

DRAFT 3rd GENERATION INTEGRATED WASTE MANAGEMENT PLAN REVIEW 2020/21



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CAPE AGULHAS MUNICIPALITY
INTEGRATED WASTE MANAGEMENT PLAN

Draft Third Generation Review

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1 Cover photo source: https://en.wikipedia.org/wiki/Cape_Agulhas

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Abbreviations

AQMP	Air Quality Management Plan
COD	Chemical Oxygen Demand in mg/ℓ
DEA	Department of Environmental Affairs
DEA&DP	Department of Environmental Affairs and Development Planning
DEAT	Department of Environment Affairs & Tourism
DMC	District Municipal Council
DoE	Department of Education
DWAF	Department of Water Affairs & Forestry
DWS	Department of Water and Sanitation
eWASA	e-Waste Association of South Africa
HCGW	Health Care General Waste
HCRW	Health Care Risk Waste
HDPE	High Density Polyethylene
IDP	Integrated Development Plan
IIWTMP	Integrated Industrial Waste Tyre Management Plan
IndWMP	Industry Waste Management Plan
iPWIS	Integrated Pollution and Waste Information System
IWMP	Integrated Waste Management Plan
IWS	Integrated Waste System
Kg	kilogram
Kℓ	kilolitre
ℓ	Litre
m ³ pa	cubic meter per annum
MRF	Material Recovery Facility
MSW	Municipal Solid Waste
NEMA	National Environmental Management Act
NEM:WA	National Environmental Management Waste Act
NPSWM	National Pricing Strategy for Waste Management
NWMS	National Waste Management Strategy
PSDF	Provincial Spatial Development Framework
RDP	Reconstruction and Development Programme
REDISA	Recycling and Economic Development Initiative of South Africa
SAWIS	South African Waste Information System
TMG	Table Mountain Group
tpa	ton per annum
VWMF	Vissershok Waste Management Facility
WCCGESF	Western Cape Green Economy Strategy Framework
WDF	Waste Drop-off Facility
WDS	Waste Disposal Site
CAM	Cape Agulhas Municipality
ODM	Overberg District Municipality

Standards used in Report:

- 1 kg = 1ℓ
- 1 kℓ = 1 m³ = 1 ton
- Weight of 1 laser ink cartridge = ca 500 g
- Weight of 1 empty 500 ml oil tin = ca 86 g
- Weight of 1 empty 5 ℓ paint tin = ca 500 g
- Weight of 1 empty 20 ℓ plastic drum = ca 1 kg
- Weight of 1 general car tyre = ca 5 kg (to 10 kg)

CAPE AGULHAS MUNICIPALITY

INTEGRATED WASTE MANAGEMENT PLAN

1. PREFACE

1.1 INTRODUCTION

The third version of the Integrated Waste Management Plan (IWMP) has been formulated by Chand Environmental Consultants cc (Chand) on behalf of Cape Agulhas Municipality to address the challenge of waste management in Cape Agulhas, home to 33,038 people. The IWMP is a statutory requirement of the National Environmental Management: Waste Act, 2008 (NEM:WA, Act No. 59 of 2008) that has been promulgated and came into effect on 1 July 2009 and that has as its goal the transformation of the current methodology of waste management, i.e. collection and disposal, to a sustainable practice focusing on waste avoidance and environmental sustainability. Implementation of this IWMP will be through municipal by-laws and in accordance with an implementation schedule. The purpose of the 2020 revision of the 3rd Generation IWMP, is to update the IWMP with the changing environment and keeping the working document current.

The primary objective of integrated waste management (IWM) planning is to integrate and optimise waste management, in order to maximise efficiency and minimise the associated environmental impacts and financial costs, and to improve the quality of life of all residents within Cape Agulhas Municipality.

The Plan takes particular note of importance of local authority waste management planning. This document underlines the following principles of the National Waste Management Strategy:

- The prevention of waste generation;
- The recovery of waste of which the generation cannot be prevented; and
- The safe disposal of waste that cannot be recovered.

The Plan will address all areas of waste management – from waste prevention and minimisation (waste avoidance), to its collection, storage, transport, treatment, recovery and final disposal. It will not only address the practicalities of waste management, but also the issues of public education and changing concepts, as these are vital to a successful management system.

1.2 GENERAL DESCRIPTION

Cape Agulhas Municipality is the southern most local authority in South Africa and is an area noted for its wheat, sheep and “veldblom” farming. The Cape Agulhas Municipality was established in December 2000 through the amalgamation of the former municipalities and towns of Bredasdorp, Napier, Struisbaai, L’Agulhas, Waenhuiskrans (also called Arniston) and Elim.

Refer to Figure 1 for a Plan of the Study Area.

1.2.1 Topography

The municipal area is relatively flat, except for the area west and north of Bredasdorp which has the typical rolling hills of the Overberg. The southern area slopes towards the ocean and has a slow drainage due to the flat gradient.

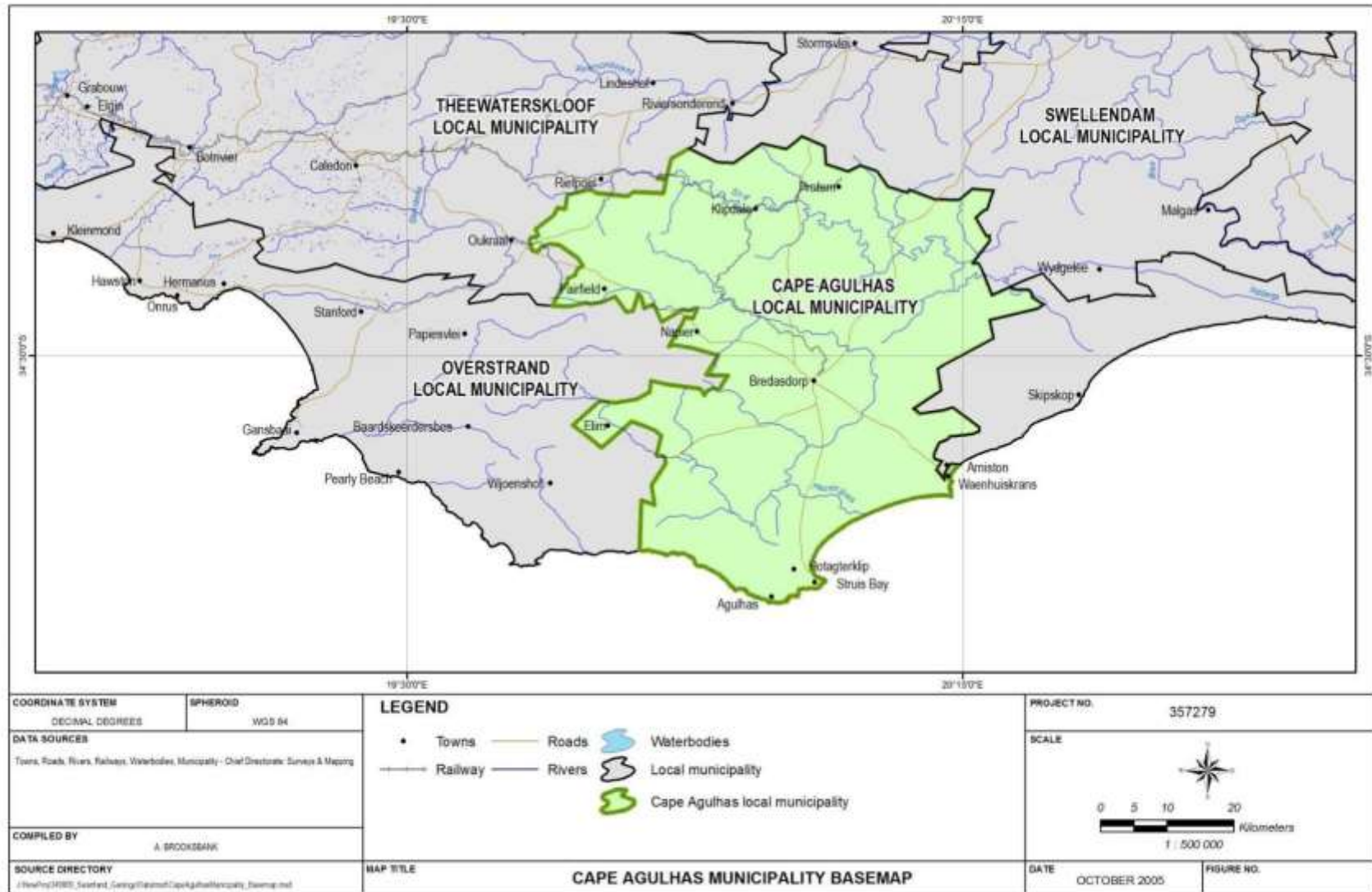


Figure 1. Study Area- Cape Agulhas Municipality

1.2.2 Geology

1.2.2.1 Geology

The Agulhas Municipal area is underlain by rocks and sediments of four geological formations which are, in chronological order, the Malmesbury, Table Mountain, and Bokkeveld Groups as well as the Bredasdorp Formation. Refer to Figure 2.

The Malmesbury Group rocks only outcrop in two small areas, one just to the west of Bredasdorp and the other to the north-west of Agulhas. These rocks are very old, >600 million years, and comprise meta-sediments such as phyllitic shale. They occupy 1% of the area.

The Table Mountain Group (TMG) rocks predominantly comprise resistant quartzitic sandstones and form the range of the Soetmuis and Heuning Berg between Napier and Bredasdorp. These mountains form a southern branch of the Cape Fold Belt. Although the outcrop area is relatively small, these rocks underlie the whole of the coastal plane at varying depths of up to ~100 m. They outcrop again along the coast between Struisbaai and the western boundary of the area and form the southernmost tip of Africa. They also underlie the inland areas, but at much greater depths. These rocks occupy about 10% of the area.

The Bokkeveld Group rocks occupy the largest area, some 60%, and comprise an alternating sequence of shales and sandstones. However, in this area the sandstones are poorly developed compared to further west. This lithology gives rise to the characteristic rolling hilly topography of the Overberg wheat land areas.

The Bredasdorp Formation forms an important component of the southern part of the area and comprises sand, calcrete, calcarenite and a basal conglomerate. It occupies 29% of the area.

A number of fairly large faults cut the TMG of the Napier-Bredasdorp Mountains, trending northeast-southwest and east-west. Extensive faulting has also been inferred from geophysics in the TMG of the coastal plain area north of Agulhas.

1.2.2.2 Groundwater

In broad terms, any aquifers developed in rocks of the Malmesbury, Table Mountain and Bokkeveld Groups will be of the fractured or secondary type, which are shown as shades of green in Figure 3. Aquifers developed in the unconsolidated to semi-consolidated sediments of the Bredasdorp Group will be of the inter-granular or primary type and are coloured shades of mauve in Figure 3.

In the fractured rock aquifers, the TMG Aquifers have the highest potential and are recognized as one of the best aquifers in South Africa. However, they have limited outcrop in the area and also have limited accessibility due to the rugged mountainous topography developed by the resistant quartzitic sandstones. Relatively large scale groundwater abstraction from this aquifer for municipal use occurs near Bredasdorp (0.2 million m³/a) and at Struisbaai (0,45 million m³/a).

The Bokkeveld rocks form a poor aquifer in the area because of their predominantly shale-like nature, low recharge and poor water quality. This rock type covers the bulk of the area. This “aquifer” is rated as b1 on the DWAF hydrogeological map, which means that median borehole yields are <0.1 l/s. Its exploitation is mainly limited to stock watering and farm domestic use.

The Bredasdorp Aquifer is an important source of groundwater for the towns of Struisbaai, Agulhas and Suiderstrand. The main aquifer development is in the basal conglomerate, which is present in channels within the underlying TMG rocks. Production boreholes at Agulhas and Suiderstrand abstract ~160 000 m³/a from this aquifer.

The best quality groundwater (refer to Figure 4) is found in the TMG and Bredasdorp Aquifers in the Soetmuis and Heuning Berg and in the coastal plain area south of Bredasdorp. This groundwater generally has an electrical conductivity (EC) of <70 mS/m. To the east, west and north of this area the quality deteriorates, particularly in the Proteem and Klipdale area, where the EC exceeds 1000 mS/m.

