1	0.1
Non-revenue Water	10	1.5	14	1.4
Total	100	14.9	100	10.2

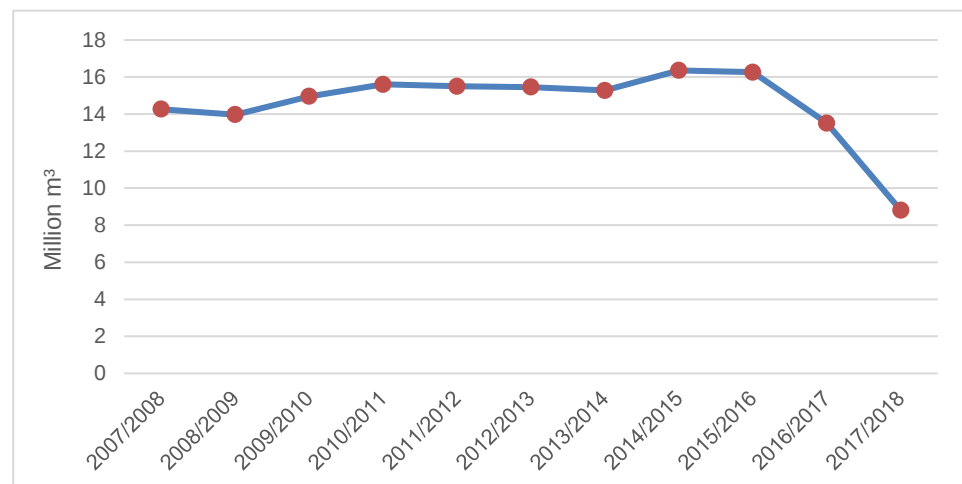


Figure 5.5.8
Water Consumption for the Drakenstein Municipality
(2007/2008 and 2017/2018)³⁴

Swartland Municipality

Water use data for the Swartland Municipality for the period 2016/2017

³³ (Drakenstein Municipality, 2019)

³⁴ (Drakenstein Municipality, 2019)

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to 2017/2018 provides an indication of the split between the various water use sectors (see **Table 5.5.9**). Domestic consumption represents the highest water use. **Figure 5.5.9** illustrates the overall water consumption for the Swartland Municipality for the period 2011/2012 to 2017/2018. The graph shows a marked decrease in consumption during 2016/2017 and continued decline in consumption in 2017/2018 as a consequence of water restrictions being imposed by the Swartland Municipality due to the severe drought experienced between 2015 and 2017 (Planning Partners, 2020f).

Table 5.5.9
Water Consumption for the Swartland Municipality
(2016/2017 and 2017/2018)³⁵

Category	Per Cent	Water Usage 2016/2017 (× 10 ⁶ m ³)	Per Cent	Water Usage 2017/2018 (× 10 ⁶ m ³)
Domestic	63	2.9	55	1.9
Commercial and Industrial	15	0.7	17	0.6
Other	9	0.4	11	0.4
Unbilled	-	-	-	-
Non-revenue Water	13	0.6	17	0.6
Total	100	4.6	100	3.5

³⁵ (Swartland Municipality, 2019b)

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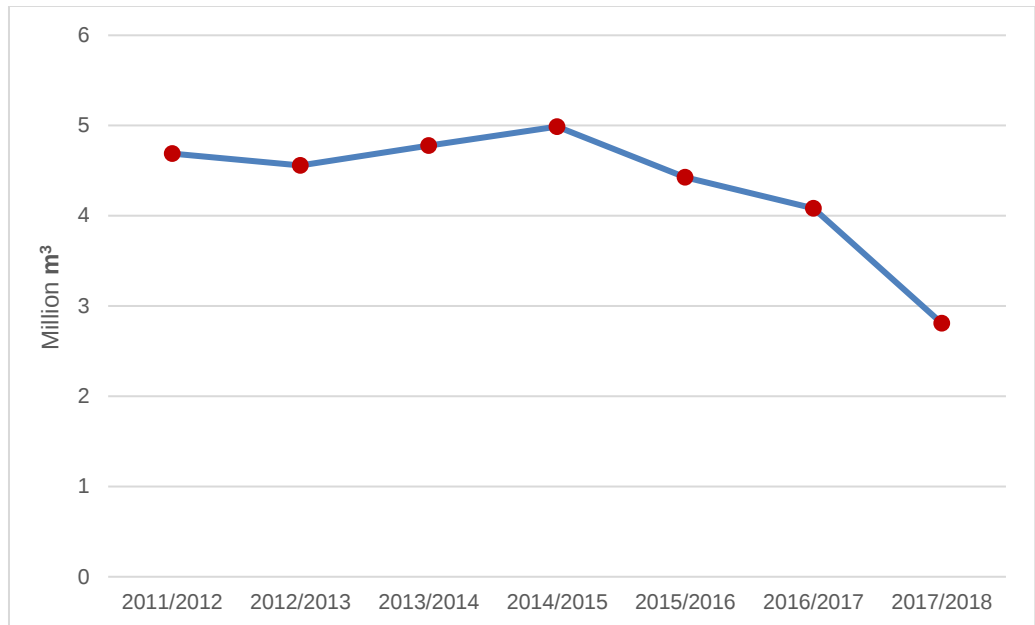


Figure 5.5.9
Water Consumption for the Swartland Municipality
(2011/2012 to 2017/2018)³⁶

Stellenbosch Municipality

The information received from the Stellenbosch Municipality is not as detailed as the information received from the other municipalities described above. Nevertheless, there are still data pertaining to annual water use, which is displayed in [Table 5.5.10](#). [Figure 5.5.10](#) illustrates the overall water consumption for the Stellenbosch Municipality for the period 2007/2008 to 2017/2018. The graph shows a marked decrease in consumption during 2016/2017 and continued decline in consumption in 2017/2018 as a consequence of frequently enhanced water restrictions being imposed by the Stellenbosch Municipality due to the severe drought experienced between 2015 and 2017 (Planning Partners, 2020f).

³⁶ (Swartland Municipality, 2019b)

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Table 5.5.10
Water Consumption for the Stellenbosch Municipality (2016/2017 and 2017/2018)³⁷

Category	Per	Water Usage 2016/2017	Per	Water Usage 2017/2018
Billed consumption	92	9.57	90	6.70
Non-revenue Water	8	0.85	10	0.78
Total	100	10.42	100	7.48

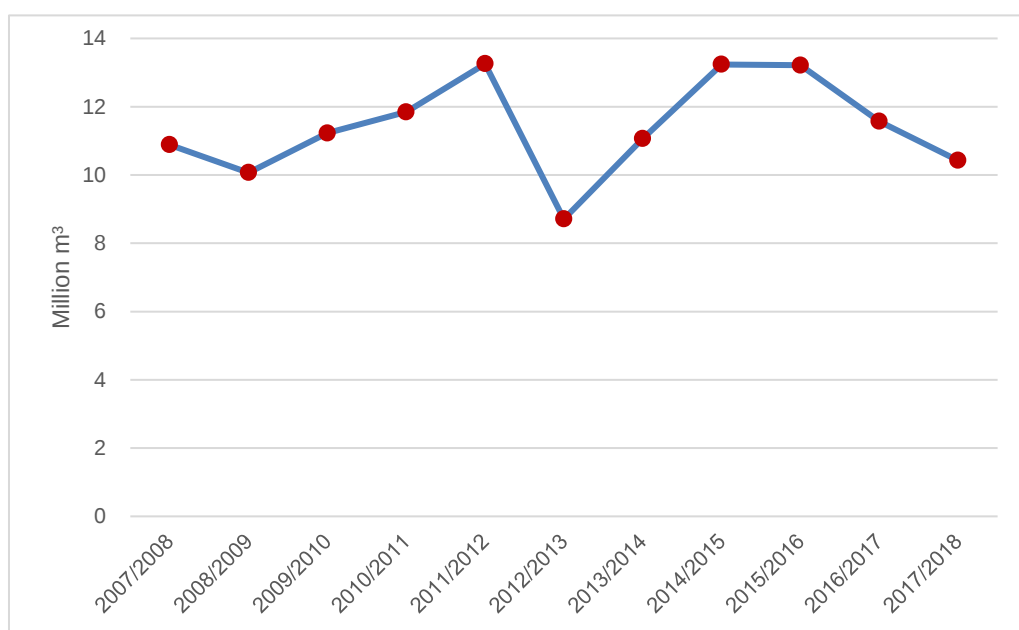


Figure 5.5.10
Water Consumption for the Stellenbosch Municipality (2007/2008 to 2017/2018)³⁸

f) Irrigation water

Raw water is supplied to agricultural users in the site region for irrigation purposes via Water User Associations (WUAs) and Irrigation Boards (IBs), as well as a few individual irrigators (Planning Partners, 2020f).

³⁷ (Stellenbosch Municipality, 2020)

³⁸ (Stellenbosch Municipality, 2020)

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Table 5.5.11 lists the WUAs and IBs that are currently active in the site region, as well as their respective water use allocations. It is evident that $144.2 \times 10^6 \text{ m}^3$ of water is allocated to agricultural irrigation within the Berg-Oliphants WMA component of the site region, while $156.3 \times 10^6 \text{ m}^3$ of water is allocated to agricultural irrigation within the Breede-Gouritz WMA component of the site region, giving a total allocation of $300.5 \times 10^6 \text{ m}^3$ for agricultural irrigation in the site region (Planning Partners, 2020f).

Table 5.5.11
Water User Associations and Irrigation Boards in the Site Region³⁹

Water User Association / Irrigation Board	DWS / BGCMA ⁴⁰ Allocation ($\times 10^6 \text{ m}^3$)
Berg-Oliphants WMA (WCWSS and other)	
Upper Berg River Irrigation Board	58.6
Wynland Water User Association	27.2
24-Rivers Irrigation Board	20.0
Lower Berg River Irrigation Board	18.1
Tulbagh Water User Association	10.9
Kromme Rivier Irrigation Board	4.0 ⁴¹
Palmiet Irrigation Board	1.8
Banhoek Irrigation Board	1.6
Daljosafat Irrigation Board	1.1
La Motte Irrigation Board	0.9
Sub-total	144.2
Breede-Gouritz WMA	
Zonderend Water User Association	50.4
Groenland Water User Association	34.8
Vyeboom Irrigation Board	13.2
Direct users from Theewaterskloof Dam	12.4 ⁴²
Holsloot Water User Association	12.3

³⁹ (Department of Water and Sanitation, 2020b)

⁴⁰ Breede-Gouritz Catchment Management Agency.

⁴¹ Augmented by $5 \times 10^6 \text{ m}^3$ inter-basin transfer from Wit River (Bainskloof) by common reference as "Gawie se Water" (Department of Water and Sanitation, 2020a).

⁴² Although the total existing lawful use of the individual irrigators is $12.4 \times 10^6 \text{ m}^3/\text{a}$, the volume that the irrigators abstract is dependent on the Theewaterskloof Dam level. When the dam level is more than 75%, the irrigators can pump up to their maximum allocation of $12.4 \times 10^6 \text{ m}^3/\text{a}$. When the Theewaterskloof Dam level is less than 75 per cent, the irrigators are only able to pump up to $8.58 \times 10^6 \text{ m}^3/\text{a}$ (Department of Water and Sanitation, 2020b).

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Water User Association / Irrigation Board	DWS / BGCMA ⁴⁰ Allocation ($\times 10^6 \text{ m}^3$)
Elandskloof Irrigation Board	11.8
Wolseley Water User Association	9.5
Waaiohoek, Olifantsberg and Jan du Toits Irrigation	3.7
Wabooms Rivier and Darling Brug Irrigation Board	3.3
Groot-Eiland-Klipdrift Irrigation Board	2.8
Smalblaar Irrigation Board	2.1
Sub-total	156.3
TOTAL	300.5

5.5.5.4 The Impact of Climate Change on Land and Water Use in the Site Region

The following climate change vulnerability projections can be highlighted out of the internal Eskom Report (RES/RR/16) on climate change vulnerability projections prepared by Engelbrecht *et al.* (2017):

- For the period 2021 to 2050 relative to the period 1961 to 1990, under low mitigation, temperature increases of 1 to 2.5°C may plausibly occur over the southern coastal regions of South Africa. Under modest-high mitigation, temperature increases will be somewhat less.
- Under both low and high mitigation, maximum temperatures are projected to rise faster than minimum temperatures.
- In association with rising maximum temperatures, the frequency of occurrence of very hot days is also projected to increase drastically under climate change.
- Increases in the occurrence of very hot days occur in association with projected changes in the frequency of occurrence of heat-wave days and high fire-danger days. These changes may impact on human and animal health through increased heat stress, are likely to impact negatively on crop yield and are conducive to the occurrence of veld and forest fires.
- A general decrease in rainfall is plausible over southern Africa under enhanced anthropogenic forcing. The winter rainfall region of the

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southwestern Cape is projected to become generally drier⁴³.

The climate change vulnerability projections described above are generally consistent with those described in the report prepared in collaboration by the African Climate and Development Initiative (ACDI) and SmartAgri titled *A Status Quo Review of Climate Change and the Agriculture Sector of the Western Cape Province* (African Climate and Development Initiative and SmartAgri, 2016), which assesses climate change responses in agriculture in the Western Cape, including the anticipated impacts of climate change in respect to *inter alia* soil and land productivity, water resources, biodiversity and ecosystem services, and agricultural production. The following is extracted from the ACDI and SmartAgri report (African Climate and Development Initiative and SmartAgri, 2016):

a) Soil and Land

The two principle drivers of plant growth and the turnover of soil organic material are temperature and precipitation. Climate change in the medium to long-term may result in a change in observed carbon stocks and fluxes within soil profiles. Predicted warming and drying in certain areas may lead to a decrease in net primary productivity and an associated decrease in above and below-ground carbon stocks. Protracted warm and dry periods may, in addition, lead to increases in the frequency and intensity of fire. However, the heterogeneity of changes in climate across the Western Cape, topography and variability in response and resilience between species makes projections of changes in carbon stocks very difficult.

b) Water Resources

While there is still some uncertainty about the specific impacts of climate change on the water resources of the Western Cape, climate change is likely to result in a reduction in the surface water availability. It is also likely to cause potential shifts in the seasonality of rainfall and runoff and an increase in the magnitude and frequency of flood events. Increasing temperatures will lead to increased evaporation from reservoirs, dams and streams as well as increasing the potential impact of invasive alien plants and forestry, which are considered streamflow reduction activities. Irrigation demands will also likely increase.

⁴³ The projected changes in rainfall patterns over South Africa display more uncertainty than in the case of projected changes in temperature. This implies that adaptation policy makers need to take into account a range of different rainfall futures, often of different signal (i.e. drier and wetter) during the decision making process (Engelbrecht, et al., 2017).

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Water resource management and planning strategies, such as Cape Town's Water Strategy (City of Cape Town, 2019b), have taken high natural climate variability into account and a highly developed and integrated water supply strategy is in place for the greater Cape Town area. Therefore, a high degree of resilience to potential climate change impacts is already in place or planned for the main demand centre in the site region. Smaller and less well integrated systems do, however, remain vulnerable to climate change impacts.

c) Biodiversity and Ecosystem Services

The Western Cape, including the site region, contains ecosystems with exceptional biodiversity and endemism by world standards. Some components of these ecosystems are under threat, particularly where land transformation for agriculture has occurred in the lowlands. Other areas, such as the mountains, enjoy considerable formal protection.

However, invasive alien plant species have significant negative impacts on ecosystems. Despite the efforts to clear invasive alien plants, extensive tracts of land are still infested and this represents an enormous cost to biodiversity. The areas that have been affected include the mountain catchments, the sandy lowlands and along river courses. Invasive alien plants compete with indigenous species and agricultural crops for water, light and nutrients. They also exacerbate fire risk. Climate change is expected to increase the invasive alien plant infestation problem in future.

While wildfires are a natural feature of fire-driven ecosystems (such as fynbos), climate change is altering their frequency and intensity (the frequency of wildfires is likely to increase substantially in the hotter, drier conditions and high fire risk conditions are projected to increase by up to 40 per cent in the western part of the Western Cape, which includes a portion of the site region). This has an adverse impact on these ecosystems.

d) Agricultural Production

The agriculture sector is an important component of the province's food system. The assessment of risk and impact of climate change on the agricultural sector requires an integrated view of the linkages between climate drivers, direct and indirect consequences on crops, livestock, and the productive environment. Agriculture is generally highly exposed to, and often highly sensitive to climate variability and climate change, leading to significant impacts on production. The potential for climate

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change to disrupt this sector and food security is a very serious issue.

In the Western Cape, the agricultural system has proven its resilience and is already relatively well adapted to existing climate variability. No major disruptions in overall production have been experienced since 2000, with climate-related disasters having a relatively small footprint and knock-on effect⁴⁴.

Below is a general overview of climate change impacts on crops and livestock farmed within the site region (African Climate and Development Initiative and SmartAgri, 2016):

- *Grain*: Staple grain crops such as wheat are generally shown to experience reductions in yield under climate warming, although rising atmospheric CO₂ concentrations counter this effect. It is expected that flexible adaptation approaches, the use of rotational production systems and an increasing shift to conservation agriculture combined with the fertilising effects of rising atmospheric CO₂, could provide sufficient resilience to warming of up to approximately 2.5°C for winter grains (i.e. wheat and barley).
- *Table grapes*: Table grapes typically require a warm to hot, dry climate (i.e. warm days, cool nights and low humidity). There must be very little rain during the ripening period in order to avoid diseases. The grapevine also require a period of dormancy, but no late frost which could damage the young buds. Possible factors include loss of chilling and increasing problems with delayed bud break, shifting phenological stages, heat stress effects on yield and quality, as a result of shifts in rainfall and humidity and insufficient water. However, given enough irrigation water, some warming and reduction in humidity could benefit table grape production in parts of the province.
- *Wine grapes*: Wine grapes are grown across the site region in a diverse range of terroirs (combinations of soil type, topography and climate). As for other perennial fruit crops, two of the primary responses to climate change in the grapevine, in the warmer production regions, are the deficiency of winter chilling, resulting in uneven bud break, and shifts in phenological stages associated with warming. This phenomenon can result in shortening the harvesting dates. For wine grapes, the major concern is not total production, but

⁴⁴ With the possible exception of the 2009 drought (African Climate and Development Initiative and SmartAgri, 2016) and the 2017/2018 drought.

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the quality of the grapes for winemaking (i.e. berry composition). Warming during the pre-harvest period reduces colour expression in some red cultivars, shifts the balance between sugars and acids (more rapid sugar accumulation and thus higher alcohol content, lower acids), and affects the flavour components which confer character. Periods of high temperature during the summer berry growth and ripening stages in the western coastal areas of the site region could change the berry aromatic profile and the style of wine which can be made from it.

Consequently, varietal suitability will be affected because of climate change and a disruption of historically grown combinations is likely to occur. Red wine grape cultivars that will be more tolerant of climate change include Cabernet Sauvignon, Pinotage and Ruby, whilst cultivars that will be most vulnerable to climate change are Shiraz and Merlot. White wine grape cultivars that will be more tolerant include Chenin Blanc and Colombard, whilst Sauvignon Blanc and Chardonnay will be most vulnerable to climate change.

- *Deciduous fruit:* Deciduous fruit can be further broken down into pome fruit and stone fruit:
 - *Pome fruit:* Pome fruit species, mainly apples and pears, in the site region occurs predominantly in the Elgin-Grabouw area where the climate for pome fruit is ideal because the winter climate is seldom cold enough to provide sufficient chilling for emergence from dormancy in spring, and rest-breaking chemical agents are routinely used to regulate the emergence of leaves and flowers (budbreak), fruit set and fruit quality. Under climate warming, accumulation of chill units will decrease, eventually reaching a critical threshold at which apple production would no longer be commercially sustainable in currently warmer areas (even moderate warming of less than 1 °C will have serious implications for sustained production in Elgin-Grabouw). Pears are less chill-dependent than apples. Initial moderate warming (1 to 1.5 C) during the fruit growth period could lead to slight gains in the cooler Elgin region.
 - *Stone fruit:* Stone fruit thrive in warm to hot and drier climates and have a low to medium winter chill requirement. The Wolseley-Tulbagh area in the site region is one of the highest producers of stone fruit in the Western Cape. Climate risks to stone fruit include some risks common to all fruit production, such as reduced availability of water (both from rainfall and

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irrigation), reduced chilling and shifts in phenology (i.e. earlier flowering). It is likely that the impacts will be felt very differently between the western and eastern production regions, depending on changing rainfall amounts and seasonality and changes in risks such as hail and strong wind which are not yet well modelled.

- Citrus fruit: In the Western Cape, citrus production focuses on oranges (Valencias and Navels) which thrive in warm to hot climates, and soft citrus (Clementines, Mandarins and Satsumas), lemons and limes which prefer a slightly cooler climate. The main production areas are in the winter rainfall areas, including the Stellenbosch-Paarl area. Citrus trees require water all year round, provided by a combination of rainfall and irrigation. Predictions are that citrus could benefit from slight warming and drying within the context of a Mediterranean climate, provided that access to sufficient irrigation water is not limiting.
- Olives: Olive production thrives under cool winters (with some chilling required for good shooting, flowering and fruiting) and hot summers. Most olive growing regions of the world have average maximum daily temperatures, in the hottest month of summer, somewhere above 30 C, but they are resilient to afternoon temperatures as high as 45 C. Although olives are relatively drought tolerant, they do require adequate moisture for commercial production (>500 mm rainfall per year) and commercial orchards are irrigated. It seems unlikely that warming will negatively affect olive production in the Western Cape (and may even favour the industry's expansion), but negative impacts could occur through changes in the availability of irrigation water.
- Fodder: Climate change is expected to impact fodder production and quality, driven largely by atmospheric and climatic factors (e.g. CO₂ concentration, temperature, and rainfall) and indirectly through changes in species composition and interactions, bush encroachment and other invasive alien plants and animals, the frequency and intensity of fire and drought and interactions with land use.
- Extensive livestock production (cattle, sheep, goats, ostriches): Livestock farmed on an extensive basis in the site region (including cattle and sheep) will be primarily impacted by changes in production of fodder (lower pasture and crop yields), changes in pests and diseases, as well as availability of water. Projections are that climate change will have a direct impact on the dairy industry by affecting the

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intensity and frequency of cattle heat stress and hence, will adversely affect reproductive performance, milk yield and quality.

- *Intensive livestock production (chickens and pigs)*: The production of pigs and poultry in the site region is characterised by intensive production systems where animals are mostly housed and feed is provided to them (although there is also a slow emergence of free range farming). The impact of climate change will affect the pig and poultry industries via the feed supply chain. Significant amounts of maize and soybean fed to poultry and pigs are produced in the crop growing areas of South Africa in the Free State, Northwest and Mpumalanga. The shortfall is imported largely from South America. Local South Africa crop production is very much under the influence of the climate change induced intensity of weather events like droughts and floods. This determines how much of the feeds are imported, which has a direct impact on cost of production. Another important consideration in connection with climate change is the increase of heat stress in animals (in most commercial production outfits animals are housed indoors all the time, and higher temperatures may result in increased heat stress).
- *Freshwater aquaculture*: The direct risks and impacts of climate change on freshwater aquaculture relate to the climatic suitability and sensitivity of the species used, and linkages with fisheries (feed, seed and markets). For example, farmed trout are exposed to possible increased temperatures of inland water bodies, their growing period could be shortened and the fish become smaller and they could become more impacted by diseases.

It is evident that climate change may have a significant impact on agricultural production (e.g. lower productivity levels and loss of harvest) in the site region in the future. These impacts therefore need to be continuously monitored in relation to the site region and reported in subsequent reviews and updates of the DSSR.

5.5.5.5 Future Development in the Site Region

a) Future Land Requirements

Future land development in the site region is, to a large extent, determined by spatial planning policy and the control of land use. Future regional activities are therefore presented by discussing strategic spatial planning strategies and policies, i.e. Integrated Development Plans and SDFs. The Cape Town MSDF (2018) (City of Cape Town, 2023a), the

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Stellenbosch SDF (Stellenbosch Municipality, 2019), the Drakenstein SDF (Drakenstein Municipality, 2018) and the Swartland SDF (Swartland Municipality, 2019a) provide a good basis for considering potential future development and land use in the site region (Planning Partners, 2020b). **Section 5.4** discusses these SDFs in greater detail.

Guiding principles that determine future land use in the site region include the following:

- Rural and high potential agricultural land should be retained for agricultural purposes as far as possible (City of Cape Town, 2023a) (Drakenstein Municipality, 2018) (Stellenbosch Municipality, 2019) (Swartland Municipality, 2019a).
- Urban development of settlements in the site region will be contained within the proposed urban edges, where applicable⁴⁵. Urban edges are intended to control growth and limit lateral expansion of towns. **Section 5.4** discusses urban development and expansion in greater detail.
- Industrial expansion in the site region is discussed in detail in **Section 5.7** (refer to **Drawing 5.7.6**). The SDFs relevant to the site region propose light industrial development be located within the existing industrial areas of each settlement. Noxious industries⁴⁶ are restricted to the industrial areas of Atlantis and Malmesbury, whilst further heavy industrial uses are proposed within the noise buffer zones of Cape Town International Airport and Ysterplaat Air Force Base, as well as the N7 gateway into Cape Town. In addition, risk industrial development is planned at Frankendale (13.4 km southeast) with 134 ha of risk industrial land and 80 ha of general industrial land. Industrial development is therefore planned to be developed within the existing industrial areas of Cape Town and the smaller towns in the site region. Since heavy industrial uses are permitted in Atlantis, Frankendale and in the vicinity of Du Noon, it can be expected that heavy industrial uses will be developed in the site vicinity in future (City of Cape Town, 2023a). Noxious and heavy

⁴⁵ The Cape Town SDF (City of Cape Town, 2023a) does not utilise the urban edge as a spatial planning policy tool. Instead, urban areas on the periphery are classified as "Incremental Growth and Consolidation Areas" (or "Managed Growth Areas"), beyond which lies "Discouraged Growth Areas", which are areas in which there is disincentive to develop (i.e. the City of Cape Town will not co-finance any infrastructure for private developments in this area, and private development initiatives will be subject to extraordinary conditions of approval and greater than conventional development charges). Development within these fringe areas is therefore expected to be lower, when compared to development in more centralised areas (Planning Partners, 2020b).

⁴⁶ Noxious industries refer to industrial uses that could be hazardous to human health, i.e. air pollution, noise pollution, etc. (City of Cape Town, 2019a)

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industries are likely to contain hazardous substances that could lead to external events (as discussed in **Section 5.7**).

Large-scale infrastructure projects have a major impact on economic growth, spatial development and environmental features. Current and future major infrastructure projects in the site region are described below (Planning Partners, 2020b):

- **N7 Freeway upgrade:** The upgrade of the N7 Freeway between Cape Town and Malmesbury, which features a dual carriageway road and various new interchanges, began in 2015 and is nearing completion, with the final phase between Bosmansdam and Melkbosstrand currently being constructed. Once completed, this road upgrade will greatly enhance accessibility between Cape Town and the urban settlements to the north, particularly Malmesbury.
- **Renewable energy projects:** Given the current and growing challenges in generating sustainable electricity supply to the whole of South Africa, the demand for renewable/alternative energy has grown and will continue to increase as infrastructure development and the growing population require more electricity in future. A number of renewable energy projects are agglomerating in the West Coast District Municipality region, including several established and future wind farms in the vicinity of urban settlements in the site region such as Darling, Hopefield, Yzerfontein and Langebaan.

b) Future Water Requirements

In the Berg-Oliphants WMA (which includes areas supplied by the WCWSS), water demand is expected to grow by 45 per cent by 2040 due to population increases and climate change (GreenCape, 2019). Barring any additional allocations or augmentation schemes, the water supply deficit is forecast to be approximately $140 \times 10^6 \text{ m}^3$ by 2025 and approximately $300 \times 10^6 \text{ m}^3$ by 2040 (GreenCape, 2019). As shown in **Figure 5.5.11**, the supply deficit in 2025 will be most sharply felt in the agricultural sector, accounting for 87 per cent of the total deficit (driven largely by demand in the Drakenstein, Stellenbosch and Swartland municipalities). However, this picture changes dramatically by 2040, with an almost even split between the supply deficit of the urban and agricultural requirements, driven largely by population growth in the CCT (GreenCape, 2019).

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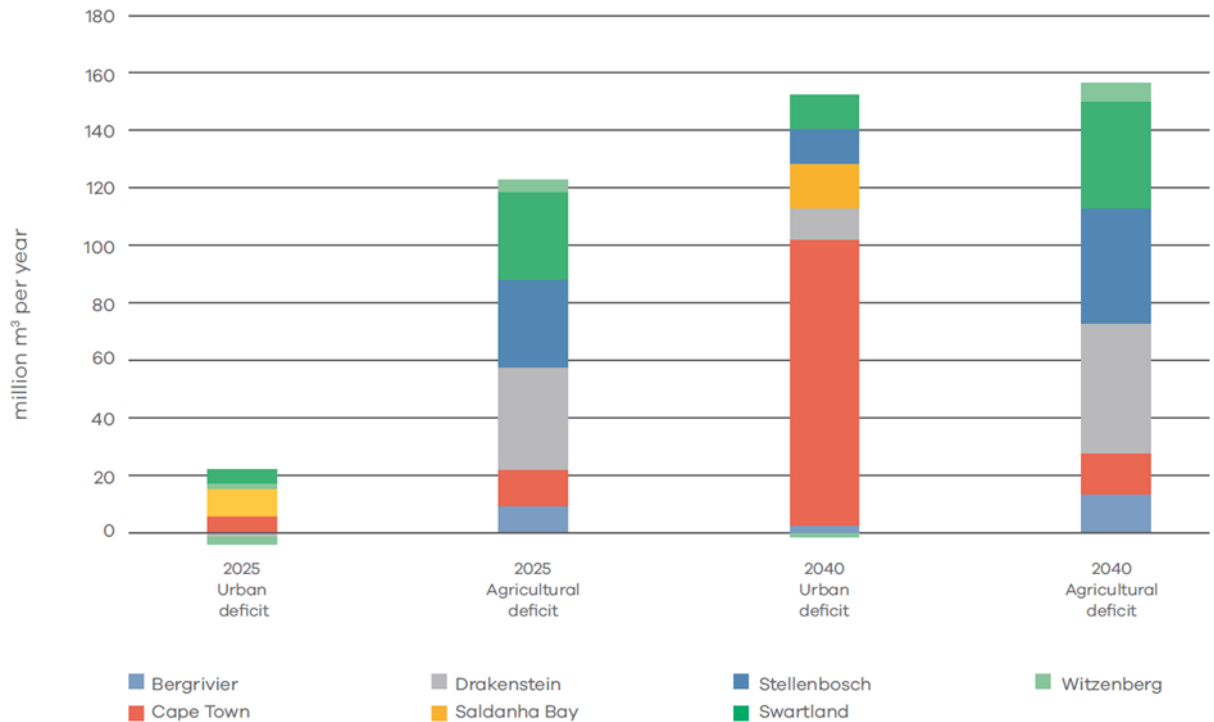


Figure 5.5.11
Projected Urban and Agricultural Supply Deficit in the Berg WMA⁴⁷

In order to address future water constraints, studies were conducted to reconcile the gap between future demand and supply. The WCWSS reconciliation strategy study was completed in 2007, and annual status updates are produced by DWS (GreenCape, 2019). The draft annual update for 2018 compares several future water balance assessment scenarios. **Figure 5.5.12** presents the scenario considered to be the most realistic base scenario without additional water conservation and demand management interventions and assumes a projected 2 per cent per annum growth rate in water demand. Dashed lines show water demand projections under different scenarios (Scenario 1 being applicable to the graph). Solid fills show the planned water supply interventions, along with their height (or stacked thickness) indicating the estimated yields for the different interventions. These interventions include potable water reuse (from WWTW), groundwater development (new resources and artificial recharge) and large-scale permanent seawater desalination. In this regard, long-term plans have been in place

⁴⁷ (GreenCape, 2019)

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for several years, but many of the planned projects are now being brought forward and re-assessed in light of the drought that was experienced between 2015 and 2017 (GreenCape, 2019).

The CCT's Water Strategy (City of Cape Town, 2019b) contains a two-stage programme to achieve the desired reliability of supply:

- a committed programme, which contains committed interventions over the next ten years comprising management interventions, surface water supply, as well as groundwater abstraction, reuse and desalination;
- an adaptable programme, which contains schemes that will be needed in the future but for which an immediate implementation decision is not required (the programme comprises additional groundwater abstraction, reuse and desalination, as well as surface water augmentation).

The committed programme can be broken down into two parts, namely management interventions and new water supplies (City of Cape Town, 2019b):

Management Interventions

- Invasive alien vegetation clearance: Should the spread of invasive alien plants continue without priority intervention, it is likely that the 1:50-year yield of the WCWSS will continue to decrease. The CCT is therefore committed to help clear invasive alien plants in the catchments of the major dams supplying Cape Town.
- Water conservation and water demand management: The CCT is currently implementing its revised Water Conservation and Water Demand Management Strategy, which includes interventions such as pressure reduction, leak detection and repairs, meter management, meter replacement, consumer awareness and education campaigns, as well as the recycling of treated effluent for industry.
- Management of the WCWSS: The CCT has recognised the need for improved monitoring and management of water resources in the WCWSS.

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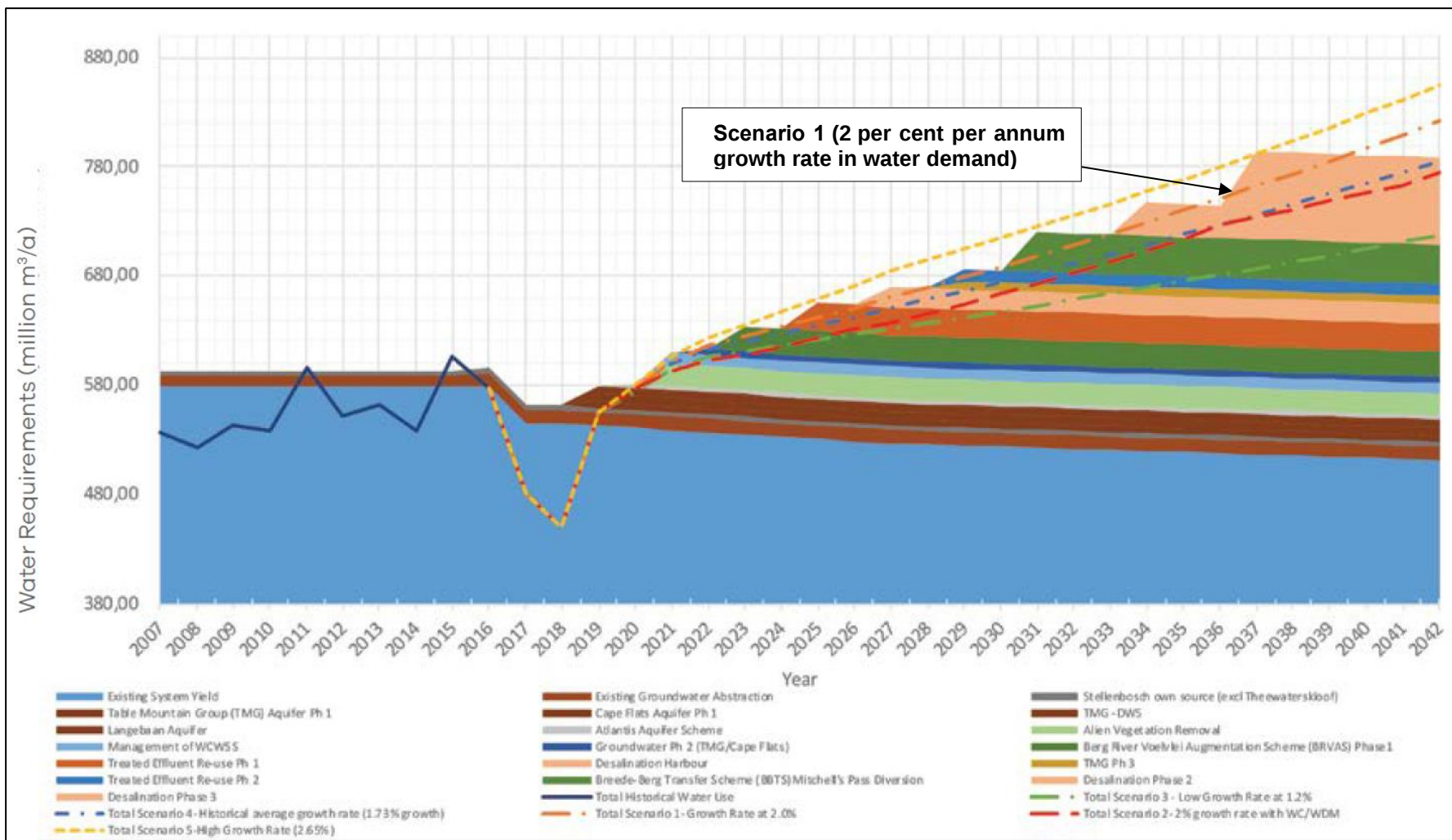


Figure 5.5.12
WCWSS Planning Scenario Reconciliation of Supply and Demand⁴⁸

⁴⁸ (GreenCape, 2019)

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New Water Supplies

- *Berg River Augmentation Scheme*: The Berg River Augmentation Scheme will abstract and pump winter flows from the Berg River to the existing Voëlvlei Dam, improving its yield by $23 \times 10^6 \text{ m}^3$ per annum. The project consists of a weir, pump station and a 6.3 km long pipeline to deliver water to the Voëlvlei Dam. Construction is anticipated to start in July 2025.
- *Cape Flats Aquifer (Phases 1 and 2)*: The Cape Flats Aquifer will be incrementally developed in two phases in the clusters of Strandfontein West, Strandfontein North and East, Philippi, Hanover Park, Bishop Lavis and Swartklip. The scheme will include artificial recharge of the aquifer by injecting high-standard treated effluent, as well as a seawater intrusion barrier. The water abstracted from the aquifer will require further treatment prior to injection into the water supply system.
- *Table Mountain Group Aquifer (Phases 1 to 3)*: Water abstracted from the Table Mountain Group Aquifer is of a relatively good quality, but may require pre-treatment before being discharged into surface water sources, such as Steenbras Upper dam, from where it will undergo further treatment. Wellfields currently being targeted are in the vicinity of Steenbras Dam, Nuweberg and Groenlandberg (near Theewaterskloof Dam).
- *Atlantis Aquifer*: The proposed project entails optimisation and expansion of the existing wellfields, as well as the refurbishment of the existing wellfields to restore them to the level of yield at which they previously operated.
- *Water reuse*: It is proposed that a permanent water reuse plant be constructed at the existing Faure WTW. Initial advanced treatment of the effluent from the Zandvliet WWTW will take place at Zandvliet, after which it will be pumped to the Faure new water scheme. Here, the highly treated effluent will be treated further, and then discharged into the inlet of the Faure WTW, where it will be blended with water from the Theewaterskloof or Steenbras Upper Dam before undergoing further water treatment.
- *Desalination*: Siting, feasibility and water quality investigations are under way for a desalination plant with a capacity of between $50 \times 10^3 \text{ m}^3/\text{day}$ and $150 \times 10^3 \text{ m}^3/\text{day}$.