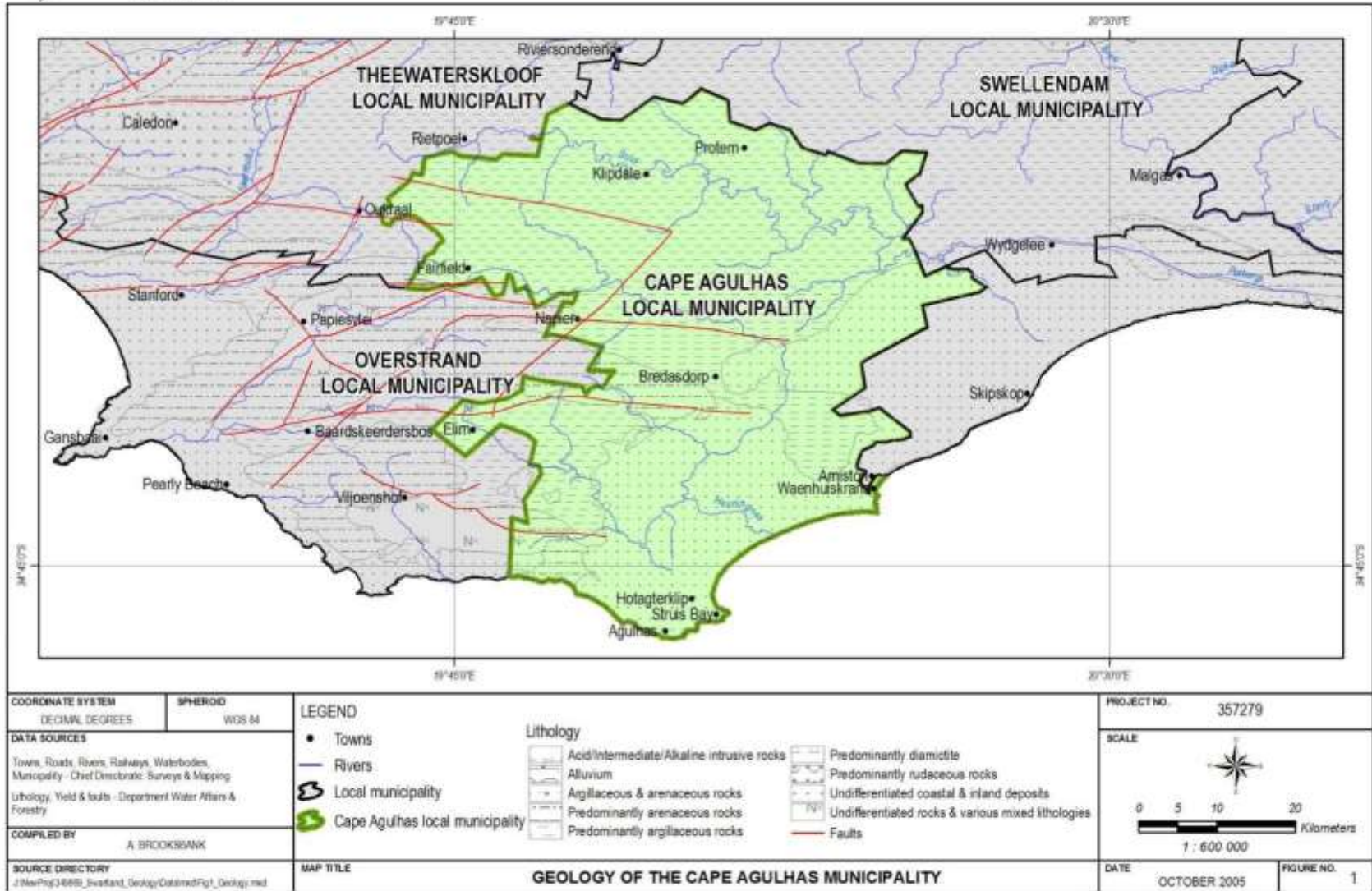


Figure 2. Geology of Cape Agulhas Municipal Area

1.2.3 Hydrology

The Cape Agulhas municipal area consists of the typical Overberg “rolling hills” to the north of Bredasdorp and a coastal plain to the south (refer to Figure 3). The coastal plain has almost no slope and has a number of vleis, e.g. Voëlvlei, Soetendalsvlei, Karsriviervlei and De Hoopsvlei. The Heunings River reaches the sea between Struisbaai and Waenhuiskrans. Due to the flat gradient of the coastal plain the drainage of the area after a rain storm is extremely slow and the water may remain as surface water for months.

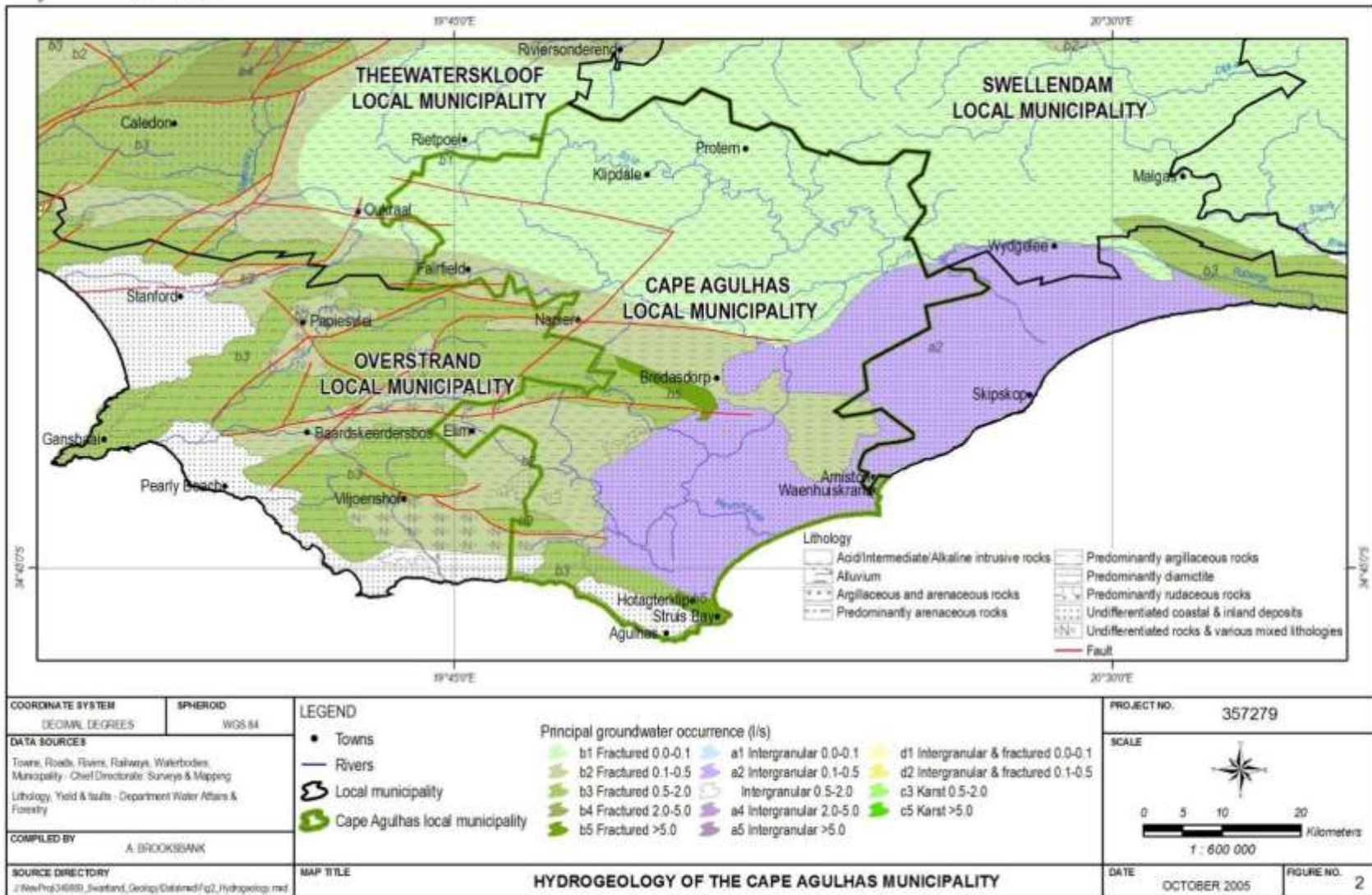


Figure 3. Hydrology of Cape Agulhas Municipal Area

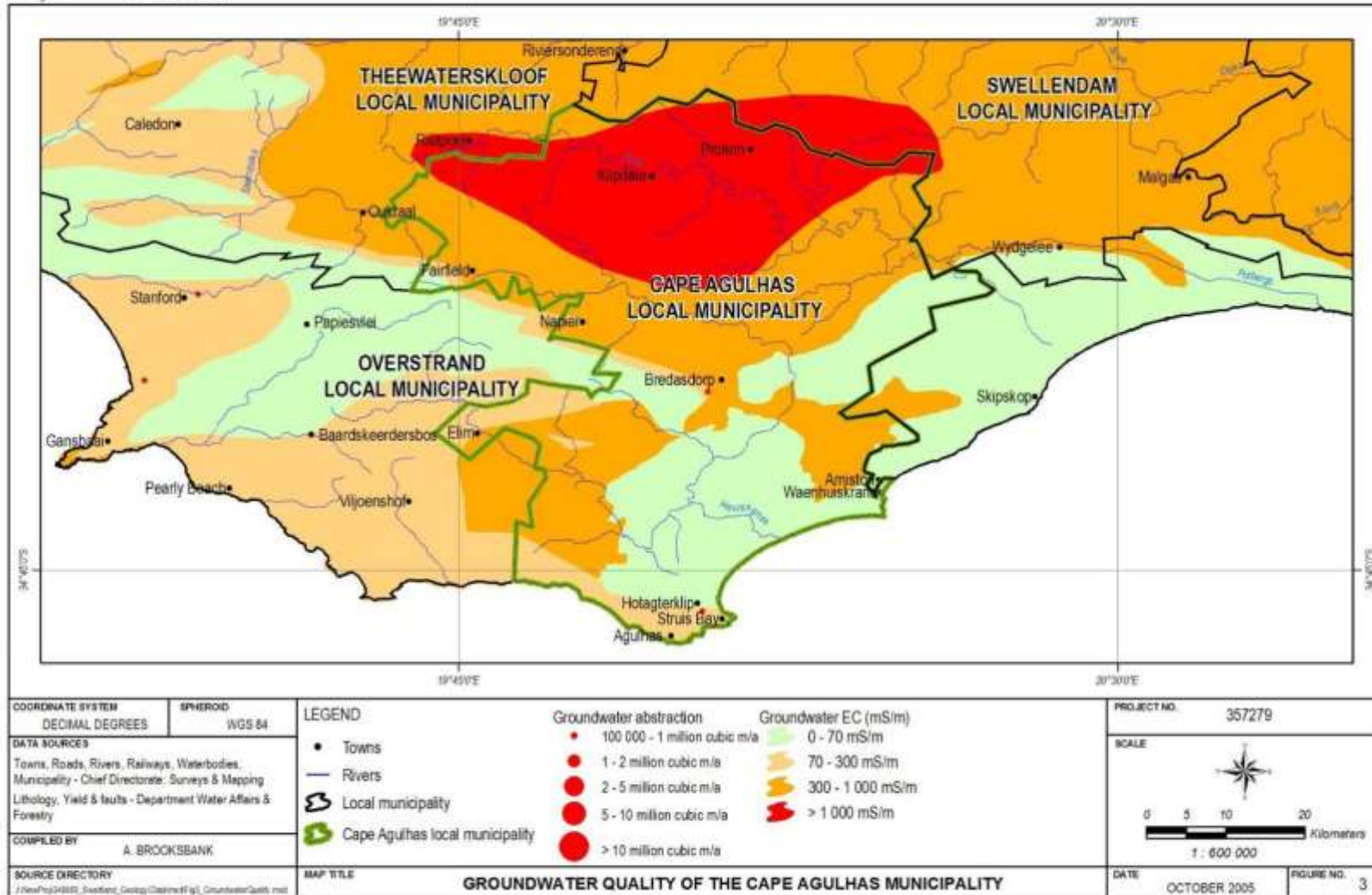


Figure 4. Groundwater of the Cape Agulhas Municipality

1.3 DEMOGRAPHICS

The Cape Agulhas Municipality is comprised of six wards, which are listed in Table 1 below.

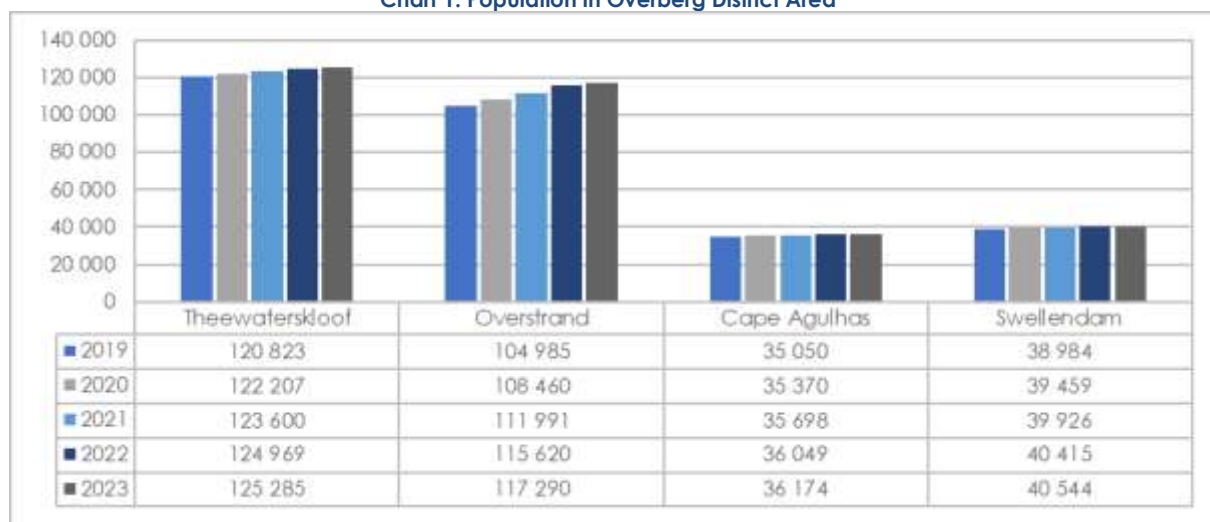
Table 1. Wards in Cape Agulhas Municipality

WARD	AREA DESCRIPTION
1	Napier, Elim, Spanjaardskloof, Houtkloof and surrounding farming areas,
2	Part of Bredasdorp and Klipdale,
3	Part of Bredasdorp which includes the low-cost housing scheme (Kleinbegin), Zwelitsha and Simunye
4	Part of Bredasdorp including the Central Business District, Proteem and surrounding farms
5	Suiderstrand, L'Agulhas, Struisbaai and Haasvlakte
6	Arniston and surrounding Farms, Overberg Test Range, Part of Bredasdorp (Selfbou and Bergsig area)

Source: Integrated Development Plan 2017/18 -2021/22

According to the Department of Social Development’s projections, Cape Agulhas currently has a population of 35 050, rendering it the smallest municipal area within the Overberg District. This total is estimated to increase to 36 174 by 2023, equating to an average annual growth of 0.8%.

Chart 1. Population in Overberg District Area



Source: Socio-economic Profile: Cape Agulhas Municipality 2019

Table 2. Age Cohorts

Cape Agulhas: Age Cohorts, 2019 – 2025

Year	Children 0 – 14 Years	Working Age 16 – 65 Years	Aged 65+	Dependency Ratio
2019	8 518	23 960	2 572	46.3
2022	8 529	24 804	2 716	45.3
2025	8 485	25 508	2 874	44.5
Growth	-0.1%	1.0%	1.9%	-

Source: Socio-economic Profile: Cape Agulhas Municipality 2019

Table 2, depicts Cape Agulhas’s population composition per age cohort. These groupings are also expressed as a dependency ratio, which in turn indicates who is part of the workforce (Age 15 - 64) and those, who are depending

on them (children and seniors). A higher dependency ratio means a higher pressure on social systems and the delivery of basic services.

Although growth in the aged cohort exceeds that of the working aged category, the population is heavily concentrated in the working aged cohort. The net change in population numbers in the working aged cohort is therefore notably higher, which in time decrease the dependency ratio in Cape Agulhas from 46.3 in 2019 to 44.5 in 2025.

The following tables provide an overview of the population and households per ward. According to Census 2011, there were 10 162 households in the Cape Agulhas Municipal Area in 2011. The 2016 Community Survey estimates, this number at 11 321 for 2016 which equates to 11.4% growth from the 2011 base. A limitation is that the 2016 Community Survey does not provide a break down on ward level.

Table 3. Total Population per Ward

INDICATOR	Ward 1	Ward 2	Ward 3	Ward 4	Ward 5	Ward 6	Total
Population	6555	6529	5272	5613	5368	3701	33038

Source: StatsSA census 2011

In order to ensure basic service delivery to all, municipal budget allocations should be informed by credible and accurate assumptions regarding the number of households within a municipal area. Access to formal housing and services in Cape Agulhas is measured against a total number of households of 10 162 in 2011 and 11 321 in 2016.

Table 4. Households

Area	2011	2016	Average annual change 2011-2016	Average annual growth 2011-2016
Cape Agulhas	10 162	11 321	232	2.2%

Source: Socio-Economic Profile 2018

Table 5. Household Sizes

Cape Agulhas: Household size, 2019 – 2023				
2019	2020	2021	2022	2023
3.3	3.3	3.3	3.2	3.2

Source: Socio-economic Profile: Cape Agulhas Municipality 2019

Household size refers to the number of people per household. It is worth noting that although the number of households in the Cape Agulhas municipal area are increasing, the actual size of households is trending downwards from 2022 onwards. This potentially implies an inflow of young professionals (either single, as couples or with small family groupings) into the area as a result of enhanced urbanisation. Other contributing factors include, but are not limited to, lower fertility rates, occurrences of divorce, ageing population, etc.

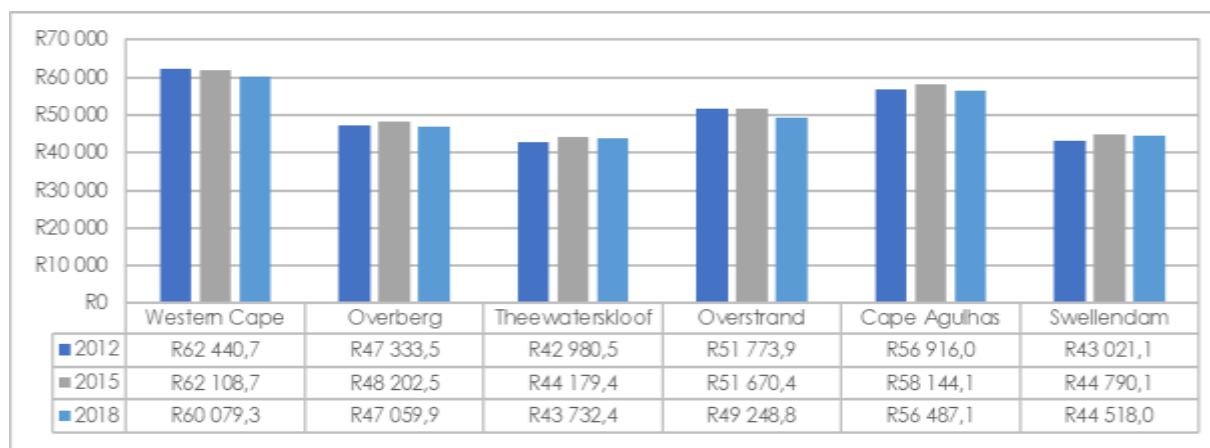
POVERTY AND INCOME

This section shows living conditions and economic circumstances of households in the Cape Agulhas municipal area based on the most recent data including Statistics South Africa’s Non-Financial Census of Municipalities 2016 and Quantec.

GDPR PER CAPITA

An increase in real GDPR per capita, i.e. GDPR per person, is experienced only if the real economic growth rate exceeds the population growth rate. Even though real GDP per capita reflects changes in the overall well-being of the population, not everyone within an economy will earn the same amount of money as estimated by the real GDPR per capita indicator.

Chart 2. GDPR in Overberg District Area



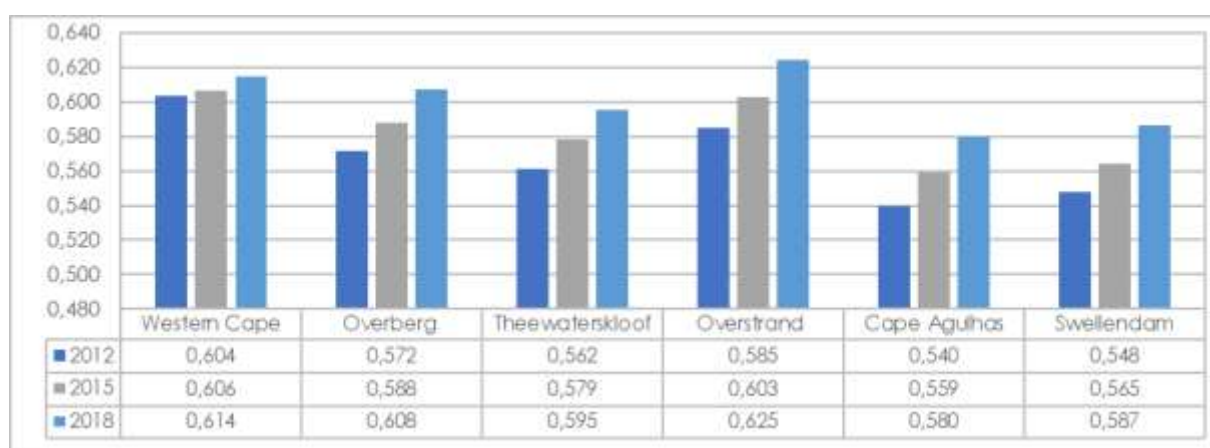
Source: Socio-economic Profile: Cape Agulhas Municipality 2019

At R56 487 in 2018, Cape Agulhas’s real GDPR per capita stands above that of the Overberg District (R47 060), but below that of the Western Cape as a whole (R60 079).

INCOME INEQUALITY

The National Development Plan (NDP) has set a target of reducing income inequality in South Africa from a Gini coefficient of 0.7 in 2010 to 0.6 by 2030. Income inequality has increased in Cape Agulhas between 2012 and 2018.

Chart 3. Gini Coefficient in Overberg District Area



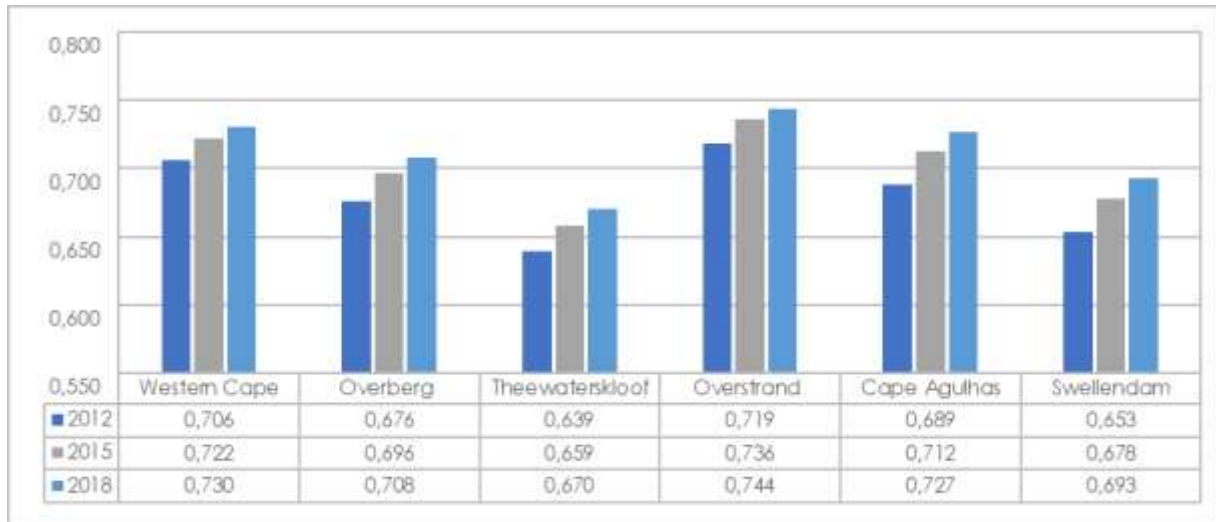
Source: Socio-economic Profile: Cape Agulhas Municipality 2019

The Cape Agulhas municipal area has the lowest income inequality levels in the OD, albeit that the area’s Gini coefficient has been increasing steadily since 2012. The municipal area’s Gini-coefficient is however still notably below that of the OD (0.608) and the Western Cape as a whole. Furthermore, income inequality levels were edging up in Cape Agulhas from 2012 to 2018. With a Gini coefficient of 0.58, income inequality in Cape Agulhas was the lowest in the OD.

HUMAN DEVELOPMENT

The United Nations uses the Human Development Index (HDI) to assess the relative level of socio-economic development in countries. Indicators that measure human development are education, housing, access to basic services and health. Per capita income is the average income. It is income per head of the population per year. Per Capita Income might not be the income of every individual in the State. Life expectancy and Infant Mortality Rate are other important criteria for measuring development.

Chart 4. Human Development Index in Overberg District Area



Source: Socio-economic Profile: Cape Agulhas Municipality 2019

There has been a general increase in the HDI in Cape Agulhas from 0.689 in 2012 to 0.73 in 2018. The level of human development in Cape Agulhas as measured through the HDI is on par with the Western Cape and the second highest in the OD.

1.4 SOURCES OF EMPLOYMENT

ECONOMIC GROWTH

Economic growth at municipal level is essential for the attainment of economic development, the reduction of poverty and improved accessibility. Fostering such growth requires an in-depth understanding of the economic landscape within which each respective municipality operates.

ECONOMIC SECTOR PERFORMANCE

The local economy of the Cape Agulhas municipal area in 2018 was dominated by the wholesale & retail trade, catering & accommodation (R660.8 million; 22.3 percent), finance, insurance, real estate and business services (R578.9 million; 19.5 percent) and the manufacturing (R428.5 million; 14.5 percent) sectors. Combined, these top three sectors contributed (R1.668 billion or 56.3 percent) to the Cape Agulhas municipal economy, which was estimated to be worth R2.961 billion in 2017.

Table 6. GDP Performance per Sector

Cape Agulhas: GDP performance per sector, 2006 - 2017									
Sector	Contribution to GDP (%) 2017	R million value 2017	Trend		Real GDP growth (%)				
			2008 - 2017	2014 - 2018e	2014	2015	2016	2017	2018e
Primary sector	7.2	212.3	2.1	-0.2	6.5	-3.1	-8.7	9.0	-4.6
Agriculture, forestry & fishing	7.0	207.1	2.1	-0.3	6.5	-3.1	-9.3	9.2	-4.6
Mining & quarrying	0.2	5.2	4.0	6.6	7.7	0.2	28.4	0.5	-3.9
Secondary sector	23.5	696.2	2.1	1.4	1.7	1.5	1.6	0.9	1.3
Manufacturing	14.5	428.5	2.4	2.0	1.6	1.7	2.3	1.7	2.6
Electricity, gas & water	2.3	69.0	-1.5	-1.0	-1.7	-2.1	-2.5	0.1	1.3
Construction	6.7	198.7	2.6	0.6	3.0	1.9	1.1	-0.9	-2.0
Tertiary sector	69.3	2 052.8	2.6	1.9	2.8	2.1	1.9	1.2	1.3
Wholesale & retail trade, catering & accommodation	22.3	660.8	2.6	1.8	2.5	3.0	2.7	0.0	0.6
Transport, storage & communication	10.9	324.1	3.6	2.7	4.5	2.0	2.3	2.5	2.2
Finance, insurance, real estate & business services	19.5	578.9	3.3	3.0	3.3	3.4	2.6	3.0	2.6
General government	9.8	291.5	0.8	-1.2	1.1	-1.7	-1.7	-2.1	-1.4
Community, social & personal services	6.7	197.5	2.0	1.6	1.9	1.4	2.0	1.8	0.8
Total Cape Agulhas	100.0	2 961.3	2.5	1.6	2.9	1.6	1.0	1.7	0.8

The 10-year trend between 2008 and 2017 shows that mining and quarrying registered the highest average growth rate (4.0 percent) followed by transport, storage & communication (3.6 percent) and the finance and business services (3.3 percent) sectors. The electricity and, gas & water reflects a contraction over the 2008 - 2017 period.

LABOUR

This section highlights key trends in the labour market within the Cape Agulhas municipal area, beginning with a breakdown of skills of the labour force, followed by employment numbers per sector as well as the unemployment levels. The wholesale and retail trade, catering and accommodation sector contributed the most jobs in the Cape Agulhas municipal area in 2016 (4 257; 27.1 percent), followed by the finance and businesses (2 517; 16.0

percent) and the agriculture, forestry and fishing (2 056; 13.1 percent) sectors. Combined, these three sectors contributed 8 830 or 56.7 percent 15 570 jobs in 2017.

Table 7. Employment Growth per Sector

Cape Agulhas: Employment growth per sector, 2006 – 2017									
Sector	Contribution to employment (%)	Number of jobs	Trend		Employment (net change)				
	2017	2017	2008 - 2017	2014 - 2018e	2014	2015	2016	2017	2018e
Primary sector	13.1	2 062	-782	110	-101	415	-84	-83	-37
Agriculture, forestry & fishing	13.1	2 056	-781	110	-101	415	-84	-83	-37
Mining & quarrying	0.0	6	-1	0	0	0	0	0	0
Secondary sector	16.6	2 610	235	277	76	48	70	57	26
Manufacturing	9.4	1 480	125	171	32	49	21	50	19
Electricity, gas & water	0.3	52	13	2	0	2	0	2	-2
Construction	6.9	1 078	97	104	44	-3	49	5	9
Tertiary sector	70.3	11 038	2 818	1 483	319	394	125	358	287
Wholesale & retail trade, catering & accommodation	27.1	4 257	1 081	653	80	189	83	205	96
Transport, storage & communication	4.7	736	295	88	30	55	-46	32	17
Finance, insurance, real estate & business services	16.0	2 517	931	555	108	132	67	95	153
General government	9.4	1 480	111	-41	65	-47	7	-65	-1
Community, social & personal services	13.0	2 048	400	228	36	65	14	91	22
Total Cape Agulhas	100.0	15 710	2 271	1 870	294	857	2 374	332	276

Only the primary sector (-782) in the Cape Agulhas municipal area reported an average decrease in jobs between 2008 and 2017, which is mainly attributed to job losses reported in the agriculture, forestry and fishing sector. This is a major cause for concern considering the notable contribution of this sector to the local economy. The sector which reported the largest increase in jobs between 2014 and 2018 was wholesale, retail and trade (653), followed by financial and business services (555), and community and social services (228).