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The overall timing and scale of the interventions in the new water programme are shown in **Table 5.5.12**. It is evident that the CCT has committed to delivering approximately $350 \times 10^3 \text{ m}^3/\text{day}$ of new capacity, and a further $70 \times 10^3 \text{ m}^3/\text{day}$ through demand management over 10 years (beginning 2019) (City of Cape Town, 2019b).

Table 5.5.12
CCT's Committed New Water Programme⁴⁹

Intervention	Project Initiation	Effective Yield	
		$\times 10^3 \text{ m}^3/\text{day}$	$\times 10^6 \text{ m}^3 \text{ p.a.}$
Demand Management	2019	70	26
Alien vegetation clearing	2019	55	20
Management of WCWSS	N/A	27	10
Cape Flats Aquifer Phase 1	2019	20	7.3
Table Mountain Group Aquifer Phase 1	2019	15	5.5
Cape Flats Aquifer Phase 1	2020	25	9.1
Atlantis Aquifer	2021	10	4
Table Mountain Group Aquifer Phase 2	2021	15	5.5
Table Mountain Group Aquifer Phase 3	2021	20	7.3
Berg River Augmentation	2022	40	15
Water Reuse Phase 1	2023	70	26
Desalination Phase 1	2026	50	18
TOTAL (including demand management)		417	154
TOTAL new supply		347	128

In addition, the CCT is preparing for an adaptable programme that can be triggered if and when required. The interventions that form part of the adaptable new water programme are shown in **Table 5.5.13** and comprise additional groundwater abstraction, reuse and desalination, as well as surface water augmentation, which together will add an additional $280 \times 10^3 \text{ m}^3/\text{day}$ to the supply system (City of Cape Town, 2019b).

⁴⁹ (City of Cape Town, 2019b)

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Table 5.5.13
CCT's Planned Adaptable New Water Programme⁵⁰

Intervention	Indicative Supply Volume (x 10 ³ m ³ /day)
Ground water (further phases)	50
Reuse scheme (Phase 2)	30
Desalination (further phases)	100
Surface water (new schemes)	100
TOTAL	280

5.5.6 Land and Water Use in the Site Vicinity

5.5.6.1 Current Land Use

An assessment of the current land use within the site vicinity was conducted in 2020 (Berry, 2020) and is illustrated in **Drawing 5.5.6**. This analysis was based on recent aerial photography and field checks. The 2020 assessment covered the 20 km radius around the site in order to ensure correspondence with the meteorological analysis (**Section 5.8** (Meteorology)).

The assessment of the current land use is a refinement of the results from the 2018 SANLC (Department of Environmental Affairs, 2019). The physical land use survey also served as a control to test land use change between 2008 and 2020.

Located on the coast, approximately 30 km north of Cape Town, the site already accommodates the KNPS. The land use survey has classified land uses within a 20 km radius of the site in the following categories:

- bare soil (sand dunes);
- cultivated, dryland;
- cultivated, irrigated;
- fallow land (areas previously disturbed by agriculture);
- mines and quarries (surface-based mining);

⁵⁰ (City of Cape Town, 2019b)

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- smallholdings and agricultural industry;
- shrubland (strandveld, fynbos and renosterveld);
- urban built-up (commercial);
- urban built-up (heavy industrial);
- urban built-up (light industrial);
- urban built-up (residential);
- urban built-up (urban and rural informal settlements);
- urban built-up (utility);
- urban built-up (recreation and resort);
- urban built-up (heritage sites);
- watercourses, wetlands and water bodies.

0 km to 5 km annuli

Land within 5 km of the site is predominantly covered by shrubland (strandveld and fynbos), fallow land, urban development, smallholdings, sand dunes, recreational areas and the existing KNPS on the site. Urban development (mainly residential) is limited to the northern extension of Melkbosstrand to the southeast of the KNPS, with Duynefontein being the closest residential area, located 2.5 km south-southeast and southeast. The Klein Zoute Rivier smallholding contains a community/informal settlement (3.1 km east-southeast), located to the east of the R27 Road adjacent to light industrial uses, which include a farm stall, sand mine, sawmill and a reinforced concrete supplier. The informal settlement is 0.3 ha in extent and contains 25 informal structures, with an estimated population of 130 residents in 2018 (SRK Consulting & PSI Risk Consultants CC, 2020). Parts of the area, especially east of the R27 Road, are heavily infested with alien vegetation (e.g. Acacia). Exposed sand dunes occur in the area north of the site and further inland to the north, corresponding with the southern part of the Witzand mobile dune system.

Recreational activities observed in the area include 4X4 activities, motocross, paintball and laser tag east of Duynefontein and the

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R27 Road, as well as a skydiving club to the northeast. Other minor land uses recorded include municipal infrastructure (WWTW), animal rescue centres, a partly rehabilitated sand mine, a small commercial centre, a small landfill site and cultivated dryland (Berry, 2020).

5 km to 10 km annuli

The 5 km to 10 km annuli reflect the first intensive agricultural use between the northeast and southeast segments. Cultivated land, large portions of which lay fallow at the time the survey was conducted in May and June of 2020, is dominant in this area with wheat, fodder crops and dairy farming being the main agricultural products. Broiler farms are present in the northeast sector, 9 km from the KNPS and beyond in the Klein Dassenberg smallholdings, southeast of Atlantis. Also present in this zone is the Atlantis industrial area north-northeast and the Melkbosstrand residential area on the coast to the south. Shrubland (mainly strandveld and to a lesser extent fynbos) covers most of the northern portion of the area and the extreme southern part (south of Melkbosstrand), where it is conserved in the Blaauwberg Conservation Area. A large dune area (Witzand mobile dune system) occurs in the northern segment, extending northwards. Other land uses in this area include commercial areas in Melkbosstrand, the Wolwefontein informal settlement (10.2 km southeast, containing 42 recently built structures), public utilities (Eskom substation, a WTW and a WWTW) and a number of open-cast mines (sand mines) scattered between the north-northeast and south-southeast segments (Berry, 2020).

10 km to 20 km annuli

The highest concentration of agricultural activity occurs 10 km to 20 km northeast of the KNPS. Known as the Klein Dassenberg smallholdings, this area shows more specialised farming activities that include poultry and egg production (broiler farms); stud farming; dairy farming; vegetables; plant nurseries; bee farming; aquaculture; equestrian centres and wood selling. In addition, well-established wheat farms and accompanying high production of fodder crops characterise the area between the east-northeast and southeast segments. Some of the farms have a well-established dairy component. The nature of the farming is similar to the one in the Swartland region.

Atlantis and Bloubergstrand/Parklands are the largest urban nodes within this area and are located in the north-northeast and south-southeast segments, respectively. Parklands is one of the fastest growing residential areas in Cape Town. It consists of lower density

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suburbs and higher density apartment blocks. Four rural settlement nodes occur in the area, namely Mamre (between the north and north-northeast segment); Pella-Katzenberg (north-northeast segment); Chatsworth (northeast segment) and Philadelphia (east segment). Two coastal resorts are present in the north-northwest segment, namely Silwerstroomstrand Resort and Ganzekraal Leisure Resort.

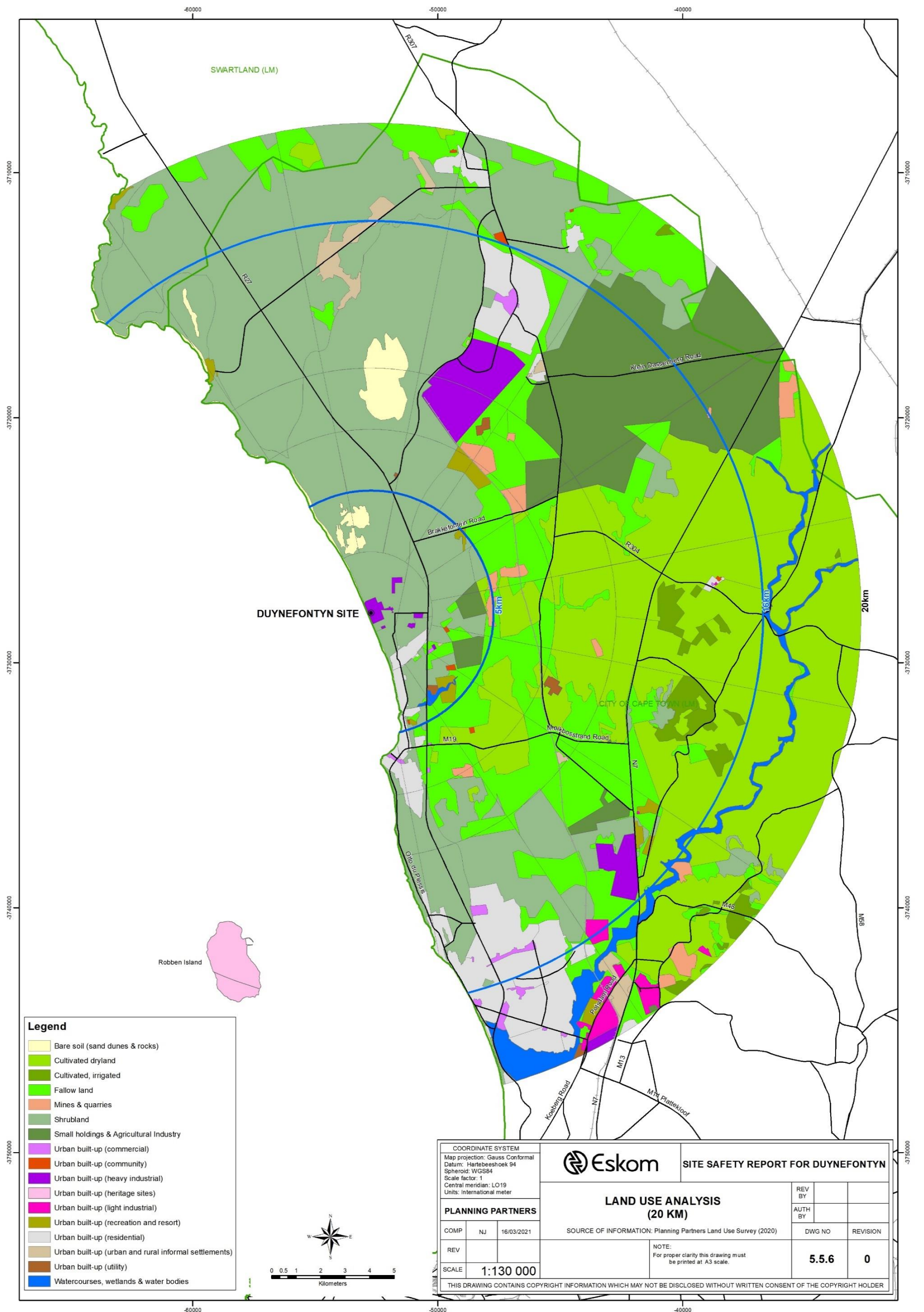
Fallow land is scattered throughout the area, with most of it between the southeast and east-southeast segments and on the periphery (just inside the 20 km radius), between the north-northwest and northeast segments. As a result of urban development and proximity to the sea, there is a decrease in agricultural activities towards the south. Cultivated land (mostly vineyards and some olives) occurs between the east and southeast segments between the 16 km and 20 km annulus, as well as a small area (vineyard) on the periphery of the northeast segment.

Robben Island, a declared world heritage site, is located in the south-southwest segment, approximately 7 km offshore from Bloubergstrand.

The island, as well as a zone of one nautical mile around it, was also declared a national monument. It is home to a historical political prison; several abandoned quarries; a lighthouse; small landing strip and a cemetery. Vegetation cover comprises mainly woody alien (*Acacia*) plants, grasses and pioneer shrubs. Due to its 300 year history of use, its natural environment has been largely transformed. Being a popular tourist destination, visitors arrive by ferry at the Murray's Bay Harbour on the north-eastern side of the island (Berry, 2020).

The results of the 2020 evaluation of the present land use (approximate areas and percentages for each land use type per annulus) are summarised in **Table 5.5.14** and the total of each land use within the site vicinity is illustrated in **Figure 5.5.13**. **Drawing 5.5.6** also illustrates the land cover per sector in percentage coverage (Planning Partners, 2020g).

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The land in the site vicinity amounts to approximately 71 520 ha, which consists of the following land use categories (see **Figure 5.5.13**) (Planning Partners, 2020g):

- natural areas (strandveld, fynbos and renosterveld shrubland) – 33.9 per cent of the total land area;
- agricultural areas – 51.3 per cent of the land area (25.2 per cent dryland, 1.4 per cent irrigated, 9.5 per cent smallholdings and agricultural industry, and 15.2 per cent fallow land);
- urban areas – 7.4 per cent of the land area, consisting of 5.6 per cent residential areas, 1.2 per cent informal settlements (urban and rural), 0.1 per cent community facilities and 0.6 per cent recreation/resort facilities;
- commercial, industrial, utility, recreational and heritage areas – 3.6 per cent of the land area, consisting of 209 ha commercial use, 403 ha light industrial use, 1 371 ha heavy industrial use (including the KNPS), 90 ha utility use and 475 ha of heritage site areas;
- watercourses, wetlands and waterbodies – 1.7 per cent of the land area;
- mines, quarries, sand and bare rock – make up the balance of 2.2 per cent.

It should be noted that the data presented in **Table 5.5.14** is land use data sourced from a study of aerial photography and subsequent “ground truthing” fieldwork conducted by a sub-consultant specialist, Mark Berry (Berry, 2020). The land cover data presented in **Appendix 5.5.A** and **Appendix 5.5.E** was sourced from the SANLC (Department of Environmental Affairs, 2019). These two respective sources applied a different methodology to how the land use / land cover is recorded, hence the difference in the presentation of the data.

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Table 5.5.14
Annular Land Use within the 20 km Radius⁵¹

Land Use	Area	Annulus (km)						Total Area Per Land Use Category
		0.0 - 2.5	2.5 - 5.0	5.0 - 7.5	7.5 - 10	10 - 16	16 - 20	
Shrubland (strandveld, fynbos & renosterveld)	ha	842.92	2 040.15	1 964.21	2 406.05	9 771.16	7 223.57	24 248.06
	%	79.83	64.55	35.45	30.10	34.41	28.36	33.90
Cultivated, dryland	ha	0	31.09	993.80	2 215.06	6 578.39	8 202.13	18 020.47
	%	0	0.98	17.93	27.72	23.17	32.20	25.20
Cultivated, irrigated	ha	0	0	0	0	738.16	246.30	984.46
	%	0	0	0	0	2.60	0.97	1.38
Smallholdings and agricultural industry	ha	0	240.00	0	309.83	3 615.75	2 597.09	6 762.67
	%	0	7.59	0	3.88	12.73	10.20	9.46
Fallow land	ha	0	340.76	2 051.45	1 987.80	3 181.16	3 332.54	10 893.71
	%	0	10.78	37.02	24.87	11.2	13.08	15.23
Urban built-up (residential)	ha	100.07	104.42	219.39	59.33	2 116.55	1 396.77	3 996.53
	%	9.48	3.30	3.96	0.74	7.45	5.48	5.59
Urban built-up (urban and rural informal settlements)	ha	0	1.83	0	12.65	565.76	277.22	857.46
	%	0	0.06	0	0.16	1.99	1.09	1.20
Urban built-up (community)	ha	0	13.42	4.71	0	3.12	22.65	43.90
	%	0	0.42	0.08	0	0.1	0.09	0.06
Urban built-up (commercial)	ha	0	3.65	14.78	0	123.63	66.72	208.78
	%	0	0.12	0.27	0	0.44	0.26	0.29
Urban built-up (light industrial)	ha	0	0	0	0	51.94	350.58	402.52
	%	0	0	0	0	0.18	1.38	0.56
Urban built-up (heavy industrial)	ha	94.06	2.67	0	408.87	807.60	57.62	1 370.82
	%	8.91	0.08	0	5.12	2.84	0.23	1.92
Urban built-up (heritage sites)	ha	0	0	0	0	364.59	110.70	475.29
	%	0	0	0	0	1.28	0.43	0.66
Urban built-up (utility)	ha	0	12.74	2.60	59.39	1.58	13.63	89.94
	%	0	0.40	0.05	0.74	0.01	0.05	0.13
Urban built-up (recreation and resort)	ha	0	86.96	120.04	5.77	114.21	80.66	407.64
	%	0	2.75	2.17	0.07	0.40	0.32	0.57
Mines & quarries (surface-based mining)	ha	0	35.79	143.69	190.70	2.23	303.52	675.93
	%	0	1.13	2.59	2.39	0.01	1.19	0.95
Bare soil (sand dunes and rocks)	ha	18.43	178.15	20.84	327.38	278.26	46.18	869.24
	%	1.75	5.64	0.38	4.10	0.98	0.18	1.22
Watercourses, wetlands and waterbodies	ha	0	36.09	0	0	40.78	1 136.08	1 212.95
	%	0	1.14	0	0	0.14	4.46	1.70
Total	ha	1 055.93	3 160.46	5 541.4	7 992.20	28 395.19	25 473.64	71 520.37

⁵¹ (Planning Partners, 2020g)

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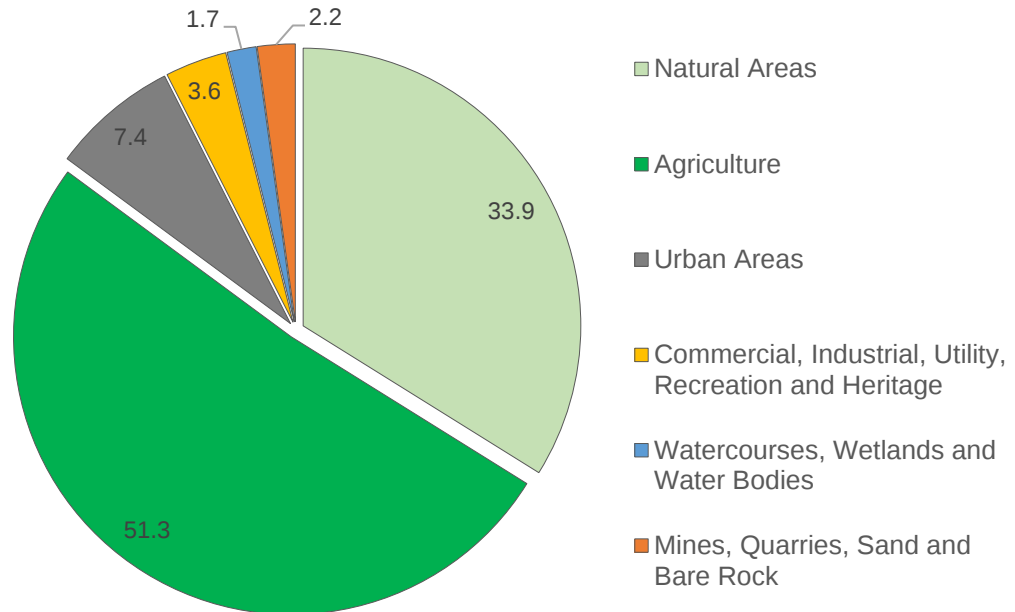


Figure 5.5.13
Percentage of Land Use Categories within the 20 km Radius⁵²

a) Natural Areas

Natural veld (dune strandveld, fynbos and some renosterveld) is mainly found directly north and east of the KNPS, as well as along the coast between Melkbosstrand and Bloubergstrand. East of the site it is largely restricted within the 5 km radius, while north of the site it stretches to beyond the 20 km radius. All these vegetation types are significantly reduced by urban development and farming activities, and thus considered to be threatened. The farms Duynefontyn and Kleine Springfontein were proclaimed as the Koeberg Private Nature Reserve in 1991 (Eskom, 2015b). Protected nature areas that are wholly or partially located within the 20 km radius include (i) Cape West Coast Biosphere Reserve; (ii) Blaauwberg Nature Reserve; (iii) Koeberg Private Nature Reserve; (iv) Witsands Aquifer Conservation Area; (v) Bokbaai Nature Reserve; (vi) Riverlands Provincial Nature Reserve; (vii) Three Fountains Private Nature Reserve; (viii) Van Schoorsdrift Conservation Area and (ix) Table Bay Nature Reserve, including Rietvlei

⁵² (Planning Partners, 2020g)

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and the Fynbos Corridor.

Parts of the area, especially alongside the West Coast Road (R27) and fallow land areas further inland are heavily infested with alien vegetation (Port Jackson and Rooikrans). This has spurred several wood selling businesses in the study area. Exposed (unvegetated) sand dunes occur in the dune areas north of the site and further inland to the north, corresponding with the southern part of the Witzands mobile dune system (Berry, 2020).

b) Soil and Vegetation

According to CapeFarmMapper data (Department of Agriculture, Forestry and Fisheries, Western Cape, 2020), seven broad soil types are found in the area (refer to the soil map in **Figure 5.5.14**), namely (in order of dominance):

- grey regic sands;
- prismaeutanic and/or pedocutanic diagnostic horizons dominant (soils with a marked clay accumulation, strongly structured and a non-reddish colour);
- soils with a diagnostic ferrihumic horizon (soils with a sandy texture, leached and with subsurface accumulation of organic matter and aluminium);
- Glenrosa and/or Mispah forms (shallow soils found on young landscapes that are not predominantly rock and does not have alluvial or aeolian properties);
- plinthic catena (a sequence of soils of about the same age derived from similar parent material with a subsurface horizon that consists for 10 per cent or more of an iron-rich, humus-poor mixture of kaolinitic clay with quartz and other diluents, which changes irreversibly to a hardpan or to irregular aggregates);
- red-yellow apedal, freely drained soils;
- miscellaneous land classes, rocky.

Grey regic sands are the predominant type found in the 20 km radius, especially in the northern parts and to the southeast. Apart from the Klein Dassenberg smallholdings in the northeast, these areas show little

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agricultural activity. The sandy soils to the north of the KNPS are typically associated with the coastal dune areas. These soils support dune strandveld and sand fynbos vegetation types, but the areas to the south and southeast of the site are largely disturbed/transformed by agriculture and urban development.

The second most dominant soil type (i.e. prismaeutanic and/or pedocutanic diagnostic horizons dominant) is found to the east of the KNPS, mainly between the northeast and southeast segments and is typically associated with cultivated dryland areas. Historically, these soils supported sand fynbos, shale renosterveld and a small area of granite renosterveld. Today, nearly all of it has been transformed by past agricultural activities with only a few small (often degraded) remnants remaining. Soils with a diagnostic ferrihumic horizon are found in the Mamre and Atlantis areas between the north and north-northeast segments, as well as on the periphery of the study area between the south-southeast and southeast segments. Historically, these soils supported sand fynbos types, but have been significantly reduced by urban development.

Glenrosa and/or Mispah forms are associated with the steeper hill slopes mainly on the periphery of the study area between the north and north-northeast segments (Dassenberg) and the southeast segment (Tygerberg Hills), as well as Blaauwberg Hill southeast of Melkbosstrand. These soils support mainly shale and granite renosterveld types, with a few small areas still left. Some of the shale renosterveld is conserved in the Blaauwberg Conservation Area. Plinthic catena is associated with the Rietvlei wetland area and the Diep River and its associated floodplains, as well as a few smaller areas on the periphery to the north. It is covered by non-terrestrial vegetation (estuarine vegetation, reeds and sedges) and greatly transformed sand fynbos.

Red-yellow apedal, freely drained soils are found in an area south of Philadelphia between the east and east-southeast segments in the 10 km to 16 km annulus. The highest concentration of vineyards and olive orchards in the study area is found in this area. Historically, these soils supported shale renosterveld, but have been entirely transformed by agricultural activities.

A few areas mapped as miscellaneous land classes and rocky outcrops are found on the periphery between the north and north-northeast segments, and between the southeast and east-southeast segments. These areas coincide with hill slopes, presumably areas too steep or rocky for agricultural use. These soils support shale and granite

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renosterveld types.

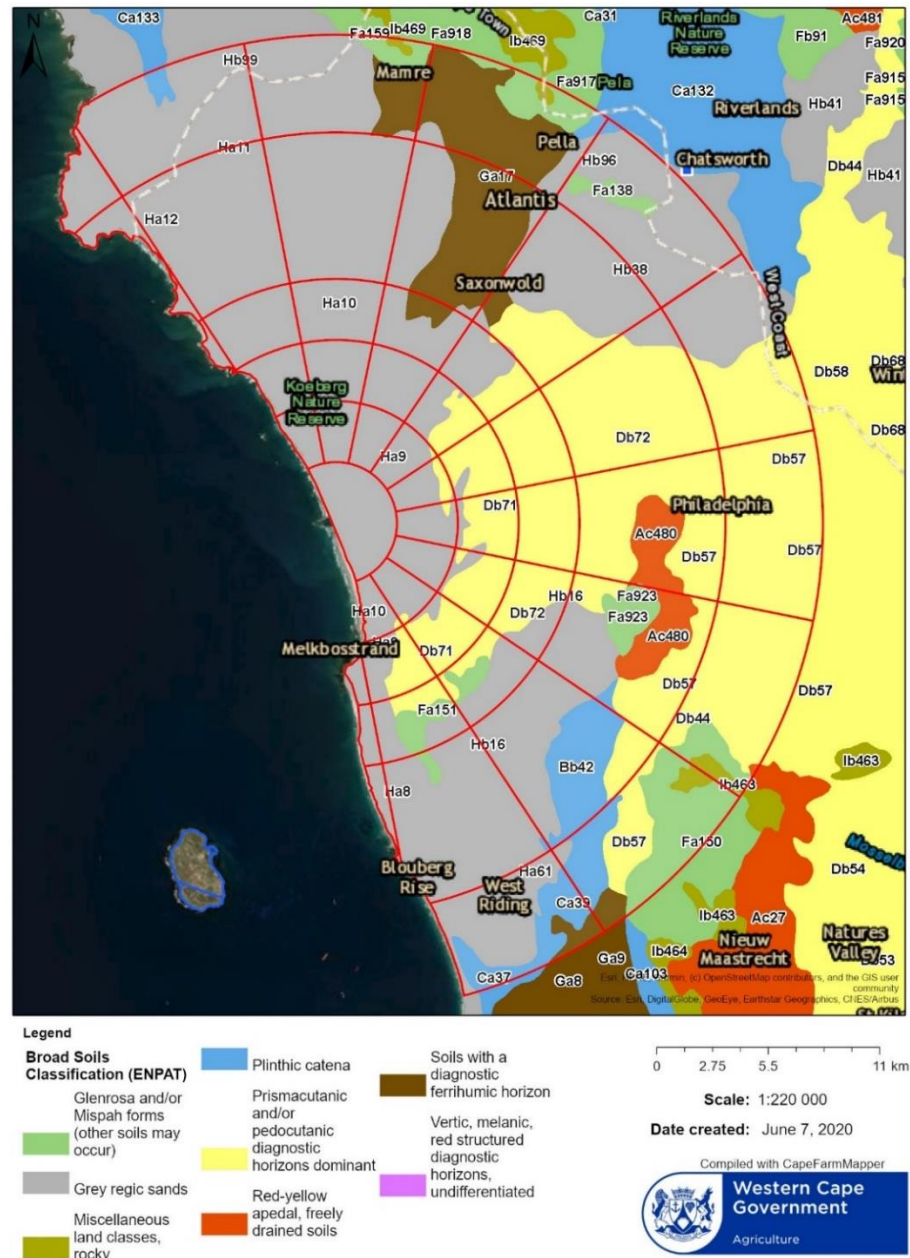


Figure 5.5.14
Soil Map (20 km)⁵³

⁵³ (Department of Agriculture, Forestry and Fisheries, Western Cape, 2020)

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c) Forest Areas

There are no indigenous forests or commercially forested plantations located within the 20 km radius. The 2020 land use survey did not identify forested areas within this study area. The forested areas that were identified in the land cover study represent tree avenues along major roads in the area and wind breaks on farms (Planning Partners, 2020g).

d) Cultivated Areas for Agricultural Uses

i. Overview

This section describes the commercial agricultural production in the site vicinity. The 2020 agricultural production survey (Planning Partners, 2020c), which was undertaken through a telephonic/email survey of farm owners and manager as well as site visits, indicated that there are several smallholding areas in the site vicinity.

The area to the north of the site, stretching from Atlantis to the West Coast, contains limited farming activity. This can be attributed to the fact that much of the land is owned by Eskom and the State and characterised by sandy (dune) soil. The bulk of the northern area contains natural vegetation and forms part of the Koeberg Nature Reserve (Planning Partners, 2020g).

The area directly to the south is characterised by predominantly urban development and consists of the low-density residential suburbs of Duynfontein and Melkbosstrand. This area contains no agricultural activities (Planning Partners, 2020g).

The smallholding areas of Klein Dassenberg (northeast of the KNPS), Driefonteinen; Klein Zoute Rivier (east of the KNPS) and Morningstar (north of the Vissershok regional landfill site) have a strong peri-urban character. Agricultural activities at Klein Dassenberg is limited to more specialised farming activities that include poultry and egg production (broiler farms); stud-farming; dairy farming; vegetables; plant nurseries; equestrian centres; wood selling and roll-on lawn. The lack of intensive cultivation is probably due to poor agricultural potential of the area and high levels of alien infestation. The intensive chicken and egg farms located within this area are operated by a single major chicken company (Planning Partners, 2020g).

The 0 to 2.5 km and 2.5 to 5 km annuli accommodate no significant agricultural production. The limited agricultural activity is due to the predominantly State-owned land, poor sandy soil, limited water, and the

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Koeberg Nature Reserve occupying the bulk of this area (Planning Partners, 2020g).

The 5 to 7.5 km annulus contains some agricultural activity, with the bulk of the area being fallow land and shrubland, except the east, east-southeast and southeast segments where cultivated commercial dryland is found (Planning Partners, 2020g)

The 7.5 to 10 km annulus contains intensive agricultural uses between the northeast and southeast segments. Cultivated dryland is dominant in most of these segments, with wheat, fodder and grazing for dairy production being the main agricultural products. The northeast and east-northeast segments contain a significant concentration of chicken and egg farming activities, located within the Klein Dassenberg and Driefonteinen smallholding areas (Planning Partners, 2020g).

The 10 to 16 km annulus contains the most fertile soil, as is reflected in the agricultural production figures. The east-northeast to east-southeast segments are characterised by dryland cultivation, with the well-established large wheat farms of Philadelphia and associated production of fodder crops. Some farms also have a well-established dairy production component. The northeast segment contains the smallholdings of Klein Dassenberg, containing more diversified and specialised farming activities, including chicken and egg production, stud farming and limited dairy farming. No significant vegetable production occurs in the area. The Morningstar smallholding area, to the southeast of the KNPS, contains a mix of residential uses, stables/paddocks (dominant); equestrian centres; a holiday resort/caravan park; self-storage units and recreational activities (Planning Partners, 2020g).

The agricultural survey identified some subsistence farming practices (wood selling; goat farming and some pigs) within the area vicinity, located 14.3 km north along the Silwerstroom-Mamre road (Planning Partners, 2020g).

The sectors where agricultural production was recorded in 2018 are the same sectors recorded in the 2007/2008 survey. No extensive additional land portions have therefore been converted to agricultural use in the last 10 years (Planning Partners, 2020c; Planning Partners, 2020g; Eskom, 2015a).

ii. Agricultural Survey in the Site Vicinity

Planning Partners undertook an agricultural production survey in 2020 of

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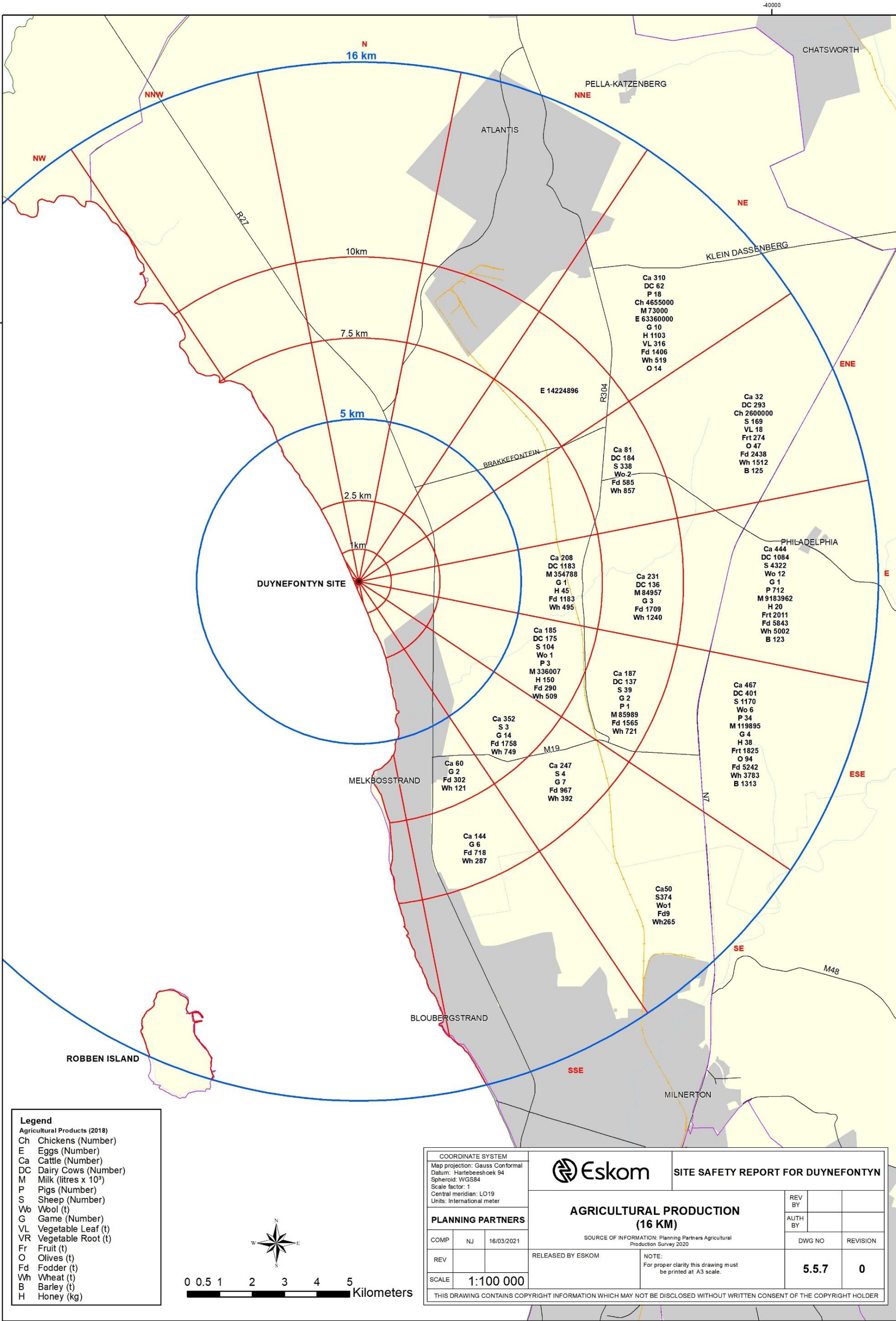
land units in the site vicinity (Planning Partners, 2020c). **Drawing 5.5.7** illustrates the sectoral allocation of agricultural activity in terms of total agricultural product per type per sector in terms of distance and direction (1.0 km; 2.5 km; 5.0 km; 7.5 km; 10 km and 16 km and 22.5° sectoral grid) for all agricultural product types. The estimated agricultural production per sector is illustrated in terms of the number of cattle; number of dairy cows; milk production (10³ l); fodder (t); wheat (t); chicken production (number); egg production (number); number of sheep; number of pigs; number of game; vegetables (t); fruit (t); olives (t) and mass of honey (kg) production. The estimated production per sector of each of the abovementioned agricultural products types is provided in **Tables 5.5.15** to **5.5.31**, which set out the results of the analysis. The data recorded reflect production per agricultural product and numbers of livestock for the 2018 farming year (Planning Partners, 2020c).