Table 8. Labour Trends

Cape Agulhas: Trends in labour force skills, 2014 - 2018				
Formal employment by skill	Skill level contribution (%)	Average growth (%)	Number of jobs	
	2017	2014 – 2018e	2017	2018e
Skilled	21.1	3.1	2 583	2 661
Semi-skilled	45.8	3.3	5 590	5 755
Low-skilled	33.1	2.9	4 044	4 097
Total Cape Agulhas	100.0	3.1	12 217	12 513

The majority of workers in the Cape Agulhas labour force in 2017 was dominated by semi-skilled workers (45.8 %), while only 21.1 percent were skilled. The number of semi-skilled workers increased fractionally more than that of low- skilled and skilled workers during the period of 2014 and 2018.

Table 9. Western Cape Unemployment Rates

Unemployment Rates for the Western Cape (%)											
Area	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Cape Agulhas	5.2	6.3	7.4	7.6	7.5	7.2	7.5	6.8	7.5	7.9	7.8
Overberg District	6.6	8.0	9.5	9.8	9.6	9.2	9.6	8.6	9.7	10.2	10.1
Western Cape	12.7	14.0	15.4	15.5	15.6	15.5	15.9	15.9	17.1	17.8	17.7

Over the last decade, the unemployment rate has been rising steadily. Unemployment in the Cape Agulhas municipal area started at 5.2 percent in 2008, rising steadily to reach 7.8 percent in 2018. The Cape Agulhas unemployment rate of 7.8 percent in 2018 is lower than the District’s 10.1 percent and the Province’s 17.7 percent. According to the 2011 census 13.8% of the economic active population was unemployed, of which the youth unemployment rate is 19.5%.

1.5 LAND-USE

The greatest use made of the land in Cape Agulhas is by agriculture. The remainder of the area is used either for residential housing, industry or nature conservation. Refer to Figure 5 for a map showing the land uses and spatial planning for the Municipality.

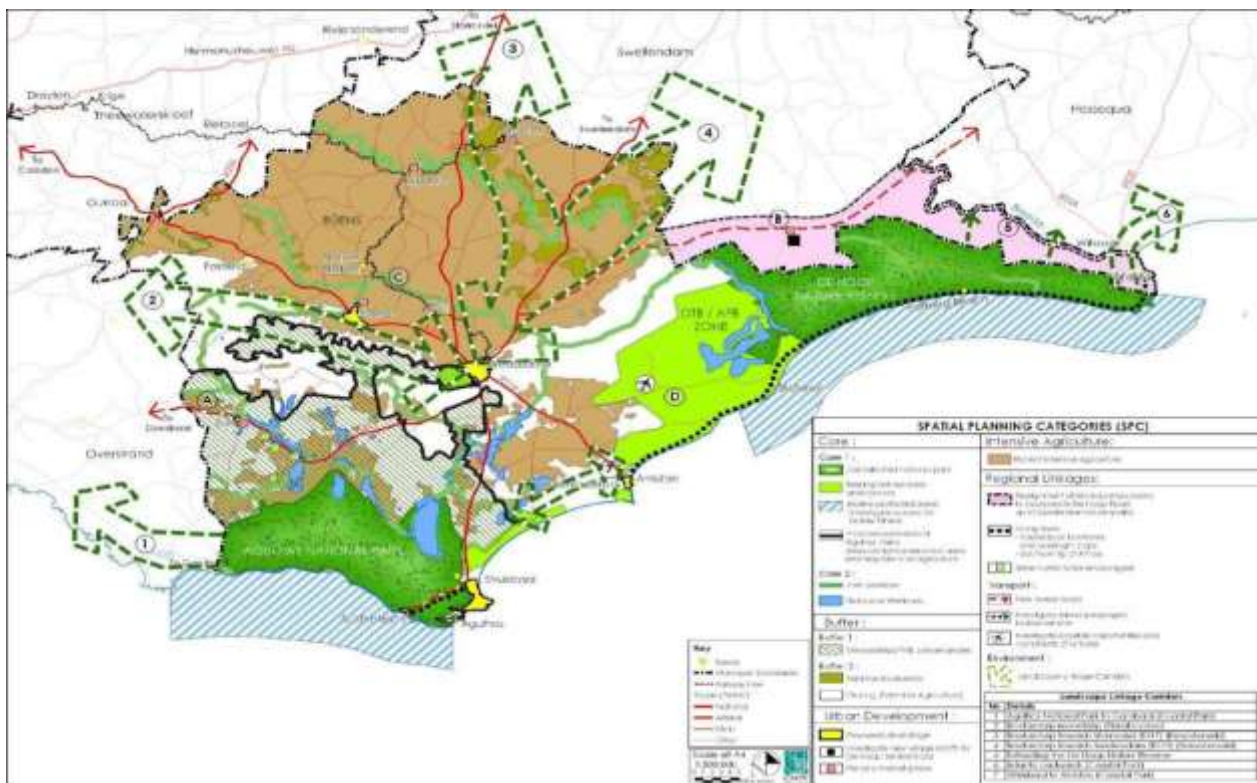


Figure 5. Land use and spatial planning for Cape Agulhas Municipality
(Source: Cape Agulhas Municipality Revised draft IDP 2014-2015)

1.6 TRANSPORT INFRASTRUCTURE

Roads:

The road network of Cape Agulhas Municipality can best be described as rural. The major roads are the north-south R319 and R317 and the northwest-southeast R316, which effectively link most of the towns within the Cape Agulhas Municipal boundaries. The area has approximately 170.5km of tarred roads of which 80% of the road could be considered to be in good condition, while 2% is in poor condition. There is an annual reseal programme which aims to maintain and improve the roads in the Municipality.

With respect to gravel roads, the area has around 28.3km thereof and the Municipality aims to have all these roads surface within the next 30 years. Maintenance on gravel roads is carried out on a quarterly basis. In addition, the Streets and Stormwater Department also upgraded certain gravel roads to tar as part of the Napier Reconstruction Development Programme (RDP) housing project. Two roads have been earmarked for important upgrades, namely the 56km road leading to De Hoop Nature Reserve and the 5km road which links L'Agulhas and Suiderstrand. The cost involved in the road upgrades requires that support be provided by the Provincial Department of Transport and Public Works as well as the District Municipality. Furthermore, construction is complete for the upgrade of the road linking Gansbaai with Elim. A pavement management system is also in place which conducts a network assessment of the pavements in the area and identifies various maintenance projects. These projects range from routine maintenance (e.g. patching), normal maintenance (various forms of surface treatment) through to heavy rehabilitation (e.g. heavy overlays and reconstruction) and are continually undertaken.

Rail:

Access to rail transport is non-existent in Cape Agulhas other than a railway line which runs from Bredasdorp to Cape Town. However, this line is not in use for passengers. Council aims to take over the buildings at the station and is currently negotiating with the relevant authorities.

Airport:

The co-use of the South African National Defence Force Air Force Base between Bredasdorp and Arniston has been proposed. The planned development of the airport as a commercial aeronautical facility will benefit agriculture, fishing and tourism industries by facilitating growth and developing downstream value -adding industries. The Municipality has recently engaged with consultants regarding how the proposed development of a commercial airport could be accelerated. The pre-feasibility study, commissioned by the Overberg District Municipality, provides more detail on the positive impact that the project may have on industry in the region.

1.7 AWARENESS AND EDUCATION

The lack of public awareness of the gravity of the problem of sustainable waste management has a significant impact on the effectiveness of the management of waste. Our poor history of waste management in South Africa means that we pay little attention to our lifestyle insofar as how it affects the environment. However, when an environmental problem is noted and the public are made aware of the need for action, there is no stronger lobby. This was evident in the outcry over CFC containing aerosols in the late eighties. Once the problem was discovered and the people informed, a combination of international action and public pressure resulted in almost an immediate ban of these ozone - depleting substances. Creating awareness of the issue of sustainable waste management may have a similar outcome.

The successful implementation of the Cape Agulhas IWMP will require that all persons within the Municipal boundaries are aware of waste issues as an integral part of the creation of a healthy environment. They should be empowered to play their specific role in the development and implementation of the waste management initiatives.

Public participation is closely linked with education and public awareness. The significant difference between awareness programmes and public participation is that public awareness focuses on disseminating information, whereas public participation aims at obtaining participation, comment, input and feedback from the public.

Awareness campaigns are rolled out during the new RDP housing projects. In addition, the Municipality also conducts awareness campaigns around waste and sustainable waste management by means of door-to-door notifications, and posters at shopping malls and schools.

1.8 BACKGROUND POLICY AND LEGISLATION

Pollution and waste is handled in a fragmented and uncoordinated manner and there are insufficient resources available for the implementation and monitoring of existing legislation. This contributes largely to the unacceptably high levels of pollution and waste in South Africa. The promulgation and implementation of various pieces of policies, legislation, standards and guidelines as well as the implementation of co-operative governance as envisaged in the Constitution aims to improve the situation.

Pollution and waste management is not the exclusive preserve of government. The private sector and civil society have crucial roles to play. The fostering of partnerships between government and the private sector is a prerequisite for sustainable and effective pollution and waste management to take place. Similarly, the spirit of partnerships and co-operative governance between organs of state is equally important due to the crosscutting nature of pollution and waste management.

1.8.1 Constitution of the Republic of South Africa

In 1996 the new Constitution created the right to the environment as a fundamental right. This fundamental right to the environment ensures everyone's right to an environment that is not harmful to their health or well-being. South African law, the environment and all South Africans have a constitutional right to have the environment protected for present and future generations.

This means that there must be reasonable legal and other measures to prevent ecological degradation, promote conservation and secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.

All legislation has to fall within the stipulations of the Constitution. The following sections are of particular relevance where waste is concerned:

Section 24(a)

Provides everyone the right to an environment that is not harmful to a person's health and well-being.

Section 24(b)

Provides everyone the right to have the environment protected through reasonable legislative and other measures. The implementation of section 24 of the National Environmental Management Act (No. 107 of 1998), as amended (NEMA) is such a legislative measure to protect the environment.

Section 25

Provides for property rights. The Constitution makes provision for both property rights and the right to a healthy environment. A situation may arise in extreme cases where there is a conflict due to rejecting an application for a listed activity from taking place. In such cases it will be up to the court to decide whether the interest of the community (right to a healthy environment) weights heavier than the right of the individual.

Section 32

Provides the right to access to information. The lack of information is one of the major obstacles in environmental impact management. Provision has been made in the regulations in terms of section 24 of NEMA that any report submitted becomes a public document.

Section 38

Provides *locus standii* or the 'right to get involved' to any member of the public. This means that any member of the public has the right to take appropriate action to prevent environmental damage. This may include taking action against the relevant authority for failing to perform its duties in preventing environmental damage or an individual or authority who is in the process of undertaking listed activities in terms of section 24 of NEMA, without the necessary authorisation to undertake such activities.

Section 41

Provides principles for co-operative governance and intergovernmental relations. The Constitution allocates legislative authority as well as executive and administrative powers to all three levels of government. Schedules 4 and 5 determine the functional areas of government. The environment is a cross-sectoral matter and it is therefore important that co-operation between government on all levels is necessary. Furthermore, Chapter 7 of the

Constitution of South Africa (Act 108 of 1996) describes the role and responsibilities of Local Government, which include the objectives in Section 152:

“The objects of local government are:

- to promote social and economic development.
- to promote a safe and healthy environment...”.

These principles are further developed in the National Environmental Management Act 1998 (Act 107 of 1998), as amended.

Section 156

Powers and functions of municipalities

(1)(a) A Municipality has executive authority in respect of, and has the right to the local government matter listed in Part B of Schedule 4 and Part B of Schedule 5.

Part B of Schedule 5 relating to Solid Waste Management:

- Refuse removal
- Refuse dumps
- Solid waste disposal

The Constitution (Act No. 108 of 1996) is relevant to pollution and waste management for two reasons. Firstly, the Bill of Rights (Chapter Two of the Constitution) contains a number of rights relevant to integrated pollution and waste management, to the extent that an Act or particular statutory provision that does not uphold these rights, is unconstitutional. Secondly, the Constitution provides the legal basis for allocating powers to different spheres of government, and is thus relevant to the institutional regulation of integrated pollution and waste management.

Supreme Law

The Constitution states that South Africa is a sovereign, democratic State. In terms of environmental management, it is important to recognize that sovereignty includes the ability to limit sovereign powers by entering into international agreements where the need arises.

The Bill of Rights

The most pertinent fundamental right in the context of integrated pollution and waste Management is the Environmental Right (Section 24), which provides that:

“Everyone has the right

- (a) to an environment that is not harmful to their health or well-being; and*
- (b) to have the environment protected, for the benefit of present and future generation through reasonable legislative and other measures that –*
 - (i) prevent pollution and ecological degradation;*
 - (ii) promote conservation; and*
 - (iii) secure ecologically sustainable development and the use of natural resources while promoting sustainable economic and social development.”*

This section of the Bill of Rights specifically imposes a duty on the State to promulgate legislation and take other steps to ensure that the right is upheld and that, among other things, pollution and ecological degradation are prevented.

1.8.2 National Environmental Management Act (No. 107 of 1998)

The NEMA provides for co-operative environmental governance by establishing principles for decision making on matters affecting the environment, institutions that will promote co-operative governance and procedures for co-ordinating environmental functions exercised by organs of state; and to provide for matters connected therewith.

As the principal framework act for environmental issues, it has direct relevance to the implementation of the National Waste Management Strategy (NWMS), one of the key implications being the designation of the

Department of Environmental Affairs (DEA) as lead agent for the environment. Chapter 7 of NEMA has important direct implications for the achievement of the NWMS initiative.

The environment as defined in NEMA is the natural environment along with its physical chemical, aesthetic and cultural properties that influence human health and well-being.

NEMA contains the following environmental principles:

- Environmental management must put people and their needs at the forefront, and must serve their interest fairly.

- Development must be socially, environmentally and economically sustainable. This means that the following things must be considered before there is development:
 - Disturbance of ecosystems and loss of biodiversity
 - Pollution and degradation of the environment
 - Disturbance of landscapes and sites where the nation's cultural heritage is found
 - Non-renewable resources must be used responsibly
 - The precautionary principle must be applied
 - Negative impacts must be anticipated and prevented and if they can't be prevented they must be minimized or remedied.

- Environmental management must be integrated. The best practical environmental option must be pursued.
- Environmental justice must be pursued so that there is not unfair discrimination in the way that negative environmental impacts are distributed

- There should be equitable access to environmental resources, benefits and services to meet basic human needs. Special measures may be taken to ensure access for persons disadvantaged by unfair discrimination.
- Responsibility for environmental health and safety of any policy, programme or project must continue throughout the life cycle of a project

NEMA also stipulates in Section 24 that there must be an environmental impact assessment before any activity or development that needs permission by law and which may significantly affect the environment.

Section 28 places a specific duty of care on every person to prevent, or mitigate and remediate, environmental damage and pollution. Any person, who was responsible for, or directly or indirectly contributed to the pollution, can be held liable. This includes the owner of the land at the time the pollution occurred or their successor in title, a person in control of the land at that time, or any person who negligently failed to prevent the situation.

The public can use NEMA to exercise their rights when they believe that the right procedures were not followed. Therefore it is extremely important to make sure that when there is a proposed development where the municipality is involved e.g. change of land-use – to make sure that the consultant and/or developers follow the right procedures.

1.8.3 The NEMA Environmental Impact Assessment Regulations

Sections 24 and 44 of NEMA make provision for the promulgation of regulations that identify activities that may not commence without environmental authorisation or existing activities in respect of which an application for environmental authorisation is required. In this context, EIA Regulations contained in three General Notices in terms of NEMA (GN R.982, 983, 984 and 985) (promulgated on 4 December 2014.)

GN R.982 prescribes two alternative authorisation processes. Depending on the type of activity that is proposed and which Listed Activities are triggered as a result, either a Basic Assessment (BA) process or a full Scoping and EIA (S&EIA) would be required. The regulations for both alternative processes stipulate that:

- Public participation must be undertaken at various stages of the assessment process;
- The assessment must be conducted by an independent Environmental Assessment Practitioner;
- The relevant authorities respond to the applications and submissions within stipulated time frames; and
- Decisions taken by the authorities can be appealed by the proponent or any other Interested and Affected Party (I&AP).

New regulations governing the appeal process under NEMA were published on 15 March 2015. The national Appeal Regulations of 08 December 2014 and the National Appeal Amendment Regulations (R.205 of 12 March 2015) make provision for appeal against any decision issued by a competent authority and prescribes the necessary process to be undertaken.

In terms of the Regulations, the appeal has to be lodged with the appeal administrator for the competent authority and a copy provided to the Applicant, in writing, within 20 days of the notification of the issue of the Environmental Authorisation.

1.8.4 The Department of Water and Sanitation's Minimum Requirements (1998)

The Department of Water and Sanitation (DWS) (previously known as the Department of Water Affairs, or DWAF) compiled a set of guidelines called "The Minimum Requirements" of which the second edition was published in 1998. These guidelines are implemented through and enforced by the Landfill Site Permit. Once a Minimum Requirement is included in a Landfill Site Permit, it is legally enforceable.

1.8.5 Waste Classification

Waste types are graded into two classes, General (G) and Hazardous (H).

- General Waste (G) is a generic term applied to all urban waste that is produced within the domain of local authorities. It comprises rubble, garden, domestic, commercial and general dry industrial waste. It may also contain small quantities of household hazardous waste substances disposed within it e.g. batteries, insecticides, etc.

General waste may be disposed of on any permitted landfill. However, General Waste sites located in areas with a positive climatic water balance must have leachate management systems, since General Waste can produce leachate with unacceptably high pollution potential.

- Hazardous Waste (H) is waste which has the potential, even at low concentrations, to have a significant adverse effect on public health and/or the environment. The following types of waste should be regarded as potentially hazardous, namely:

Hazardous Waste is further classified in terms of Hazard Ratings, based on Acute Mammalian Toxicity, Eco toxicity, Environmental bioaccumulation in the food chain and Chronic Toxicity. Hazardous Waste is thus classified into:

Hazard Rating 1: Extreme Hazard
 Rating 2: High Hazard
 Rating 3: Moderate Hazard
 Rating 4: Low Hazard

a. Definition of Hazardous Waste

Hazardous Waste is defined as:

“An inorganic or organic element or compound that, because of its toxicological, physical, chemical or

persistency properties, may exercise detrimental acute or chronic impacts on human health and the environment ”. It can be generated from a wide range of commercial, industrial, agricultural and domestic activities and may take the form of liquid, sludge or solid. These characteristics contribute not only to degree of hazard, but are also of great importance in the ultimate choice of a safe and environmentally acceptable method of disposal.”

Further to this, a Hazardous Waste can be defined as a waste that directly or indirectly represents a threat to human health or the environment by introducing one or more of the following risks:

- Explosion or fire;
- Infections, pathogens, parasites or their vectors;
- Chemical instability, reactions or corrosion;
- Acute or chronic toxicity;
- Cancer, mutations or birth defects;
- Toxicity, or damage to the ecosystems or natural resources;
- Accumulation in biological food chains, persistence in the environment, or multiple effects to the extent that it requires special attention and cannot be released into the environment or be added to sewage or be stored in a situation which is either open to air or from which aqueous Leachate could emanate.

The definition of Hazardous Waste is very broad, since wastes can vary substantially in nature, composition, size, volume, appearance and degree of harmfulness. In terms of the Minimum Requirements, therefore, Hazardous Wastes are grouped into four Hazard Ratings

This further classification, termed the Hazard Rating, differentiates between a Hazardous Waste that is fairly or moderately hazardous and one that is very or extremely hazardous.

b. Classification of Hazardous Waste

There are four steps in the classification of a Hazardous Waste

- Identification of the waste or waste stream as probably Hazardous.
- Testing and analysis to determine the hazardous properties, characteristics and components of a waste. This will confirm whether the waste is Hazardous or not.
- Classification and treatment in accordance with SANS Code 0228 “The Identification and Classification of Dangerous Substances and Goods”.
- Analysis and Hazard Rating of the waste or its residue, in order to determine the Hazard Rating and the Minimum Requirements for disposal.

An additional step would be re-examination of an existing classification with the objective of possible delisting and reclassification. This would apply in cases where, because of pre-treatment, low concentration, low mobility or other applicable factors, waste can delist to a lower Hazard Rating.

c. Analysis to confirm that a waste is a Hazardous Waste

If it is probable that the waste is a Hazardous Waste, it must be tested for its properties and analysed for its substances. These are then compared to the lists of characteristics, properties and substances in

SANS Code 10228, the Basal Convention, and the Waste Classification Tables in the Minimum Requirements.

If the properties and substances of the waste are not listed in SANS Code 10228, but conform to the Basel Convention or one of the nine classes in the Code, the waste is probably a Hazardous Waste. The Department should then be approached for guidance.

d. SANS Code 10228: 2010 (Edition 5)

SANS Code 10228: “The Identification and Classification of Dangerous Goods and Substances” is a system for classifying hazardous substances for transport purposes. In the Code, hazardous substances are given an identification number and divided into nine classes:

- Class 1 Explosives
- Class 2 Gases
- Class 3 Flammable liquids
- Class 4 Flammable solids
- Class 5 Oxidising substances and organic peroxides
- Class 6 Toxic and infectious substances
- Class 7 Radioactive substances
- Class 8 Corrosives
- Class 9 Other miscellaneous substances.

The waste must be tested against the nine classes, to see into which class it falls (it may fall into more than one class). The Minimum Requirements for that class must then be complied with.

1.8.6 The Western Cape Health Care Waste Management Act, 2007 (Act 7 of 2007)

The Western Cape Health Care Management Act (WCHCMA) was amended in December 2010 in order to be better aligned with the terminology of the National Environmental Management: Waste Act (No. 59 of 2008) and provides for the effective handling, storage, collection, transportation, treatment and disposal of health care waste by all persons in the Province of the Western Cape; and provides for matters incidental thereto.

The object of this Act is to promote integrated health care waste management and thereby—

- (a) reduce the risks of health care waste to human health;
- (b) prevent the degradation of the environment;
- (c) prevent the illegal dumping of health care waste;
- (d) promote sustainable development, and
- (e) ensure responsible management of health care waste within the Province.

Under this Act a Municipality must:

- (a) enforce the relevant provisions of this Act within its area of jurisdiction;
- (b) perform audits of generators, transporters, treaters or disposers of health care waste within its area of jurisdiction to ensure compliance with the provisions of this Act;
- (c) report annually to the Provincial Minister on the number of incidents of illegal dumping of health care risk waste within its area of jurisdiction, the number of incidents of illegal dumping of health care risk waste pursued in a court of law, and the number of incidents of illegal dumping of health care risk waste successfully convicted in a court of law.

Health Care Waste is produced by hospitals, clinics, physicians, offices, dentists, funeral homes, veterinary clinics and medical- and research laboratories.

Currently approximately only 10-15% of medical waste is considered infectious. The enormous volumes of health care waste requiring special handling and disposal for all infectious and pathological waste are responsible for the current re-evaluation of the terminology for health care waste.

The modern trend in infection control is dictated by the risk posed by the procedure and not by the diagnoses. Thus health care waste is divided into Health Care General Waste (HCGW) and Health Care Risk Waste (HCRW). Health Care Risk Waste generally indicates infectious waste, pathological waste, sharps, chemical and pharmaceutical waste, radioactive and cytotoxic waste.

1.8.7 National Water Act (Act no. 36 of 1998)

The purpose of the Act is to ensure that the Municipality's water resources are protected, used, developed and conserved in ways which take into account the protection of aquatic and associated ecosystems; that addresses basic human needs; that ensures the reduction and prevention of pollution; and that meets international obligations.

Section 19 of the NWA deals with landowners and users involved in any activity or process which causes, has caused or is likely to cause pollution of water resources. Such landowners and users are obliged to take all reasonable measures to prevent any such pollution from occurring, continuing or recurring. This includes measures to comply with any prescribed waste standard or management practice. The relevant extract is detailed below:

- 19 (1) *An owner of land, a person in control of land or a person who occupies or uses the land on which -*
- (a) *any activity or process is or was performed or undertaken; or*
 - (b) *any other situation exists, which causes, has caused or is likely to cause pollution of a water resource, must take all reasonable measures to prevent any such pollution from occurring, continuing or recurring.*
- (2) *The measures referred to in subsection (1) may include measures to -*
- (a) *cease, modify or control any act or process causing the pollution;*
 - (b) *comply with any prescribed waste standard or management practice;*
 - (c) *contain or prevent the movement of pollutants;*
 - (d) *eliminate any source of the pollution;*
 - (e) *remedy the effects of the pollution; and*
 - (f) *remedy the effects of any disturbance to the bed and banks of a watercourse.*
- (3) *A catchment management agency may direct any person who fails to take the measures required under subsection (1) to -*
- (a) *commence taking specific measures before a given date;*
 - (b) *diligently continue with those measures; and*
 - (c) *complete them before a given date.*
- 4) *Should a person fail to comply, or comply inadequately with a directive given under subsection (3), the catchment management agency may take the measures it considers necessary to remedy the situation.*
- (5) *Subject to subsection (6), a catchment management agency may recover all costs incurred as a result of it acting under subsection (4) jointly and severally from the following persons:*
- (a) *Any person who is or was responsible for, or who directly or indirectly contributed to, the pollution or the potential pollution;*
 - (b) *the owner of the land at the time when the pollution or the potential for pollution occurred, or that owner's successor-in-title;*
 - (c) *the person in control of the land or any person who has a right to use the land at the time when -*
 - (i) *the activity or the process is or was performed or undertaken; or*
 - (ii) *the situation came about; or*
 - (d) *any person who negligently failed to prevent -*
 - (i) *the activity or the process being performed or undertaken; or*
 - (ii) *the situation from coming about.*
- (6) *The catchment management agency may in respect of the recovery of costs under subsection (5), claim from any other person who, in the opinion of the catchment management agency, benefitted from the measures undertaken under subsection (4), to the extent of such benefit.*

- (7) *The costs claimed under subsection (5) must be reasonable and may include, without being limited to, labour, administrative and overhead costs.*
- (8) *If more than one person is liable in terms of subsection (5), the catchment management agency must, at the request of any of those persons, and after giving the others an opportunity to be heard, apportion the liability, but such apportionment does not relieve any of them of their joint and several liability for the full amount of the costs."*

The latest registration guide can be found on the DWS website on <https://www.dwa.gov.za/Projects/WARMS/Registration/R000218/updatedwateruserregistrationguideNew2.pdf>

Furthermore, the NWA requires anyone who intends undertaking a water use, as defined, to obtain a licence. The water uses that may be relevant to waste management activities include the following:

- discharging waste or water containing waste into a water resource through a pipe, canal, sewer, sea outfall or other conduit;
- disposing of waste in a manner which may detrimentally impact on a water resource; and
- removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people

The applications for permits, licenses and exemptions made before the promulgation of this Act could still be dealt with in terms of the Water Act 1956 (Act No. 54 of 1956).

On 6 September 2013, the DEA published a notice to revise certain General Authorisations under the National Water Act, 1998. The revision relates to the following water uses:

- Engaging in the irrigation of any land with waste or water containing waste generated through any industrial activity or by a waterworks (controlled activity);
- Discharging waste or water containing waste into a water resource through a pipe, canal, sewer or other conduit;
- Disposing in any manner of water which contains waste from, or which has been heated in, any industrial or power generation process;
- Disposing of waste in a manner which may detrimentally impact on a water resource; and
- Removing, discharging or disposing of water found underground if it is necessary for the efficient continuation of an activity or for the safety of people.