The agricultural survey (Planning Partners, 2020c) established a few general characteristics regarding agricultural activities in the site vicinity. The survey found that some commercial farmers use crop rotation strategies, which affect yield and product type per year and therefore meaningful long-term trends cannot be determined. Furthermore, certain farming units are rented out, sometimes for short periods, thereby resulting in varying production figures over the long-term.

As part of the agricultural survey (Planning Partners, 2020c), it was established which individual cadastral units are managed as a single 'farming unit' (owned and/or managed by one owner or entity) or form part of a number of cadastral units that make up a farming unit. The individual cadastral units and combined farming units recorded in 2018 are illustrated in **Drawing 5.5.8**. In some cases, non-contiguous cadastral units are managed as a farming unit, consisting of a number of geographically dispersed cadastral units. These can be identified in **Drawing 5.5.8** and are shaded the same colour.

The allocation of annual agricultural production in terms of sectors was performed according to a cadastral unit. Where a cadastral unit was bisected by the sectoral grid, the allocation of agricultural production was informed by the land use analysis, which informed the different uses across a cadastral unit. The agricultural production figures were then grouped per sector.

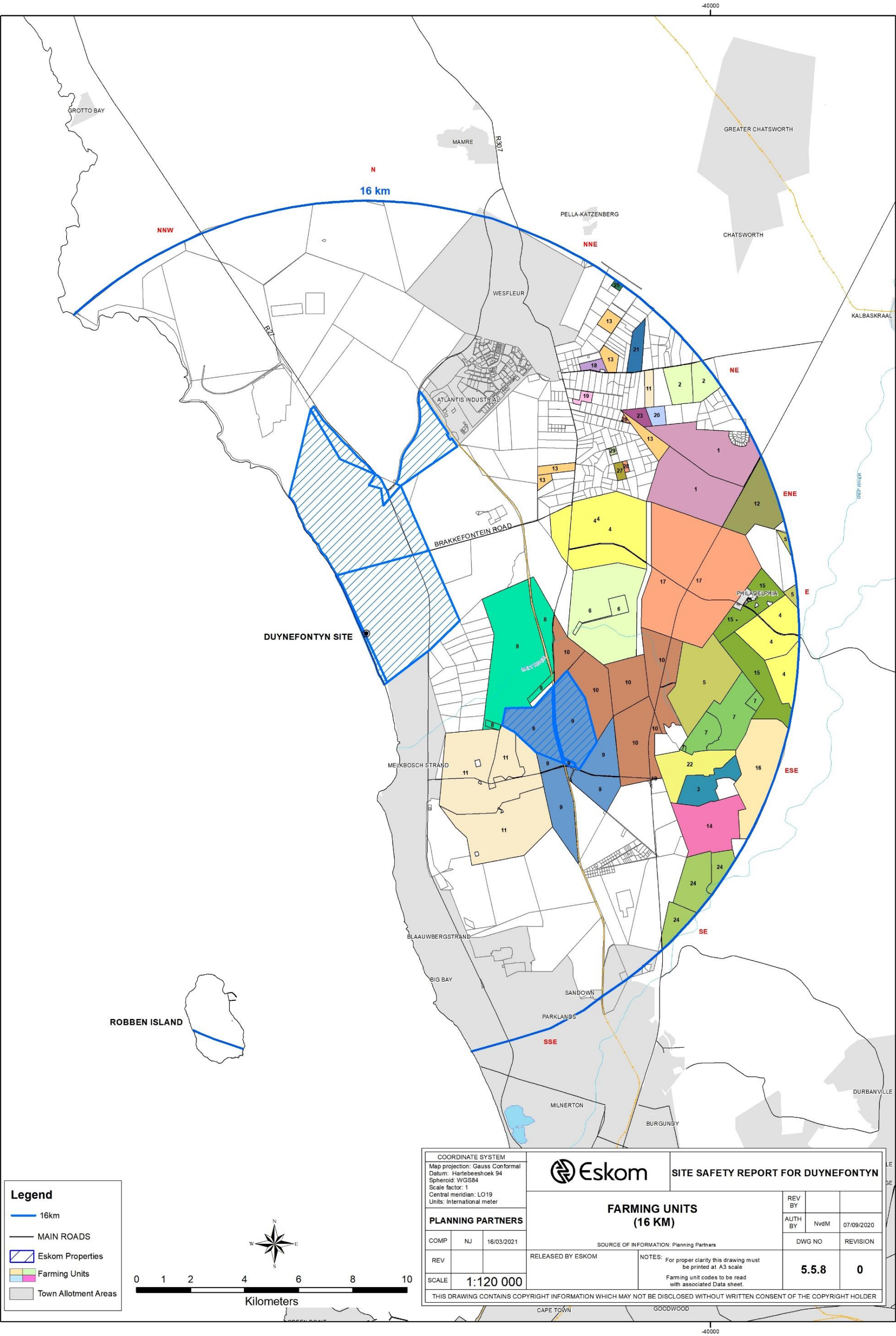
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Legend	
Agricultural Products (2018)	
Ch	Chickens (Number)
E	Eggs (Number)
Ca	Cattle (Number)
DC	Dairy Cows (Number)
M	Milk (litres x 10³)
P	Pigs (Number)
S	Sheep (Number)
Wo	Wool (t)
G	Game (Number)
VL	Vegetable Leaf (t)
VR	Vegetable Root (t)
Fr	Fruit (t)
O	Olives (t)
Fd	Fodder (t)
Wh	Wheat (t)
B	Barley (t)
H	Honey (kg)

COORDINATE SYSTEM					SITE SAFETY REPORT FOR DUYNEFONTYN							
Map projection: Gauss Conformal					REV BY							
Datum: Hartbeeshoek 94												
Spheroid: WGS84			AGRICULTURAL PRODUCTION (16 KM)			AUTH BY						
Scale factor: 1												
Central meridian: LO19												
Units: International meter			SOURCE OF INFORMATION: Planning Partners Agricultural Production Survey 2020			DWG NO		REVISION				
PLANNING PARTNERS			RELEASED BY ESKOM			NOTE: For proper clarity this drawing must be printed at A3 scale.			5.5.7		0	
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Chickens and Eggs

There are several intensive commercial chicken and egg production facilities located in the site vicinity. These are operated by one major chicken company (i.e. Tydstroom, a commercial entity of the holding company Quantum Foods). These farms are located within the Klein Dassenberg and Driefonteinen smallholding areas (7.5 km to 16 km northeast and east-northeast). There are farms and smallholdings in the site vicinity with small numbers of non-commercial chickens (e.g. two to three chickens per property) that result in limited and infrequent collection of eggs. The production figures associated with these farms, smallholdings and domestic egg collection were not included in the data set reported (Planning Partners, 2020c).

Table 5.5.15 shows the distribution of chickens in the site vicinity. The number of chickens recorded in 2018 is less than that recorded in 2007. This can be attributed to the closing down of a large chicken and egg producer in the site vicinity (Planning Partners, 2020c).

Table 5.5.15
Chicken (2018)

Distance (km)	Number of Chickens in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	4 655 000	2 600 000	0	0	0	0
Total in a Segment	0	0	4 655 000	2 600 000	0	0	0	0

Table 5.5.16 illustrates the distribution of egg production in the site vicinity. Quantum Foods (Mynsar Eggs and Philadelphia Chick Breeders) is the only company in the area with production facilities located in the Klein Dassenberg and Driefonteinen areas (located between 7.5 km and 16 km in the northeast). Egg production is markedly lower than in 2007. This can be attributed to the closing down of a large chicken and egg producer in the site vicinity (Planning Partners, 2020c).

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Table 5.5.16
Egg Production (2018)

Distance (km)	Number of Eggs Produced in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	14 224 896	0	0	0	0	0
10.0 to 16.0	0	0	63 360 000	0	0	0	0	0
Total in a Segment	0	0	77 584 896	0	0	0	0	0

Cattle, Dairy Cows and Milk Production

Drawing 5.5.7 illustrates that beef cattle are concentrated between 5 km and 16 km from the northeast to the south-southeast, with the largest concentration being in the 10 km and 16 km east and east-southeast sectors (south of Philadelphia). The distribution of cattle is closely associated with the distribution of fodder production (Planning Partners, 2020c).

There has been a marked increase (42 per cent) in the number of beef cattle since the previous agricultural survey was conducted in the site vicinity during 2007/2008. Cattle numbers are not distributed equally between adjacent sectors when comparing the 2007/2008 and 2018 figures. This may be attributed to farmers moving cattle between pastures within the same farming unit, where the farming unit is located within more than one sector (Planning Partners, 2020c).

Table 5.5.17 reflects the number of cattle (2018) in the site vicinity (Planning Partners, 2020c).

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Table 5.5.17
Cattle (2018)

Distance (km)	Number of Cattle in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	208	185	352	60
7.5 to 10.0	0	0	0	81	231	187	247	144
10.0 to 16.0	0	0	310	32	444	467	50	0
Total in a Segment	0	0	310	113	883	839	649	204

Table 5.5.18 provides the distribution of dairy cows in the site vicinity, whilst **Table 5.5.19** provides the distribution of milk production in the same area. Dairies in the site region are predominantly located within the urban areas around Cape Town, but a few smaller dairies occur in the site vicinity. A comparison between **Table 5.5.18** and **Table 5.5.19** reveals that the spatial distribution of dairy cows and milk production are very similar. In 2018, $10\,239 \times 10^3 \text{ l}$ of milk was produced in the site vicinity (Planning Partners, 2020c). There has been an increase in the number of cows and volume of milk produced in the site vicinity, measured against the data recorded in 2007/2008 survey. A 7.5 per cent increase in the number of dairy cows and a 4 per cent increase in milk production were recorded in the 2020 survey (Planning Partners, 2020c).

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Table 5.5.18
Dairy Cows (2018)

Distance (km)	Number of Dairy Cows in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	1 183	175	0	0
7.5 to 10.0	0	0	0	184	136	137	0	0
10.0 to 16.0	0	0	62	293	1 084	401	0	0
Total in a Segment	0	0	62	477	2 403	713	0	0

Table 5.5.19
Milk Production (2018)

Distance (km)	Milk Production in a Sector (10 ³ ℓ)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	355	336	0	0
7.5 to 10.0	0	0	0	0	85	86	0	0
10.0 to 16.0	0	0	73	0	9 184	120	0	0
Total in a Segment	0	0	73	0	9 624	542	0	0

Pigs

Table 5.5.20 illustrates that pig farming is insignificant in the site vicinity, with only 768 pigs being recorded in the site vicinity (Planning Partners,

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2020c). This does however represent more than a doubling of the number of pigs in the site vicinity since the 2007/2008 survey. The spatial distribution of pigs is similar in both surveys (Planning Partners, 2020c).

Table 5.5.20
Pigs (2018)

Distance (km)	Number of Pigs in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	3	0	0
7.5 to 10.0	0	0	0	0	0	1	0	0
10.0 to 16.0	0	0	18	0	712	34	0	0
Total in a Segment	0	0	18	0	712	38	0	0

Sheep and Wool Production

Table 5.5.21 and **Table 5.5.22** illustrate that there is significant sheep farming being practiced in the site vicinity (Planning Partners, 2020c). There is a significant increase in the number of sheep recorded in the site vicinity since the 2007/2008 survey, especially within the 10 km to 16 km east and east-southeast sectors, south of Philadelphia (a more than 5-fold increase). It was recorded that sheep were reared for predominantly wool production purposes in the site vicinity (Planning Partners, 2020c). It can be noted that these two sectors contain large areas of irrigated cultivated land, which could yield the required fodder crops for grazing purposes (Planning Partners, 2020c; Planning Partners, 2020g).

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**Table 5.5.21
Sheep (2018)**

Distance (km)	Number of Sheep in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	104	3	0
7.5 to 10.0	0	0	0	338	0	39	4	0
10.0 to 16.0	0	0	0	169	4 322	1 170	374	0
Total in a Segment	0	0	0	507	4 322	1 313	381	0

**Table 5.5.22
Wool Production (2018)**

Distance (km)	Wool Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	1	0	0
7.5 to 10.0	0	0	0	2	0	0	0	0
10.0 to 16.0	0	0	0	0	12	6	1	0
Total in a Segment	0	0	0	2	12	7	1	0

Game

The site vicinity is not known as a game meat production area. Only two of the respondents reported a limited number of game present, namely 10 ostriches and 40 wild antelope in total were recorded in the survey (refer to **Table 5.5.23**). In addition, the KNPS Environmental Surveillance Laboratory recorded two farms within an 8 km radius that contained 140 and 50 ostriches, respectively in 2018. These ostriches were recorded as

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for 'own use'. Another farm had 15 ostriches which were sold to Oudtshoorn (**Eskom, 2018**).

Table 5.5.23
Game (2018)

Distance (km)	Number of Game in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	1	0	14	2
7.5 to 10.0	0	0	0	0	3	2	7	6
10.0 to 16.0	0	0	10	0	1	4	0	0
Total in a Segment	0	0	10	0	5	6	21	8

Though the Koeberg Nature Reserve accommodates a range of antelope such as Zebra, Blue Wildebeest and a number of smaller buck species, these are not kept for meat production purposes (Planning Partners, 2020c).

Vegetables

Table 5.5.24 and **Table 5.5.25** illustrate the distribution of vegetable production in the site vicinity. Limited commercial vegetable production takes place in the site vicinity and occurs predominantly in the Klein Dassenberg smallholding area, to the southeast of Atlantis. The total volume of vegetables produced in the site vicinity in 2018 is however significantly more than in 2007/2008. The spatial distribution of vegetable production between the two years is however the same. (Planning Partners, 2020c).

Only leaf vegetables were recorded, including cauliflower, cabbage and lettuce. No root crop cultivation was recorded (Planning Partners, 2020c).

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Table 5.5.24
Leaf Vegetable Production (2018)

Distance (km)	Leaf Vegetable Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	316	18	0	0	0	0
Total in a Segment	0	0	316	18	0	0	0	0

Table 5.5.25
Root Vegetable Production (2018)

Distance (km)	Root Vegetable Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	0	0	0	0	0	0
Total in a Segment	0	0	0	0	0	0	0	0

Fruit

Table 5.5.26 illustrates the distribution of fruit production in the site vicinity. Fruit production recorded in the survey included table and wine grapes located between 10 km and 16 km in the east-northeast to east-southeast sectors. The spatial distribution is similar to the areas recorded in 2007/2008 and an increase of 14 per cent was recorded (Planning Partners, 2020c).

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Table 5.5.26
Fruit Production (2018)

Distance (km)	Fruit Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	0	274	2 011	1 825	0	0
Total in a Segment	0	0	0	274	2 011	1 825	0	0

Olives

Table 5.5.27 shows the distribution of olive production in the site vicinity. Olives and olive oil are produced on five farms in the site vicinity between 10 km and 16 km in the northeast to east-southeast sectors (Planning Partners, 2020c).

Table 5.5.27
Olive Production (2018)

Distance (km)	Olive Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	14	47	0	94	0	0
Total in a Segment	0	0	14	47	0	94	0	0

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Fodder

Fodder production figures are presented in **Table 5.5.28**. Fodder is predominantly produced on farms where cattle, dairy cows and sheep are kept. Significantly more fodder was produced in 2018 than in 2007/2008, but the spatial distribution is similar between the two production years. The increase in fodder production correlates within the increase in cattle, dairy cows and sheep reared in 2018 (Planning Partners, 2020c). The increase in production can therefore be attributed to increased hectareage and planting to serve increased demand and not an increase in rainfall, as there was less rainfall recorded in 2017/2018 compared to 2007/2008 (Climate Systems Analysis Group, 2020).

Table 5.5.28
Fodder Production (2018)

Distance (km)	Fodder Crop Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	1 183	290	1 758	302
7.5 to 10.0	0	0	0	585	1 709	1 565	967	718
10.0 to 16.0	0	0	1 406	2 438	5 843	5 242	9	0
Total in a Segment	0	0	1 406	3 023	8 735	7 097	2 734	1 020

Wheat

Table 5.5.29 illustrates the distribution of wheat production in the area. The highest volume of wheat production occurs between 10 km and 16 km in the east-northeast to east-southeast areas around Philadelphia. Wheat production requires large farming units and only the large, established farms are utilised for this practice. More wheat was produced in 2018 than the recorded volume in 2007/2008 (23 per cent increase) (Planning Partners, 2020c). The increase in production may be attributed to increased hectareage planted and not an increase in rainfall, as there was less rainfall recorded in 2017/2018 compared to 2007/2008 (Climate Systems Analysis Group, 2020).

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Table 5.5.29
Wheat Production (2018)

Distance (km)	Wheat Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	495	509	749	121
7.5 to 10.0	0	0	0	857	1 240	721	392	287
10.0 to 16.0	0	0	519	1 512	5 002	3 783	265	0
Total in a Segment	0	0	519	2 369	6 737	5 013	1 406	408

Barley

The distribution of barley production in the site vicinity is illustrated in **Table 5.5.30**, which is insignificant and limited to the area between 10 km and 16 km in the east-northeast to east-southeast sectors (Planning Partners, 2020c).

Table 5.5.30
Barley Production (2018)

Distance (km)	Barley Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	0	0	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	0	125	123	1 313	0	0
Total in a Segment	0	0	0	125	123	1 313	0	0

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Honey

Table 5.5.31 shows the distribution of honey production in the area. Honey production was only recorded on three farming units, with the bulk being produced at Camphill Village (15 km northeast). Honey production in 2018 showed a markedly lower production than in 2007/2008 (Planning Partners, 2020c).

Table 5.5.31
Honey Production (2018)

Distance (km)	Honey Production in a Sector (kg)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0.0 to 1.0	0	0	0	0	0	0	0	0
1.0 to 2.5	0	0	0	0	0	0	0	0
2.5 to 5.0	0	0	0	0	0	0	0	0
5.0 to 7.5	0	0	0	0	45	150	0	0
7.5 to 10.0	0	0	0	0	0	0	0	0
10.0 to 16.0	0	0	1 103	0	20	38	0	0
Total in a Segment	0	0	1 103	0	65	188	0	0

Summary

Table 5.5.32 provides a summary of the volume and numbers associated with the different agricultural activities that were recorded in the site vicinity (Planning Partners, 2020c).

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Table 5.5.32
Summary of Production in the Site Vicinity: Crops and Livestock (2018)

Chickens (Number sold per Year)		Eggs (Number sold per Year)		Cattle (Number)	Milk Cows (Number)	Milk (10 ³ ℓ)
7 255 000		77 584 896		2 998	3 655	10 239
Pigs (Number)	Sheep (Number)	Wool (t)	Game (Number)	Leaf Vegetables (t)	Root Vegetables (t)	
768	6 523	22	50	334	0	
Fruit (t)	Olives (t)	Fodder (t)	Wheat (t)	Barley (t)	Honey (kg)	
4 110	155	24 015	16 452	1 561	1 356	

Comparing the agricultural production figures recorded in 2007/2008 with the latest recorded figures for 2018, a change in agricultural activity has occurred in the site vicinity, specifically the significant increase in the production of fodder, sheep, pigs and vegetables in 2018. Chicken and egg production have however decreased since 2007/2008 (Planning Partners, 2020c).

Approximately 29 per cent of the site vicinity is devoted to commercial farming (both dryland and a mixture of irrigated and agricultural industries). The following four smallholding areas are located in the site vicinity, as presented in **Drawing 5.5.8**, that are predominantly characterised by natural vegetation, fallow land, residential and service industrial purposes:

- Kleine Zoute Rivier, located to the east of the West Coast Road (3.0 km east and east-southeast);
- Driefonteinen, located to the southeast of Atlantis (10.0 km northeast);
- Morningstar, located to the west of the N7 Freeway (12.0 km southeast);

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- Klein Dassenberg, located to the east of Atlantis (13.0 km northeast).

These smallholding areas are predominantly used for residential purposes. The 2018 survey data recorded intensive egg farming occurring, as well as limited dairy and vegetable farming within the smallholding areas. The data are included in the figures set out above (Planning Partners, 2020c).

The Morningstar (12 km southeast) and Klein Dassenberg (12 km northeast) smallholding areas are experiencing pressure to be redeveloped for urban uses. These trends are however limited by current planning policy (City of Cape Town, 2023b).

The site visits conducted in 2020 identified some subsistence farming practices in the site vicinity (small livestock like pigs and goats and not cultivated crops) located 14.3 km north along the Silwerstroom Road towards Mamre (Planning Partners, 2020c).

iii. Collection of Free Foods in the Site Vicinity

The study conducted by Petersen et. al (2012) on the harvesting of wild products in the CMA reveals that the various leaves / stems / bulbs / flowers / fruits listed in **Table 5.5.33** are typically obtained from the area surrounding the urban settlement of Atlantis located within the site vicinity. It is evident that the majority of products harvested are used for the display of flowers / foliage or for medicinal purposes.

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Table 5.5.33
Wild products harvested in the broader Atlantis area

Scientific Name	Common Name	Harvest Target	Common Usage
<i>Adenandra villosa</i>	China flower / buchu	Leaves / stems	Medicine
<i>Bulbinella triquetra</i>	n/a	Flowers / fruits	Medicine
<i>Carpobrotus edulis</i>	Cape fig / Sour fig	Fruit / leaves	Food / Medicine
<i>Cyclopia genistoides</i>	Honeybush tea	Leaves / stems	Medicine
<i>Cysticapnos vessicaria</i>	African fumitory / <i>Klapperbos</i>	Stems	Medicine
<i>Erica plukenetii</i>	<i>Klipheide</i>	Flowers / foliage	Flowers / foliage
<i>Erica plumosa</i>	n/a	Flowers / foliage	Flowers / foliage
<i>Eriocephalus africanus</i>	Wild rosemary	Leaves	Medicine
<i>Gladiolus alatus</i>	Turkey chick	Flowers / bulb	Flowers / foliage
<i>Microdon capitatus</i>	<i>Knopbos / Levyns</i>	Flowers / foliage	Flowers / foliage
<i>Moraea villosa</i>	Peacock moraesa	Bulb	Medicine
<i>Ornithogalum thyrsoides</i>	Wonder-flower / Star-of- Bethlehem	Flowers / foliage	Flowers / foliage
<i>Protea burchelli</i>	Burchells protea	Flowers / foliage	Flowers / foliage
<i>Protea scolymocephala</i>	Thistle protea / Thistle sugarbush	Flowers	Flowers / foliage
<i>Staavia radiata</i>	<i>Altydbossie</i>	Flowers / foliage	Flowers / foliage
<i>Struthiola leptantha</i>	n/a	Bark	Medicine
<i>Thamnochortus spicigerus</i>	<i>Dekriet</i>	Leaves	Flowers / foliage / fibre
<i>Zantedeschia aethiopica</i>	Common arum lily / Wit varkoor	Flowers / foliage	Flowers / foliage

e) Urban Areas

Residential land uses in the site vicinity are largely concentrated in the north-northeast (Atlantis and surrounding nodes) and south-southeast segments. Types of residential use range from informal settlements to

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low-density residential, such as the Atlantic Beach Golf Estate at Melkbosstrand. Atlantis, located to the northeast, and the Bloubergstrand-Parklands area in the south-southeast segment are the largest urban areas in the site vicinity (Planning Partners, 2020g).

Urban development south of the KNPS comprises mainly of the residential areas along the coastline, with Duynefontein being the nearest. Two distinct urban nodes can be identified, namely Melkbosstrand-Duynefontein and Bloubergstrand-Table View. The Parklands/Sunningdale area directly north of Table View is currently exhibiting rapid urban growth. Residential development in this area is, however, still beyond the 10 km radius from the KNPS (Planning Partners, 2020g).

Urban built-up areas (2 877.5 ha in total) in the site vicinity are located in Atlantis, Philadelphia, Duynefontein and the northern portions of Table View and Parklands/Sunningdale (Department of Environmental Affairs, 2019). These urban settlements can be described as follows (Planning Partners, 2020g):

- Atlantis: The town (8 km north-northeast) was originally developed as a de-centralised location for residential uses, with incentives for industrial activities. Opportunities exist for infill development on vacant land within the existing urban edge. This could lead to an increase in the population, commercial, institutional and industrial uses in the site vicinity.
- Philadelphia: The town (14 km east) was previously a service centre for the surrounding local farming community. It is also a focus as a tourist destination and residential investment opportunity for commuters and retirees. There are a limited number of vacant plots within the urban edge.
- Duynefontein and Melkbosstrand: The predominantly residential areas of Duynefontein and Melkbosstrand (2.7 km south-southeast) are under development pressure due to their unique location and proximity to the coast. Due to the urban edges and safety restrictions associated with the KNPS, urban development however is restricted within these settlements. Redevelopment is limited, with new mixed-use development being guided by the CCT planning policies to the small business area (6.5 km south). The population of these residential areas are, therefore, expected to increase at a very low rate such that traffic evacuation times and management of risks due to a nuclear and radiological emergency in close proximity to KNPS

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can be maintained within the CCT and regulatory framework.

- *Bloubergstrand, Sunningdale, Parklands, Table View and Big Bay:*
The Blaauwberg District is one of the fastest growing districts within the CMA and includes the suburbs of Bloubergstrand, Sunningdale, Parklands, Table View and Big Bay (City of Cape Town, 2023b). The area is characterised by high-density residential developments and commercial activities along the main routes. Apartment buildings and hotels are located along the beachfront. Most of the future urban growth within this district is focused in Parklands and Sunningdale. It can be expected that the residential, commercial, institutional and industrial uses within this area will intensify significantly, and consequently it is expected that the population will increase over time (population projections is presented in more detail in **Section 5.4**).

f) Informal Settlements and Informal Trading

The following eight informal settlements are located within the site vicinity (City of Cape Town, 2023c):

- Klein Zoute Rivier (3.4 km east-southeast), located to the east of the R27 Road and adjacent to light industrial uses, which include a farm stall, sand mine, sawmill and a reinforced concrete supplier. The informal settlement is 0.3 ha in extent and contains 25 informal structures.
- Vredelust Farm (5.7 km south-southeast) is a small rural settlement located to the south of Melkbosstrand Road and contains 47 structures.
- Wolwerivier (9.9 km southeast), located along the Mamre Road to the northwest of the Morningstar smallholding area, contains 54 structures and is an extension to the existing Wolwerivier Incremental Development Area.
- Dassenberg Drive (11.7 km north-northeast) is a small rural settlement located to the west of Atlantis. The area measures approximately 1.3 ha in extent and contains 16 informal structures.
- Witsand (12 km northeast) comprises 8 separate settlements located to the east of Atlantis and contains a total of 4 328 informal structures on approximately 19.4 ha of land.

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- Rastacamp Atlantis (13.1 km north-northeast) is located to the west of Atlantis and contains 7 informal structures.
- Blouberg Sands (13.8 km south-southeast) is located immediately to the north of the suburb of Blouberg and contains 35 structures.
- Silverstroom Road (15.5 km north) is a rural informal settlement with 486 informal structures.

Table 5.5.34 provides a summary of informal settlements located within 20 km of the site (to be read in conjunction with **Drawing 5.5.9**).

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Table 5.5.34
Informal Settlements within 20 km of the Site⁵⁴

Code	Informal Settlement	Structure Count	Distance (km)	Direction
IS1	Klein Zoute Rivier	25	3.19	ESE
IS2	Vredelust Farm	47	5.40	SSE
IS3	Wolweriver	54	10.12	SE
IS8	Dassenberg Drive	16	10.84	NNE
IS4	Witsand Invasion 1	694	11.11	NE
IS6	Witsand Invasion 2	239	11.14	NNE
IS5	Witsand Infills 2	24	11.17	NE
IS7	Witsand POS	372	11.21	NNE
IS9	Witsand Infills 1	56	11.34	NE
IS10	Witsands Infills 3	72	11.50	NE
IS11	Witsands Infills 4	23	11.62	NE
IS12	Witsand	2 848	11.71	NE
IS13	Rasta Camp - Atlantis	7	12.17	NNE
IS14	Blouberg Sands	35	12.61	SSE
IS15	Silverstroom Road	486	13.42	N
IS16	Phillidelphia 2	8	15.58	E
IS17	Phillidelphia	15	15.59	E
IS18	Ekuphumleni - Du Noon	69	17.48	SSE
IS18	Du Noon Small Farmers	19	17.57	SSE
IS18	Du Noon TRA	300	17.67	SSE
IS18	Du Noon Holding Site 1	78	17.71	SSE
IS18	Du Noon Holding Site 3	98	17.78	SSE
IS18	Du Noon Business Site	124	17.83	SSE
IS18	Du Noon Holding Site 2	81	17.86	SSE
IS18	Du Noon School Site	816	18.00	SSE
IS18	Siyahlala - Du Noon	1 251	18.12	SSE

Drawing 5.5.9 illustrates the existing development footprint that was

⁵⁴ (City of Cape Town, 2023c)

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identified in the land use analysis in the site vicinity (Planning Partners, 2020g), as well as future expansion areas identified in the Cape Town MSDF (City of Cape Town, 2023a).

Informal settlements are discussed in further detail in **Section 5.4** (Demography).

Regulated⁵⁵ clusters of informal trading occur at five locations within the site vicinity (City of Cape Town, 2020f), viz.:

- Corner of MelkbosstrandMelkbostrand Road and Otto du Plessis Drive, MelkbosstrandMelkbostrand (5.9 km south-southeast) comprises 6 operational trading bays;
- Atlantis (Wesfleur) taxi rank (13.9 km north-northeast) comprises 22 operational trading bays;
- Intersection of Sandown Road and Whitehall Way, Parklands (14.9 km south-southeast) comprises 4 operational trading bays;
- Corner of Main Road and Link Road, Parklands (16.6 km south-southeast) comprises 3 operational trading bays; and
- Killarney (Potsdam) taxi rank (19.5 km south-southeast) comprises 7 operational trading bays.

Appendix 5.5.D provides details of the individual trading bays within each cluster that were operational at the time of data collection. The locations of the identified informal trading areas are also mapped in **Drawing 5.5.9**.

g) Land for Industrial, Institutional and Recreational Purposes

The KNPS is classified as a heavy industrial use. The Atlantis industrial area, the largest industrial node in the site vicinity, is situated between 8 and 12 km north-northeast of the site and contains both light and heavy industries. The other prominent existing industrial development located within the site vicinity is Rivergate (15.6 km southeast).

Scattered industries in the form of opencast mines (sand, stone aggregate and clay), brickfields and the Vissershok regional landfill site

⁵⁵ Informal trading in the CMA is controlled by the municipality. Informal traders are required to obtain trading permits in terms of the City of Cape Town Informal Trading By-law (City of Cape Town, 2009) and may only trade in specified areas in terms of the permits granted.

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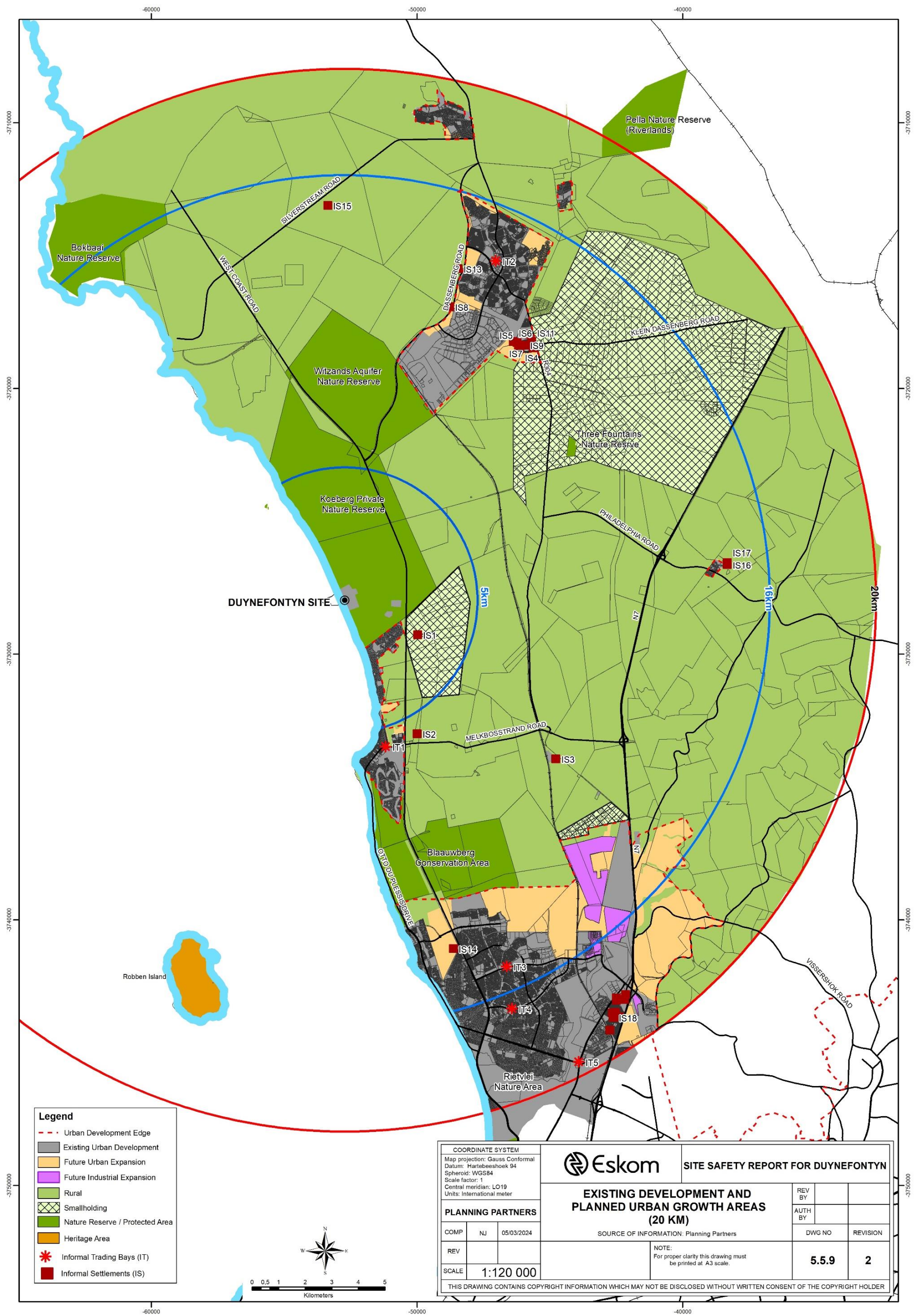
occur to the northeast, east and southeast.

Land for institutional uses that constitute schools; hospitals; clinics; police stations; fire stations, etc. are predominantly located within the urban areas and are described in more detail in **Section 5.4** and **Section 5.7**.

Robben Island, located 13.6 km south-southwest of the site contains the Robben Island Museum.

Tourist accommodation in the site vicinity is focused in Melkbosstrand and Bloubergstrand and includes guesthouses and hotels, as well as self-catering units within apartment buildings. Resorts and caravan parks within the site vicinity include the following: Ou Skip Park (4.1 km south-southeast); Silwerstroomstrand Resort (11.5 km north-northwest); Ganzekraal Leisure Resort (19.5 km north-northwest) and Sonnekus Resort, located at the Morningstar smallholding area (12.5 km southeast) (Planning Partners, 2020g). Tourist accommodation is presented in more detail in **Section 5.4**.

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h) Water Bodies, Wetlands and Groundwater

Watercourses, wetlands and water bodies in the site vicinity include the Salt/Sout River; Rietvlei wetland and the Diep River. The latter traverses the entire southeastern part of the site vicinity. Other unmapped wetlands and watercourses are also present in the site vicinity.

The area south of the KNPS contains a series of low-lying, north-south running dunes, which gave rise to a mosaic system of alkaline dune slack wetlands. The wetlands are fed primarily by a seasonally fluctuating water table. During the winter months, pools of shallow, brackish water are formed. In summer, these pools dry out as the water table recedes. To the north of the site, coastal infiltration ponds have been excavated between the sand dunes, which are fed by treated industrial effluent and untreated stormwater runoff from Atlantis (Planning Partners, 2020g).

There are two aquifers present at the site, the upper intergranular Sandveld Aquifer and the lower fractured rock Malmesbury Aquifer. The former is a major aquifer to the north and east of the site where it is extensively exploited by the CCT as a water resource, e.g. the Witzand and Silwerstroom wellfields, supplying the nearby town of Atlantis. These two aquifers are discussed in detail in **Section 5.11** (Geohydrology).

i) Mines and Quarries

The investigations showed that the only quarry situated within 5 km of the site vicinity, located on the Ou Skip Road, east of Melkbosstrand (3.4 km south-southeast), is no longer operational.

Beyond the 5 km annulus, and up to the 20 km annulus, limited mining occurs. The Tygerberg region contains a number of quarries east of the N7 Freeway, of which four are presently active. Sand-mining activities take place north of Dassenberg Drive, near Atlantis. Smaller brickworks are dispersed throughout the area between Bloubergstrand, Kalbaskraal (the nearest being 7.6 km northeast) and at Fisantekraal, north of Durbanville (Planning Partners, 2020g). Mines and quarries are discussed in more detail in **Section 5.7**.

5.5.6.2 Land and Water Bodies Supporting Wildlife

Although agriculture and to a lesser degree, urban development, have transformed much of the site vicinity, a diverse range of natural vegetation types are still present, with areas of low shrubland (fynbos and renosterveld) occurring in the interior. Shrubland (strandveld fynbos) is

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still dominant in the coastal region (Department of Environmental Affairs, 2019).

There are several proclaimed conservation areas, contained wholly or partially, in the site vicinity, including:

- *Cape West Coast Biosphere Reserve*: The Cape West Coast Biosphere Reserve is part of UNESCO's Man and the Biosphere Programme which promotes sustainable development. It stretches from the Diep River in the south to the Berg River in the north, covering 378 000 ha of coastal lowland plains and marine areas (including a core area of 79 000 ha). It is characterised by the richness of its plant species, which amount to about 8 700 species, and its high endemism (68 per cent of plant species are found only in the Cape Floral Kingdom) (Planning Partners, 2020a).
- *Blaauwberg Nature Reserve*: It is located north of Big Bay and extends to Melkbosstrand in the north and to beyond Blaauwberg Hill in the east and covers approximately 1 445 ha. The reserve conserves three threatened vegetation types, namely Cape Flats dune strandveld, Swartland shale renosterveld and Cape Flats sand fynbos. The conservation area contains a wetland, over 560 plant species, 40 mammal species (including whales, dolphins and seals), over 140 bird species, 28 reptile and 5 amphibian species. A range of recreational activities are available, including picnicking, hiking, surfing and bird watching. No accommodation is available within the conservation area (Planning Partners, 2020a).
- *Koeberg Private Nature Reserve*: This private nature reserve includes and surrounds the site. It is made up of five properties owned by Eskom that covers roughly 3 000 ha and conserves one of the remaining portions of Cape Flats dune strandveld present in the Cape Town region. The reserve is home to a number of animal species, including the Steenbok, Duiker, Springbok, Eland, Gemsbok, Burchell's Zebra, Small Grey Mongoose and caracal. Reptiles include the Cape Cobra. There are 40 species of reptile occurring on the nature reserve and 9 species of amphibian that potentially occur at the site (8 of which are of probable or confirmed occurrence). The reserve is also home to more than 210 birds species (Planning Partners, 2020a).
- *Witsands Aquifer Nature Reserve*: The nature reserve spans approximately 3 000 ha in extent and includes the Atlantis Dunefields and the Silwerstroomstrand Conservation Area, both priority nature

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sites. The conservation area protects the Atlantis Aquifer and more than 163 plant species, as well as natural and cultural heritage sites. The two dominant vegetation types are Cape Flats dune strandveld and Atlantis sand fynbos. The conservation area is habitat to more than 50 species of water birds, as well as lizards, amphibians and mammals, such as Steenbok, Cape Grysbok, Small Grey Mongoose, Cape Mole Rat and caracal. Of special significance is the globally threatened Black Harrier, which is successfully conserved in both the Atlantis Dunefields and Silwerstroomstrand Conservation Area (Planning Partners, 2020a).

- *Bokbaai Nature Reserve*: It is 1 181 ha in size and a privately owned conservation area and National Heritage Site, nested within Ganzekraal (CapeNature, 2019).
- *Riverlands Provincial Nature Reserve*: The nature reserve is managed by Cape Nature and located between Atlantis and Malmesbury. The reserve, which measures approximately 1 112 ha, is a biodiversity hotspot with more than 420 species of indigenous plants (Dzikiti, et al., 2014).
- *Three Fountains Private Nature Reserve*: It is a 21 ha private farm near Philadelphia specialising in Renosterveld conservation.
- *Table Bay Nature Reserve*: This nature reserve consists of seven management sections, including Rietvlei; Zoarvlei; Milnerton Lagoon; Milnerton Racecourse; Diep River; Parklands Fynbos Corridor and the Coastal Section. It covers approximately 880 ha of diverse habitats ranging from riverine floodplains; permanent and seasonal wetlands; open pans; a tidal estuary and coastal dunes. The vegetation mainly consists of endangered Cape Flats dune strandveld and critically endangered Cape Flats sand fynbos. The nature reserve lies on the Table Bay coastline, stretching from close to the Cape Town city centre to the north of Parklands.

Other important (core) botanical sites identified in the site vicinity are (Department of Agriculture, Forestry and Fisheries, Western Cape, 2020):

- Species-rich fynbos areas directly north and east of Atlantis, including the Papekuil Outspan area;
- Klein Dassenberg, east of Atlantis;

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- Schoongezicht Farm, directly south of the Klein Dassenberg smallholding area;
- Buffelsrivier coastal area, north-northwest of the site.

Table 5.5.35 provides a summary of nature reserves located in the site vicinity.

Table 5.5.35
Nature Reserves in the Site Vicinity⁵⁶

Nature Reserve	Distance and Direction	Size (ha)
Cape West Coast Biosphere Reserve	0.0 km	378 000 (partially located in the site vicinity)
Blaauwberg Conservation Area	7.5 km SSE	2 000
Koeberg Private Nature Reserve	0.0 km	3 000
Witsands Aquifer Conservation Area	6.0 km N	3 000
Bokbaai Nature Reserve	15 km NNW	1 180
Three Fountains Private Nature Reserve	11 km ENE	21

The perennial wetlands located in the site vicinity also serve as habitat for a range of plant and animal species.

5.5.6.3 Current Water Use

a) Water Bodies Used for Commercial and Freshwater Recreational Fishing and Other Recreational Purposes

There are no major dams located in the site vicinity that could be used for fishing or recreation (refer to **Drawing 5.5.5**).

With respect to rivers, recreational freshwater fishing occurs in the site vicinity in the lower Diep River and Sout River. Recreational fishing requires a license, but is not regulated and the abundance and volumes of fish caught in the site vicinity are therefore not known (Planning

⁵⁶ (Department of Agriculture, Forestry and Fisheries, Western Cape, 2020)

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Partners, 2020f).

Recreational fishing along the coast and offshore are addressed in detail in **Section 5.6**, whilst beach recreational activities are discussed in **Section 5.4**.

b) Water Bodies Used for Community Water Supply and Irrigation

The Diep River is the largest river system in the site vicinity. There are no important dams located in the site vicinity (Planning Partners, 2020f).

Estimated community water supply to the towns in the vicinity is described below (the numbering used in **Drawing 5.5.5** corresponds with the numbering used in the text below).

i. Atlantis

Atlantis is reliant on groundwater supply from the Atlantis Aquifer (i.e. the Atlantis Water Supply Scheme), which is abstracted at the following locations:

- The Witzands Wellfield (WR1): The Witzands WTW (W1, 5.73 km north) and pump station consist of a wellfield with boreholes, water softening plant and balancing tank, which currently yields 16×10^6 l/day. Water is also received from the Voëlville Dam. The treated water is stored in the two Hospital Hill reservoirs (WR5 and WR6), with a storage capacity of 10×10^6 l and 20×10^6 l, respectively (Planning Partners, 2020f).
- Silwerstroom Wellfield (WR4): The Silwerstroom WTW (W2, 12.05 km north-northwest) and pump station consist of a wellfield with boreholes and currently yields 4×10^6 l/day. The treated water is stored in the two Pella reservoirs (WR8 and WR9), with capacities of 10×10^6 l and 40×10^6 l, respectively. These two reservoirs supply potable water to the residential areas of Atlantis, Mamre and Pella, but are located outside of the site vicinity (Planning Partners, 2020f).

ii. Duynefontein, Melkbosstrand and Blaauwberg

The Melkbos reservoirs (WR2 (9.1 km south-southeast) and WR3 (9.2 km south-southeast), with a combined capacity of 40×10^6 l, supply the Duynefontein, Melkbosstrand and Blaauwberg areas with potable water. Water gravitates along a 700 mm pipeline to a valve chamber northeast of the Melkbosstrand/M14 intersection. The Melkbos reservoirs

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also receive treated water from the Voëlvelei Dam (Planning Partners, 2020f).

iii. Silwerstroom

The Midlands reservoir (WR7) is located 14.4 km north along the Silwerstroom Road, near the Silwerstroomstrand Resort, has a capacity of 10×10^6 l and serves the Silwerstroom area (Planning Partners, 2020f).

5.5.6.4 Future Development in the Site Vicinity

SDFs, compiled by local authorities every five years, guide development within the areas of jurisdiction of such authorities. In addition to the high-level strategies and objectives contained in these SDFs, they also earmark specific land parcels and areas for specific types of development, such as residential, industrial or commercial development. The implementation of development projects takes place in accordance with the proposals of the SDFs applicable to an area.

The CCT MSDF (City of Cape Town, 2023a) is the primary spatial planning policy document that guides future development and land use within the site vicinity. The urban settlements in the site vicinity are managed by the CCT and include Atlantis; Duynfontein; Melkbosstrand and the northern portion of Bloubergstrand and Parklands.

a) Nature Conservation Areas

The CCT MSDF discourages urban growth in key environmentally sensitive coastal areas and biodiversity areas (e.g. Cape West Coast Biodiversity Reserve; Koeberg Private Nature Reserve; Blaauwberg Nature Reserve and other fynbos remnant areas) in the site vicinity (City of Cape Town, 2023a).

With respect to formal nature conservation areas in the site vicinity, the Cape West Coast Biodiversity Reserve covers a large portion of this area. The reserve includes an area of 378 000 ha of coastal lowland plains that stretches from Diep River in the south to Berg River in the north. Membership to the conservation effort is on a voluntary basis (Cape West Coast Biosphere, 2020). It can, however, be expected that the conservation area will remain as is, or even be expanded.

The Owner Controlled Boundary is included within the Koeberg Private Nature Reserve, roughly 3 000 ha in extent (Eskom, 2020; Planning Partners, 2020g). The portion of the site that will not be required for the

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nuclear installation(s) and associated activities will be retained for conservation purposes.

The Blaauwberg Nature Reserve is another important conservation effort in the site vicinity and aims to establish a private conservation area (see **Drawings 5.5.4** and **5.5.9**). The area of 2 000 ha in extent stretches from Bloubergstrand in the south to Melkbosstrand in the north. No urban or large-scale agricultural development is expected within this conservancy area.

Planned protected areas in the site vicinity include the Ganzekraal Conservation Area, which is located approximately 60 km north of Cape Town on the R27 Road and covers an area of approximately 6 236 ha (this area's formal declaration as Nature Reserve as 'Ganze Craal' is currently in progress) (CapeNature, 2019).

b) Forest Areas

There are no commercially forested areas or indigenous forests located in the site vicinity (Planning Partners, 2020g). It can reasonably be expected that no forest-related developments will occur in the site vicinity in the future.

c) Agriculture

A large proportion of the site vicinity represents extensive agricultural land, as well as the Klein Zoute Rivier, Driefonteinen, Morningstar and Dassenberg smallholding areas. These areas are under threat from development pressure. The CCT MSDF however, promotes the preservation and utilisation of high potential agricultural land and areas currently being used for agricultural purposes by discouraging future urban development in these areas (City of Cape Town, 2023a).

d) Urban Development

The municipal spatial development framework (MSDF) considered for the previous version of the DSSR (Eskom, 2022a), the Cape Town MSDF 2012 (City of Cape Town, 2012), projected long-term growth along two northern corridors: one north of Blaauwberg and one north of Durbanville. The current MSDF for Cape Town, the Cape Town MSDF 2023 (City of Cape Town, 2023a), on the other hand, proposes targeted investment and land use management based on inward growth. The two different spatial approaches are conceptually illustrated in **Figure 5.5.15**.

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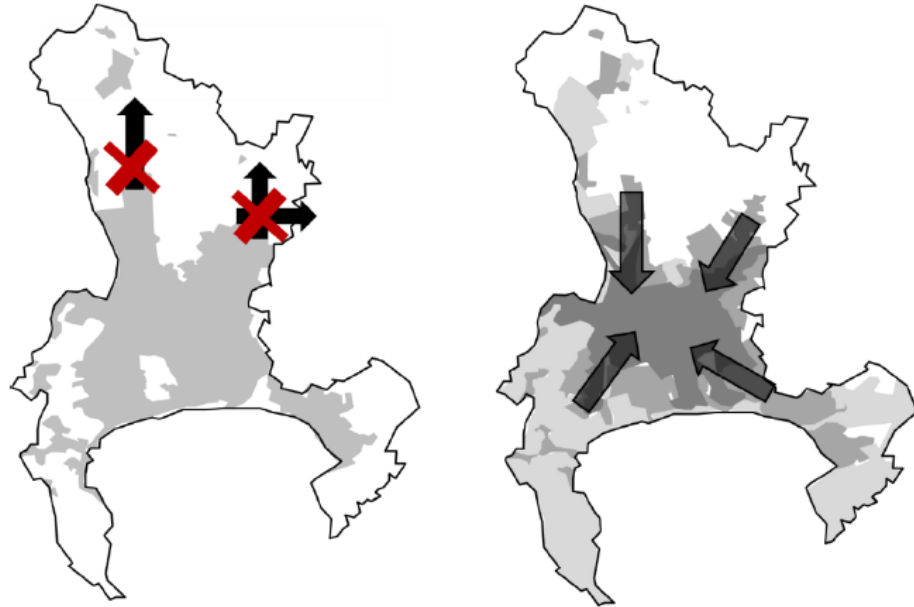


Figure 5.5.15
City of Cape Town MSDF: 2012 versus 2018 Long-term
Spatial Vision for Cape Town⁵⁷

The City of Cape Town’s spatial policy of inward growth is reflected in the “consolidated spatial plan concept” contained in the Cape Town MSDF 2023 (refer to **Figure 5.5.16**), which according to the MSDF (2023a) is established on the basis of four primary Spatial Transformation Areas, namely:

- Urban Inner Core;
- Incremental Growth and Consolidation Areas;
- Discouraged Growth Areas, which include Areas of Agricultural Significance; and
- Critical Natural Assets.

⁵⁷ (City of Cape Town, 2023a)

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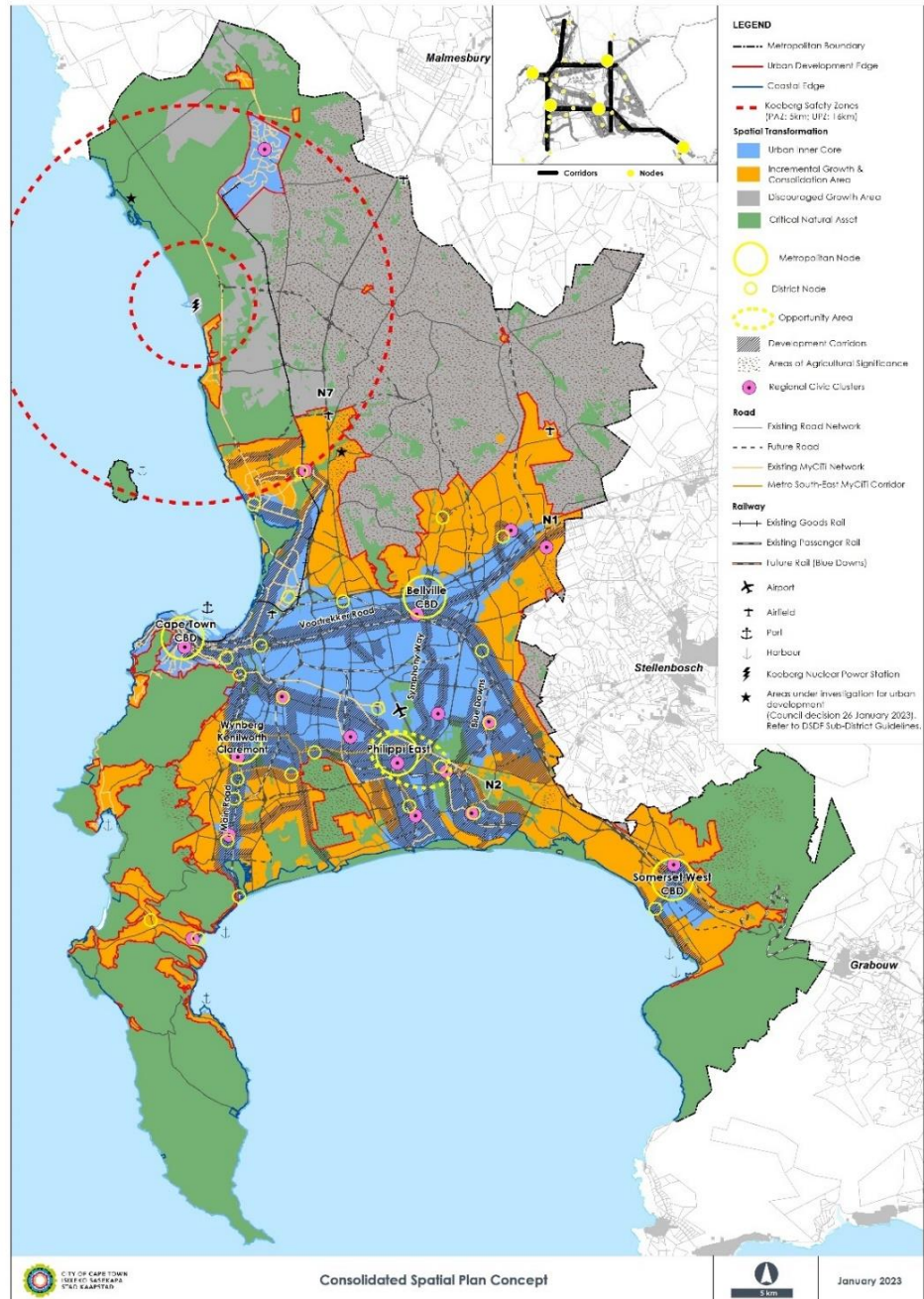


Figure 5.5.16
Cape Town MSDF 2023 Consolidated Spatial Plan Concept⁵⁸

The Cape Town MSDF 2023 makes use of the ‘urban development edge’

⁵⁸ (City of Cape Town, 2023a)

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as a complementary growth management tool to manage land development in the Cape Metropolitan Area (CMA). According to the Cape Town MSDF 2023 (City of Cape Town, 2023a), the urban development edge delineation is intended to:

- protect ‘Areas of Agricultural Significance’;
- limit uncontrolled urban sprawl to areas aligning within long term engineering infrastructure networks;
- allow for the optimisation of vacant and under-utilised land within the built up area;
- allow for horizontal expansion opportunities of urban development in areas away from risk regions area;
- promote risk averse, sustainable and resilient development;
- to protect the functional integrity of sensitive biodiversity;
- ensure efficiency increases in service delivery of centrally located government sponsored social and community facilities and public transport.

Further, the Cape Town MSDF 2023 makes the following statement with regards to development within the PAZ (2023a, p. 74):

“No new development is permissible within the Precautionary Action Zone (area within a 5 km radius of the Koeberg nuclear reactors) other than development that is directly related to the siting, construction, operation and decommissioning of the KNPS or that is a result of the exercising of existing zoning rights.”

Areas classified in the Cape Town MSDF 2023 as ‘Urban Inner Core’ and ‘Incremental Growth and Consolidation Areas’ (City of Cape Town, 2023a), as well as areas classified in the 2023 Blaauwberg District Plan as ‘New Development Areas’ (City of Cape Town, 2023b) are illustrated as ‘Future Urban Expansion’ and ‘Future Industrial Expansion’ on **Drawing 5.5.9**.

Figure 5.5.17 identifies the changes in the planned future urban expansion areas between the Cape Town MSDF 2012, as presented in the DSSR 2015 (Eskom, 2015a) and the Cape Town MSDF 2023 (City of Cape Town, 2023a), as presented in **Drawing 5.5.9**.

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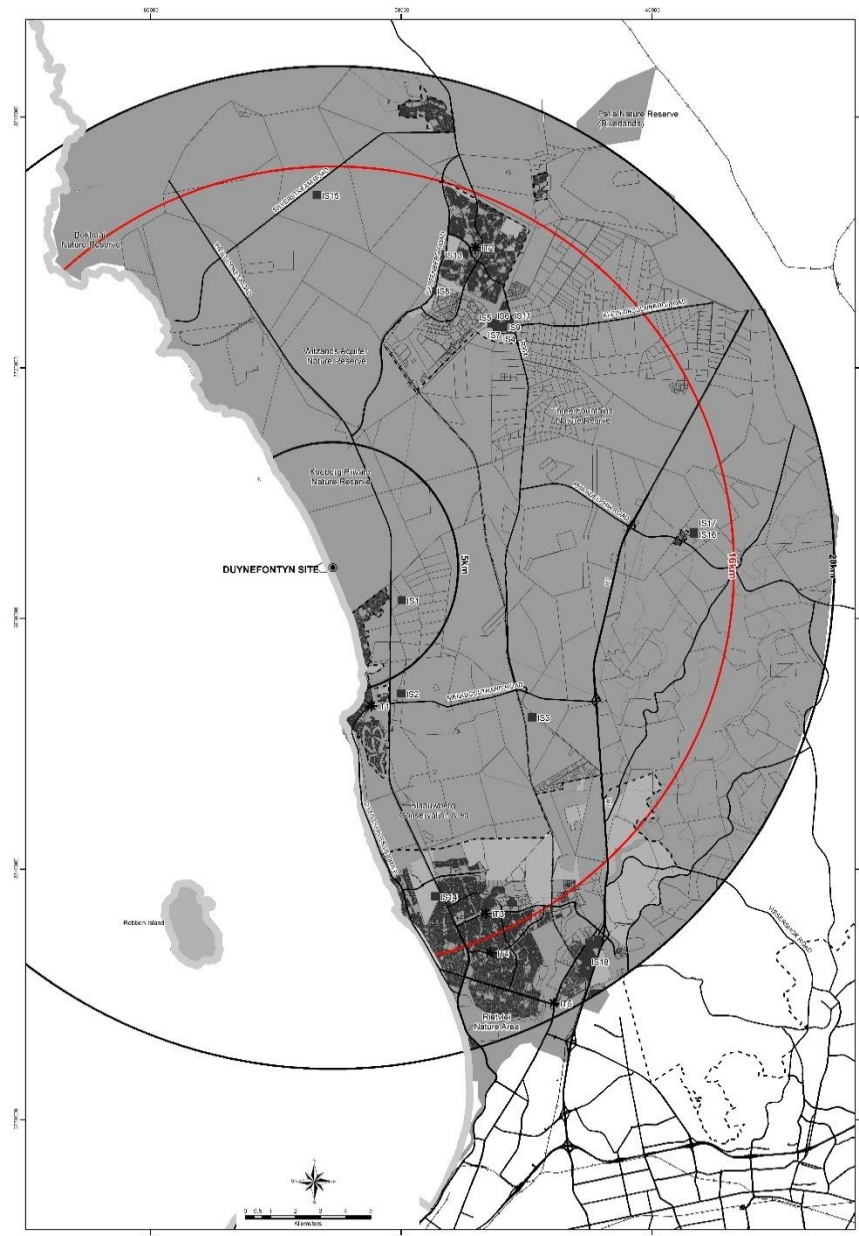


Figure 5.5.17
Changes to Urban Expansion Areas within the Site Vicinity –
MSDF 2012 vs. MSDF 2023⁵⁹

It is evident that a large portion of land previously identified for future urban expansion within the 16 km EPZ to the north of Sandown and Morning Star immediately west of the N7 has been retracted by the City

⁵⁹ (City of Cape Town, 2023a)

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of Cape Town. Instead, the City of Cape Town has now identified land to the east of the N7 for further urban expansion.

It is important to note that both the Cape Town MSDF 2023 and the 2023 Blaauwberg District Plan identify Silwerstroomstrand and the Farm Springfontein (located east-south-east of Silwerstroomstrand) as being an “area under investigation for urban development” in terms of the City of Cape Town Council’s decision to approve the Cape Town MSDF 2023 and the 2023 District Plans (including the Blaauwberg District Plan), as well as in terms of the sub-district guidelines contained in the 2023 Blaauwberg District Plan. More specifically, the City of Cape Town Council’s decision to approve the Cape Town MSDF 2023 and the 2023 District Plans states the following in respect to future urban development at Silwerstroomstrand and the Farm Springfontein (City of Cape Town, 2023d):

“Incorporate the area as shown on the map as an Incremental Growth and Consolidation Area in terms of the draft Metropolitan Spatial Development Framework and as a new development area in terms of the draft Blaauwberg District Plan. Ensure compliance with all statutory processes but specifically compliance with the Koeberg Evacuation Plan.”

The development guidelines for ‘Sub-district 4: West Coast Area’ contained in the Blaauwberg District Plan 2023 states the following in relation to Silwerstroomstrand (City of Cape Town, 2023b, pp. 117-118):

- *“Recognise Silwerstroomstrand area as a new development opportunity and give guidance to its possible development.”*
- *“Within a limited area around the existing Silwerstroomstrand resort, allow for mixed use development, including commercial and tourism / recreational development, public facilities and a range of residential opportunities and densities to support development of a vibrant and permanent coastal node and destination place.”*
- *“Limit this development to the surrounds of the resort, and avoid development sprawling north of the river.”*
- *“For the current Silwerstroomstrand Resort area, and some land to the north, facilitate improved public access to the coastline, with primary public access for the recreational / tourism area promoted at the Silwerstroomstrand node.”*

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The development guidelines for ‘Sub-district 4: West Coast Area’ contained in the Blaauwberg District Plan 2023 states the following in relation to Farm Springfontein (City of Cape Town, 2023b, p. 118):

“A limited secondary development (on the Springfontein Farm) south of Silwerstroom River may be supported if this would secure a substantial and extraordinary public benefit. This development should be in support of the Silwerstroomstrand node and include improved public access southwards from Silverstroomstrand to coastal access points down to the last rocky point.”

The following general development guideline, as contained in the Blaauwberg District Plan 2023, is associated with the specific development guidelines for Silwerstroomstrand and Farm Springfontein (City of Cape Town, 2023b, p. 118):

“Any new development will be subject to nuclear safety and evacuation planning, in addition to the existing district level ‘Koeberg Nuclear Power Station / Safety Zones’ guidelines.”

The ‘Koeberg Nuclear Power Station / Safety Zones’ guidelines, as extracted from the Blaauwberg District Plan 2023, are as follows (City of Cape Town, 2023b, p. 63):

- *“All urban development within the Emergency Planning Zone (0 – 16 km) of the Nuclear reactors (Reference Point X = -52727.4000, Y = -3727966.6500) must conform to the procedural guidance and restrictions reflected in the Development Management Scheme section 158 (Specific Conditions regarding the Koeberg Restriction Area Overlay Zoning).”*
- *“Guidance in points 3 – 5 below will be reviewed once the Regulations for Development around Koeberg is available from the Minister of Mineral Resources and Energy or the review of Item 158 of the City of Cape Town’s Development Management Scheme is approved by Council.”*
- *“The principle for the 0 – 5 km zone is that no new development will be permitted unless place bound and directly related to the nuclear power station.”*
- *“The principle for the 5 – 16 km zone is that limited development will be considered subject to assessments. And that in general the number of permanent population, employees and visitors should be*

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limited.”

- *“The City, in association with Eskom, for the National Nuclear Regulator, will develop tools to assess and report on the cumulative impacts of development applications in relation to available evacuation time. Development applications will be assessed through the Traffic Evacuation model.”*
- *“Changes in land use outside the existing built up area must consider disaster management infrastructure and operational systems necessary for people on the property to be notified of an evacuation order (i.e. Sirens, information in Home Owners Association Constitution/Rules of the Scheme) and to act on the order.”*
- *“Proposals for urban development in the 0 – 16 Koeberg Emergency Planning Zone which is also in the Discouraged Growth Area or outside the urban development edge is discouraged. Agricultural, tourism or recreational related land uses which are compatible with the agricultural or rural zoning could be considered, but will require special attention to nuclear safety and evacuation planning, and implementation of said plans. This should include alert systems, sirens, nearby declared evacuation routes, capacity at mass care centres, and means of notifying owners and all visitors at all times about emergency procedures (e.g. Including information in Home Owners’ Association Constitution / Rules of the Scheme etc). Special agreements with the National Nuclear Regulator and Eskom may be required and engagement should happen in the early stages of proposals. These costs are for the developer unless otherwise agreed to by Eskom.”*

It is therefore clear that future development within the 16 km EPZ is highly regulated by current spatial planning policy instruments controlled by the City of Cape Town.

e) Informal Settlements

There are several informal settlements already established within the 16 km EPZ (refer to **Table 5.5.34**). Areas of informality, including informal settlements, continue to spring up across Cape Town as a result of rapid urbanisation and population growth, and existing settlements also continue to expand. In an attempt to combat unlawful occupation of land within the CMA – including within the 16 km EPZ - the City of Cape Town promulgated the Unlawful Occupation By-law, 2021 (City of Cape Town, 2021). The by-law sets out procedures and obligations for both the City of Cape Town and private

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landowners (including Eskom) with regards to land that is unlawfully occupied. It is the responsibility of all landowners within the 16 km EPZ to monitor unlawful occupation of land, as well as for actioning the necessary measures to remove unlawful occupants in a timely manner.

f) Industrial, Institutional and Recreational Purpose

i. Industrial development

Industrial development in the site vicinity is largely focused within the Atlantis industrial area (9 km north-northeast), where large areas of vacant land are available for development (refer to **Drawing 5.5.9**). The remaining industrial development within the site vicinity will occur in future urban expansion areas within the CMA (City of Cape Town, 2020b), including:

- Frankendale (Portions 2 and 3 of Cape Farm No. 152): Approval was granted in September 2017 for a 352.66 ha site to be rezoned to subdivisional overlay zone for the purposes of general industrial (80 ha), risk industrial (134 ha), public roads, public open space and utility zone. The approval is for a phased development comprising 1 549 920 m² Gross Leasable Area. The validity period is 5 years, with a possibility for a single extension for a further 5-year period.
- Enviroserv (Portion 36, a portion of Portion 2, of Cape Farm No. 152): The 39.47 ha site, an operational solid waste management facility, was rezoned from General Industrial to Risk Industry.

An additional development project located in the site vicinity is currently in the planning stages, namely the Brakkefontein Solar Park situated approximately 6 km northeast of Melkbosstrand and 6 km south of Atlantis. If developed as proposed, the Brakkefontein Solar Park will be a solar photovoltaic energy generation facility comprising of a number of photovoltaic panels that will convert solar radiation energy into electrical energy. The facility will have the combined capacity to generate a maximum electricity output of about 75 MW. The solar panels will be spaced over an area of about 135 ha (iSHEcon, 2020).

Based on currently available information, the nearest industrial development to the proposed nuclear installation(s) will be located 9 km from the site.

Both light and heavy industries are permitted within future industrial areas identified in **Drawing 5.5.9**. Heavy industries could contain hazardous substances that could result in a human-induced external event.

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Industrial development is discussed in more detail in **Section 5.7**.

ii. Institutional development

Based on the correspondence with the City of Cape Town's Blaauwberg District Land Use Management Branch (City of Cape Town, 2020b), as well as the information contained in the Cape Town MSDf 2023 (City of Cape Town, 2023a), no new major institutional developments are planned in the site vicinity. It is possible, however, that institutional facilities may be built as the population and demand for such facilities within this area increases in the future. Institutional development in the site vicinity could lead to an increase in the number of people that need to be evacuated with a nuclear incident or accident. Institutional development is discussed in more detail in **Section 5.4**.

iii. Recreational development

The existing Silverstroomstrand resort (11.5 km north-northwest) is identified in the Blaauwberg District Plan 2023 as having potential to provide a public amenity of metropolitan significance and has therefore been identified for potential further development (along with nearby Farm Springfontein) (City of Cape Town, 2023b). There are no other planned new tourist facilities in the site vicinity (City of Cape Town, 2020b; City of Cape Town, 2023a; City of Cape Town, 2023b). Recreational development is discussed in more detail in **Section 5.4**.

g) Water Bodies and Wetlands

No new dams are planned to be built in the site vicinity (City of Cape Town, 2023a; Planning Partners, 2020f).

Wetlands have conservation status according to South African environmental law (e.g. National Environmental Management Act No. 107 of 1998) and the existing wetlands will therefore remain protected.

h) Future Water Supply to the Site

Average potable water use by the KNPS from the CCT supply during the period 2010 to 2015 was 18.4 l/s. Following water savings interventions, this has reduced to 10.8 l/s and is unlikely to be reduced further.

The municipal supply is scheduled to be replaced by groundwater from the Aquarius Wellfield supplying a desalination plant at KNPS. However, this is a short-term option as the Aquarius Wellfield resource is finite and this aquifer is also being used by the CCT. Desalination of seawater is

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therefore seen as the long-term supply option, pending further feasibility studies. This option is also favoured by Eskom for any new nuclear installations on the site. Refer to **Section 5.12**, which discusses the proposed water supply in detail.

i) Mines and Quarries

Based on the correspondence with the CCT's Blaauwberg District Land Use Management Branch (City of Cape Town, 2020b), as well as the information contained in the CCT MSDF (City of Cape Town, 2023a), no new mines or quarries are planned in the site vicinity.

5.5.7 Land and Water Use within the Emergency Planning Zones

The characterisation of land and water use was considered within the emergency planning zones (EPZs) that apply to KNPS and Duynefontyn (as defined in **Chapter 8**).

The purpose of the characterisation is to inform emergency planning and remedial measures that must be considered to minimise the preliminary estimation of public exposure in case of a potential radiological incident or accident. Emergency response actions that must be considered include evacuation, shelter, thyroid blocking, temporary relocation, food banning and ongoing monitoring and communication (Eskom, 2022b).

Land and water data were evaluated for the existing KNPS' EPZs, i.e. PAZ (5 km), UPZ (16 km) and LPZ (80 km), as defined in **Chapter 8**. For the purposes of this section the following data sets were analysed:

- land cover, as illustrated in **Drawing 5.5.2**;
- land use, as illustrated in **Drawing 5.5.6**;
- agricultural production, as illustrated in **Drawing 5.5.7**;
- agricultural collection, processing and distribution facilities, as illustrated in **Drawing 5.5.3**;
- existing and planned development, as illustrated in **Drawing 5.5.9**.

5.5.7.1 Land Cover (80 km)

Based on the regional land cover analysis (Planning Partners, 2020a), the land cover data were analysed per sector in terms of the site EPZs. The EPZs were superimposed on the 5 km 22.5° sectoral grid and land

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cover was determined per EPZ in terms of the land cover classifications that represent the 2018 SANLC (Department of Environmental Affairs, 2019). The analysis is recorded in **Appendix 5.5.E** and illustrated in **Drawing 5.5.2**.

It should be noted that the results of the land cover analysis vary from those recorded for the DSSR 2015 (Eskom, 2015a), and in some instances this variation is relatively substantial. There are four possible reasons for this variation in results:

- the use of new technology for the 2018 SANLC study, specifically 20 m multi-seasonal Sentinel 2 satellite imagery⁶⁰, as well as the use of the new gazetted land cover classification standard (SANS 19144-2) (Planning Partners, 2020a);
- the conversion of agricultural land to natural areas for the purposes of conservation;
- the impact of climate change on land use, particularly the conversion of agricultural land to other uses;
- the impact of the global economic downturn on the agricultural sector (i.e. the abandonment of agricultural land in favour of other uses). Note that the agricultural survey that was undertaken for the site vicinity during 2018 recorded higher production figures than in 2007/2008. This could be attributed to better farming practices.

0 km to 5 km EPZ (PAZ)

Land cover within the 0 km to 5 km PAZ consists of approximately 3 365.8 ha (80.3 per cent) of shrubland⁶¹; 105.7 ha (2.5 per cent) of natural wooded land; 47.8 ha of grassland (1.1 per cent) and 3.7 ha of thicket dense bush (0.1 per cent). The land cover therefore consists of predominantly natural vegetation (84 per cent of the PAZ area). This is an increase from the DSSR 2015, which recorded 65.9 per cent natural vegetation in the PAZ area (Eskom, 2015a). The 0 km to 5 km zone also contains 301.2 ha of barren land (7.2 per cent), corresponding largely to sand dunes situated to the north of the KNPS site (Department of Environmental Affairs, 2019).

Cultivated commercial annual non-pivot (i.e. commercial dryland

⁶⁰ The 1990 and 2013 to 2014 South African National Land-Cover datasets were both generated from 30 m resolution Landsat imagery, as this was the only option available at that time of production, in terms of free-to-access, medium resolution imagery (Thompson, 2019).

⁶¹ Including fynbos (Thompson, 2019)

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agriculture) constitutes 33.5 ha (0.8 per cent) of the PAZ (Department of Environmental Affairs, 2019). This is a substantial reduction in this land use when compared to the DSSR 2015, which recorded 381.44 ha (9.1 per cent) (Eskom, 2015a).