The revision also includes changes to improve protection of water resources. These include provisions such as limiting the application of General Authorisations to sites located further 500m from the boundary of a wetland. Requiring water users to report incidents which have or are likely to have a detrimental impact on water resource quality to the responsible authority within 24 hours is another provision, as is the expansion of the list of water resources into which domestic and industrial wastewater may not be discharged. The revised general authorisations will be applicable for a period of five years from the date of publication of the notice.

1.8.8 National Environment Management: Air Quality Act 2004 (Act No. 39 of 2004)

This Act has been promulgated in order to reform the law regulating air quality in order to protect the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development while promoting justifiable economic and social development. It also provides for national norms and standards regulating air quality monitoring, management and control by all spheres of government; for specific air quality measures; and for matters incidental thereto.

The object of this Act is:

- (a) to protect the environment by providing reasonable measures for-
 - (i) the protection and enhancement of the quality of air in the Republic;
 - (ii) the prevention of air pollution and ecological degradation; and

- (iii) securing ecologically sustainable development while promoting justifiable economic and social development; and
- (b) generally to give effect to section 24(b) of the Constitution in order to enhance the quality of ambient air for the sake of securing an environment that is not harmful to the health and well-being of people.

The List of Activities which results in Atmospheric Emissions, which have or may have a Significant Detrimental Effect on the Environment, including Health, Social Condition, Economic Conditions, Ecological Conditions or Cultural Heritage was published on 22 November 2013. This list defines the emission limits for specific activities and processes. Depending on the future processing, treatment and handling activities at each waste management site in the Municipality, the need for an Atmospheric Emission License (AEL) could be triggered.

(a) *The following special arrangements shall apply*

- i. *For pyrolysis, reference oxygen content does not apply.*
- ii. *The facility shall be designed, equipped, built and operated in such a way so as to prevent the emissions into the air, giving rise to significant ground-level air pollution (i.e. leading to the exceedance of an accepted ambient air quality threshold standard).*
- iii. *Monitoring equipment shall be installed and acceptable techniques used in order to accurately monitor the parameters, conditions and mass concentrations relevant to the co-processing of AFR and incineration of waste. All continuous, on-line emission monitoring results must be reported as a Daily Average concentration expressed as mg/Nm³, and at 'normalised' conditions of 10% O₂, 101.3 kPa, 273 K / 0 °C, dry gas.*
- iv. *Discontinuous (periodic) emission monitoring results must be expressed as mg/Nm³, or ng/Nm³ I-TEQ for PCDD/PCDF, and at 'normalised' conditions of 10% O₂, 101.3 kPa, 273 K / 0 °C, dry gas.*
- v. *Exit gas temperatures must be maintained below 200 °C.*
- vi. *Pollution control devices (exhaust gas cooling and bag filter or ESP) must have a daily availability of 98% (i.e. maximum downtime of 2% or 30 minutes per running 24 hours). The cumulative annual downtime (total downtime over a one year period) may however not exceed 60 hours (0.685 % per annum).*
- vii. *Continuous, on-line measurement of the following emissions and operating parameters is required:*
 - *Particulate matter (total particulate);*
 - *O₂;*
 - *CO;*
 - *NO_x;*
 - *S₀₂;*
 - *HCl;*
 - *HF;*
 - *VOC/TOC;*
 - *Emission exhaust volume (e.g. Nm³/hr) and flow rate (e.g. m/s);*
 - *Water vapour content of exhaust gas (humidity);*
 - *Exhaust gas temperature;*
 - *Internal process temperature/s;*
 - *Pressure; and*
 - *Availability of air pollution control equipment (including exit gas cooling).*
- viii. *Appropriate installation and functioning of automated, continuous monitoring equipment for emissions to air, which are subject to quality control and to an annual surveillance test. Independent accredited calibration must be undertaken by means of parallel measurements with the reference methods, at a frequency as per the requirements of the equipment, but as a minimum every 3 years.*
- ix. *Periodic measurements of heavy metals and dioxin and furan emissions must be undertaken, using national (if available) or internationally acceptable methods, by independent/external, accredited specialists twice during the first 12 months of waste incineration / AFR co-processing, and annually thereafter.*

- x. Average emission values for heavy metals are to be measured over a minimum sample period of 60 minutes to obtain a representative sample, and a maximum of 8 hours, and the average values for dioxins and furans (expressed as I-TEQ) over a sample period of a minimum of 60 minutes and maximum of 8 hours.
- xi. Periodic measurements of heavy metals and dioxins and furans are to be carried out representatively to provide accurate and scientifically correct emission data and results, and sampling and analysis must be carried out by independent, accredited laboratories.
- xii. To ensure valid monitoring results are obtained, no more than five half-hourly average values in any day, and no more than ten daily average values per year, may be discarded due to malfunction or maintenance of the continuous measurement system.
- xiii. All measurement results must be recorded, processed and presented in an appropriate manner in a Quarterly Emissions Monitoring Report in order to enable verification of compliance with permitted operating conditions and air emission standards. Quarterly Emission Monitoring Reports must include, amongst others:
 - Daily average results of all continuous, on-line emission monitoring parameters, reported on line graphs that include individual, daily average data points, and indicating the relevant air emission limit if applicable;
 - Results of all continuous, on-line operational monitoring parameters, reported on line graphs that correspond in scale with the emission monitoring results;
 - Results of periodic emission measurements of heavy metals, and dioxins and furans; Confirmation of residence times and temperatures of specific wastes co-processed as determined by the specific feed points, plant dimensions and material and gas flow rates;
 - Discussion on availability or air pollution control equipment, together with reasons for and management of downtime;
 - All relevant results must be compared with baseline measurements taken prior to the co-processing of AFR or hazardous waste; and
 - Detailed evaluation and discussion of any non-compliance during the reporting period.
- xv. Treatment of High Level POPs Containing Waste (as defined by the Stockholm and Basel Conventions) are to be preceded by an independently monitored Performance Verification Test to determine the Destruction Efficiency (DE) and Destruction and Removal Efficiency (DRE) of principal organic hazardous compounds (POHC) using a suitable verification compound (e.g. trichloro-ethane).
- xvi. A plan for conducting a Performance Verification Test must be submitted to the relevant Government Department/s at least 3 months prior to the commencement of such a test, and must include, amongst others, the following:
 - Motivation for why the plant should be used for treatment of High Level POPs;
 - A feasibility study showing that the plant is technically qualified;
 - Planned date for commencement of the test and expected duration;
 - Details on the waste to be co-processed during the test, including source, volume, composition etc.;
 - Motivation for the particular choice of waste and its suitability in providing an accurate and representative indication of the plant's DE and DRE, and therefore suitability to treat High Level POPs Containing Waste;
 - Extension of monitoring regime to include Chlorobenzenes, HCB, PCBs, Benzene, Toluene, Xylenes, PAHs, and NH₃;
 - Monitoring and analysis to be conducted, the associated methodologies and independent parties responsible for monitoring.
- xvii. A detailed, independent report documenting and interpreting the results of the Performance Verification Test must be compiled. As a minimum, a DE/DRE of 99.9999% would be required, as well as compliance with Air Emission Standards.
- xviii. An Air Quality Improvement Plan for achieving emission limits over time must be developed if transitional arrangements apply to compliance with emission standards.
- xix. Compliance time frames for health care risk waste incineration will be as specified in paragraphs (8);

(9); and (10) unless specific compliance time frames for health care risk waste incineration have been set under health care risk waste regulations, in which case, the specific compliance time frames for health care risk waste incineration set under health care risk waste regulations shall apply.

- xx. Continuous emission monitoring for Health Care Risk Incinerators shall be complied with by 31 March 2014.
- xxi. Combustion of solid, liquid and gaseous waste materials in installations primarily used for steam for steam raising or electricity generation must comply with the emission standards of this sub- category.

1.8.9 Municipal By-Laws

Cape Agulhas Municipality's By-law for Refuse Removal was published in the Provincial Gazette Western Cape on 3 October 2005. The following is a summary of this By-law and should be read in conjunction with the full gazetted version.

1. Definitions

List of definitions of terms used in the By-law

2. Application

The provisions of this By-law do not derogate from the provisions of any other legislation and this by-law binds any organ of state.

3. Refuse and waste removal services provided by the Council

The Council provides refuse and waste removal services.

- Owners of premises where a body corporate is in existence, trade premises or agricultural are responsible for making independent arrangements for the removal of refuse and waste, but may apply to Council for waste removal.
- Owners of premises may apply for additional receptacles.

4. Retention of existing refuse removal systems

- All existing refuse removal systems in operation will be retained and
- All agreements entered into with the Council in respect of refuse removal will continue in terms of the provisions thereof.

5. Amendment of existing refuse removal systems

- The Council may amend any existing refuse removal system
- No refuse removal system will be considered for amendment unless for the reasons listed in the by-law.
- A proposal by residents for the amendment of an existing refuse removal system must take into consideration the provisions of sub-section (2)
- Any proposal as contemplated in subsection (3) must be in respect of an area with clearly defined natural boundaries.
- When an amended system is finally approved by Council, the Council will adopt a set of provisions in respect of the additional terms not contained in this by-law and publish it as a schedule to the by-law.

6. Powers of the Council in relation to refuse and waste removal

The Council may:

- (a) in respect of the approval in terms of town planning legislation of new developments, redevelopments and subdivisions require the listed items under 6(a)
- (b) require that private refuse and waste removals be scheduled in days and times approved by Council
- (c) may provide or require of the owner of premises additional bags, bins or receptacles

- (d) may provide or require of the owner of premises refuse removals at a frequency as may be determined by the engineer.

7. Disposal of refuse and waste

No person may dispose of refuse or waste in any manner unless it conforms to the conditions listed under section 7.

8. Disposal of refuse, waste and hazardous waste

No person may:

- (a) deposit any waste or hazardous waste in a refuse bin, street refuse bin or any bag to be removed by Council
- (b) burn refuse, waste or hazardous waste, except in an approved incinerator
- (c) dispose of hazardous waste without the prior permission of the Council.

9. Storage of waste and hazardous waste

- (1) No person may store waste awaiting disposal under the conditions listed under 9(1)(a – b).
- (2) No owner of premises may store, or allow to be stored, on such premises, hazardous waste awaiting disposal unless under the conditions listed under 9(2)(a-b)

10. Transport of refuse, waste and hazardous waste

- (1) No person may transport refuse or waste by any means, unless the refuse or waste is covered or contained in a receptacle so as to prevent spillage, seepage, leakage or being blown away by the wind.

(2) No owner of premises may transport, arrange for, or allow the transportation of hazardous waste from such a premises unless written proof is provided from the person in charge of a facility approved by the Council where such hazardous waste is disposed of.

- (3) No person who transports hazardous waste by any means may:
 - (a) dispose of such hazardous waste at or in any place other than at a facility approved by Council;
 - (b) transport such waste unless it is in a sealed container; and
 - (c) allow such hazardous waste to spill, leak or seep from any container.

11. Entry upon landfill sites, drop off sites and other facilities

- (1) Every person who enters upon a landfill site or other facility provided by Council in respect of waste management must comply with the instruction as displayed at the entrance.
- (2) A person who does not comply with the contents of a notice is guilty of an offence.

12. Removal of refuse

- (1) Only refuse may be deposited in refuse bins and refuse bags which are removed by Council.
- (2) In those residential areas where only refuse bins are utilised:
 - (a) bins may only be put out on the sidewalk on those days that refuse is removed
 - (b) the refuse which is put out but not deposited in a bin, will not be removed
 - (c) bins may not be filled to such extent that the lid cannot be closed
 - (d) only bins prescribed by Council may be used
 - (e) owners are responsible for the cleansing of refuse bins.
- (3) In areas where Council provides refuse bins the following:
 - (a) bins will remain property of the Council
 - (b) bins may not be utilised for any other purpose than for the depositing of refuse
 - (c) nothing which may cause damage to a bin may be deposited therein
 - (d) bins may not be removed from the premises to which it had been allocated
 - (e) the Council may hold the owner responsible for the cost of replacing a bin
- (4) In areas where refuse is removed by means of bags:
 - (a) refuse which is not in bags as prescribed by Council will not be removed
 - (b) refuse may only be put out on the sidewalk on those days that refuse is removed

- (c) the owner must ensure that bags are placed in a position that the contents are secured
 - (d) the Council determines the maximum number of bags which may be put out
 - (e) no sharp objects may protrude from the bag
- (5) In areas where refuse is removed by means of bags supplied by the owner, only the type of bags prescribed by Council may be used.

13. Dumping and littering prohibited

- (1) No person may dump or accumulate any refuse or waste in any street, public open space, vacant land, body of water, river or stream
- (2) No person may throw away or leave any object in a street, public place or vacant property.

14. Tariffs

- (1) The Council determines and levies the tariffs in respect of services rendered.
- (2) No person shall be entitled exemption from or a reduction in tariffs determined by the Council, merely on the grounds that such a person makes limited use of the service rendered.

15. Transitional arrangements

A person who can prove that an approval was granted in terms of any by-law contained in Schedule 2, may continue to act in terms of that approval, provided that:

- (a) the conditions imposed in terms of the original approval will remain in force
- (b) the original approval will be valid inly in respect of the premises for which it was granted
- (c) no approval may be transferred from the original applicant to another person.

16. Offences and penalties

A person who contravenes a provision of this by-law, or fails to comply with a condition or notice legally issued in terms of this by-law, is guilty of an offence and on conviction liable to the payment of a fine.

This by-law is to be replaced with an Integrated Waste Management By-law by end of FY 2020/2021 in order to align with the NEM:WA Act, 2008, as the current by-law was gazetted in 2005.

1.8.10 National Waste Management Strategy (NWMS)

The National Waste Management Strategy (NWMS) was approved by Cabinet in 2011 in GG 35306 GN.344 of 4 May 2012 and presents Government's strategy for integrated waste management for South Africa. The NWMS is a legislative requirement of the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) and the purpose of the Strategy is to achieve the objectives of the Waste Act.

The National Waste Management Strategy presents a long-term plan (up to the year 2016) for addressing key issues, needs and problems experienced with waste management in South Africa. The strategy gives effect to the Bill of Rights, Constitution of South Africa, Act 107 of 1998, based on which the people of South Africa have the right to an environment that is not detrimental to their health. Furthermore, the strategy translates into action Government's policy on waste as set out in the Draft White Paper on Integrated Pollution and Waste Management for South Africa (published in 1998).