The current land cover distribution within 0 km to 5 km shows that there is 201.8 ha (4.8 per cent) of urban built-up residential formal suburbs (i.e. Duynefontein); 31.8 ha (0.8 per cent) urban built-up industrial (including the KNPS) and 6.7 ha (0.2 per cent) of urban built-up commercial⁶² within this PAZ. In addition, there is 2.2 ha of built-up smallholdings (0.1 per cent) (Department of Environmental Affairs, 2019).

Minor mining activity (i.e. sand mining) occurs in this PAZ, with 6.1 ha (0.15 per cent) being identified in the 2018 SANLC (Department of Environmental Affairs, 2019).

Water bodies (3.6 ha) and wetlands (77.2 ha) make up the remainder of this PAZ (Department of Environmental Affairs, 2019).

A large portion of this PAZ forms part of the Eskom property holdings that makes up the site. It therefore falls within the area under the control of the operator and the requirements of the regulations on siting can be complied with.

5 km to 16 km EPZ (UPZ)

Land cover within the 5 km to 16 km UPZ of the site consists of approximately 25 046.8 ha (59.8 per cent) of shrubland; 924.6.7 ha (2.2 per cent) of natural wooded land; 744.8 ha of grassland (1.8 per cent) and 37 ha of thicket dense bush (0.1 per cent). The land cover therefore consists of predominantly natural vegetation (63.9 per cent of the UPZ area) and represents an increase in natural vegetation in the UPZ when compared with the DSSR 2015 (52.4 per cent) (Eskom, 2015a). This increase in natural vegetation can be attributed to the ever-expanding conservation areas in the 5 km to 16 km zone, including the Cape West Coast Biodiversity Reserve; Koeberg Private Nature Reserve and Blaauwberg Nature Reserve. This zone also contains 882.4 ha of barren land (2.1 per cent). No indigenous forests are present, however there is 353.3 ha (0.84 ha) of 'planted forest' areas (most likely representing tree avenues and wind breaks) (Department of

⁶² Commercial land use in the 0 km to 5 km EPZ is prohibited in terms of clause 7(a) of the Department of Energy's regulations on siting, unless authorisation for such activity has been granted (Department of Energy, 2011). It is therefore assumed that the various instances of commercial land use within this EPZ have either been granted authorisation from the relevant authorities or this land use designation is an erratum in the 2018 SANLC.

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Environmental Affairs, 2019).

Cultivated commercial annual non-pivot (i.e. commercial dryland agriculture), constitutes 9 594.3 ha (22.9 per cent) of the UPZ (Department of Environmental Affairs, 2019). This is a substantial reduction in this land use when compared to the DSSR 2015, which recorded 17 078.2 ha (41.1 per cent) (Eskom, 2015a). Other agricultural land uses in this zone are cultivated commercial permanent vines (622.7 ha) and cultivated commercial permanent orchards (51.7 ha) (Department of Environmental Affairs, 2019).

The land cover distribution within the 5 km to 16 km UPZ demonstrates that there are elements of the food chain that are present that would need to be taken into consideration with respect to emergency and remedial measures relating to food-banning and monitoring.

The current land cover distribution within 5 km to 16 km shows that there are approximately 2 266 ha (5.4 per cent) of urban built-up residential suburbs; 141.3 ha (0.3 per cent) urban built-up industrial and 91.3 ha (0.2 per cent) of urban built-up commercial within this UPZ. In addition, there are 135.8 ha of built-up smallholdings (0.3 per cent) (Department of Environmental Affairs, 2019). The urban component of the land cover appears to have remained relatively constant in this zone when compared to the results contained in the DSSR 2015 (Eskom, 2015a).

Minor mining activity (i.e. sand mining) occurs in this UPZ (235.3 ha or 0.56 per cent). Water bodies (45.1 ha) and wetlands (724.7 ha) make up the remainder of this UPZ (Department of Environmental Affairs, 2019).

16 km to 80 km EPZ (LPZ)

The land cover distribution within the 16 km to 80 km LPZ is illustrated in **Drawing 5.5.2**. The analysis demonstrates that the bulk of the LPZ is dominated by natural vegetation and agricultural activities (Department of Environmental Affairs, 2019; Planning Partners, 2020a).

The LPZ contains 71 378.3 ha of urban uses, representing the CMA, the surrounding towns and smallholding areas.

The viable implementation of emergency and remedial measures will require ongoing monitoring of agricultural produce and processing facilities in order to monitor possible contamination of the food chain and the need for food-banning within the 80 km LPZ.

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5.5.7.2 Land Use (16 km)

Based on the 2020 land use survey (Berry, 2020), the land use data were analysed per sector in terms of the site EPZs. The EPZs were superimposed on the 5 km 22.5° sectoral grid and land use was determined per EPZ in terms of the land use classifications represented in the land use analysis (Planning Partners, 2020g). This analysis is illustrated in **Drawing 5.5.6**. The land use analysis was conducted up to 20 km from the site and the analysis of land use within the EPZs is therefore limited to the same area.

0 km to 5 km EPZ (PAZ)

The land use survey confirmed that land within the 0 km to 5 km PAZ is used for predominantly conservation purposes, consisting of approximately 2 883.1 ha (68.9 per cent) of natural vegetation (shrubland, including strandveld and renosterveld fynbos), as well as 196.6 ha of bare rock and soil. There is also 340.8 ha of fallow land (Planning Partners, 2020a) (refer to **Drawing 5.5.6**).

Agricultural activity within the PAZ is limited to cultivated dryland (0.7 per cent) and agricultural smallholdings (5.7 per cent) (Planning Partners, 2020g).

The land use analysis confirmed that there is limited urban development within the PAZ. This represents the residential suburb of Duynefontein to the south of the site, as well as the existing KNPS. A large portion of this PAZ forms part of the Eskom property holdings that make up the site. It therefore falls within the area under the control of the operator and the requirements of the regulations on siting can be complied with.

5 km to 16 km EPZ (UPZ)

The analysis of the land use confirmed that land within the 5 km to 16 km UPZ is predominantly used for conservation and agricultural purposes (Planning Partners, 2020g). The analysis confirmed that there are elements of the food chain present within this UPZ that would need to be taken into consideration with respect to emergency and remedial measures, in particular to food-banning and monitoring.

The urban settlements of Atlantis, Duynefontein, Melkbosstrand, Philadelphia and the northern section of Bloubergstrand are also present (Planning Partners, 2020g).

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5.5.7.3 Existing and Planned Development within the EPZ (16 km)

An evaluation of existing SDFs and conservation initiatives within the 20 km zone of the site was conducted for the purposes of this section (see **Subsection 5.5.6**). Based on this evaluation, the potential for changes in land use within the respective EPZs were assessed. Refer to **Drawing 5.5.9** which illustrates existing and planned development within 20 km of the site.

0 km to 5 km EPZ (PAZ)

A large proportion of this PAZ is already included within the Koeberg Private Nature Reserve, as well as the proposed Blaauwberg Nature Reserve to the southeast (see **Drawing 5.5.9**).

Eskom owns the bulk of the properties located within this PAZ and therefore controls the bulk of the area. Furthermore, the KNPS's current 5 km exclusion zone prohibits any new development, excluding Eskom developments, within 5 km of the existing site (City of Cape Town, 2023a). This exclusion zone correlates closely with the site PAZ. No future development is therefore allowed within the 5 km radius around the site and limited development is only permitted within the existing urban area of Dufnefontein (see **Drawing 5.5.9**).

The operator would therefore be able to ensure compliance with the regulations on siting (Department of Energy, 2011).

The Klein Zoute Rivier smallholding contains an informal settlement (3.1 km east-southeast). The future expansion of this settlement would need to be monitored.

5 km to 16 km EPZ (UPZ)

A large portion of the land within the 5 km to 16 km UPZ forms part of the Cape West Coast Biosphere Reserve, stretching from Diep River in the south of the site vicinity northwards. Another large portion of land to the southeast of the site forms part of the Blaauwberg Nature Reserve.

The urban settlements of Dufnefontein, Melkbosstrand, Bloubergstrand, Philadelphia and Atlantis fall within this UPZ. The Cape Town MSDF 2023 makes use of the 'urban development edge' as a complementary growth management tool to manage land development in the CMA (refer to **Subsection 5.5.6.4**). Furthermore, the 'Koeberg Nuclear Power Station / Safety Zones' guidelines, as included in the Blaauwberg District Plan 2023, are applicable.

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In order to ensure that future urban expansion does not exceed current planned limits, restrictive land use change measures are already in place in the form of the KNPS's 5 km and 16 km restrictive zones and will ensure that the feasibility of emergency and remedial measures are not compromised over the lifetime of the nuclear installation(s).

It can therefore be expected that land use within this UPZ will be dominated by conservation and agricultural uses. The existing urban development will not be permitted to expand beyond current planned limits, without *"demonstrating that the proposed development will not compromise the adequacy of disaster management infrastructure required to ensure the effective implementation of the IKNEP/RRR"*. With respect to emergency and remedial measures, the appropriate measures relating to food banning, temporary relocation, monitoring and public communication would be implemented, as set out in detail in **Chapter 8**.

5.5.7.4 Agricultural Production (16 km)

Based on the data recorded during the agricultural production survey (Planning Partners, 2020c), data on agricultural products were analysed per sector in terms of the site PAZ and UPZs. These two EPZs were superimposed on the 5 km 22.5° sectoral grid and agricultural products per sector calculated. The analysis is limited to the site vicinity and is illustrated in **Drawing 5.5.7**.

0 km to 5 km EPZ (PAZ)

The analysis confirmed that no agricultural products were produced in the 0 km to 5 km PAZ for 2018 agricultural year (Planning Partners, 2020c) (refer to **Tables 5.5.36** to **5.5.51** and **Drawing 5.5.7**).

5 km to 16 km EPZ (UPZ)

The main agricultural sectors within the 5 km to 16 km radii are dairy, wheat and chicken farming.

Table 5.5.36 and **Table 5.5.37** demonstrate that dairy farming occurs beyond 5 km of the site. Closely associated with the dairy industry is land used for grazing of cattle (see **Table 5.5.38**) and fodder production (see **Table 5.5.39**). The bulk of the fodder production occurs beyond 5 km of the site. The number of cattle and dairy cows and fodder production volumes (Planning Partners, 2020c) provide an indication of the amount of animal feed required to be imported into the area, should this be required as part of emergency and remedial measures, defined in the

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emergency plan.

Table 5.5.36
Dairy Cows per EPZ (2018)⁶³

EPZ	Number of Dairy Cows in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	62	477	2 403	713	0	0
Total in a Segment	0	0	62	477	2 403	713	0	0

Table 5.5.37
Milk Production per EPZ (2018)⁶⁴

EPZ	Milk Production in a Sector (10 ³ ℓ)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	73	0	9 624	542	0	0
Total in a Segment	0	0	73	0	9 624	542	0	0

⁶³ (Planning Partners, 2020c)

⁶⁴ (Planning Partners, 2020c)

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Table 5.5.38
Cattle per EPZ (2018)⁶⁵

EPZ	Number of Cattle in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	310	113	883	839	649	204
Total in a Segment	0	0	310	113	883	839	649	204

Table 5.5.39
Fodder Production per EPZ (2018)⁶⁶

EPZ	Fodder Crop Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	1 406	3 023	8 735	7 097	2 734	1 020
Total in a Segment	0	0	1 406	3 023	8 735	7 097	2 734	1 020

Wheat production is an important industry within this zone and occurs between 5 km and 16 km in the northeast to south-southeast segments (refer to **Table 5.5.40** and **Drawing 5.5.7**). Barley is also produced in the UPZ, but in relatively minor quantities when compared to wheat (refer to **Table 5.5.41** and **Drawing 5.5.7**) (Planning Partners, 2020c). The agricultural produce survey (Planning Partners, 2020c) recorded no maize production in the site vicinity during the 2018 agricultural year.

⁶⁵ (Planning Partners, 2020c)

⁶⁶ (Planning Partners, 2020c)

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Table 5.5.40
Wheat Production per EPZ (2018)⁶⁷

EPZ	Wheat Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	519	2 369	6 737	5 013	1 406	408
Total in a Segment	0	0	519	2 369	6 737	5 013	1 406	408

Table 5.5.41
Barley Production per EPZ (2018)⁶⁸

EPZ	Barley Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	0	125	123	1 313	0	0
Total in a Segment	0	0	0	125	123	1 313	0	0

There are 9 commercial chicken production facilities (broilers and hatcheries) located between 5 km and 16 km in the northeast and east-northeast segments (Planning Partners, 2021). Therefore, a large number of chickens are present in the UPZ (refer to **Table 5.5.42**) and a large number of eggs are also produced (refer to **Table 5.5.43** and **Drawing 5.5.7**) (Planning Partners, 2020c).

⁶⁷ (Planning Partners, 2020c)

⁶⁸ (Planning Partners, 2020c)

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Table 5.5.42
Chickens per EPZ (2018)⁶⁹

EPZ	Number of Chickens in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	4 655 000	2 600 000	0	0	0	0
Total in a Segment	0	0	4 655 000	2 600 000	0	0	0	0

Table 5.5.43
Egg Production per EPZ (2018)⁷⁰

EPZ	Number of Eggs Produced in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	77 584 896	0	0	0	0	0
Total in a Segment	0	0	77 584 896	0	0	0	0	0

Limited sheep farming occurs within this zone and is focused within the 5 km to 16 km UPZ in the east-northeast to southeast segments (refer to **Table 5.5.44** and **Drawing 5.5.7**). Wool is also produced in the same annuli where sheep occur, but the volumes are minor (refer to **Table 5.5.45**) (Planning Partners, 2020c).

⁶⁹ (Planning Partners, 2020c)

⁷⁰ (Planning Partners, 2020c)

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Table 5.5.44
Sheep per EPZ (2018)⁷¹

EPZ	Number of Sheep in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	0	507	4 322	1 313	381	0
Total in a Segment	0	0	0	507	4 322	1 313	381	0

Table 5.5.45
Wool Production per EPZ (2018)⁷²

EPZ	Wool Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	0	2	12	7	1	0
Total in a Segment	0	0	0	2	12	7	1	0

Pig farming is relatively insignificant within this zone and is largely focused within the 5 km to 16 km east sector (refer to **Table 5.5.46** and **Drawing 5.5.7**).

⁷¹ (Planning Partners, 2020c)

⁷² (Planning Partners, 2020c)

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Table 5.5.46
Pigs per EPZ (2018)⁷³

EPZ	Number of Sheep in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	18	0	712	38	0	0
Total in a Segment	0	0	18	0	712	38	0	0

Limited numbers of commercial game occur within this zone (refer to **Table 5.5.47**), with only 10 ostriches and 40 wild buck being kept on two farming units (Planning Partners, 2020c). In addition, the KNPS Environmental Surveillance Laboratory recorded two farms within an 8 km radius that contained 140 and 50 ostriches, respectively, in 2018. These ostriches were recorded as for 'own use'. Another farm had 15 ostriches which were sold to Oudtshoorn (Eskom, 2018).

Table 5.5.47
Game per EPZ (2018)⁷⁴

EPZ	Number of Sheep in a Sector							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	10	0	5	6	21	8
Total in a Segment	0	0	10	0	5	6	21	8

Table 5.5.48 illustrates that leaf vegetable production is insignificant within the PAZ and UPZ (Planning Partners, 2020c).

⁷³ (Planning Partners, 2020c)

⁷⁴ (Planning Partners, 2020c)

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Table 5.5.48
Leaf Vegetable Production per EPZ (2018)⁷⁵

EPZ	Leaf Vegetable Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	316	18	0	0	0	0
Total in a Segment	0	0	316	18	0	0	0	0

Fruit produced in the site vicinity includes grapes (refer to [Table 5.5.49](#)) and olives (refer to [Table 5.5.50](#)). It is evident that fruit farming only occurs in the sectors between 5 km and 16 km east-northeast to east-southeast (Planning Partners, 2020c).

Table 5.5.49
Fruit Production per EPZ (2018)⁷⁶

EPZ	Fruit Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	0	274	2 011	1 825	0	0
Total in a Segment	0	0	0	274	2 011	1 825	0	0

⁷⁵ (Planning Partners, 2020c)

⁷⁶ (Planning Partners, 2020c)

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Table 5.5.50
Olive Production per EPZ (2018)⁷⁷

EPZ	Olive Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	14	47	0	94	0	0
Total in a Segment	0	0	14	47	0	94	0	0

Honey is produced beyond the 5 km radius throughout the northeast to east-southeast segments (refer to [Table 5.5.51](#) and [Drawing 5.5.7](#)) (Planning Partners, 2020c).

Table 5.5.51
Honey Production per EPZ (2018)⁷⁸

EPZ	Honey Production in a Sector (t)							
	N	NNE	NE	ENE	E	ESE	SE	SSE
0 to 5	0	0	0	0	0	0	0	0
5 to 16	0	0	1 103	0	65	188	0	0
Total in a Segment	0	0	1 103	0	65	188	0	0

[Table 5.5.52](#) provides a summary of the agricultural production within the site PAZ and UPZ.

⁷⁷ (Planning Partners, 2020c)

⁷⁸ (Planning Partners, 2020c)

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Table 5.5.52
Summary of Agricultural Production per EPZ: Crops and Livestock
(2018)⁷⁹

EPZ	Cattle	Dairy Cows	Milk	Fodder	Wheat	Barley	Chickens	Eggs
	(Number)	(Number)	(10 ³ ℓ)	(t)	(t)	(t)	(Number)	(Number)
0 to 5 km	0	0	0	0	0	0	0	0
5 to 16 km	2 998	3 655	10 239	24 015	16 452	1 561	7 255 000	77 584 896
Total	2 998	3 655	10 239	24 015	16 452	1 561	7 255 000	77 584 896
EPZ	Sheep	Wool	Pigs	Game	Leaf Vegetables	Fruit	Olives	Honey
	(Number)	(t)	(Number)	(Number)	(t)	(t)	(t)	(kg)
0 to 5 km	0	0	0	0	0	0	0	0
5 to 16 km	6 523	22	768	50	334	4 110	155	1 356
Total	6 523	22	768	50	334	4 110	155	1 356

5.5.7.5 Agricultural Produce Collection, Processing and Distribution (80 km)

Based on the data recorded in connection with agricultural collection, processing and distribution facilities (Planning Partners, 2021), the distribution of these facilities were analysed per sector in terms of the site EPZs. The EPZs were superimposed on the 5 km 22.5° sectoral grid and agricultural collection, processing and the distribution facilities per sector was determined. This analysis is illustrated in **Drawing 5.5.3**.

⁷⁹ (Planning Partners, 2020c)

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0 km to 5 km EPZ (PAZ)

There are no facilities recorded within the PAZ for the collection, processing or distribution of agricultural produce (Planning Partners, 2021). No products are therefore exported out of the PAZ.

5 km to 16 km EPZ (UPZ)

The analysis of agricultural collection, processing and distribution facilities identified three dairies and one cheese factory within this zone, as well as six chicken broilers and three chicken hatcheries. The analysis also identified two processing and packaging facilities associated with grain, as well as one animal feed production facility (also grain related). One combined wine and olive cellar, as well as one other winery was identified within this zone. One fruit processing facility was also identified within the UPZ (refer to **Drawing 5.5.3**) (Planning Partners, 2021).

16 km to 80 km EPZ (LPZ)

Viticulture, dairy and chickens are the dominant types of agricultural collection, processing and distribution facilities in the site region (Planning Partners, 2021).

All of the main wine farms within the Stellenbosch; Franschhoek; Paarl; Wellington and Malmesbury areas have a winery on the farm where the grapes are grown. Also, Paarl and Stellenbosch have major wineries located within the urban areas (Planning Partners, 2021).

Most milk produced within the area of 16 km to 80 km of the site is distributed to the dairies within the same zone due to the costs of transporting milk. Tankers from these dairies collect milk from the farms and transport it directly to the dairies. The largest dairies are located within Cape Town; Darling; Stellenbosch and Paarl, as well as on the large dairy farms (Planning Partners, 2021).

Chicken and egg production is distributed throughout the rural areas surrounding the towns of Atlantis; Philadelphia; Paarl and Wellington, as well as on the periphery of Cape Town near Fisantekraal (Planning Partners, 2021).

The major wheat silos within this zone are located within the CMA; Malmesbury; Paarl and outside Hopefield (Planning Partners, 2021).

The main abattoirs within this zone are located close to Hermon, Paarl, Malmesbury and Grabouw (Planning Partners, 2021).

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The concentration of fruit collection, processing and distribution facilities is closely associated with the areas where the specific fruit is produced. Grabouw has large processing facilities for deciduous fruit and Wellington for dried fruit. Other clusters where fruit is collected occur around Paarl and Wolseley (Planning Partners, 2021). Vegetables are not grown in great quantities in the site region (Planning Partners, 2020d), however there are numerous vegetable processing and distribution facilities in the site region, particularly within the CMA (Planning Partners, 2021). Large amounts of fruit produced in the site region are also exported out of the Port of Cape Town (Planning Partners, 2021).

The distribution of fish processing establishments associated with the commercial marine fishing industry is described in **Section 5.6**. These are predominantly located in Cape Town. There are a small number of aquaculture farms distributed throughout the rural areas of the site region (Planning Partners, 2021).

The analysis indicated that there are a significant number of activities associated with agricultural production in the site region. The collection, processing and distribution centres for agricultural produce represent locations where contaminated food products produced in the site region could be present and enter the food chain. Emergency planning measures will therefore require ongoing monitoring of these centres and their activities.

5.5.7.6 Water Use (80 km)

0 km to 5 km EPZ (PAZ)

The only urban development within the PAZ is a portion of the residential suburb of Duynfontein. The CCT MSDF (City of Cape Town, 2023a) indicates restricted development within this zone and therefore no future municipal water infrastructure is planned within the PAZ. The only expected future water infrastructure will be that of the proposed nuclear installation(s).

Fresh water supply for the operation of the nuclear installation(s) and supporting functions is dealt with in **Section 5.12**.

5 km to 16 km EPZ (UPZ)

Water uses within the UPZ consist of groundwater used for irrigation on farms and for drinking water for animals and humans on these farms, as

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well as potable water for Atlantis (Planning Partners, 2020f). Potable water supplied by the CCT and augmented from the Voëlvlei Dam to Philadelphia; Duynefontein; Melkbosstrand and the northern portion of Bloubergstrand, is also pertinent (Planning Partners, 2020f).

Water for irrigation purposes originates from groundwater sources and the WCWSS supply system (Planning Partners, 2020f). Since the agricultural activities within this zone are expected to remain constant or decrease due to the conservation efforts within this area, water consumption for irrigation purposes is expected to also remain constant or decrease within the UPZ.

Potable water for the settlements within this EPZ originates from groundwater sources at Atlantis and the major dams located outside of this EPZ. Water is treated at the WTW located at either the water source or within these settlements and distributed to individual users (Planning Partners, 2020f). Refer to **Drawing 5.5.5** for the location of these water sources and WTW.

16 km to 80 km EPZ (LPZ)

The vast majority of the rural agricultural area beyond 16 km receives water from groundwater sources and the main rivers (e.g. Berg River) for the irrigation on farms and drinking water for animals and humans on these farms. The farming area surrounding Grabouw receives its water from Eikenhof Dam via the Groenland Water User Association infrastructure, while the Theewaterskloof Dam also supplies water to agricultural areas (Planning Partners, 2020f).

Potable water for the settlements within the LPZ predominantly originates from the major dams located within the site region servicing the WCWSS, with other water sourced from the Swartland Regional Water Supply Scheme; the Withoogte Regional Water Supply Scheme and other minor municipal-owned water schemes (refer to **Subsection 5.5.5.3**) (Planning Partners, 2020f). Groundwater sources, including the Atlantis Aquifer and the Table Mountain Group Aquifer, are also used to supply potable water (Planning Partners, 2020g). Water is treated at the WTW located either at the water source or within these settlements and distributed to individual users. Refer to **Drawing 5.5.5** for the location of these water sources and WTW.

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5.5.8 Main Activities Relevant to Safety

5.5.8.1 Potential Effects of the Nuclear Installation(s) on Land Use

The site is located on the coast within a region that is dominated by natural areas, conservation efforts and agricultural activity. The CMA is the dominant urban settlement and is located in the south, south-southeast and southeast segments. Other urban settlements include coastal towns and rural settlements associated with intensive cultivation of crops and livestock. Cape Town and Atlantis are the focus for industrial activities. Indications are that land use in the site region is stable, with the focus on agriculture and conservation, with restricted physical expansion of existing urban settlements. Urban development is encouraged to occur through redevelopment and densification within the existing urban areas, with all municipalities except the CCT making use of 'urban edge' as a spatial planning tool. It is unlikely that the location of the nuclear installation(s) at the site would have an additional restricting effect on development from a regional perspective, due to the existing KNPS's 5 km and 16 km restriction zones, with measures to restrict development within these zones already included in the CCT MSDF (City of Cape Town, 2023a) and included in the Development Management Scheme of the CCT's Municipal Planning By-Law (2019) (City of Cape Town, 2019a). The EPZs for the proposed nuclear installation(s) will be bounded by the KNPS EPZs. The 16 km UPZ is therefore adequate to manage land and water use for the proposed nuclear installation(s).

In order for the regulatory practices of the NNR to provide for the effective control of persons, property and the environment, it is essential to ensure that the safety and other requirements imposed on (see **Subsection 5.5.3**) and the needs of the nuclear installation(s) be considered and accommodated within the SDFs. At the revising of SDFs, Eskom and the NNR would need to be afforded the opportunity to provide input into this process before SDFs are approved by the relevant authorities.

The evaluation of the land and water use for this section showed that regulatory guidance and/or monitoring will be required to further control and manage the development of land and water resources within the formal EPZs surrounding the proposed nuclear installation(s). Such guidance will need to be developed in consultation with the relevant provincial and/or municipal authorities as provided for by regulations (National Nuclear Regulator, 2016). This will ensure that future changes in land and water use within the EPZs would not give rise to activities that may become an external hazard to the nuclear installation(s) (e.g. a

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restriction on the location of hazardous industries or other industries that may have a detrimental impact on emergency planning) or that may expose the public and the environment to undue risk from the nuclear installation(s).

Given the proximity of the settlements of Duynefontein; Melkbosstrand and Atlantis, consideration must be given to creating regulations in the 16 km UPZ. In this regard, the following steps are necessary:

- restrict the potential for urban expansion of Duynefontein; Melkbosstrand and Atlantis;
- limit the extent and scale of services and facilities;
- require that all proposals to rezone agricultural land or to facilitate institutional uses (i.e. significant land use changes) be referred to Eskom for comment prior to decisions being made by the local, district or provincial authorities.

In accordance with existing national nuclear regulations, Eskom will perform periodic reviews to assess the current and planned population distribution, the disaster management infrastructure and any new development.

5.5.9 Management of Uncertainties

5.5.9.1 Limited Information

The development of this section of the DSSR has been based on currently (2018) available and latest available information, pre and post 2018. At the same time, it was not always possible to obtain complete information on all topics / aspects. Complete information on the following was not possible to obtain:

- Agricultural production data: During the agricultural production survey of farming units in the site vicinity (Planning Partners, 2020c) information could not be gathered for all farming units (e.g. it was either not possible to establish contact with landowners of these farming units or the farm owners were unwilling to provide information).
- Water use in the Breede-Gouritz WMA: Limited up-to-date information is available in connection with water usage (both community water use and irrigation water use) in the Breede-Gouritz WMA.

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- Fresh water recreational fishing: Information regarding freshwater subsistence and recreational fishing yields in the site region is not known or regulated.
- Potable water consumption data: Water consumption data for the urban settlements in the site region differ in level of detail due to the different municipalities in the site region. The total water use of each consumption category (domestic, industrial or agriculture) could therefore not be determined.

5.5.9.2 Uncertain Information in Respect to Climate Change

Climate change projections are based on probable future outcomes and are therefore associated with uncertainties. These uncertainties arise due to incomplete knowledge that results from a lack of information and/or from disagreement about what is known or even knowable. It has many sources ranging from quantifiable errors in the data to ambiguously defined concepts or terminology to uncertain projections of human behaviour.

5.5.9.3 Approaches to their Management

The following approaches were adopted with respect to the following limited and/or uncertain information data sets:

Agricultural Production Data

In instances where information could not be obtained, the Department of Agriculture's Farm Mapper interactive website (Department of Agriculture, Forestry and Fisheries, Western Cape, 2020) was used to determine both the summer and winter crop types and hectareage of agricultural activity occurring on these particular farms for the year 2017/2018. An estimated calculation of the agricultural crop yield was then carried out according to surrounding farm production figures. To estimate the number of livestock on each of these land units, the previous 2007/2008 data were used (Planning Partners, 2011). Furthermore, the land use survey conducted during 2020 informed the agricultural survey and is used to confirm which farms are found to be agricultural inactive, e.g. identified as 'fallow land'; 'shrubland'; 'urban built-up'; etc. (Berry, 2020).

The estimation undertaken is not considered to be significant, as no additional agricultural products were identified (in relation to those already confirmed to be farmed in the site vicinity). Emergency planning

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measures should therefore not be affected, as they would apply equally to all farming units and the uncertainty does not affect the overall results and conclusions reflected in this section.

A database of farming units, including ownership information, was compiled as part of this section (**Planning Partners, 2020c**), which should be updated with each review. Measures could be put in place whereby farmers submit data to Eskom on a regular basis to facilitate the data gathering process.

Water Use in the Breede-Gouritz WMA

Only a very small part of the site region falls within the area that is serviced by the Breede-Gouritz WMA, with the vast majority of the site region falling within the Berg-Oliphants WMA (more specifically the Berg River Catchment Area within the Berg-Oliphants WMA, which encompasses water supplied by the WCWSS). Therefore the limited information pertaining to the Breede-Gouritz WMA is not considered significant.

In the absence of site-specific habit survey data or the availability of an extensive survey being conducted to determine subsistence and recreational freshwater fishing yields, a conservative approach is adopted in the evaluation of the potential impact on the public and the environment. Generic internationally accepted intake rates are applied for both recreational and subsistence fishing activities in the evaluation conducted as part of **Chapter 7**. The uncertainty therefore does not affect the overall results and conclusions reflected in this section.

Potable Water Consumption Data

Data obtained on water consumption for the major urban settlements in the site region differed in level of detail. This is due to the fact that the different municipalities in the site region have different consumption data management systems. However, the CCT, which is the main water user in the site region, provided sufficient data for each consumption category. The level of detail is therefore considered sufficient for this section.

Climate Change

Although the science on the impacts of climate change on land and water use is climate constantly evolving, current projections indicate that climate change may have a significant impact on agricultural production (e.g. lower productivity levels and loss of harvest) within the site region in the future. These impacts therefore need to be continuously monitored

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in relation to the site region and reported on in subsequent reviews and updates of the DSSR.

5.5.10 Monitoring

Monitoring Prior to Nuclear Installation(s) Construction and Operation

The results of the land and water use analysis that was presented in this section are planned to be reviewed periodically by Eskom.

5.5.10.1 Monitoring During Nuclear Installation(s) Construction and Operation

During the nuclear installation(s) lifetime, data presented in this section should be reviewed and updated periodically, in order to identify any trends in land and water use (including the impacts of climate change), and agricultural production and processing that may require additional controls to be put in place or may require the revision of the emergency plan. The reason for not specifying exact dates are due to uncertainties in the construction, operation and decommissioning time spans. It will be sufficiently clarified during future updates of this DSSR. Given the fact that the site region contains a major agricultural component, monitoring of agricultural produce should be considered as part of the emergency plan.

Monitoring is also required in order to ensure that timely intervention by Eskom will occur, both where an activity poses a potential threat to the nuclear installation(s) and where the nuclear installation(s) may pose an increased risk to the safety of the public and the environment. More specifically, agricultural products produced and processed in the site region are also exported nationally and internationally and the potential for exposure to an extended public therefore exists.

Eskom has an existing monitoring programme in place for the KNPS which is in operation on the site. The monitoring programme included a pre-operational phase environmental surveillance programme from 1979 to 1981. An operational phase environmental surveillance programme followed in 1981 and is currently in place and is reviewed annually.

The environmental surveillance programme includes terrestrial, marine and direct radiation monitoring, directed at measuring the effect of the operation of KNPS on the public and environment (Eskom, 2018). The results of the monitoring programme are reported on in accordance with the Eskom Generation Standard: GGS-1309, Rev. 1 Radiation

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Protection: Environmental Surveillance (Eskom, 2018).

Samples are collected from indicator and control sites, as illustrated in **Figures 5.5.18** to **5.5.20**. Note that the centre point illustrated in the figure corresponds with the site centroid applied for the purpose of analysing data in this subsection.

Additional samples are collected throughout the year and form part of a supplementary sampling programme, which has recently been initiated to enhance the current environmental surveillance programme (Eskom, 2018).

The programme consists of the following:

- terrestrial monitoring: air particle and air iodine; broad leaf vegetation; food products; leafy vegetables; milk; root vegetable; sewage effluent; sewage sludge; a non-routine sewage sludge monitoring programme; soil; surface fresh water and waste facility (liquid);
- marine monitoring: abalone; black mussel; crayfish; fish; kelp; sea sediment; sea water and white mussel;
- direct radiation monitoring by thermoluminescent dosimeters (TLDs), as illustrated in **Figures 5.5.18** and **5.5.19**.

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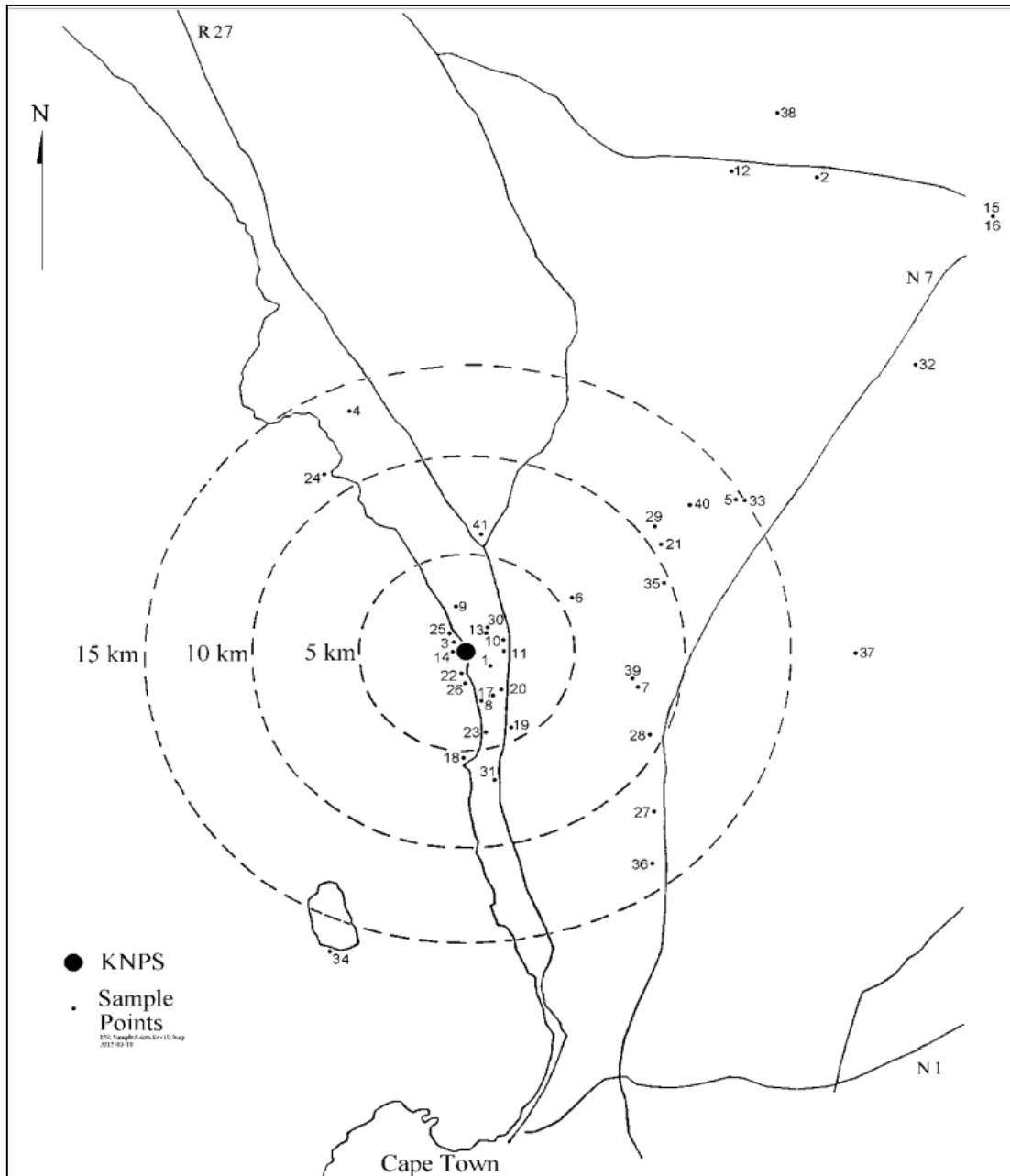


Figure 5.5.18
Map of Sampling Locations⁸⁰

⁸⁰ (Eskom, 2018)

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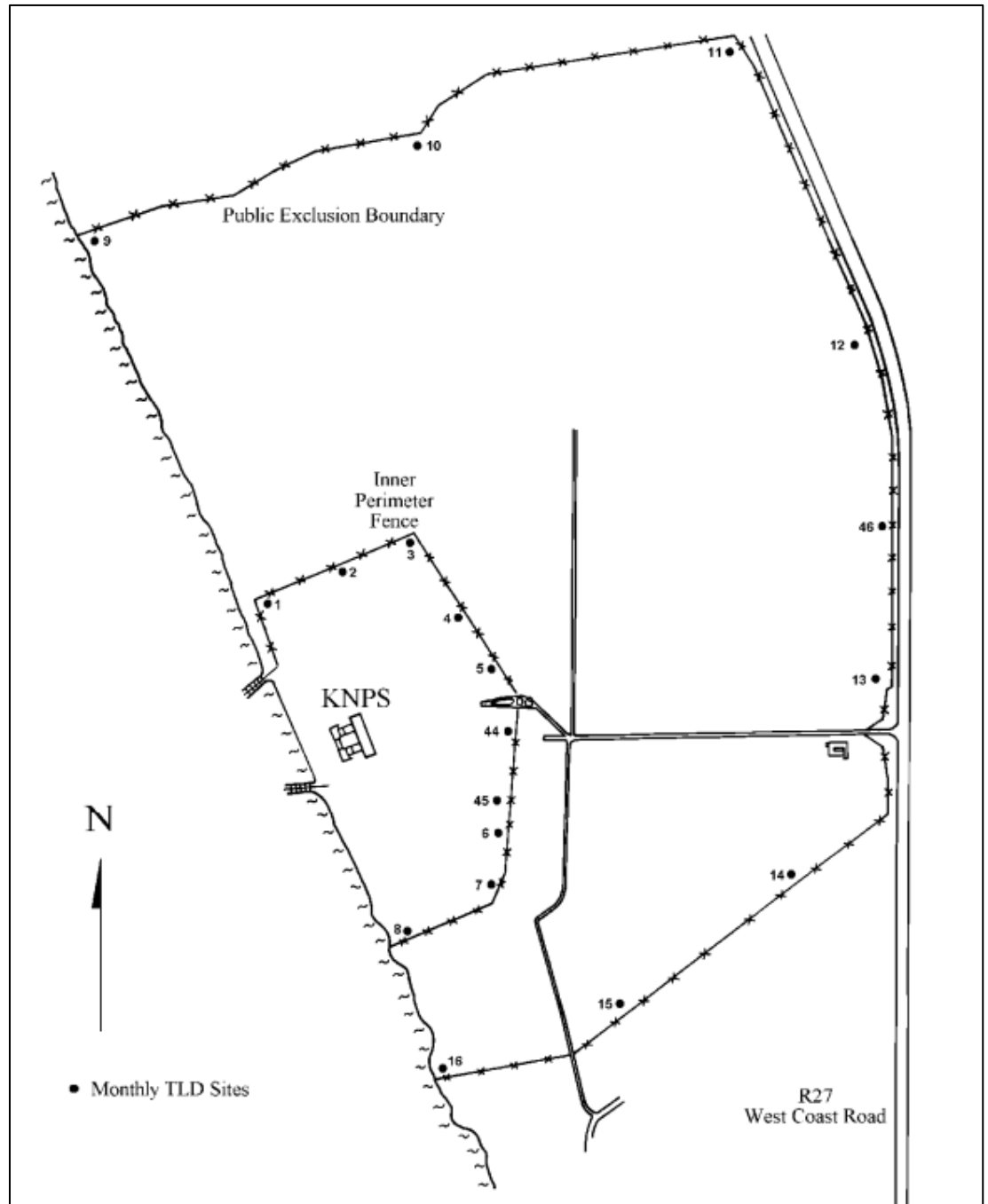


Figure 5.5.19
Map of TLD Locations (3 km Radius)⁸¹

⁸¹ (Eskom, 2018)

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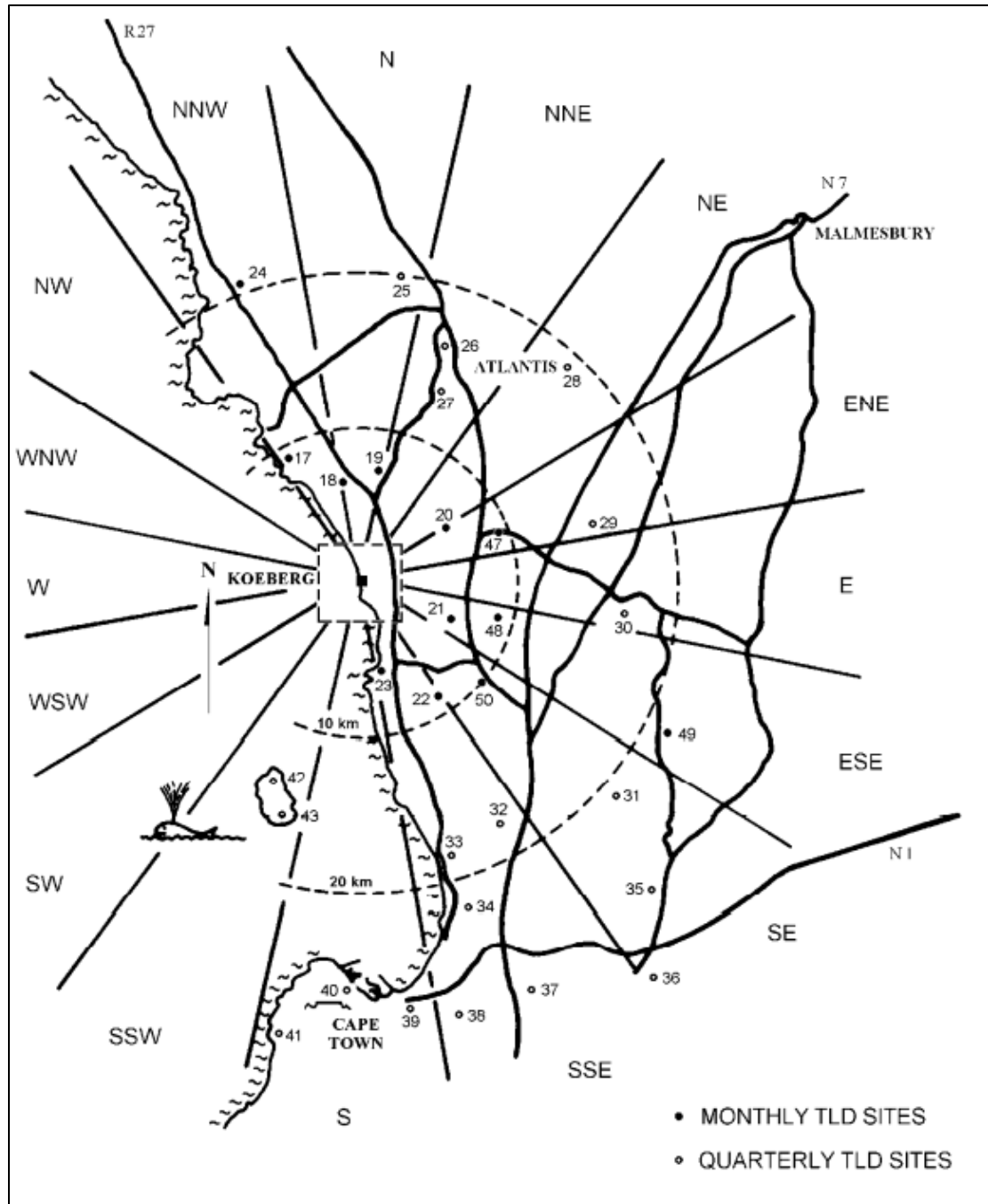


Figure 5.5.20
Map of TLD Locations (30 km Radius)⁸²

In accordance with this monitoring system, the results of the monitoring

⁸² (Eskom, 2018)

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programme are analysed, corrective actions are taken, additional monitoring activities are implemented and the potential effects of any operational incident at the KNPS is evaluated and reported on (**Eskom, 2018**).

5.5.10.2 Monitoring After Nuclear Installation(s) Operation and Decommissioning

The need for continued monitoring of land use, water use and agricultural produce will be determined in terms of **Chapter 7**.

5.5.11 Management System

As required by the SSR Technical Specification (Eskom, 2022b), the assessment and evaluation of present and future land and water use around the site entailed the following components:

- desktop study;
- site investigations;
- receipt/use of data from other DSSR investigations;
- data analysis and reporting;
- use of computer software in particular *Microsoft Excel* sheets and GIS for collating, interpretation and presentation of data;
- mapping and creation of a GIS database and data management system.

A quality assurance programme for land and water use evaluation was established to control the effectiveness of the execution of the site investigation and data analysis. This conforms to the overall management system for this DSSR, as set out in **Chapter 10** and the Eskom guidelines, i.e. to the appropriate grading for safety classification in terms of the NNR's RD-0034 (National Nuclear Regulator, 2008) and Eskom's NSIP02189 (Eskom, 2021) classification procedure. The evaluation of land and water use of a nuclear installation site has been determined as Safety Level 3, Safety Qualification 3. The details of the management system are set out in **Chapter 10**.

The activities carried out as part of the evaluation of the site and the results achieved are presented and described in this section. The databases are referenced in this section and form part of the GIS

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database that has been developed for this section. The results of the analysis are presented in the tables and in the drawings prepared for this section.

The following documents were compiled by the consultant and accepted by Eskom to assist in quality assurance and to present a clear and auditable trail showing how key decisions were made and conclusions reached:

- SRK's Integrated Quality Management System and associated Work Instructions;
- the project-specific Project Quality Plan;
- Method Statement;
- Quality Control Plans;
- Project Process Chart.

The land and water use site characterisation has followed a peer review process to ensure that the work is carried out using standard industry methodologies and approaches. The peer review was carried out by a suitably qualified, independent and experienced professional, accepted by Eskom. Quality assurance is therefore demonstrated through the preparation of:

- process map containing reference to various data files;
- peer review reports.

Electronic records have been stored in a secure central repository with regular off-site back-up procedures and subject to Eskom's approval. The overall quality system complies with that set out in **Chapter 10**. All references cited are saved in the central repository.

Table 5.5.52 lists the activities to be carried out as part of the land and water use evaluation, links to other DSSR chapters/sections and the relevant quality control requirements.

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Table 5.5.53
Summary of Activities, Links and Quality Requirements

Activity	Links		Quality Control Requirements
	Inputs	Outputs	
Land cover analysis	<u>Section 5.1</u> (Geography): Determination of the site centroid. <u>Chapter 8:</u> Determination of the EPZs.	<u>Section 5.7</u> (Nearby Transportation, Industrial and Military Facilities); <u>Chapter 6</u> (Evaluation of External Events), <u>Chapter 7</u> and <u>Chapter 8:</u> Provide information on existing land use. It is used to identify and validate potential sources of external hazards and the identification of potential risk to the population and the environment and informs the feasibility of the emergency plan.	• Method statement; • GIS application and analysis; • Graphical and tabulated presentation illustrating land cover in area and percentage distribution per sector for the site region; • Officially accepted national database; • Peer review.
Agricultural collection, processing and distribution		<u>Chapter 8:</u> Information used in the identification of potential risk to the population and the environment and the feasibility of the emergency plan.	• Method Statement; • Surveys and site verification; • GIS application and analysis; • Graphical and tabulated presentation illustrating agricultural collection, processing and distribution facilities per category per sector for the site region; • Peer review.

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Activity	Links		Quality Control Requirements
	Inputs	Outputs	
Current land and water use analysis	<u>Section 5.3</u> (Ecology) and <u>Section 5.12</u>: Information obtained from hydrologist and ecologist as a key input in the site land and water use description. <u>Chapter 8</u>: Determination of the EPZs. Eskom site investigations.	<u>Section 5.4 (Demography)</u>; <u>Section 5.7</u>; <u>Chapter 7</u> and <u>Chapter 8</u>: Information on existing land use is used to identify potential sources of external hazards and the identification of potential risk to the public and the environment and to inform the feasibility of the emergency plan.	• Method Statement; • Aerial photography, site survey and land use mapping; • GIS application and analysis; • Graphical and tabulated presentation illustrating land and water use in area and percentage distribution per sector per land use category for the site vicinity; • Water use per sector (domestic, industrial and commercial) from municipal records; • Peer review.
Agricultural production survey	<u>Chapter 8</u>: Determination of the EPZs.	<u>Chapter 7</u> and <u>Chapter 8</u>: Information on agricultural produce is used to identify potential radiological exposure pathways and to inform the feasibility of the emergency plan.	• Method Statement; • Telephonic survey; • GIS application and analysis; • Graphical and tabulated presentation illustrating agricultural produce as a total per category per sector for the site vicinity; • Peer review.

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Activity	Links		Quality Control Requirements
	Inputs	Outputs	
Emergency Planning Zones	Chapter 8: Determination of the EPZs.	Chapter 8: Input to the evaluation of the feasibility of the emergency planning and the control and monitoring of water and land use development in the formal EPZs.	• Method Statement; • Peer review.

Table 5.5.53 provides a summary table demonstrating compliance with the regulatory requirements that need to be met, as set out in **Subsection 5.5.3**.

Table 5.5.54
Regulatory Compliance Matrix

Act/Regulation	Regulation	Issue	Section Where Covered
Regulations on Siting (Department of Energy, 2011)	3(5)(c)(e)(f)	Site specific data on land use, regional development and projections.	<u>Subsections 5.5.5, 5.5.6 and 5.5.7</u>
	3(7)	Emergency Planning Zones.	<u>Subsections 5.5.4.1, 5.5.4.4 and 5.5.7</u>
Regulatory Guide: Interim Guidance for the Siting of Nuclear Facilities, RG 011 (National Nuclear Regulator, 2016)	7.1	The foreseeable significant changes in land use, such as expansion of existing facilities and human activities or the construction of high-risk installations.	<u>Subsections 5.5.5.1, 5.5.5.4, 5.5.5.5, 5.5.6.1, 5.5.6.4 and 5.5.7</u>
	8.2(1)	Characterisation of land and water use in the site region.	<u>Subsections 5.5.4.1 and 5.5.5</u>
	8.2(2)	Land and bodies of water that may be used by the population or may serve as a habitat for organisms in the food chain.	<u>Subsections 5.5.2, 5.5.3, 5.5.6, 5.5.6.2, 5.5.6.3 and 5.5.7</u>
	8.2(3)(a)	Land devoted to agricultural uses, its extent, and the main crops and their yields.	<u>Subsections 5.5.5.1, 5.5.6.1 and 5.5.7</u>
	8.2(3)(b)	Land devoted to dairy farming, its extent and yields.	
	8.2(3)(c)	Land devoted to industrial, institutional and recreational	<u>Subsections 5.5.5.1, 5.5.6.1 and 5.5.7</u>

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Act/Regulation	Regulation	Issue	Section Where Covered
		purposes, its extent and the characteristics of its use.	
	8.2(3)(d)	Bodies of water used for commercial, individual and recreational fishing, including details of the aquatic species fished, their abundance and yield.	<u>Subsections 5.5.5.3 and 5.5.6.3</u>
	8.2(3)(e)	Bodies of water used for commercial purposes, including navigation, community water supply, irrigation and recreational purposes such as bathing and sailing.	
	8.2(3)(f)	Land and bodies of water supporting wildlife and livestock.	
	8.2(3)(g)	Direct and indirect pathways for potential radioactive contamination of the food chain.	<u>Subsections 5.5.5.1, 5.5.6.1 and 5.5.7</u>
	8.2(3)(h)	Products imported to or exported from the region which may form part of the food chain.	
	8.2(3)(i)	Free foods such as mushrooms, berries and seaweed.	<u>Subsection 5.5.5.1</u>
	8.2(4)	Present use of water in the site region, as well as scope for future change in water use.	<u>Subsections 5.5.5.3, 5.5.5.4, 5.5.5.5 and 5.5.7</u>
	8.2(5)(b)	Types of water use both present and projected (life of facility)	
	8.2(5)(e)	Descriptions of the nature and extent of projected land use.	<u>Subsections 5.5.5.1, 5.5.6.1 and 5.5.7</u>
	8.2.5(f)	The location of any other nuclear and/or radiological facilities located or proposed within the vicinity of the site.	<u>Subsections 5.5.6.4 and 5.5.7</u>
	8.2(6)	Recent agricultural production data and predictions for future production	<u>Subsections 5.5.5.1, 5.5.6.1 and 5.5.7</u>
	8.4.2(2)(e)	Information on past, current and anticipated future water uses	<u>Subsections 5.5.5.3, 5.5.5.4, 5.5.5.5 and 5.5.7</u>
	8.6.1(d)	Locations and amount of water used for consumption, industrial, agricultural and recreational purposes.	<u>Subsection 5.5.5.3</u>

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Act/Regulation	Regulation	Issue	Section Where Covered
	9.1.(4)(g)	Agricultural activities that are sensitive to possible discharges of radionuclides	<u>Subsections 5.5.5.1 and 5.5.6.1</u>

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Appendix 5.5.A

Annular Land Cover in the Site Region in Hectares and Percentage

The land cover distribution is summarised in 10 km bands/annuli extending from the site up to the 80 km radius. The information was obtained from the 2018 South African National Land Cover (**Department of Environmental Affairs, 2019**).

		Distance Band (km)								
Land Cover Category	Area	0 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Total
Barren land	Ha	736.10	580.01	525.33	756.26	1 631.55	2 101.88	6 677.29	5 136.02	18 144.46
	%	4.15	1.21	0.58	0.55	0.95	1.17	3.23	2.14	1.66
Built-up commercial	Ha	19.66	143.03	846.92	917.90	804.53	229.00	117.98	41.48	3 120.49
	%	0.11	0.30	0.94	0.67	0.47	0.13	0.06	0.02	0.29
Built-up industrial	Ha	76.21	172.57	974.91	1 394.24	323.12	239.09	112.97	60.72	3 353.85
	%	0.43	0.36	1.08	1.02	0.19	0.13	0.05	0.03	0.31
Built-up residential (all)	Ha	547.16	2 820.40	10 327.69	19 716.05	14 311.11	8 257.35	3 452.81	3 176.76	62 609.32
	%	3.09	5.86	11.45	14.43	8.36	4.60	1.67	1.32	5.74
Built-up smallholdings	Ha	2.17	151.17	240.86	1 686.81	1 255.81	725.73	713.68	395.82	5 172.06
	%	0.01	0.31	0.27	1.23	0.73	0.40	0.34	0.16	0.47
Cultivated commercial annual pivot irrigated	Ha	0.00	66.52	1515.61	540.49	297.37	710.84	376.47	1 655.51	5 162.82
	%	0.00	0.14	1.68	0.40	0.17	0.40	0.18	0.69	0.47
Cultivated commercial annual non-pivot	Ha	3 310.34	12 458.55	32 397.25	45 439.92	72 622.35	66 577.73	59 945.83	60 235.59	352 987.56
	%	18.68	25.89	35.91	33.25	42.42	37.10	28.96	25.10	32.38
Cultivated commercial permanent orchards	Ha	0.00	130.66	173.41	996.82	2 452.54	3 717.81	1132.59	10 126.96	18 730.79
	%	0.00	0.27	0.19	0.73	1.43	2.07	0.55	4.22	1.72
Cultivated commercial permanent vines	Ha	0.00	731.16	3 744.82	10 965.53	15 628.88	11 575.61	2 011.56	8 933.56	53 591.12
	%	0.00	1.52	4.15	8.02	9.13	6.45	0.97	3.72	4.92
Cultivated subsistence	Ha	0.00	0.00	0.00	0.00	0.00	0.00	18.62	24.23	42.85
	%	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00
Eroded land	Ha	0.00	0.00	0.00	0.00	72.32	63.84	46.31	28.71	211.19
	%	0.00	0.00	0.00	0.00	0.04	0.04	0.02	0.01	0.02
Grasslands	Ha	291.78	1 057.69	3 161.47	3 753.01	4 588.81	6 288.89	13 252.12	12 930.36	45 324.14
	%	1.65	2.20	3.50	2.75	2.68	3.50	6.40	5.39	4.16
Indigenous forest	Ha	0.00	0.00	0.00	297.85	110.97	8.38	93.07	95.02	605.29
	%	0.00	0.00	0.00	0.22	0.06	0.00	0.04	0.04	0.06
Mines	Ha	90.31	267.88	161.59	138.97	521.33	324.31	6.85	111.43	1 622.68
	%	0.51	0.56	0.18	0.10	0.30	0.18	0.00	0.05	0.15
Natural wooded land	Ha	575.32	949.00	2 476.10	3 480.24	6 893.18	6 502.82	5 740.55	5 959.77	32 576.98
	%	3.25	1.97	2.74	2.55	4.03	3.62	2.77	2.48	2.99
Planted forest	Ha	116.80	372.29	603.64	868.97	2 816.74	3 790.09	2 016.39	4 786.20	15 371.11
	%	0.66	0.77	0.67	0.64	1.65	2.11	0.97	1.99	1.41
Shrubland	Ha	11 562.07	26 895.72	30 080.78	41 356.60	39 933.02	61 887.72	103 021.51	117 050.04	431 787.47
	%	65.23	55.90	33.34	30.26	23.33	34.49	49.78	48.78	39.60

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		Distance Band (km)								
Land Cover Category	Area	0 to 10	10 to 20	20 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	Total
Thicket dense bush	Ha	10.38	91.14	187.98	1 224.61	1 238.86	2632.64	2 249.01	2 839.42	10 474.05
	%	0.06	0.19	0.21	0.90	0.72	1.47	1.09	1.18	0.96
Waterbodies	Ha	18.98	224.31	374.52	472.25	1 728.25	1 155.82	3 296.50	3 798,96	11 069.58
	%	0.11	0.47	0.42	0.35	1.01	0.64	1.59	1.58	1.02
Wetlands	Ha	367.51	1 000.98	2 430.37	2 669.36	3 965.47	2 647.45	2 687.35	2 549.18	18 317.66
	%	2.07	2.08	2.69	1.95	2.32	1.48	1.30	1.06	1.68
TOTAL	Ha	17 724.79	48 113.07	90 223.24	136 675.90	171 196.21	179 436.99	206 969.49	239 935.76	1 090 275.45

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Appendix 5.5.B

Agricultural Produce Collection, Processing and Distribution Facilities in the Site Region (80 km)

The location, distance and direction of agricultural collection, processing and distribution facilities within 80 km of the site are presented in the following **Tables 5.5.B.1** to **5.5.B.10** (Planning Partners, 2021).

Table 5.5.B.1
Chicken and Eggs

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
C1	Darling Fresh Chickens	Abattoir	33.52	N
C2	Tydstroom Poultry	Broiler	40.02	N
C3	Laywell Farms	Hatchery	41.58	N
C4	Seasons Find 525 CC	Abattoir	60.02	N
C5	Rainbow Farms	Broiler	65.03	N
C6	Bonny Bird Farms	Broiler	65.40	N
C7	Caledonia Plaas Golden York	Hatchery	70.94	N
C8	Rainbow Farms	Broiler	26.73	NNE
C9	Rondevie Nulaid	Hatchery	34.15	NNE
C10	Chalala Farm	Broiler	37.34	NNE
C11	Philadelphia Chick Breeders	Broiler	9.68	NE
C12	Pioneer Foods	Broiler	13.02	NE
C13	Zoutrivier Boerdery Pty Ltd	Broiler	13.00	NE
C14	Rainbow Farms	Broiler	14.53	NE
C15	Tydstroom Dassenberg Hatchery	Hatchery	12.90	NE
C16	Nooitgedacht Egg Farm	Hatchery	13.45	NE
C17	Dassenberg Broilers Pty Ltd	Broiler	12.49	NE
C18	Pioneer Foods	Broiler	13.37	NE
C19	Mynsar Eggs (Pty) Ltd	Hatchery	14.08	NE
C20	Rainbow Farms	Broiler	16.61	NE
C21	B20 County Fair	Broiler	22.73	NE
C22	Rainbow Bellville Hatchery	Hatchery	25.81	NE
C23	Rainbow Chicken Farm	Hatchery	28.59	NE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
C24	Bonny Bird Farms	Broiler	28.23	NE
C25	Rainbow Farms	Broiler	25.71	NE
C26	Pioneer Foods	Broiler	67.55	NE
C27	Bergsig Breeders	Broiler	71.80	NE
C28	Pioneer Foods	Broiler	71.37	NE
C29	Pioneer Foods	Hatchery	73.01	NE
C30	Klipvlei Broilers (Pty) Ltd	Broiler	17.93	ENE
C31	Tydstroom Poultry	Poultry	18.08	ENE
C32	Claudewil Broilers Pty Ltd	Broiler	17.21	ENE
C33	Astral Operations Ltd	Broiler	26.19	ENE
C34	Rodeo Esturie	Hatchery	26.47	ENE
C35	County Fair	Broiler	30.82	ENE
C36	LP Buhr Boerdery Bk	Broiler	30.26	ENE
C37	Amaqanda Farms	Hatchery	35.58	ENE
C38	Astral Operations Ltd	Broiler	32.17	ENE
C39	Rainbow Farms	Broiler	35.87	ENE
C40	County Fair Laying Farm	Hatchery	40.56	ENE
C41	Vredebest Plase	Broiler	44.19	ENE
C42	County Fair Soetendal Hatchery	Hatchery	58.11	ENE
C43	Limietrivier Boerdery	Broiler	62.87	ENE
C44	Paarl Poultry Farms	Broiler	58.86	ENE
C45	Belleveu Chix	Hatchery	59.24	ENE
C46	Pioneer Foods	Broiler	57.71	ENE
C47	Bellevue Hatchery Farm	Broiler	59.03	ENE
C48	Lelievlei Chickens (Pty) Ltd	Broiler	78.69	ENE
C49	Lelievlei Chickens (Pty) Ltd	Hatchery	78.38	ENE
C50	Impro Chickens (Pty) Ltd	Broiler	79.16	ENE
C51	Koplander	Broiler	25.46	E
C52	Blaauw Blomme Kloof Farm	Hatchery	32.05	E
C53	Sherwood Farm	Broiler	31.55	E
C54	Golden Yolk Eggs	Hatchery	36.93	E
C55	Uitsig Braai Kuikens	Broiler	36.57	E

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
C56	Golden Yolk Eggs Hazeley	Broiler	37.08	E
C57	Golden Yolk Eggs Hazeley	Hatchery	36.82	E
C58	County Fair - Astral Operations	Hatchery	42.08	E
C59	Paardeberg Eiers	Hatchery	38.84	E
C60	Dundarach Poultry Farm	Hatchery	37.64	E
C61	County Fair	Hatchery	45.83	E
C62	Astral Operations Ltd	Broiler	44.69	E
C63	County Fair - Astral Operations	Hatchery	43.46	E
C64	Bellvue	Hatchery	46.50	E
C65	Country Fair	Hatchery	44.19	E
C66	Pioneer Foods	Hatchery	45.21	E
C67	Windmeul Eierboere	Hatchery	52,37	E
C68	Ongegund Farm	Hatchery	53.04	E
C69	Rainbow Farms	Hatchery	50.05	E
C70	Rainbow Farms	Broiler	49.56	E
C71	Amstelhof Farm	Hatchery	59.04	E
C72	Koplande Plase Pty Ltd	Broiler	57.06	E
C73	Rosendal Poultry Farm	Hatchery	59.73	E
C74	Witte Else Boom Farm	Broiler	75.93	E
C75	Namchar	Hatchery	30.00	ESE
C76	Astral Operations Ltd	Broiler	30.96	ESE
C77	The Duck Farm	Abattoir	10.34	ESE
C78	County Fair	Hatchery	32.56	ESE
C79	County Fair Primary Processing	Abattoir	31.78	ESE
C80	Astral Operations Ltd	Hatchery	35.84	ESE
C81	Sunnyside Eggs	Hatchery	40.24	ESE
C82	Astral Operations Ltd	Broiler	40.31	ESE
C83	Craigmore Poultry Farm Pty Ltd	Broiler	36.60	ESE
C84	Craigmore Poultry Farm Pty Ltd	Hatchery	36.47	ESE
C85	County Fair	Abattoir	31.08	ESE
C86	Astral Operations Ltd	Hatchery	38.89	ESE
C87	Country Fair Hatchery	Hatchery	39.43	ESE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
C88	County Fair	Broiler	40.55	ESE
C89	County Fair	Hatchery	41.14	ESE
C90	County Fair	Broiler	37.16	ESE
C91	Astral Operations Ltd	Hatchery	41.35	ESE
C92	Astral Operations Ltd	Hatchery	37.76	ESE
C93	Zamdram Poultry	Hatchery	37.11	ESE
C94	Department of Agriculture Western Cape	Broiler	43.20	ESE
C95	Astral Operations Ltd	Broiler	42.34	ESE
C96	Paarl Poultry Farms	Broiler	45.79	ESE
C97	Eienkenhof Poultry Farm	Hatchery	44.70	ESE
C98	Country Fair	Hatchery	46.45	ESE
C99	Byways Poultry Farm Pty Ltd	Hatchery	46.29	ESE
C100	Le Bonheur Farm	Hatchery	53.12	ESE
C101	Rainbow Farms	Broiler	52.83	ESE
C102	Paarl Poultry Farms	Broiler	49.81	ESE
C103	Astral Operations Ltd	Broiler	48.14	ESE
C104	Elkana Trust Poultry Farm	Broiler	55.56	ESE
C105	Drakenstein Poultry Abattoir	Abattoir	56.51	ESE
C106	Drakenstein Correctional Services	Hatchery	58.94	ESE
C107	Drakenstein Correctional Services	Broiler	58.51	ESE
C108	Kanonkop Eierplaas	Hatchery	23.32	SE
C109	Bluegum Grove	Hatchery	42.97	SE
C110	Usana	Hatchery	43.11	SE
C111	Winshaw Vineyards Usana	Broiler	46.44	SE
C112	Lazena Boerdery	Abattoir	57.89	SE
C113	Lazena Boerdery	Broiler	64.71	SE
C114	Elgin Freerange Chickens	Abattoir	63.02	SE
C115	Wessels Gat Farm	Hatchery	75.82	SE
C116	Wessels Gat Farm	Broiler	76.34	SE
C117	Schultz Chickens	Hatchery	39.48	SSE
C118	Frylicks Poort Poultry Abattoir	Abattoir	37.69	SSE

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Table 5.5.B.2
Milk and Other Dairy Products

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
D1	Rheboksfontein	Dairy	35.94	NNW
D2	Wolwefontein	Dairy	37.23	NNW
D3	Droëvlei	Dairy	43.63	NNW
D4	Swartwater	Dairy	46.40	NNW
D5	Oatlands Holstein Stud	Dairy	25.30	N
D6	Udderly Delicious	Cheese manufacturing	33.92	N
D7	Darling Creamery	Dairy processing	33.80	N
D8	Rooihoogetvlei	Dairy	33.64	N
D9	Vyekraal	Dairy	40.77	N
D10	Hartebeeskloof	Dairy	41.86	N
D11	Uilenkraal	Dairy	51.52	N
D12	Vyvlei	Dairy	38.53	NNE
D13	Goediehoop	Dairy	37.76	NNE
D14	Tweekuil Melkery	Dairy	40.71	NNE
D15	Kwasizabantu Mission	Dairy	26.37	NE
D16	Moreson Roll on lawn	Dairy	26.77	NE
D17	The Grains Dairy	Dairy	28.14	NE
D18	DCS Boerdery	Dairy	26.75	NE
D19	Prikstoel	Dairy	31.06	NE
D20	Mernes	Dairy	39.24	NE
D21	Majuba	Dairy	43.07	NE
D22	Adamsfontein	Dairy	42.14	NE
D23	Middlepos 611	Dairy	49.74	NE
D24	Voerspoed	Dairy	51.46	NE
D25	Sie	Dairy	63.31	NE
D26	Goedertrou	Dairy	60.56	NE
D27	De Langekloof	Dairy	63.45	NE
D28	Kleinbakoven	Dairy	70.68	NE
D29	Akbar Dairy Trust	Dairy	13.62	ENE
D30	Populierbos	Dairy	19.11	ENE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
D31	Bergendal	Dairy	20.46	ENE
D32	Jerseys Populierbos	Dairy	20.38	ENE
D33	Welte Farm	Dairy	28.08	ENE
D34	Welgegund Boerdery	Dairy	25.21	ENE
D35	Klein Morgenwacht Farm	Dairy	29.13	ENE
D36	Droevlei	Dairy	29.66	ENE
D37	Drie Susters Melkery - Fair Cape	Dairy	30.45	ENE
D38	Doornkraal	Dairy	31.55	ENE
D39	Doornfontein Holsteins	Dairy	33.43	ENE
D40	Moerasfontein	Dairy	38.08	ENE
D41	Schonenberg Dairy	Dairy	42.87	ENE
D42	Rhenosterbosrug Dairy	Dairy	41.37	ENE
D43	Houtbaai Dairy	Dairy	51.17	ENE
D44	Klein Eikenboom	Dairy	53.89	ENE
D45	Foxenburg Estate	Cheese manufacturing	59.56	ENE
D46	Bosplaas Iomalor	Dairy	59.98	ENE
D47	Dasvlei	Dairy	14.42	E
D48	Adderly Boerdery	Dairy	16.65	E
D49	Blankenberg	Dairy	24.44	E
D50	Joyce's Dairy Farm	Dairy	29.00	E
D51	Joyce's Dairy Farm	Dairy	28.37	E
D52	Joyce's Dairy Farm Droevlei	Dairy	27.76	E
D53	Farm Gratefontein	Dairy	33.54	E
D54	Elohims	Dairy	37.59	E
D55	Langvlei Calendonville Plase	Dairy	38.05	E
D56	Hoër Landbouskool Boland	Dairy	42.00	E
D57	Stelipad Boerdery	Dairy	48.66	E
D58	Afton Grange	Dairy	51.87	E
D59	Malans Dairy	Dairy processing	14.30	E
D60	Vasco Cheese CC	Cheese manufacturing	19.28	ESE
D61	Faircape Dairy Farm	Dairy	18.00	ESE
D62	Fair Cape	Dairy processing	19.13	ESE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
D63	Adderly Boerdery	Dairy	22.43	ESE
D64	Bon Mella Estate CC	Dairy processing	22.36	ESE
D65	Loch Lynne	Dairy	21.55	ESE
D66	Vrymunstuntein Farm	Dairy	29.97	ESE
D67	Sumstum Farm	Dairy	29.10	ESE
D68	Mountain View Stables	Dairy	25.82	ESE
D69	Eensgezind Farm & Dairy	Dairy	38.53	ESE
D70	Leidersburg Dairy	Dairy	44.00	ESE
D71	Krommerhee	Dairy	40.93	ESE
D72	Department of Agriculture Western Cape	Dairy	40.27	ESE
D73	Department of Agriculture Western Cape	Dairy	41.26	ESE
D74	Department of Agriculture Western Cape	Dairy	41.80	ESE
D75	BKB Livestock	Dairy	46.86	ESE
D76	Fairview Cheese	Cheese manufacturing	45.45	ESE
D77	Dalewood Fromage	Cheese manufacturing	45.80	ESE
D78	Dalewood Farm	Dairy	46.75	ESE
D79	Kleinbegin Farm	Dairy	53.59	ESE
D80	Werda (Rhodes Food Group)	Dairy	8.18	ESE
D81	Joyce's Dairy Farm	Dairy	16.57	SE
D82	Vissershok	Dairy	33.00	SE
D83	Best Buy Cheese Company (PTY) Ltd	Cheese manufacturing	39.37	SE
D84	Zevenwacht Cheesery	Cheese manufacturing	48.01	SE
D85	Parmalat - Simonsberg Cheese	Cheese manufacturing	49.84	SE
D86	Roulou	Dairy	50.73	SE
D87	Stellenbosch Cheese	Cheese manufacturing	50.11	SE
D88	Bontevlei Venue	Dairy	50.10	SE
D89	Parmalat SA (Pty) Ltd	Dairy processing	50.07	SE
D90	Welgevallen	Dairy	19.57	SE
D91	Dairy Exchange	Dairy processing	19.24	SSE
D92	Lausanne Dairies CC	Dairy processing	18.73	SSE
D93	Fair Cape Dairies	Dairy processing	23.90	SSE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
D94	Cape Cheese	Cheese manufacturing	31.43	SSE
D95	Polar Ice Cream	Ice cream manufacturing	32.53	SSE
D96	Clover	Dairy processing	32.37	SSE
D97	Parmalat	Dairy processing	31.83	SSE
D98	Parmalat Aylesbury	Ice cream manufacturing	36.11	SSE
D99	Sonnendal Dairies	Dairy processing	40.36	SSE
D100	Lilly Valley	Dairy	40.27	SSE
D101	Wilhelmsheim Melkery	Dairy	40.07	SSE
D102	Oakland Milk	Dairy processing	52.16	SSE
D103	Imhoff Farm Cheese Dairy	Cheese manufacturing	35.94	S

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**Table 5.5.B.3
Fruit and Vegetables**