The objective of integrated pollution and waste management is to move away from fragmented and uncoordinated waste management to integrated waste management. Such a holistic and integrated management approach extends over the entire waste cycle from cradle to grave, and covers the prevention, minimisation, generation, collection, transportation, treatment and final disposal of waste. Integrated waste management thus represents a paradigm shift in South Africa's approach to waste management, by moving away from waste management through impact management and remediation and establishing instead a waste management system, which focuses on waste prevention and waste minimisation.

The Strategy is built around a framework of eight goals, as listed below, along with specific goals that must be reached by 2016. All listed targets must be reached by 2016:

- 1) Promote waste minimisation, re-use, recycling and recovery of waste:
 - 25% of recyclables diverted from landfill sites for re-use, recycling or recovery.
 - All metropolitan municipalities, secondary cities and large towns have initiated separation at source programmes.
 - Achievement of waste reduction and recycling targets set in IndWMPs for paper and packaging, pesticides, lighting (CFLs) and tyres industries.
- 2) Ensure the effective and efficient delivery of waste services.
 - 95% of urban households and 75% of rural households have access to adequate levels of waste collection services.
 - 80% of waste disposal sites have permits.
- 3) Grow the contribution of the waste sector to the green economy
 - 69 000 new jobs created in the waste sector.
 - 2 600 additional SMEs and cooperatives participating in waste service delivery and recycling.
- 4) Ensure that people are aware of the impact of waste on their health, well-being and the environment.
 - 80% of municipalities running local awareness campaigns.
 - 80% of schools implementing waste awareness programmes.
- 5) Achieve integrated waste management planning
 - All Municipalities have integrated their IWMPs with their IDPs and have met the targets set in the IWMPs.
 - All waste management facilities required to report to SAWIS have waste quantification systems that report information to WIS.

The strategy aims to reduce both the generation and the environmental impact of waste. It presents a plan for ensuring that uncontrolled and uncoordinated waste management no longer adversely affects the socio-economic development of South Africa, the health of its people and the quality of its environmental resources. It establishes a waste management system that concentrates on avoiding, preventing and minimising waste and makes provision for waste management services for all by extending an acceptable standard of waste collection, as well as transportation, treatment and disposal services to all communities.

While the long-term objective of the strategy is waste prevention and minimisation, a number of remedial actions such as improved waste collection and waste treatment are required in the shorter term due to prevailing inadequate waste management practices.

The Strategy is an institutionally inclusive strategy because its achievement relies on participation by numerous role-players in the public sector, private sector and civil society.

To implement the Waste Act, government must:

- Draft regulations, standards and Integrated Waste Management Plans.
- Regulate waste management activities through licences and enforce their conditions.
- Implement the South African Waste Information System (SAWIS).
- Coordinate waste management activities using a system of Waste Management Officers.
- Give effect to multilateral agreements, ensure proper import, and export controls.
- Progressively expand access to at least a basic level of waste services and plan for future needs.
- Facilitate the establishment of a national recycling infrastructure.
- Provide the framework for the remediation of contaminated land.
- Work in partnership with the private sector and civil society.

The NWMS is currently being reviewed by the Minister, Ms Barbara Creecy, and has not been finalised at the time of review of this 3rd Generation IWMP.

1.8.11 White Paper on Education and Training (1995)

The 1995 *White Paper on Education and Training* states that “environmental education, involving an interdisciplinary, integrated and active approach to learning, must be a vital element of **all levels and programmes of the education and training system**. In order to create environmentally literate and active citizens and ensure that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources”.

The White Paper advocates environmental education and training **at all levels**. This would include the local government sphere, particularly when it comes to the environmental education & training of government officials and workers.

The education of the youth is the responsibility of national and provincial government. However, the Constitution does state that where the capacity exists, functions can be delegated to local government, and that the spheres of government, while distinctive, are interdependent and interrelated. Local government should support the other spheres of government (such as the national Department of Education, DoE) in areas of its own focus, such as environmental management and sustainable development.

The Municipality has conducted environmental training for schools, government officials and workers through the Youth in Waste programme.

1.8.12 The Municipal Systems Act (Act 32 of 2000)

This policy outlines the role and responsibilities of local governments as to:

- Provide democratic and **accountable** government for local communities;
- Ensure the provision of services to communities in a **sustainable** manner;
- Promote **social** and economic development;
- Promote a safe and healthy **environment**;
- Encourage the **involvement** of communities and community organisations in the matters of local government, and
- Strive, within its financial and administrative capacity, to achieve the objectives above.

These responsibilities indicate a need for an environmentally educated work force (accountable) as well as an environmentally educated public (involvement). The Municipal Systems Act (32 of 2000) requires municipalities to promote public participation and to build the capacity of residents, councillors and municipal officials to engage in participatory processes. As a means of tracking progress in this area, the executive of a municipality is obliged to report annually on the level of public participation in municipal matters.

Each Municipality must include in its integrated development plan contemplated in Chapter 5 of the Municipal Systems Act, an integrated waste management plan that is consistent with the relevant provincial integrated waste management plan. The annual performance report, which must be prepared in terms of section 46 of the Municipal Systems Act, must contain information on the implementation of the municipal integrated waste management plan.

1.8.13 The Municipal Structures Act, 1998 (Act No. 117 of 1998)

This Act makes provision for the establishment of municipalities in accordance with the requirements relating to categories and types of municipality. It establishes criteria for determining the category of municipality to be established in an area and defines the types of municipality that may be established within each category.

The Act furthermore provides for an appropriate division of functions and powers between categories of Municipality and regulates the internal systems, structures and office-bearers of the municipalities. It also provides for appropriate electoral systems for matters in connection therewith.

1.8.14 National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (“The Waste Act”)

On 1 July 2009 the National Environmental Management: Waste Act, 2008 (Act No. 59 of 2008) (“the Waste Act”) came into effect and was subsequently amended on 2 June 2014 through the NEM:WA (No. 26 of 2014). The Waste Act repealed Section 20 of the Environment Conservation Act, 1989 (Act No. 73 of 1989) (“ECA”) and introduces new provisions regarding the licensing of waste management activities.

Provision has been made in the form of legislative and regulatory tools to facilitate and ensure implementation of the Act by all spheres of government.

The Waste Act was published to reform the law regulating waste management in order to protect the health of the environment by providing reasonable measures for the prevention of pollution and ecological degradation and for securing ecologically sustainable development.

The purpose of this Act is to protect health, well-being and the environment by providing reasonable measures for:

- the minimisation of the consumption of natural resources;
- the avoidance and minimisation of the generation of waste;
- the recovery, re-use and recycling of waste;
- the treatment and safe disposal of waste as a last resort;
- the prevention of pollution and ecological degradation;
- securing ecologically sustainable development while promoting justifiable economic and social development;
- promoting and ensuring the effective delivery of waste services;
- remediating land where contamination presents, or may present, a significant risk of harm;
- achieving integrated waste management reporting and planning;
- to ensure that people are aware of the impacts of waste on health and the environment;
- to provide for compliance and generally to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to the health and well-being of people.

The interpretation and application of this Act must be guided by the national environmental management principles set out in section 2 of NEMA.

The Waste Act allows for the compilation of a Waste Management Strategy, national, provincial and local standards.

In terms of their by-laws, municipalities must establish waste service standards as per to the following provisions of the Act:

(1) A municipality must exercise its executive authority to deliver waste management services, including waste removal, waste storage and waste disposal 10 services, in a manner that does not conflict with section 7 or 8 of this Act.

(2) Each municipality must exercise its executive authority and perform its duty in relation to waste services, including waste collection, waste storage and waste disposal services, by—

- (a) adhering to all national and provincial norms and standards;*
- (b) integrating its waste management plans with its integrated development plans;*
- (c) ensuring access for all to such services;*
- (d) providing such services at an affordable price, in line with its tariff policy referred to in Chapter 8 of the Municipal Systems Act;*
- (e) ensuring sustainable services through effective and efficient management; 20 (/) keeping separate financial statements, including a balance sheet of the services provided.*

(3) In exercising its executive authority contemplated in subsection (1). a municipality may furthermore, amongst other things, set—

- (a) local standards for the separation, compacting and storage of solid waste that 25 is collected as part of the municipal service or that is disposed of at a municipal waste disposal facility;*

(b) local standards for the management of solid waste that is disposed of by the municipality or at a waste disposal facility owned by the municipality, including requirements in respect of the avoidance and minimisation of the 30 generation of waste and the re-use, recycling and recovery of solid waste;

(c) local standards in respect of the directing of solid waste that is collected as part of the municipal service or that is disposed of by the municipality or at a municipal waste disposal facility to specific waste treatment and disposal facilities; and

(d) local standards in respect of the control of litter.

(4) Whenever the Minister or MEC acts in terms of this Act in relation to a municipality, the Minister or MEC must seek to support and strengthen the municipality's ability or light to perform its functions in relation to waste management activities.

(5) (a) Whenever a municipality intends passing a by-law so as to give effect to subsection (1), it must follow a consultative process provided for in Chapter 4 of the Municipal Systems Act.

(b) Paragraph (a) need not be complied with if the by-law is amended in a non-substantive manner.

In addition, municipalities must also:

- may identify requirements in respect of the separation, compacting and storage of waste;
- may identify requirements for the management of waste, including requirements in respect of the avoidance of the generation of waste and the recovery, reuse and recycling of waste;
- the requirements in respect of the directing of waste to specific treatment and disposal facilities.

Each Municipality must include in its integrated development plan contemplated in Chapter 5 of the Municipal Systems Act, an integrated waste management plan that is consistent with the relevant provincial integrated waste management plan.

The annual performance report, which must be prepared in terms of section 46 of the Municipal Systems Act, must contain information on the implementation of the municipal integrated waste management plan.

Municipalities must also in terms of the Act:

- conduct municipal activities in accordance with the National Waste Management Strategy and any national or provincial norms and standards;
- compile an integrated waste management plan as well as annual reporting of the implementation thereof;
- ensure that waste management services are provided within the municipality in a manner which prioritises the recovery, re-use or recycling of waste and provides for the treatment and safe disposal of waste as a last resort;
- designate a waste management officer;
- ensure that provision is made for the management and collection of litter;
- secure compliance with the objects of this Act that are in the domain of the municipality;
- implement any other measures that are necessary for securing the objects of this Act that are within the domain of the municipality; and
- improve, designate or provide a container for waste generators to place their waste in for collection.

Duty to provide collection services - Every municipality has an obligation to progressively ensure that efficient, effective and affordable waste collection services are provided in its area.

A municipality may, by notice, require any person making use of the municipal collection service to separate specified types of waste from the general waste for the purposes of recovery, re-use or recycling.

In terms of Section 19(1) of the Waste Act, the Minister may publish a list of waste management activities that have, or are likely to have, a detrimental effect on the environment. In terms of Section 20 of the Waste Act (2008), no person may commence, undertake or conduct a waste management activity except in accordance with the following:

- the requirements or standards determined in terms of Section 19(3) of the Waste Act for that activity; or
- a waste management license issued in respect of that activity, if a license is required.

In August 2013, a new list of waste management activities was revised and the latest list was published in November 2013. These activities were published in Government Notice R.921 in Government Gazette No. 37083 of 29 November 2013. No person may commence with, undertake or conduct these activities unless a waste management license is issued in respect of the activity.

A person who wishes to commence, undertake or conduct an activity listed under Category A must conduct a Basic Assessment process whilst activities listed under Category B requires a Scoping and EIA process to be undertaken.

In terms of Section 49(2) of the Waste Act (2008) a decision to grant a waste management license in respect of a waste disposal facility is subject to the concurrence of the Minister responsible for Water Affairs. The Waste Act further specifies that the issuing of a waste management license for a waste disposal facility is subject of the inclusion in the license of any conditions contained in a Record of Decision issued by the Minister responsible for Water Affairs. Regarding any measures that the Minister responsible for Water Affairs considers necessary to protect a water resource as defined in the National Water Act, 1998 (Act No. 36 of 1998).

The 2014 Amendment Act calls for the establishment of a waste management bureau which is required to provide support and advice to municipalities with regard to the development and implementation of Waste Management Plans and capacity building programmes, as well as building municipal waste management capacity.

Furthermore, the Amendment Act also presented the addition of Schedule 3, which details various waste definition information. Hazardous and General Waste has been defined in terms of the various sources, processes and industry.

A number of National Norms and Standards are also currently in place. These include the following:

- National Waste Information Regulations, GN R 625 (13 August 2012).
- Waste Classification and Management Regulations GN R 634 (23 August 2013).
- National Norms and Standards for the Assessment of Waste for Landfill Disposal GN R 635 (August 2013).
- National Norms and Standards for Disposal of Waste to Landfill GN R 635 (August 2013).
- List of Waste Management Activities that have, or are likely to have a detrimental effect on the environment, GN R 921 (29 November 2013) (as well as the amendment by GN 332 of 02 May 2014).
- National Norms and Standards for extraction, flaring for recovery of landfill gas; scrapping or recovery of motor vehicle; storage of waste GN R 925 (29 November 2013).
- Fees for Consideration and processing of applications for Waste Management Licences and Transfer and Renewal thereof GN R 142 (28 February 2014) (Municipality to pay app fee for WML).
- National Norms and Standards for the Remediation of Contaminated Land and Soil Quality GN R 331 (02 May 2014).

1.8.15 National Pricing Strategy for Waste Management

The National Pricing Strategy for Waste Management (NPSWM) is a legislative requirement of the National Environmental Management: Waste Amendment Act (Act No. 26 of 2014) and gives effect to the National Waste Management Strategy (NWMS). It is currently being developed in order to serve as an incentive to change particular behaviour towards the generation of waste and waste management by all sectors of society. The aim is to provide an enabling environment for waste recycling and to contribute to the recycling economy in South Africa through recovery, re-use and recycling of waste.

The strategy contains guiding methodologies for the setting of waste management charges, aimed at funding the re-use, recycling or recovery of waste; implementation of industry waste management plans (IndWMP) for those activities that generate specific waste streams; and the operations of the Waste Management Bureau.

A number of economic instruments would be used which includes the payment of volumetric tariffs and waste disposal taxes to municipalities. Municipalities would need to manage this process, but would need to be established and/or be provided with the necessary systems (financial and administrative) and infrastructure.

Extended producer responsibility is defined as the “environmental policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of a product's life cycle”. The intention is to relieve municipalities of some of the financial burden of waste management, and to provide incentives to producers to reduce resources, use more secondary materials, and implement product design changes to reduce waste.