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FV1	Heinz Foods	Food processing and packing	10.30	NNE
FV2	Pioneer Foods t/a Bokomo Foods Sugarbird	Packers and cool chain facilities	36.07	NE
FV3	Morester Vrugte	Packers and cool chain facilities	53.98	NE
FV4	Helderberg	Packers and cool chain facilities	54.02	NE
FV5	VN Boerdery TA De Hoop	Packers and cool chain facilities	55.58	NE
FV6	Grassroots Group	Processing	68.14	NE
FV7	24 Riviere Bemarking	Packers and cool chain facilities	70.14	NE
FV8	Karsten Fruit Packers (Pty) Ltd	Packers and cool chain facilities	70.24	NE
FV9	Tulbagh Dried Fruit	Fruit packers	76.43	NE
FV10	Del Monte Fruits South Africa (Rhodes Fruits Group)	Packers and cool chain facilities	77.26	NE
FV11	Tulpak	Fruit packers	79.18	NE
FV12	Dreampack (Pty) Ltd	Packers and cool chain facilities	77.00	NE
FV13	Green Willows Properties	Fruit packers	77.22	NE
FV14	JLER - Le Roux Group	Packers and cool chain facilities	47.12	ENE
FV15	Bonataba	Fruit packers	48.59	ENE
FV16	Safe Farm Exports	Packers and cool chain facilities	49.16	ENE
FV17	Sonlia Pakhuis	Packers and cool chain facilities	54.44	ENE
FV18	Rora Orchards	Packers and cool chain facilities	73.99	ENE
FV19	Top Fruit (Graaff Fruit)	Packers and cool chain facilities	75.46	ENE
FV20	La Plaisante Estate (Pty) Ltd	Fruit packers	76.00	ENE
FV21	Rora Farm Trust	Packers and cool chain facilities	76.10	ENE
FV22	Moreson (De Keur)	Fruit packers	78.75	ENE
FV23	Wolfpack Wolseley Fruit Packers (Pty) Ltd	Fruit packers	76.43	ENE
FV24	VV4 Vervoer Koelkamers	Packers and cool chain facilities	76.56	ENE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FV25	Hoekstra Fruit Farms	Fruit packers	44.51	E
FV26	Hoekstra Fruit Farms	Fruit packers	44.64	E
FV27	Rainbow Fruit Pty Ltd	Fruit packers	49.80	E
FV28	Colors Fruit SA (Pty) Ltd	Fruit packers	49.74	E
FV29	JD Kirsten	Fruit packers	49.05	E
FV30	Redelinghuys	Fruit packers	49.19	E
FV31	JD Kirsten	Fruit packers	48.54	E
FV32	Uitkyk Farm	Fruit packers	48.42	E
FV33	JD Kirsten	Fruit packers	49.38	E
FV34	Hoekstra Fruit Farms	Fruit packers	48.19	E
FV35	Letuche Farming	Fruit packers	47.27	E
FV36	La Ferme Derik	Fruit packers	46.45	E
FV37	Fruit2U Packhouse and Coldstore	Packers and cool chain facilities	48.77	E
FV38	Hoekstra Fruit Farms	Fruit packers	46.00	E
FV39	Hoekstra Fruit Farms	Fruit packers	46.23	E
FV40	Noord Agter Paarl Koelkamers	Cool chain facilities	45.66	E
FV41	Lebombo Cape	Packers and cool chain facilities	46.39	E
FV42	Oudeburg Farm Fruition Pty Ltd	Fruit packers	49.90	E
FV43	Firwoods	Packers and cool chain facilities	50.71	E
FV44	Tiger Brands (Jam Manufacturing Unit)	Jam manufacturing	50.46	E
FV45	Salomonsvlei Boerdery	Fruit packers	53.39	E
FV46	Novo Packhouse	Packers and cool chain facilities	50.85	E
FV47	ColdHarvest Paarl	Cool chain facilities	50.77	E
FV48	Getfresh Food Services		50.45	E
FV49	Pacmar	Juice processing	50.39	E
FV50	Heinz Foods	Ketchups, soups, noodles and baked beans	52.50	E
FV51	Inkoop Verpakking	Packers and cool chain facilities	55.52	E
FV52	Kambrosig Tien	Fruit packers	55.47	E
FV53	Freezer Fresh	Cool chain facilities	35.09	ESE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FV54	Blue Jay	Packers and cool chain facilities	47.31	ESE
FV55	WP Fresh Distributors	Fresh produce distribution	49.05	ESE
FV56	Banhoek Fruit	Fruit packers	54.78	ESE
FV57	Hillcrest Berry Orchards	Packers and cool chain facilities	54.01	ESE
FV58	Hillcrest Berry Orchards	Packers and cool chain facilities	53.81	ESE
FV59	Dwars River Packers	Packers and cool chain facilities	54.86	ESE
FV60	Rhodes Food Group Paarl	Fruit processing and meal production	54.31	ESE
FV61	SwanPack Fruit CC	Fruit packers	50.29	ESE
FV62	Toledo Fruit	Fruit packers	51.64	ESE
FV63	CiMoPack (Pty) Ltd	Packers and cool chain facilities	51.93	ESE
FV64	Stellenpak	Packers and cool chain facilities	51.23	ESE
FV65	Tweespruit Boerdery	Fruit packers	52.34	ESE
FV66	Banhoek Fruit	Packers and cool chain facilities	55.05	ESE
FV67	Cape Fruit Processors	Packers and cool chain facilities	55.74	ESE
FV68	Franschhoek Fruit Packers	Packers and cool chain facilities	68.13	ESE
FV69	Moreson Trust	Packers and cool chain facilities	74.34	ESE
FV70	Crookes Brothers (Vyeboom Boerdery)	Packers and cool chain facilities	74.20	ESE
FV71	Dew Crisp	Packers and cool chain facilities	70.11	ESE
FV72	Philco Boerdery Trust (Pty) Ltd	Packers and cool chain facilities	78.86	ESE
FV73	Fruit Packers and coldchain and transport	Packers and cool chain facilities	78.10	ESE
FV74	Ideafruit (Vyeboom Koop)	Packers and cool chain facilities	79.02	ESE
FV75	Chiltern Farms (Pty) Ltd	Packers and cool chain facilities	76.67	ESE
FV76	Melpack Fruitways (Graymead Coldstore)	Packers and cool chain facilities	75.08	ESE
FV77	SAFT Atlantic	Cool chain facilities	19.06	SE
FV78	SCP Juice It	Fruit juice processing	32.76	SE
FV79	Bellville Market	Fresh produce wholesaler	30.63	SE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FV80	Juice Direct	Fruit juice processing	39.49	SE
FV81	JC Fruit Juice	Fruit juice processing	39.34	SE
FV82	Taurus Packaging (Freshco)	Packers and cool chain facilities	44.32	SE
FV83	By den Weg	Packers and cool chain facilities	44.26	SE
FV84	Limberlost Zetler Berries	Cool chain facilities	46.90	SE
FV85	Alecs Distributors	Fresh produce distribution	47.64	SE
FV86	Eurafruit	Packers and cool chain facilities	47,53	SE
FV87	Nu Leaf	Packers and cool chain facilities	53.84	SE
FV88	Anko Packers	Packers and cool chain facilities	53.78	SE
FV89	Deli Veg	Vegetables	52.81	SE
FV90	S Zetler and Sons Farming Enterprises CC	Packers and cool chain facilities	50.69	SE
FV91	Top Class Fruit and Veg	Fresh produce distribution	57.06	SE
FV92	Euroberry (Pty) Ltd	Berry processing	56.75	SE
FV93	Lourensford	Packers and cool chain facilities	60.84	SE
FV94	Elgin Fruit Juices (Pty) Ltd	Packers and cool chain facilities	74.99	SE
FV95	Vintage Distributors t/a Glen Apples	Packers and cool chain facilities	74.50	SE
FV96	Elgin Dew	Packers and cool chain facilities	74.52	SE
FV97	Elgin Hills	Packers and cool chain facilities	78.84	SE
FV98	Eldorado Vrugte	Fruit packers	78.83	SE
FV99	Remhoogte Boerdery	Packers and cool chain facilities	78.91	SE
FV100	Dennegeur	Packers and cool chain facilities	78.39	SE
FV101	Dennegeur- Gemsbokfontein	Packers and cool chain facilities	78.77	SE
FV102	Appelthwaite Farm (Pty) Ltd	Packers and cool chain facilities	77.53	SE
FV103	Appletiser Pure Fruit Juices (Pty) Ltd	Juice processing	77.56	SE
FV104	Associated Fruit Processors	Juice processing	77.60	SE
FV105	Terra Madre Fruit Juice and Ciders	Juice and cider processing	78.89	SE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FV106	Elgin Orchards (Pty) Ltd	Packers and cool chain facilities	76.19	SE
FV107	Morningstar	Cool chain facilities	76.28	SE
FV108	Two-A-Day Group	Packers and cool chain facilities	76.54	SE
FV109	Molteno Fruitways Farm	Packers and cool chain facilities	77.00	SE
FV110	Die Vallei	Packers and cool chain facilities	78.72	SE
FV111	Vyebosch Plase	Packers and cool chain facilities	77.90	SE
FV112	Nu Berry Fruits	Fruit processing	19.31	SSE
FV113	Fruitique (Inovative Friut)	Agro processing plant	18.76	SSE
FV114	SAFT Killarney	Cool chain facilities	18.27	SSE
FV115	Cape Fruit Coolers (Pty) Ltd	Cool chain facilities	18.17	SSE
FV116	Veg and More	Fresh produce distribution	23.41	SSE
FV117	EazyVeg	Fresh produce distribution	21.98	SSE
FV118	Nutripick (Pty) Ltd	Fresh produce distribution	29.70	SSE
FV119	Golden Harvest Internal	Export	29.99	SSE
FV120	M & R Marketing	Fresh produce distribution	29.69	SSE
FV121	RSA Market Agents Cape Town	Fresh produce distribution	29.71	SSE
FV122	Cape Town Market	Fresh produce wholesaler	29.70	SSE
FV123	Green Scene Fresh Wholesalers CC	Fresh produce wholesaler	27.82	SSE
FV124	Magalies Citrus	Agro processing plant	18.62	SE
FV125	Daniel Bros Fruit & Veg	Fresh produce distribution	36.12	SSE
FV126	Philippi Groente Verpakkers	Vegetable packing	41.89	SSE
FV127	Philippi Fresh Produce	Fresh produce wholesaler	40.33	SSE
FV128	Patel Enterprises	Fresh produce wholesaler	27.89	S
FV129	Agrana	Packers and cool chain facilities	40.48	S
FV130	Cape Town Port	Export	26.41	S
FV131	Salt River Market	Fresh produce wholesaler and distribution	27.99	S

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FV132	Epping Market	Fresh produce wholesaler and distribution	29.64	SSE

Table 5.5.B.4
Fruit and Vegetable Canners

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FC1	Sad Sugarbird (Pioneer Foods)	Fruit canning	36.02	NE
FC2	Del Monte Fruits SA (Rhodes Food Group)	Fruit canning	77.01	NE
FC3	Koo (Tiger Brands)	Fruit canning	50.49	E
FC4	Cape Fruit Processors	Fruit canning	55.90	ESE
FC5	Rhodes Food Group	Fruit canning	55.01	ESE
FC6	Zetler and Sons (Wynland Boerdery)	Fruit canning	51.35	SE
FC7	Sagra Foods	Fruit canning	23.43	SSE

Table 5.5.B.5
Dried Fruit

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
FD1	Dried Fruit for Africa	Dried fruit processing and packaging	32.04	SE
FD2	Dried Fruit for All (Pty) Ltd	Dried fruit processing and packaging	21.54	SSE

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Table 5.5.B.6
Viticulture

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V1	Groote Post Vineyards	Wine cellar	21.54	N
V2	Oude Post Wine Cellar	Wine cellar	31.59	N
V3	Cloof Wine Estate	Wine cellar	23.15	NNE
V4	Darling Wine Cellar	Wine cellar	27. 59	NNE
V5	Franki's Vineyards	Wine cellar	37.58	NNE
V6	Wildevorst Wines	Wine cellar	76.40	NNE
V7	Abbotts Hill Wines	Wine cellar	29.42	NE
V8	Nuweland Winery	Wine cellar	32.68	NE
V9	Swartland Winery	Wine cellar	39.00	NE
V10	Hughes Family Wines	Wine cellar	45.63	NE
V11	Meerhof Wine Cellar	Wine cellar	50.71	NE
V12	Kloovenburg	Wine cellar and olives	52.94	NE
V13	Het Vlock Casteel	Wine cellar and olives	53.54	NE
V14	Mullineux & Leeu Family Wines	Wine cellar	50.53	NE
V15	Allesverloren Wine Estate	Wine cellar	54.11	NE
V16	Pulpit Rock Winery	Wine cellar	54.00	NE
V17	Riebeek Cellars	Wine cellar	55.45	NE
V18	Lemberg Estate	Wine cellar	75.23	NE
V19	Montpellier De Tulbagh	Wine cellar	77.31	NE
V20	Oudekloof Wine Estate & Luxury Guest Farm	Wine cellar	75.09	NE
V21	Linde Vineyards	Wine cellar	78.67	NE
V22	Oude Compagnies Post Private Cellars	Wine cellar	77.60	NE
V23	Saronsberg Wine Cellar	Wine cellar	79.64	NE
V24	Twee Jonge Gezellen	Wine cellar	79.88	NE
V25	Nassau Winery	Wine cellar	30.26	ENE
V26	Dragonridge Wines	Wine cellar	35.35	ENE
V27	Babylon's Peak Private Cellar	Wine cellar	37.62	ENE
V28	David & Nadia	Wine cellar	39.52	ENE
V29	Badenhorst Family Wines	Wine cellar	38.96	ENE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V30	Lammershoek Wine Estate	Wine cellar	38.63	ENE
V31	Sadie Family Wines	Wine cellar	38.53	ENE
V32	The Observatory Cellars	Wine cellar	36.90	ENE
V33	Annex Kloof Winery	Wine cellar	39.37	ENE
V34	Vondeling Wines	Wine cellar	40.36	ENE
V35	Porcelain Mountain Wines	Wine cellar	45.59	ENE
V36	Timmerman Cellar	Wine cellar	54.41	ENE
V37	Welbedacht Wine Estate	Wine cellar	55.70	ENE
V38	Long Barn Winery	Wine cellar	59.95	ENE
V39	Waboomsrivier Wynkelde	Wine cellar	74.08	ENE
V40	Bergsig Wine Estate	Wine cellar	72.95	ENE
V41	Lateganskop Winery	Wine cellar	72.36	ENE
V42	Silk Bush (The Mountain Vineyards)	Wine cellar	79.98	ENE
V43	Mountain Ridge Wines	Wine cellar	75,06	ENE
V44	Eensaamheid Wines	Wine cellar	38.48	E
V45	Perdeberg Wine Cellar	Wine cellar	36.70	E
V46	Silwervis and Terracura Wines	Wine cellar	37.97	E
V47	Jacques Germanier (Pty) Ltd - Sonop Wine Farm	Wine cellar	39.01	E
V48	Ruitersvlei Wine Estate	Wine cellar	43.84	E
V49	Black Pearl Vineyards	Wine cellar and olives	43.43	E
V50	Gallop Hill	Wine cellar	43.46	E
V51	Crow's Nest Wines	Wine cellar	43.72	E
V52	Domaine Brahms Winery	Wine cellar	42.64	E
V53	Oude Denneboom	Wine cellar and olives	40.58	E
V54	Scali Wines	Wine cellar	40.24	E
V55	Spice Route Winery (Tasting Centre)	Wine cellar	46.25	E
V56	Landskroon Wine	Wine cellar	45.88	E
V57	The Mason's Winery	Wine cellar	49.77	E
V58	Bergheim	Wine cellar	49.91	E
V59	Pearl Mountain Wine Farm	Wine cellar and olives	48.41	E
V60	Boland Cellar (Northern Paarl)	Wine cellar	48.64	E

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	SITE SAFETY REPORT FOR DUYNEFONTYN	Rev 1b	Chapter- Page
	LAND AND WATER USE		5.5-222

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V61	Veenvouden Winery Private Cellar	Wine cellar	49.44	E
V62	Nwanedi Wine & Country Manor	Wine cellar	49.77	E
V63	De Villiers Cellar	Wine cellar	48.00	E
V64	Under Oaks Winery	Wine cellar	47.35	E
V65	Nelson Wine Estate	Wine cellar	46.99	E
V66	Fraterstraat Kelder Bpk	Wine cellar	50.74	E
V67	Avondale Cellar	Wine cellar	53.69	E
V68	KWV Wine emporium	Wine cellar	50.54	E
V69	Vendome	Wine cellar	51.47	E
V70	Nederburg Wines	Wine cellar	53.16	E
V71	Boland Wine & Brandy Merchants	Wine cellar	50.70	E
V72	Mooi Bly	Wine cellar	54.83	E
V73	Tempel Wines	Wine cellar	50.42	E
V74	Imbuko Wines	Wine cellar	54.74	E
V75	Diemersfontein Wine and Country Estate	Wine cellar	53.51	E
V76	Thokozani Winelands Investments	Wine cellar	53.39	E
V77	Vinpac	Bag-in-box filling plant	50.46	E
V78	Paarl Valley Bottling Company	Bottling	50.59	E
V79	Wellington Wines (Wellington Cellar)	Wine cellar	52.00	E
V80	Hawekwa Bottelering	Bottling	52.34	E
V81	DGB Winery	Wine cellar	51.66	E
V82	Zanddrif Vineyards	Wine cellar	50.31	E
V83	Jacaranda Wine Farm	Wine cellar	53.62	E
V84	Mischa Estate	Wine cellar	54.54	E
V85	Lazanou Organic Vineyards	Wine cellar	52.78	E
V86	Wildepaaardejacht (The Ahrens Family Winery)	Wine cellar	56.34	E
V87	Mellasat Cellar	Wine cellar	57.04	E
V88	Olsen Wines	Wine cellar	57.81	E
V89	Druk My Niet Wine Estate	Wine cellar	55,33	E
V90	Upland Estate	Wine cellar	56.66	E
V91	Alkmaar Boutique Vineyard	Wine cellar	55.71	E

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	SITE SAFETY REPORT FOR DUYNEFONTYN	Rev 1b	Chapter- Page
	LAND AND WATER USE		5.5-223

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V92	Hildenbrand Wine & Olive Estate	Wine cellar and olives	55.45	E
V93	Mont Du Toit Cellar	Wine cellar	55.78	E
V94	Napier Winery	Wine cellar	56.57	E
V95	Canetsfontein	Wine cellar	59.06	E
V96	Dunstone Country Estate	Wine cellar	58.51	E
V97	Welvanpas Cellar	Wine cellar	59.40	E
V98	Andreas Wines	Wine cellar	56.92	E
V99	Nabygelegen Private Cellar	Wine cellar	58.92	E
V100	Bosman Family Vineyards	Wine cellar	55.84	E
V101	Val du Charron Wine and Leisure Estate Guesthouse	Wine cellar	57.44	E
V102	Linton Park Wine Cellar	Wine cellar	56.67	E
V103	Doolhof Wine Estate	Wine cellar	60.74	E
V104	Jason's Hill Private Cellar	Wine cellar	73.93	E
V105	Breeland Wynkelder	Wine cellar	73.92	E
V106	Slanghoek Cellar	Wine cellar	74.16	E
V107	Opstal Estate	Wine cellar	74.03	E
V108	Mountain Oaks Winery	Wine cellar	73.90	E
V109	Lorraine Private Cellar	Wine cellar	77.07	E
V110	Du Toitskloof Cellar	Wine cellar	77.71	E
V111	Aufwaerts Koop Wynkelder	Wine cellar	79.83	E
V112	Du Preez Estate	Wine cellar	79.06	E
V113	Badsberg Winery	Wine cellar	77.75	E
V114	Havanna Hills Wine Cellar	Wine cellar and olives	12.80	ESE
V115	Capaia Wine Estate	Wine cellar	13.35	ESE
V116	Loch Lynne	Wine cellar	22.95	ESE
V117	Leeuwenkuil Family Vineyards	Wine cellar	39.87	ESE
V118	Vrede Wines	Wine cellar	39.81	ESE
V119	M'hudi Wines	Wine cellar	35.89	ESE
V120	Villiera Wines	Wine cellar	37.93	ESE
V121	Koelenhof Wine Cellar	Wine cellar	38.23	ESE
V122	Ernst Gouws & Co	Wine cellar	38.19	ESE
V123	Joostenberg Winery	Wine cellar	37.62	ESE

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	LAND AND WATER USE		5.5-224

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V124	Eaglesvlei Wines	Wine cellar	39.18	ESE
V125	Hoopenburg Wines	Wine cellar	39.55	ESE
V126	PFM Briers Louw	Wine cellar	38.99	ESE
V127	Louisenhof Wines	Wine cellar	43.71	ESE
V128	Beyerskloof Wine Cellar	Wine cellar	43.38	ESE
V129	Kanu	Wine cellar	42.89	ESE
V130	Casa Mori	Wine cellar and olives	41.96	ESE
V131	L'Avenir Estate	Wine cellar	44.72	ESE
V132	Summerhill Wines	Wine cellar	44.52	ESE
V133	Deux Frères Wines	Wine cellar	44.54	ESE
V134	Origin Wine	Wine cellar	41.50	ESE
V135	Simonsig Wine Estate	Wine cellar	42.35	ESE
V136	Slaley Cellar	Wine cellar and olives	43.82	ESE
V137	Uitkyk Estate	Wine cellar	44.78	ESE
V138	Kanonkop Wine Estate	Wine cellar	44.38	ESE
V139	Elsenburg Wine Cellar	Wine cellar	42.09	ESE
V140	Laibach Vineyards	Wine cellar	44.08	ESE
V141	Marklew Family Wines	Wine cellar	44.14	ESE
V142	Warwick Estate	Wine cellar	44.01	ESE
V143	Natte Valleij	Wine cellar	44.97	ESE
V144	Le Bonheur Wine Estate	Wine cellar	44.41	ESE
V145	Mitre's Edge	Wine cellar	44.57	ESE
V146	Arra Vineyards	Wine cellar	43.14	ESE
V147	De Meye Wine Estate	Wine cellar	40.02	ESE
V148	Mount Vernon Farm	Wine cellar	44.49	ESE
V149	Anura Vineyards	Wine cellar	44.97	ESE
V150	Groenfontein	Wine cellar	41.36	ESE
V151	Glenelly Estate	Wine cellar	49.29	ESE
V152	Nietvoorbij Wine Cellar	Wine cellar	47.71	ESE
V153	Louis Wines	Wine cellar	46.05	ESE
V154	Rustenberg Wines	Wine cellar	49.02	ESE
V155	Morgenhof Estate	Wine cellar	46.51	ESE

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	SITE SAFETY REPORT FOR DUYNEFONTYN	Rev 1b	Chapter- Page
	LAND AND WATER USE		5.5-225

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V156	Edgebaston	Wine cellar	45.96	ESE
V157	Protea Hill Farm	Vinegar	46.61	ESE
V158	Remhoogte Wine Estate	Wine cellar	45.16	ESE
V159	Knorhoek Wines	Wine cellar	46.54	ESE
V160	Quoin Rock Winery	Wine cellar	46.15	ESE
V161	Muratie Wine Estate	Wine cellar	46.45	ESE
V162	Delheim	Wine cellar	47.18	ESE
V163	Lievland Wine Estate	Wine cellar	45.07	ESE
V164	Boer & Brit Wines	Wine cellar	45.04	ESE
V165	Mont Destin Wine Farm	Wine cellar	45.95	ESE
V166	Marianne Wine Estate & Guesthouse	Wine cellar	46.19	ESE
V167	Backsberg Wine Estate	Wine cellar	47.93	ESE
V168	Noble Hill Wines	Wine cellar	49.68	ESE
V169	Babylonstoren	Wine cellar and olives	48.77	ESE
V170	Glen Carlou Wine Estate	Wine cellar	46.26	ESE
V171	Simonsvlei Wine Cellar	Wine cellar	47.89	ESE
V172	African Bottlecap	Bottling	48.24	ESE
V173	Kleine Draken - Zandwijk Wines (Pty) Ltd	Wine cellar	49.06	ESE
V174	Brenthurst Winery	Wine cellar	48.77	ESE
V175	Fairview	Wine cellar	46.88	ESE
V176	Rudera Wines	Wine cellar	52.64	ESE
V177	Lanzerac Hotel & Spa	Wine cellar	51.62	ESE
V178	Sonklip	Wine cellar	51.62	ESE
V179	Rozendal	Wine cellar	51.60	ESE
V180	Fijnbosch Wine Farm	Wine cellar	54.32	ESE
V181	Neil Ellis Wines	Wine cellar	50.73	ESE
V182	Delaire Graff Estate	Wine cellar	53.01	ESE
V183	Camberley Cellar	Wine cellar	53.68	ESE
V184	Le Pommier Wines	Wine cellar	53.31	ESE
V185	Alluvia Estate	Wine cellar	53.10	ESE
V186	Tokara Cellar	Wine cellar	52.55	ESE
V187	MolenVliet Wine & Guest Estate	Wine cellar	54.13	ESE

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	LAND AND WATER USE		5.5-226

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V188	Zorgvliet Wine Estate	Wine cellar	53.60	ESE
V189	Vuurberg Wines	Wine cellar	54.31	ESE
V190	Boschendal Winery	Wine cellar	54.83	ESE
V191	Plaisir de Merle	Wine cellar	51.16	ESE
V192	First Cape Wine Farm	Wine cellar	52.37	ESE
V193	Vrede en Lust Wine Farm	Wine cellar	51.56	ESE
V194	Rupert & Rothschild Vignerons	Wine cellar	51.05	ESE
V195	Drakensig Wines	Wine cellar	50.14	ESE
V196	Leopards Leap (L'Huguenot Kelder)	Wine cellar	51.36	ESE
V197	Val de Vie Estate	Wine cellar	52.19	ESE
V198	Aquabella	Bottling	54.10	ESE
V199	De Zoete Inval Wine Estate	Wine cellar	50.55	ESE
V200	Rainbow's End Estate	Wine cellar	55.85	ESE
V201	Oldenburg Vineyards	Wine cellar	55.42	ESE
V202	Antonji Rupert Wines	Wine cellar	58.10	ESE
V203	Graham Beck Wines - Franschoek	Wine cellar	59.44	ESE
V204	L'ormarins Wine Estate	Wine cellar	57.63	ESE
V205	Lynx Estate Winery	Wine cellar	59.98	ESE
V206	Solms-Delta	Wine cellar	55.73	ESE
V207	Allée Bleue Estate	Wine cellar	55.22	ESE
V208	Four Paws Wines	Wine cellar	64.89	ESE
V209	La Vigne Estate	Wine cellar	64.93	ESE
V210	Maison Estate	Wine cellar	64.10	ESE
V211	Môreson Wine Farm	Wine cellar	62.50	ESE
V212	Eikehof Cellar	Wine cellar	62.86	ESE
V213	Akkerdal Estate	Wine cellar	61.66	ESE
V214	La Motte Estate	Wine cellar	63.64	ESE
V215	La Chataigne	Wine cellar	62.36	ESE
V216	Topiary Wines	Wine cellar	60.50	ESE
V217	Boekenhoutskloof	Wine cellar	69.23	ESE
V218	Haut Espoir	Wine cellar	68.93	ESE
V219	La Bourgogne Wine Farm	Wine cellar	69.48	ESE

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	LAND AND WATER USE		5.5-227

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V220	Colmant Cap Classique & Champagne	Wine cellar	69.98	ESE
V221	La Bri Cellar	Wine cellar	69.14	ESE
V222	Bo La Motte Farm	Wine cellar	69.95	ESE
V223	Auberge Clermont	Wine cellar	68.84	ESE
V224	La Couronne Wines	Wine cellar	68.49	ESE
V225	Le Vallon Farm	Wine cellar	69.68	ESE
V226	Chanteclair Estate	Wine cellar	70.00	ESE
V227	Glen Wood Winery	Wine cellar	65.79	ESE
V228	Mont Rochelle Hotel & Mountain Vineyards	Wine cellar	67.79	ESE
V229	Mullineux & Leeu Family Wines	Wine cellar	67.48	ESE
V230	Leeu Estates	Wine cellar	66.95	ESE
V231	The Franschhoek Cellar	Wine cellar	67.88	ESE
V232	Grande Provence Wine Estate	Wine cellar	67.06	ESE
V233	Black Elephant Vintners - La Petite Vigne	Wine cellar	68.55	ESE
V234	Chamonix Estate	Wine cellar	68.97	ESE
V235	Haute Provence	Wine cellar	66.59	ESE
V236	Dieu Donne Cellar	Wine cellar	69.10	ESE
V237	La Provence Estate	Wine cellar	65.68	ESE
V238	My Wyn	Wine cellar	69.35	ESE
V239	Patryskop	Wine cellar	73.90	ESE
V240	Stony Brook Cellar	Wine cellar	70.33	ESE
V241	Keerweder	Wine cellar	70.44	ESE
V242	Franschhoek Pass Winery	Wine cellar	71.15	ESE
V243	Blueberry Hill Cottages	Wine cellar	70.56	ESE
V244	La Petite Ferme Franschhoek	Wine cellar	70.56	ESE
V245	Haute Cabrière Estate	Wine cellar	70.40	ESE
V246	De Grendel Wines	Wine cellar	23.26	SE
V247	D'Aria Winery	Wine cellar	24.63	SE
V248	Maastricht	Wine cellar	23.31	SE
V249	Bloemendal Wine Estate	Wine cellar	23.89	SE
V250	Nitida Cellar	Wine cellar	23.04	SE

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	LAND AND WATER USE		5.5-228

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V251	Hillcrest Wine and Olive Estate	Wine cellar and olives	22.24	SE
V252	Durbanville Hills Cellar	Wine cellar	20.62	SE
V253	Signal Gun Wine Cellar	Wine cellar	23.02	SE
V254	Klein Roosboom	Wine cellar	20.53	SE
V255	Russo Family Vintners	Wine cellar	22.75	SE
V256	Kronendal	Wine cellar	22.34	SE
V257	Canto Wines	Wine cellar	22.86	SE
V258	Diemersdal Wine Estate	Wine cellar	23.75	SE
V259	Meerendal Wine Estate	Wine cellar	22.46	SE
V260	Altydgedacht Wine Estate	Wine cellar	26.04	SE
V261	Dormershire Wines	Wine cellar	39.36	SE
V262	Altyding	Wine cellar	39.72	SE
V263	Zevenwacht Wine Estate	Wine cellar	39.20	SE
V264	Mooiplaas Estate	Wine cellar	39.37	SE
V265	Kaapzicht Estate	Wine cellar	38.49	SE
V266	Goede Hoop Estate	Wine cellar	39.51	SE
V267	Klein Bottelary Estate	Wine cellar	38.79	SE
V268	Hazendal Wine Estate	Wine cellar	36.43	SE
V269	Koopmanskloof	Wine cellar	39.23	SE
V270	Groenland	Wine cellar	37.28	SE
V271	Bellevue Winery	Wine cellar	37.88	SE
V272	Raats Family Wines	Wine cellar	43.85	SE
V273	Jacobsdal Estate	Wine cellar	42.33	SE
V274	Van Biljon Wines (Tarentaal Cottages)	Wine cellar	43.89	SE
V275	Amani Cellar	Wine cellar	42.32	SE
V276	Nico vd Merwe Wines	Wine cellar	42.25	SE
V277	Karibib Wines - Solitary Wine	Wine cellar	42.14	SE
V278	Bein Wine	Wine cellar	42.37	SE
V279	Boschkloof Wines	Wine cellar	44.44	SE
V280	De Toren Private Cellar	Wine cellar	43.24	SE
V281	Reyneke Wines	Wine cellar	43.05	SE
V282	Beau Joubert Vineyards & Winery	Wine cellar	41.95	SE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V283	401 Rozendal	Wine cellar	42.88	SE
V284	Mulderbosch	Wine cellar	43.22	SE
V285	Overgaauw Estate	Wine cellar	44.99	SE
V286	Saxenburg	Wine cellar	40.05	SE
V287	Gilga Wines	Wine cellar	44.55	SE
V288	De Waal Wines	Wine cellar	42.75	SE
V289	Bonfoi Estate	Wine cellar	43.33	SE
V290	De Morgenzon	Wine cellar	41.48	SE
V291	L'Olivier Wine & Olive Estate	Wine cellar and olives	42.71	SE
V292	Fort Simon Winery	Wine cellar	40.29	SE
V293	The Hills Wine	Wine cellar	44.29	SE
V294	Sterhuis Wine Estate	Wine cellar	40.59	SE
V295	Clos Malverne Wine Estate	Wine cellar	43.84	SE
V296	Louisvale Cellar	Wine cellar	43.24	SE
V297	Botanica Wines	Wine cellar	44.23	SE
V298	House of JC Le Roux	Wine cellar	43.21	SE
V299	SylvanVale Vineyards - The Devon Valley Hotel	Wine cellar	43.58	SE
V300	Meinert Wines	Wine cellar	43.25	SE
V301	Stellenview Premium Wines	Wine cellar	42.67	SE
V302	Clovelly Wines	Wine cellar	41.90	SE
V303	Hartenberg Wine Estate	Wine cellar	41.44	SE
V304	Croydon Vineyard Residential Estate	Wine cellar and olives	49.99	SE
V305	Vergenoegd Wine Estate	Wine cellar	48.85	SE
V306	Compagniesdrift	Wine cellar	47.48	SE
V307	Usana	Wine cellar	47.38	SE
V308	Fijndraai Cottages	Wine cellar	47.38	SE
V309	Beau Belle Wines	Wine cellar	47.90	SE
V310	Klein Moerbeij	Wine cellar	47.11	SE
V311	Stellenbosch Vineyards	Wine cellar	46.76	SE
V312	Enaleni Vineyards	Wine cellar	47.05	SE
V313	Spier Wine Estate	Wine cellar	47.31	SE
V314	Stellendrift	Wine cellar	46.17	SE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V315	Thandi	Wine cellar	46.19	SE
V316	Vredenheim Wildlife & Winery	Wine cellar	46.97	SE
V317	Lovane Boutique Wine Estate	Wine cellar	45.76	SE
V318	Distell	Wine cellar	48.05	SE
V319	Asara Wine Estate	Wine cellar	45.62	SE
V320	Wynland Bottelering	Wine cellar	48.30	SE
V321	Stellekaya Winery	Wine cellar	48.31	SE
V322	The High Road	Wine cellar	48.32	SE
V323	Vilafonté	Wine cellar	48.34	SE
V324	Dalla Cia	Wine cellar	48.33	SE
V325	Neethlingshof Estate	Wine cellar	45.09	SE
V326	Stellenbosch University Welgevallen Cellar	Wine cellar	49.78	SE
V327	Die Bergkelder	Wine cellar	48.21	SE
V328	Fleur du Cap	Wine cellar	48.17	SE
V329	Middelvlei Estate	Wine cellar	46.39	SE
V330	Stellen Fine Wine	Wine cellar	47.82	SE
V331	Aaldering Vineyards & Wines	Wine cellar	45.49	SE
V332	Heron Ridge	Wine cellar	53.27	SE
V333	Equitania	Wine cellar	53.95	SE
V334	JP Bredell Wines	Wine cellar	53.12	SE
V335	Miravel	Wine cellar	51.00	SE
V336	Lanrust Wine Estate	Wine cellar	51.45	SE
V337	Stonewall Wines	Wine cellar	53.45	SE
V338	Romond Vineyards	Wine cellar	54.12	SE
V339	Helderberg Wijnmakerij	Wine cellar	52.23	SE
V340	Ken Forrester Vineyards (Scholtzenhof)	Wine cellar	52.98	SE
V341	Avontuur Estate	Wine cellar	53.04	SE
V342	Hidden Valley Wines	Wine cellar and olives	54.57	SE
V343	Pfeifer's Boutique Wines	Wine cellar	50.36	SE
V344	Post House	Wine cellar	51.70	SE
V345	The Winery of Good Hope	Wine cellar	51.86	SE
V346	Longridge Winery	Wine cellar	52.87	SE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V347	Le Riche Wines	Wine cellar	50.83	SE
V348	Ernie Els Wines	Wine cellar	53.78	SE
V349	Lyngrove Wines and Guesthouse	Wine cellar	50.04	SE
V350	Eikendal Estate	Wine cellar	52.03	SE
V351	Guardian Peak Wines	Wine cellar	53.10	SE
V352	Cavalli Wine & Vineyard	Wine cellar	51.11	SE
V353	Somerbosch Wines	Wine cellar	51.30	SE
V354	Webersburg	Wine cellar	52.70	SE
V355	Alto Wine Estate	Wine cellar	52.79	SE
V356	Kathrein Wine Estate	Wine cellar	52.04	SE
V357	Peter Falke Wines	Wine cellar	52.06	SE
V358	Rust en Vrede Estate	Wine cellar	53.08	SE
V359	Stellenzicht Vineyards	Wine cellar	53.74	SE
V360	Annandale Wines	Wine cellar	51.27	SE
V361	Audacia Winery	Wine cellar	51.30	SE
V362	Dornier Wines	Wine cellar	53.70	SE
V363	StellenRust	Wine cellar	51.87	SE
V364	Klein Dasbosch	Wine cellar	52.31	SE
V365	Blaauwklippen Estate Wine	Wine cellar	50.61	SE
V366	Vriesenhof Vineyards	Wine cellar	51.90	SE
V367	Stark-Conde Wines	Wine cellar	53.94	SE
V368	Aeternitas Wines	Wine cellar	59.66	SE
V369	Flagstone Winery	Wine cellar	57.67	SE
V370	Kings Kloof Vineyards	Wine cellar	57.84	SE
V371	Cordoba Cellar	Wine cellar	55.03	SE
V372	Uva Mira Winery	Wine cellar	55.12	SE
V373	De Trafford Wines	Wine cellar	57.11	SE
V374	Keermont Vineyards	Wine cellar	56.38	SE
V375	Onderkloof Wine Estate	Wine cellar	64.57	SE
V376	Highberry Wines	Wine cellar	64.13	SE
V377	Waterkloof Wines	Wine cellar	63.15	SE
V378	Morgenster Cellar	Wine cellar	61.69	SE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
V379	Vergelegen	Wine cellar	61.54	SE
V380	Lourensford Wine Cellar	Wine cellar	61.01	SE
V381	Journey's End	Wine cellar	65.64	SE
V382	Gantouw Farm	Wine cellar	66.92	SE
V383	Mount Rozier	Wine cellar	65.01	SE
V384	Idiom Wine	Wine cellar	66.87	SE
V385	Lithos	Wine cellar	65.49	SE
V386	Weddermill	Wine cellar	66.67	SE
V387	Elgin Ridge	Wine cellar	78.78	SE
V388	Elgin Vintners	Wine cellar	77.52	SE
V389	Glen Erskine Estate	Wine cellar	78.69	SE
V390	Belfield Vineyards	Wine cellar	77.94	SE
V391	Catherine Marshall Wines	Wine cellar	76.34	SE
V392	Oakvalley Estate	Wine cellar	78.41	SE
V393	Clos d'Oranje	Wine cellar	29.65	S
V394	Groot Constantia Estate	Wine cellar	38.81	S
V395	High Constantia	Wine cellar	38.66	S
V396	Hout Bay Vineyards	Wine cellar	38.94	S
V397	Eagles' Nest	Wine cellar	37.54	S
V398	Ambeloui Wine Cellar	Wine cellar	37.65	S
V399	Beau Constantia	Wine cellar	37.41	S
V400	Kling	Wine cellar	37.21	S
V401	Constantia Glen	Wine cellar	37.08	S
V402	Steenberg Vineyards	Wine cellar	44.22	S
V403	Constantia Uitsig	Wine cellar	40.63	S
V404	Buitenverwachting Wine Estate	Wine cellar	40.56	S
V405	Klein Constantia Estate	Wine cellar	40.14	S
V406	Cape Point Vineyards	Wine cellar	46.68	S

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Table 5.5.B.7
Olives

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
O1	Fraaisig CC	Olive cellar	17.49	NE
O2	Kloovenburg	Olive and wine cellar	52.94	NE
O3	Het Vlock Casteel	Olive and wine cellar	53.54	NE
O4	Olive Boutique	Olive cellar	53.38	NE
O5	Goedgedacht Olives	Olive cellar	50.73	NE
O6	Raptor Rise	Olive cellar	77.98	NE
O7	GPE Farm (Pty) Ltd	Olive cellar	50.10	ENE
O8	Foxenburg Estate	Olive cellar	59.70	ENE
O9	Groote Vallei Olive Estate	Olive cellar	75.22	ENE
O10	Vesuvio Olive Estate	Olive cellar	39.77	E
O11	Black Pearl Vineyards	Olive and wine cellar	43.43	E
O12	Olyvenbosch Olive Farm	Olive cellar	44.13	E
O13	Oude Denneboom	Olive and wine cellar	40.58	E
O14	Pearl Mountain Wine Farm	Olive and wine cellar	48.41	E
O15	Costa Nervi	Olive cellar	52.11	E
O16	Villamar	Olive cellar	50.10	E
O17	Lanquedoc Paarl of Olives Farm Estate	Olive cellar	56.23	E
O18	Ashia Cheetah Experience	Olive cellar	55.38	E
O19	Buffet Olives	Olive cellar	55.71	E
O20	Cascade Manor	Olive cellar	56.88	E
O21	Drakenstein Olives and Olive Oil	Olive cellar	55.23	E
O22	Hildenbrand Wine & Olive Estate	Olive and wine cellar	55.45	E
O23	Havanna Hills Wine Cellar	Olive and wine cellar	12.80	ESE
O24	Rosanna Olive Farm	Olive cellar	35.47	ESE
O25	Devonair Wine Estate	Olive and wine cellar	42.71	SE
O26	Casa Mori	Olive and wine cellar	41.96	ESE
O27	Slaley Cellar	Olive and wine cellar	43.82	ESE
O28	Chrisna's Olives & Deli	Olive cellar	43.78	ESE
O29	Babylonstoren	Olive and wine cellar	48.77	ESE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
O30	Glen Carlou Wine Estate	Olive and wine cellar	46.26	ESE
O31	House of Olives	Olive cellar	48.34	ESE
O32	Tokara Cellar	Olive and wine cellar	52.55	ESE
O33	Antonji Rupert Wines	Olive and wine cellar	58.10	ESE
O34	La Bourgogne Winefarm	Olive and wine cellar	69.48	ESE
O35	Auberge Clermont	Olive and wine cellar	68.84	ESE
O36	Le Vallon Farm	Olive and wine cellar	69.68	ESE
O37	My Wyn	Olive and wine cellar	69.35	ESE
O38	Gooding's Groves Olive Farm	Olive cellar	65.22	ESE
O39	Hillcrest Wine and Olive Estate	Olive and wine cellar	22.24	SE
O40	Koopmanskloof	Olive and wine cellar	39.23	SE
O41	L'Olivier Wine & Olive Estate	Olive and wine cellar	42.71	SE
O42	Le Verger	Olive cellar	44.47	SE
O43	Kunjani Wines	Olive and wine cellar	42.25	SE
O44	Olivesinfact	Olive cellar	41.68	SE
O45	Fijndraai Cottages	Olive and wine cellar	47.38	SE
O46	Friesland Cottage	Olive cellar	53.68	SE
O47	Hidden Valley Wines	Olive and wine cellar	54.57	SE
O48	Morgenster Cellar	Olive and wine cellar	61.69	SE
O49	Gantouw Farm	Olive and wine cellar	66.92	SE

Table 5.5.B.8
Grain

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
G1	Schaftplaas	Silo bags	77.10	NNW
G2	Wolfiesfontein	Other	77.39	NNW
G3	Darling Wesgraan	Silos	33.68	N
G4	De Bron	Other	48.23	N
G5	Nutrikor Uilenkraal	Millers	51.33	N
G6	Volstruisfontein	Silos	51.57	N
G7	Enkelvlei Boerdery	Other	57.46	N

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
G8	Overberg Agri Bedrywe (Edms) Beperk Koperfontein	Silos	63.89	N
G9	Kupgat	Other	69.45	N
G10	JG Melk Brd	Silos	70.92	N
G11	BKB GrainCo Pampoenkraal	Silo bags	74.62	N
G12	Pioneer Foods	Food processing and packing	10.35	NNE
G13	Bokomo Weet-Bix (Pioneer Foods)	Food processing and packing	11.20	NNE
G14	Rondevlei Morster	Other	38.56	NNE
G15	Pioneer Foods	Millers	48.45	NNE
G16	Pioneer Foods	Millers	48.45	NNE
G17	Ruststasie Wesgraan	Silos	48.51	NNE
G18	Bovlei	Silo bags	52.35	NNE
G19	Egbertsvlei	Silo bags	58.97	NNE
G20	Bester Moreesburg Silobag Depo (Bex Group)	Silo bags / silos	61.98	NNE
G21	Overberg Agri Moreesburg	Silos	62.15	NNE
G22	Wesfed Feeds	Animal feed	62.37	NNE
G23	Swartland Oliepers	Oil production	62.31	NNE
G24	Drieootpvelei	Other	61.21	NNE
G25	Dryskop	Other	64.58	NNE
G26	BKB GrainCo Melkboom	Silo bags	68.23	NNE
G27	Moorreesburg Rollermeule	Millers	65.77	NNE
G28	Saylucar Hek3 Rooihoogte	Silos	76.24	NNE
G29	Overberg Agri Koringberg	Silos	76.02	NNE
G30	Bakoven Farm	Silo bags	78.00	NNE
G31	Lousvlei	Silo bags	78.27	NNE
G32	Sasko Pasta	Food processing and packing	34.75	NE
G33	Nova Feeds Malmesbury	Animal feed	35.56	NE
G34	Sasko Grain Malmesbury	Silos / millers	35.70	NE
G35	Malmesbury Wesgraan	Silos	35.81	NE
G36	Saambegin	Other	40.58	NE
G37	Klipfontein Bunker Silo	Grain dam	42.35	NE
G38	Nooiensfontein	Silos	49.47	NE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
G39	Voerspoed	Other	51.44	NE
G40	Group 35 Foods	Millers	55.36	NE
G41	Riebeek-Wes Wesgraan	Silos	55.52	NE
G42	Afgri Malasdam	Grain bunker	55.41	NE
G43	Farm 1042 Malmesbury	Silos	63.39	NE
G44	Overberg Agri Leliedam	Silos	67.05	NE
G45	Kaap Agri Bedryf Bpk Gouda	Silos	70.60	NE
G46	Kaap Agri Bedryf Bpk Halfmanshof	Silos	76.66	NE
G47	Boesmansfontein Farmstead	Silos	42.82	ENE
G48	Farm RE 1530 Paarl	Silos	47.96	ENE
G49	Farm 1763 Paarl	Silo bags	58.74	ENE
G50	Quenti Alpaca & Mill	Millers	58.72	ENE
G51	Boland Meule	Millers	56.16	ENE
G52	Lange Hoogte Farm	Silo bags	57.68	ENE
G53	Mr. Smuts	Millers	60.88	ENE
G54	Farm RE_400 Tulbagh	Silo bags	73.39	ENE
G55	Eldorado Farm Tulbagh	Silo bags	79.76	ENE
G56	Farm RE_417 Tulbagh	Silo bags	77.23	ENE
G57	De Goede Ontmoeting Farm	Silo bags	16.60	E
G58	Kaap Agri Bedryf Bpk Klipheuwel	Silos	25.21	E
G59	Afgri Animal Feed	Animal feed	25.01	E
G60	Dundarach Poultry Farm	Silos (animal feed)	35.13	E
G61	Grainco	Oilseed production	51.03	E
G62	Distell	Maize and barley processing	50.82	E
G63	Sasko Paarl Miller	Millers / silos	50.79	E
G64	Meadow Feed Mills	Millers	50.53	E
G65	Nibbly Bits	Food processing and packing	50.57	E
G66	Vitaline Feeds	Animal feed	52.06	E
G67	Weest Kloof Farm Paarl	Silo bags	55.46	E
G68	Afgri Animal Feeds Western Cape	Animal feed	13.80	ESE
G69	Equi-Feeds	Animal feed	28.57	ESE
G70	Afgri Eensgezindt Bunker	Grain dam	25.52	ESE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
G71	Profile Feeds	Animal feed	45.88	ESE
G72	Tiger Brands Distributors Albany Bakeries Bellville	Food processing and packing	33.94	SE
G73	Tongaat Hulett Starch Bellville	Millers	32.76	SE
G74	Tiger Brands Milling Western Cape (Golden Cloud)	Millers	31.03	SE
G75	Bester Voer & Graan - Moorreesburg Sak Depot	Silo bags	49,42	SE
G76	Renoil	Oil production	64.05	SE
G77	Amaro Foods	Food processing and packing	19.45	SSE
G78	Artisan Breads	Food processing and packing	21.96	SSE
G79	Bokomo Foods	Food processing and packing	28.48	SSE
G80	Alpen Food Company	Food processing and packing	28.26	SSE
G81	Tiger Brands Maitland	Silos / Agro processing plant	28.08	SSE
G82	Albany Bakery	Food processing and packing	28.21	SSE
G83	Sasko Epping Mill	Millers	30.37	SSE
G84	Cape Grain Milling	Millers	35.97	SSE
G85	Premier Foods Salt River Mill	Millers	28.22	S
G86	Sasko Enterprise	Food processing and packing	34.72	S
G87	Compas Bakery	Food processing and packing	51.25	S

Table 5.5.B.9
Meat

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
M1	Moorreesburg Abattoir	Abattoir	57.89	NNE
M2	Roelcor Abattoir	Abattoir	35.18	NE
M3	G & H Verwerking	Cool chain facilities	36.01	NE
M4	Swartland Ostrich (Roelcor Holdings)	Abattoir	35.34	NE
M5	Okin (Pty) Ltd	Meat suppliers	35.35	NE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
M6	Deli Co Abattoir	Abattoir	60.11	NE
M7	Tomis	Abattoir	63.02	ENE
M8	Dundarach Poultry Farm	Meat processing	37.69	E
M9	Real Meat Co	Meat suppliers	55.00	E
M10	Paarl Abattoir	Abattoir	55,62	E
M11	DC Meat	Meat processing	60.02	E
M12	Phisantekraal Boerdery	Abattoir	25.40	ESE
M13	4 Meats	Meat suppliers	33.87	ESE
M14	Woodys Consumer Brands	Meat suppliers	34.21	ESE
M15	Drakenstein Red Meat	Abattoir	60.02	ESE
M16	Paarl South	Abattoir	58.52	ESE
M17	Hartlief Cape Depot	Meat processing and packaging	32.59	SE
M18	Finlar Foods	Meat processing	32.70	SE
M19	Britos Meat	Meat suppliers	32.53	SE
M20	Winelands Pork	Abattoir	32.54	SE
M21	Desert Meat Co	Meat suppliers	32.57	SE
M22	Freshers Meat	Meat suppliers	38.82	SE
M23	Groenland Meat Traders and Abattoir	Abattoir	74.81	SE
M24	Assured Services	Meat suppliers	18.03	SSE
M25	Cape Continental Meats	Meat processing and packaging	18.28	SSE
M26	Crown National	Meat processing and packing	21.07	SSE
M27	Al Almien Foods	Meat suppliers	20.75	SSE
M28	Trade Meat Supplies CC	Meat suppliers	20.70	SSE
M29	Tasty Cold Meats	Processed meat manufacturing	20.65	SSE
M30	Rich Meat	Meat suppliers	19.71	SSE
M31	Blaauwberg Cold Storage and Meat Specialities	Cool chain facilities	19.64	SSE
M32	Mr Fresh Meats	Meat suppliers	25.73	SSE
M33	Anchor Foods	Processed meat manufacturing	25.37	SSE
M34	Excellent Meat	Meat suppliers	27.50	SSE
M35	Good Hope Meats	Meat suppliers	32.10	SSE

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
M36	Mountain Meat Traders	Meat processing	30.72	SSE
M37	Gastro Foods	Meat processing	31.08	SSE
M38	Freezerland Frozen Foods	Cool chain facilities	35.61	SSE
M39	Busy Corner Meat Wholesalers	Meat processing	33.97	SSE
M40	Emanon	Meat suppliers	33.81	SSE
M41	Supreme Halaal Meat Products	Meat suppliers	32.98	SSE
M42	Airport Meats	Cool chain facilities	33.51	SSE
M43	Liben Meats	Meat suppliers	25.02	S
M44	San Giorgio's Meat Products	Meat suppliers	40.22	S

Table 5.5.B.10
Freshwater Aquaculture

NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
A1	To Be Confirmed ⁸³	Aquaculture farm	66.47	NE
A2	To Be Confirmed ⁸⁴	Aquaculture farm	60.83	ENE
A3	Cape Olive	Aquaculture farm	60.07	E
A4	Molapong - De Poort	Aquaculture farm	65.75	E
A5	Molapong Trout Farm (Fisantekraal)	Aquaculture farm	71.36	E
A6	Du Kloof Lodge	Aquaculture farm	72.33	E
A7	Little Stream Farm	Aquaculture farm	4.51	ESE
A8	Nembwe	Aquaculture farm	41.25	ESE
A9	Western Cape Government Elsenburg	Aquaculture farm	43.27	ESE
A10	Le Bonheur	Aquaculture farm	53.39	ESE
A11	La Ferme - Fly Fishing	Aquaculture farm	63.96	ESE
A12	Three Streams Smokehouse	Processing facilities	73.13	ESE
A13	Three Streams Trout Farm	Aquaculture farm	72.99	ESE

⁸³ The name of this farm was not included in the list obtained from Elsenburg. The name must still be verified by means of a site visit and will be included in the next revision of this DSSR.

⁸⁴ As above.

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NO.	NAME OF ENTITY / FACILITY	TYPE OF FACILITY	DISTANCE (km)	DIRECTION
A14	US Jonkershoek	Aquaculture farm	57.20	SE
A15	Schoneberg Koi Farm	Aquaculture farm	62.32	SE
A16	Lourensford	Aquaculture farm	61.33	SE
A17	Constantiaberg Emporium & Smokehouse	Processing facilities	32.65	SSE

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Appendix 5.5.C Market Distribution of Agricultural Produce

The volume of selected agricultural products that enter the respective distribution channels in relation to the municipalities located within and partly within the site region are presented in the following **Tables 5.5.C.1 to 5.5.C.4** (Planning Partners, 2021).

**Table 5.5.C.1
Market Distribution of Selected Citrus Fruits per Municipality**

Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Oranges						
Bergrivier	966	21	2 675	8 567	-	12 229
Breede Valley	-	-	-	1	-	1
City of Cape Town	-	-	2 294	3 882	-	6 176
Drakenstein	99	-	-	122	-	221
Witzenberg	-	-	56	68	-	124
Total	1 065	21	5 025	12 640	-	18 751
Lemons						
Bergrivier	1	142	-	819	-	962
Breede Valley	-	-	869	880	-	1 749
City of Cape Town	-	-	713	1 611	-	2 324
Drakenstein	2 401	5	402	3 271	-	6 079
Stellenbosch	106	26	105	2 919	-	3 156

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Swartland	-	-	196	850	-	1 046
Theewaterskloof	56	-	-	789	-	845
Witzenberg	1 231	-	22	139	-	1 392
Total	3 795	173	2 307	11 278	-	17 553
Naartjies						
Bergrivier	96	-	-	11 647	1	11 744
Breede Valley	-	-	-	901	-	901
City of Cape Town	-	-	-	3	-	3
Drakenstein	869	-	-	2 257	-	3 126
Stellenbosch	-	-	-	969	-	969
Swartland	-	-	-	436	26	462
Theewaterskloof	-	-	-	4 617	-	4 617
Witzenberg	-	-	10	-	-	10
Total	965	-	10	20 830	27	21 832
Grapefruit						
Stellenbosch	68	-	6 732	1 237	-	8 039
Other soft citrus or easy peelers						
Bergrivier	3	119	63	6 063	-	6 248
Breede Valley	248	248	662	8 868	-	10 026
City of Cape	164	-	212	441	-	817

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Town						
Drakenstein	-	-	101	3 332	-	3 433
Stellenbosch	-	-	-	105	-	105
Theewaterskloof	8	-	-	-	-	8
Witzenberg	-	1 051	67	1 219	-	2 337
Total	423	1 418	1 105	20 028	0	22 974

Table 5.5.C.2
Market Distribution of Selected Deciduous Fruits per Municipality

Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Apples						
Bergvriër	985	8 610	-	1 200	419	11 214
Breede Valley	452	136	702	2 928	30	4 248
City of Cape Town	-	8 054	-	-	-	8 054
Drakenstein	2 625	-	3 996	6 704	-	13 325
Overstrand	-	-	558	1 065	-	1 623
Stellenbosch	144	341	238	38	-	761

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Theewaterskloof	34 845	32 077	107 948	178 053	5 464	358 387
Witzenberg	35 398	74 221	61 601	156 298	654	328 172
Total	74 449	123 439	175 043	346 286	6 567	725 784
Pears						
Bergervier	3 839	11	-	1 326	-	5 176
Breede Valley	602	384	5 124	3 859	-	9 969
City of Cape Town	-	-	-	6 710	-	6 710
Drakenstein	2 021	-	4 655	6 654	-	13 330
Overstrand	-	-	120	610	-	730
Stellenbosch	88	264	29	3 399	-	3 780
Theewaterskloof	5 699	5 592	19 984	33 463	1 401	66 139
Witzenberg	31 236	6 304	42 460	102 735	2 019	184 754
Total	43 485	12 555	72 372	158 756	3 420	290 588
Peaches						
Bergervier	144	530	-	146	-	820
Breede Valley	1 129	957	9 137	269	15	11 507
City of Cape Town	-	-	955	-	-	955
Drakenstein	342	17	377	1 168	-	1 904
Stellenbosch	158	371	-	293	105	927

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Swartland	629	-	-	270	-	899
Theewaterskloof	119	-	517	153	29	818
Witzenberg	8 958	4 391	27 745	10 354	793	52 241
Total	11 479	6 266	38 731	12 653	942	70 071
Plums						
Bergrivier	130	24	-	891	-	1 045
Breede Valley	3 978	15	596	1 658	5	6 252
City of Cape Town	-	-	2 671	-	-	2 671
Drakenstein	3 564	619	244	7 817	-	12 244
Stellenbosch	690	255	52	5 315	-	6 312
Theewaterskloof	374	97	26	1 302	445	2 244
Witzenberg	1 775	1 443	1 795	11 869	24	16 906
Total	10 511	2 453	5 384	28 852	474	47 674
Table Grapes						
Bergrivier	640	-	1 585	36 225	-	38 450
Breede Valley	1 627	7 920	11 407	73 354	2 233	96 541
City of Cape Town	24	-	-	3 627	51	3 702
Drakenstein	2 133	778	2 162	9 014	-	14 087
Stellenbosch	-	186	449	2 063	-	2 698

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Witzenberg	1 018	-	-	2 315	-	3 333
Total	5 442	8 884	15 603	126 598	2 284	158 811
Wine Grapes						
Bergervier	-	900	1 050	5 141	-	7 091
Breede Valley	-	14 225	242 793	5 850	2 094	264 964
City of Cape Town	-	1 216	22 576	-	767	24 559
Drakenstein	-	5 345	30 335	1 834	277	37 791
Overstrand	-	80	1 627	99	-	1 806
Stellenbosch	-	5 552	45 305	705	10 518	62 081
Swartland	-	-	9 878	-	2 843	12 721
Theewaterskloof	-	-	4 697	-	-	4 697
Witzenberg	-	-	12 101	-	-	12 101
Total		27 319	370 363	13 629	16 499	427 810

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Table 5.5.C.3
Market Distribution of Selected Sub-tropical Fruits per Municipality

Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Avocados						
Witzenberg	-	277	-	32	-	309
Berries						
Bergrivier	-	-	47	190	-	237
City of Cape Town	-	-	-	30	-	30
Drakenstein	736	200	1 399	-	619	2 954
Overstrand	331	717	-	-	331	1 379
Stellenbosch	504	1 026	128	40	-	1 698
Theewaterskloof	-	96	-	111	-	207
Witzenberg	-	-	-	37	-	37
Total	1 571	2 039	1 574	408	950	6 542
Melons						
Bergrivier	-	134	-	-	-	134
Breede Valley	437	-	-	-	738	1 175
Drakenstein	68	25	7	-	-	100
Swartland	-	900	-	-	-	900
Total	505	1 059	7	-	738	2 309

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Table 5.5.C.4
Market Distribution of Selected Vegetables per Municipality

Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Beetroot						
Breede Valley	480	950	234	234	-	1 898
City of Cape Town	1 542	1 294	308	308	61	3 513
Drakenstein	-	-	80	-	-	80
Overstrand	14	1	-	-	-	15
Total	2 036	2 245	622	542	61	5 506
Butternut						
Breede Valley	3 715	738	175	1 334	293	6 255
City of Cape Town	161	154	51	-	-	366
Drakenstein	39	705	509	1 645	-	2 898
Overstrand	7	-	-	-	6	13
Theewaterskloof	168	-	-	-	-	168
Witzenberg	2 500	-	-	2 360	59	4 919
Total	6 590	1 597	735	5 339	358	14 619
Cabbage						
Breede Valley	266	31	233	-	-	530
City of Cape	1 813	467	142	143	10	2 575

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Town						
Drakenstein	783	1 254	391	391	-	2 819
Overstrand	2 021	25	-	-	-	2 046
Stellenbosch	176	-	-	-	-	176
Swartland	-	149	-	-	-	149
Theewaterskloof	-	-	180	-	-	180
Witzenberg	271	9	-	-	-	280
Total	5 330	1 935	946	534	10	8 755
Carrots						
Breede Valley	1 590	-	-	-	-	1 590
City of Cape Town	8 094	3 078	437	871	20	12 500
Drakenstein	657	2 332	333	672	-	3 994
Overstrand	-	15	-	-	-	15
Stellenbosch	617	17	-	-	-	634
Witzenberg	2 516	3 142	-	-	-	5 658
Total	13 474	8 584	770	1 543	20	24 391
Green Beans						
City of Cape Town	3	-	-	-	-	3
Overstrand	3	-	-	-	-	3

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Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Stellenbosch	40	20	20	-	-	80
Theewaterskloof	11	-	-	-	-	11
Witzenberg	1	-	-	-	-	1
Total	58	20	20	-	-	98
Onions						
Breede Valley	31 199	125	-	-	100	31 424
City of Cape Town	-	10	-	-	10	20
Overstrand	-	3	-	-	-	3
Swartland	2 448	1 989	-	661	-	5 098
Theewaterskloof	523	47	-	-	-	570
Witzenberg	86 050	21 721	-	10 421	3 535	121 727
Total	120 220	23 895	-	11 082	3 645	158 842
Peppers						
Bergervier	-	-	-	-	21	21
City of Cape Town	-	5	-	-	5	10
Drakenstein	12	-	-	-	-	12
Overstrand	10	-	-	-	-	10
Stellenbosch	-	400	-	-	-	400
Swartland	49	-	-	-	-	49

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	LAND AND WATER USE		5.5-251

Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Witzenberg	565	-	-	-	1 132	1 697
Total	636	405	-	-	1 158	2 199
Potatoes						
Bergervier	30 256	2 572	10 978	-	-	43 806
City of Cape Town	1 223	308	-	102	20	1 653
Drakenstein	2 383	983	-	313	-	3 679
Overstrand	-	15	-	-	-	15
Saldanha Bay	180	-	-	-	-	180
Swartland	3 605	-	8 845	-	-	12 450
Witzenberg	11 269	6 283	8 386	5 708	1 701	33 347
Total	48 916	10 161	28 209	6 123	1 721	95 130
Pumpkins						
Breede Valley	645	125	25	-	27	822
City of Cape Town	41	82	41	-	-	164
Drakenstein	78	78	-	-	-	156
Overstrand	-	13	-	-	-	13
Theewaterskloof	135	-	-	-	-	135
Witzenberg	423	263	-	248	127	1 061
Total	1 322	561	66	248	154	2 351

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	LAND AND WATER USE		5.5-252

Municipality	Fresh produce market	Direct to retailers & chain stores	Processing factories	Exported	Direct sales from farmer to consumer	Total
Metric Tons						
Sweet Potatoes						
Drakenstein	596	281	266	-	-	1 143
Overstrand	-	15	-	-	-	15
Swartland	1 177	-	-	4 715	-	5 892
Total	1 773	296	266	4 715	-	7 050
Tomatoes						
Breede Valley	382	64	-	-	51	497
City of Cape Town	44	759	88	-	10	901
Drakenstein	692	4 289	2 000	-	-	6 981
Overstrand	-	15	-	-	-	15
Swartland	19	421	-	-	-	440
Total	1 137	5 548	2 088	-	61	8 834

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Appendix 5.5.D

Regulated Informal Trading Bays and Goods & Services (20 km)⁸⁵

NAME	TYPE OF GOODS	DISTANCE (km)	DIRECTION
Otto Du Pessis and Melkbosstrand Bay 003	Dried Fish	5.97	SSE
	Foods		
	Garden Material & Accessories		
	Plants		
	Wood		
Otto Du Pessis and Melkbosstrand Bay 004	Arts & Crafts	5.97	SSE
	Flowers		
	Foods		
	Plants		
Otto Du Pessis and Melkbosstrand Bay 005	Fruit & Veg	5.97	SSE
Otto Du Pessis and Melkbosstrand Bay 006	Beverages	5.97	SSE
	Biltong		
	Braai Equipment		
	Herbs & Spices		
	Prepared Foods		
	Sauces & Condiments		
	Snacks		
	Wood		
Otto Du Pessis and Melkbosstrand Bay 010	Arts & Crafts	5.97	SSE
	Leather Goods		
Otto Du Pessis and Melkbosstrand Bay 012	Beverages	5.97	SSE
Avondale - Atlantis Westfleur Pavement Bay 001	Arts & Crafts	13.96	NNE
	Clothing		
	Plants		
Avondale - Atlantis Westfleur Pavement Bay 002	Clothing	13.96	NNE
	Foods		
	Toys & Games		

⁸⁵ (City of Cape Town, 2020f)

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	LAND AND WATER USE		5.5-254

NAME	TYPE OF GOODS	DISTANCE (km)	DIRECTION
Avondale - Atlantis Westfleur Pavement Bay 003	Clothing	13.96	NNE
	Linen		
Avondale - Atlantis Westfleur Pavement Bay 004	Beverages	13.96	NNE
	Clothing		
	Gifts		
Avondale - Atlantis Westfleur Pavement Bay 005	Beverages	13.96	N
	Foods		
Avondale - Atlantis Westfleur Pavement Bay 007	Arts & Crafts	13.96	NNE
	Clothing		
	Dried Fruit		
	Herbs & Spices		
	Leather Goods		
Avondale - Atlantis Westfleur Pavement Bay 009	Foods	13.96	NNE
Avondale - Atlantis Westfleur Pavement Bay 012	Clothing	13.96	NNE
	Soft Goods		
	Sweets		
	Toilet Paper		
Avondale - Atlantis Westfleur Pavement Bay 014	Carpets & Rugs	13.96	NNE
	Clothing		
	Foods		
	Footwear		
	Herbs & Spices		
	Toilet Paper		
Avondale - Atlantis Westfleur Pavement Bay 018	Clothing	13.96	NNE
	Flowers		
	Jewellery		
	Sweets		
	Toilet Paper		
Avondale - Atlantis Westfleur Pavement Bay 019	Clothing	13.96	NNE
	Fruit & Veg		
	Groceries		
Avondale - Atlantis Westfleur Pavement Bay 020	Fruit & Veg	13.96	NNE

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NAME	TYPE OF GOODS	DISTANCE (km)	DIRECTION
Avondale - Atlantis Westfleur Pavement Bay 021	Clothing	13.96	NNE
	Soft Goods		
Avondale - Atlantis Westfleur Pavement Bay 022	Clothing	13.96	NNE
	Cosmetics		
	Dried Fish		
	Fruit & Veg		
	Groceries		
Avondale - Atlantis Westfleur Pavement Bay 023	Clothing	13.96	NNE
	Dried Fruit		
	Footwear		
	Herbs & Spices		
	Linen		
	Perfumes		
	Toys & Games		
Avondale - Atlantis Westfleur Pavement Bay 024	Foods	13.96	NNE
	Fruit & Veg		
Avondale - Atlantis Westfleur Pavement Bay 025	Clothing	13.96	NNE
	Footwear		
	Linen		
Avondale - Atlantis Westfleur Pavement Bay 026	Dairy	13.96	NNE
	Fruit & Veg		
	Sauces & Condiments		
Avondale - Atlantis Westfleur Pavement Bay 027	Fruit & Veg	13.96	NNE
Avondale - Atlantis Westfleur Pavement Bay 028	Dried Fish	13.96	NNE
	Fruit & Veg		
Avondale - Atlantis Westfleur Pavement Bay 029	Clothing	13.96	NNE
	Cosmetics		
	Crockery		
	Footwear		
	Jewellery		
	Linen		

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NAME	TYPE OF GOODS	DISTANCE (km)	DIRECTION
Avondale - Atlantis Westfleur Pavement Bay 030	Clothing	13.96	NNE
	Dried Fish		
	Snacks		
	Toilet Paper		
Parklands - Sandown Rd & Whitehall Way - Bay 001	Wood	14.89	SSE
Parklands - Sandown Rd & Whitehall Way - Bay 002	Grass	14.89	SSE
	Wood		
	Wooden Products		
Parklands - Sandown Rd & Whitehall Way - Bay 003	Grass	14.89	SSE
	Wooden Products		
Parklands - Sandown Rd & Whitehall Way - Bay 006	Grass	14.89	SSE
	Wooden Products		
Parklands - Main Rd & Link Rd Bay 002	Fruit & Veg	16.65	SSE
Parklands - Main Rd & Link Rd Bay 003	Books	16.65	SSE
	Clothing		
Parklands - Main Rd & Link Rd Bay 004	Wood	16.65	SSE
Killarney - Potsdam and Blaauwberg Rd Bay 001	Beverages	19.48	SSE
	Clothing		
	Crockery		
	Foods		
	Sweets		
Killarney - Potsdam and Blaauwberg Rd Bay 008	Beverages	19.48	SSE
	Cakes & Biscuits		
	Cigarettes		
	Fruit & Veg		
	Sweets		
Killarney - Potsdam and Blaauwberg Rd Bay 011	Clothing	19.48	SSE
	Computer Accessories		
	Crockery		
	Electrical & Electronic Goods		
	Second Hand Goods		

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NAME	TYPE OF GOODS	DISTANCE (km)	DIRECTION
Killarney - Potsdam and Blaauwberg Rd Bay 025	Beverages	19.48	SSE
	Cell Phone Merchandise		
	Cigarettes		
	Fruit & Veg		
	Sweets		
Killarney - Potsdam and Blaauwberg Rd Bay 029	Fruit & Veg	19.48	SSE
Killarney - Potsdam and Blaauwberg Rd Bay 030	Beverages	19.48	SSE
	Cigarettes		
	Fruit & Veg		
	Sweets		
Killarney - Potsdam and Blaauwberg Rd Bay 032	Foods	19.48	SSE
	Prepared Foods		

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Appendix 5.5.E Annular Land Cover within the Site EPZs

Land Cover Category	Area	0 km - 5 km	5 km - 16 km	16 km - 80 km	Total
Barren land	Ha	301.24	882.37	16 960.85	18 144.46
	%	7.19%	2.11%	1.62%	1.66%
Built-up commercial	Ha	6.73	91.93	3 021.84	3 120.49
	%	0.16%	0.22%	0.29%	0.29%
Built-up industrial	Ha	31.76	141.26	3 180.83	3 353.85
	%	0.76%	0.34%	0.30%	0.31%
Built-up residential (all)	Ha	201.83	2 266.01	6 0141.49	62 609.32
	%	4.81%	5.41%	5.76%	5.74%
Built-up smallholdings	Ha	2.17	135.79	5 034.0	5 172.06
	%	0.05%	0.32%	0.48%	0.47%
Cultivated commercial annual pivot irrigated	Ha	0.00	0.00	5 162.82	5 162.82
	%	0.00%	0.00%	0.49%	0.47%
Cultivated commercial annual non-pivot	Ha	33.47	9 594.28	343 359.81	352 987.56
	%	0.80%	22.90%	32.88%	32.38%
Cultivated commercial permanent orchards	Ha	0.00	51.70	18 679.09	18 730.79
	%	0.00%	0.12%	1.79%	1.72%
Cultivated commercial permanent vines	Ha	0.00	622.70	52 968.42	53 591.12
	%	0.00%	1.49%	5.07%	4.92%
Cultivated subsistence	Ha	0.00	0.00	42.85	42.85
	%	0.00%	0.00%	0.00%	0.00%
Eroded land	Ha	0.00	0.00	211.19	211.19
	%	0.00%	0.00%	0.02%	0.02%
Grasslands	Ha	47.82	744.78	44 531.54	45 324.14
	%	1.14%	1.78%	4.26%	4.16%
Indigenous forest	Ha	0.00	0.00	605.29	605.29
	%	0.00%	0.00%	0.06%	0.06%
Mines	Ha	6.10	235.30	1 381.29	1 622.68
	%	0.15%	0.56%	0.13%	0.15%
Natural wooded land	Ha	105.71	924.61	31 543.16	32 576.98
	%	2.52%	2.21%	3.02%	2.99%
Planted forest	Ha	0.00	353.34	15 017.77	15 371.11
	%	0.00%	0.84%	1.44%	1.41%
Shrubland	Ha	3 365.75	25 046.83	403 374.89	431 787.47

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Land Cover Category	Area	0 km - 5 km	5 km - 16 km	16 km - 80 km	Total
	%	80.29%	59.78%	38.63%	39.60%
Thicket dense bush	Ha	3.70	36.99	10 433.36	10 474.05
	%	0.09%	0.09%	1.00%	0.96%
Waterbodies	Ha	3.64	45.13	11 020.81	11 069.58
	%	0.09%	0.11%	1.06%	1.02%
Wetlands	Ha	77.70	724.69	17 515.27	18 317.66
	%	1.85%	1.73%	1.68%	1.68%
TOTAL	Ha	4 191.09	41 897.70	1 044 186.66	1 090 275.45

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