1.8.16 White Paper: Policy on Pollution Prevention, Waste Minimisation, Impact Management and Remediation (March 2000)

In line with international trends and our national objectives of efficient and effective management of our nation's resources, priority is given to prevention of waste. Unlike previous policies that focused predominantly on so-called “end of pipe” treatment, this White Paper underscores the importance of preventing pollution and waste and avoiding environment degradation.

Effective mechanisms to deal with unavoidable waste will remain necessary, but much greater attention must be directed to the introduction of preventative strategies aimed at waste minimisation and pollution prevention. Ever increasing urban and industrial development throughout the world is leading to levels of pollution, which seriously threaten the natural resources upon which humankind depends for its survival.

Although South Africa has extensive environment, pollution and waste management legislation, responsibility for its implementation is scattered over a number of departments and institutions.

The fragmented and uncoordinated way pollution and waste is currently being dealt with, as well as the insufficient resources to implement and monitor existing legislation, contributes largely to the unacceptably high levels of pollution and waste in South Africa.

The White Paper on Integrated Pollution and Waste Management will result in a review of the existing legislation and the preparation of a single piece of legislation dealing with waste and pollution matters.

Pollution and waste management is not the exclusive preserve of government. The private sector and civil society have crucial roles to play. The fostering of partnerships between government and the private sector is a prerequisite for sustainable and effective pollution and waste management to take place. Similarly, the spirit of partnerships and co-operative governance between organs of state is equally important due to the crosscutting nature of pollution and waste management.

Monitoring and collection of information on pollution and waste generation are crucial for the implementation of pollution and waste reduction measures. Moreover, the sharing of such information and creating awareness about the issues will enable all stakeholders, including communities, to gain a better understanding of the relation between pollution, waste management and the quality of life.

The White Paper proposes a number of tools to implement the objectives of the policy it sets out. The most significant of these is a legislative programme that will culminate in new pollution and waste legislation. This proposed legislation, amongst other things, will address current legislative gaps, and clarify and allocate responsibilities within government for pollution and waste management.

The policy presents seven strategic goals, which are as follows:

- Goal 1: Effective Institutional Framework and Legislation
- Goal 2: Pollution Prevention, Waste Minimisation, Impact Management and Remediation
- Goal 3: Holistic and Integrated Planning
- Goal 4: Participation and Partnerships Governance in Integrated Pollution and Waste Management

- Goal 5: Empowerment and Education in Integrated Pollution and Waste Management
- Goal 6: Information Management
- Goal 7: International Cooperation

The role of Local Government

Municipalities will be responsible for providing waste management services, and managing waste disposal facilities. Specific functions to be carried out by municipalities will include:

- compiling and implementing general waste management plans, with assistance from provincial government
 - implementing public awareness campaigns
 - collecting data for the Waste Information System
 - providing general waste collection services and managing waste disposal facilities within their areas of jurisdiction
- implementing and enforcing appropriate waste minimisation and recycling initiatives, such as promoting the development of voluntary partnerships with industry, including the introduction of waste minimisation clubs where possible, regional planning, establishment and management of landfill sites, especially for regionally based general waste landfills.

1.8.17 Planning Documents

1.8.17.1 The Provincial Spatial Development Framework (March 2014)

Waste is one of the key challenges identified in the Provincial Spatial Development Framework (PSDF). The PSDF states that:

- Increasing amounts of waste produced, if not recycled, is going to result in the increased need for waste disposal sites throughout the Province.
- Recovery / recycling facilities and initiatives hold the potential to prevent the need to establish new waste disposal sites.
- The Cape Town functional region, as a primary waste generator, must upscale waste recovery and recycling initiatives.
- The location of regional waste sites has the potential to either unlock opportunities or unnecessarily burden municipalities operationally.

In terms of provincial spatial policy, it is important to minimise the negative impacts on resources consumption and disposal (i.e. e-waste) through the implementation of recycling and recovery programmes as well as by locating regional waste sites adjacent to rail infrastructure in order to improve transport of waste in the province. In terms of solid waste systems, it has been identified that an increase in waste recycling and reuse is required, as well as adopting waste-to-energy programmes and facilities in the long-term.

1.8.17.2 Western Cape Green Economy Strategy Framework (2013)

The Western Cape Green Economy Strategy Framework (WCCGESF) was developed in response to the sensitivity of the Western Cape to climate change, both economically and in terms of natural capital.

The purpose of this framework is to optimise green economic opportunities and enhance environmental performance through smart living, working and mobility. The framework acknowledges the concerning issue of the waste profile where about 80% of municipal waste in the Western Cape goes to landfills compared with less than 20% in best practice regions. It provides a number of areas related to waste minimisation, waste-to-energy, reuse and recycling which are all addressed through this framework and, although there are no specific instructions to municipalities, it is important for municipalities to be aware of these initiatives and provide support where needed. Some examples of waste-related goals include:

- The development and configuring of neighbourhoods, which promote, amongst other things, zero waste.
- Minimise waste to landfill through the recycling and up-cycling of waste.
- Placing responsibility for waste minimisation onto the private sector.

- The development of the Integrated Waste Exchange (IWEX) which is a free online system that enables waste generators and users to exchange waste materials within the boundaries of the City of Cape Town.
- Promoting the beneficiation of waste through development of opportunities on farms to convert waste to energy.
- The promotion of smart manufacturing which minimises waste and increases efficiency
- A number of key priorities have been presented. One of the key priorities is for the province to be an early adopter towards achieving zero waste through growing the commercial waste economy in partnership between public and private sectors as a major source of green jobs. The broad actions applicable to this goal include the following:
 - Innovation; and
 - Identify waste materials that can be beneficiated into higher value products.
- Enabling Environment:
 - Review the regulatory environment to support waste economy, particularly among small enterprises; and
 - Create a knowledge bank of waste opportunities.
- Market Development:
 - Develop a province-wide waste exchange to support the expansion and creation of new waste enterprises by improving the knowledge of waste sources – already underway with Green Cape’s recent Western Cape Industrial Symbiosis Programme (WISP).

Another priority is to be an early adopter of use of waste as a commercial resource, which identifies high value opportunities in agricultural waste, in addition to waste to energy opportunities. This would be achieved through the following actions:

- Link pricing of waste removal to volumes of non-recycled waste generated.
- Review regulatory environment to increase ease of establishing waste to energy initiatives.
- Create markets for new energy generated.

Lastly, a priority is to pioneer the development of emerging market skills programmes for key green skills in renewable energy, water and waste through:

- Establishing a collaborative platform to share information on skills gaps and needs that draws together public, private and educational sectors;
- Unlocking funding for targeted training initiatives;
- Creating partnerships with global skills centres to develop new skills sets;
- Developing e-learning systems as a core component of learning; and
- Facilitating shared research agendas between the public, tertiary and private sectors to meet the needs of the green economy.

1.8.17.3 Cape Agulhas Air Quality Management Plan

An Air Quality Management Plan (AQMP) was released in August 2013 and its purpose is to ensure that Cam is compliant with National Environmental Management: Air Quality Act 39 of 2004 (NEM:AQA) demands that all municipalities introduce AQMPs which describe the actions proposed in support of achieving air quality standards. The CAM AQMP was reviewed and tabled to the Cape Agulhas Municipal Council in 2019.

Waste treatment and disposal has been identified as a source of air emissions in the CAM. The reduction of these emissions is important and goals are provided in Table 10 below.

Table 10. Emissions goals for Cape Agulhas Municipality

Target	Activity	Timeframe Short-term (6-12 months); Medium-term (1-2 years); Long-term (3-5 years)
Waste Treatment and Disposal	Develop an emissions inventory of waste burning sources (incinerators, sewage and waste water treatment works)	Short – Medium
	Ensure all operating incinerators are permitted	Continuous
	Maintain a current database of permitted and non-permitted landfill sites	Continuous

1.8.17.4 Integrated Industry Waste Tyre Management Plan (GN 988 of 30 November 2012)

The Recycling and Economic Development Initiative of South Africa (REDISA) compiled an IMWP for waste tyres, which was approved by cabinet in November 2013. The IIWTMP makes provision for effective and integrated management of waste tyres in the country and provides regulations for producers (also known as subscribers as all producers must subscribe to the IIWTMP), transporters, waste tyre depots, waste tyre processors, the external management committee and the adjudication committee.

Waste tyre transporters are required to register with the waste management officer in the municipality or province as required by law and, in terms of the contract awarding process, a liaison team formed to ensure compliance with the waste tyre management process will work with and support municipalities.

1.8.17.5 Paper and Packaging Industry Waste Management Plan (Draft 2014)

A Draft version of the Paper and Packaging Industry Waste Management Plan (IWMP) was submitted to DEA in September 2014 and is currently awaiting final approval.

Presently, the cornerstone of the IWMP is around an industry-managed system. The primary objectives include the following;

- Maximise diversion from landfill;
- Provide industry with a steady stream of good quality recyclables;
- Reduce resource consumption;
- Job creation;
- Cleaning up the environment;
- To be non-profit and to run as cost effectively as possible;
- Develop new collection systems;
- The importance of industry providing support to municipalities;
- The development of labour intensive models to handle and sort recyclable materials;
- Develop markets to absorb recyclables collected;
- Encourage entrepreneurship;
- Ensure obligatory membership of a Product Responsibility Organisation; and
- The costs to implement the IWMP are to be obtained from “obligated industries”.

1.8.17.6 eWASA Industry Waste Management Plan (Draft November 2011)

A Draft IWMP for electronic waste (e-waste) is currently available through the e-Waste Association of South Africa (eWASA). The plan acknowledges the high costs of recycling e-waste, particularly when compared to the revenue generated from the recovered materials. The IWMP is voluntary and aims to provide guidance to policy makers and system architects on the policy tools, configuration alternatives, financing schemes and management alternatives that may be used to operate take-back systems.

1.8.17.7 Western Cape Climate Change Response Strategy (Feb 2014)

A relevant focus area identified in the strategy is The Built Environment, including Critical Infrastructure, Human Settlements and Integrated Waste Management and undertakes to commence with a Waste Management Flagship Programme in the near future as part of one of the eight priority flagship programmes proposed.

Waste recycling and the absolute reductions in the total volume of waste disposed to landfill each year form important actions under the Environmental Sustainability and Resilience objectives. The plan also highlights the availability of numerous waste-to-energy opportunities in the Western Cape and has designated the development of waste-to-energy opportunities for both the municipal and the private (commercial and industrial) waste systems as one of the priority areas.

Another important focus area under the Built Environment is that of waste minimisation and management. Priorities related to this issue include:

- Development of waste characterisation profiles for municipalities in the Western Cape; and
- Promotion of the waste economy and identification of opportunities to reduce waste going to landfill.

2. EXISTING WASTE MANAGEMENT IN THE CAPE AGULHAS MUNICIPALITY

2.1 WASTE QUANTITIES AND TYPES

2.1.1 General Waste Volumes

For determining the waste quantities in Cape Agulhas Municipality, the population statistics from census were used to calculate the total tonnage of municipal solid waste (MSW), using typical waste generation figures per person of each sector of the community.

No accurate data on waste generation in Cape Agulhas Municipality exists due to the lack of weighbridges or other measuring devices. The rural population was not taken as contributors; consequently, the figures below do not include rural waste.

2.1.2 Volumes of General Waste generated

Domestic waste generation in the urban areas of Cape Agulhas Municipality is depicted in Table 11.

Table 11. General waste volumes for Cape Agulhas

Main Town	Population (2016)	Waste Generated in Tonnes/year (2015)	Average Waste Generation Factor for Area in kg/p/d
L'Agulhas (Cape Agulhas and Agulhas)	6,700	50	0.02
Suiderstrand	44	15	0.93
Arniston	1,267	110	0.23
Bredasdorp	15,524	1250	0.19
Napier	4,214	110	0.07
Elim	1,412	55	0.11
Struisbaai	3877	250	0.16
Total	33,038	1,625	0.24

Commercial Waste

Due to unavailability of data, commercial waste has not been included in the above volumes.

Non-Hazardous Industrial Waste

Due to unavailability of data, non-hazardous industrial waste has not been included in the above volumes.

Builder's Rubble

Data on builder's rubble has been included. Builder's rubble is also use as cover material

Public Cleaning Waste

Public cleansing waste is 10% of the waste disposed at the landfill site.

Recoverable Material Volumes

The May 2013 State of Environment Outlook Report for the Western Cape Province, Waste Management Chapter 4 (draft for public comment) provides an analysis of the waste stream from the Overberg District Municipality.

From this information it can be derived that the following percentages (by mass) of recoverable material could be present in Cape Agulhas' general waste stream:

Paper:	22%
Plastic:	10%
Glass:	5%
Metal:	6%
Green/organics	24%
Builders' rubble	33%

From the waste composition as reflected above, it can be calculated that the total volume of recoverable materials that are theoretically available in the waste stream will be as indicated in Table 12.

Table 12. Volumes of recoverable materials

Main Town	PAPER (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)	GREEN (t/a)	BUILDERS (t/a)
Struisbaai	41.8	19	9.5	11.4	45.6	30
Suiderstrand	2.2	1	0.5	0.6	2.4	5
L'Agulhas	8.8	4	2	2.4	9.6	10
Napier	22	10	5	6	24	10
Arniston	22	10	5	6	24	10
Elim	11	5	2.5	3	12	5
Bredasdorp	209	95	47.5	57	228	100
Total	305,8	139	69,5	83,4	333,6	165

Due to the methods of collection, i.e. the collection of mixed un-separated household waste, a large amount of deterioration and contamination of potentially recoverable material takes place. Post - collection recovery (as is currently the norm in South Africa) implies that only a part of the above tonnages is available for recovery and recycling, due to contamination. For that reason, separation at source is considered the preferred methodology to increase the volumes and value of recovered materials.

Although experience has shown that participation by the public is largely economy driven, the current trend is that separation at source, which implies that recoverable materials are separated by the home owner and "given" to the municipality (or Service Provider) for free, is mainly supported by the middle and higher income groups, whereas the low and very low income groups support buy-back centres or swap-shops where recoverable materials are bought/traded from the residents.

However, previously acquired data illustrates that the implementation of source separation only leads to a 1% increase in over-all recovered material volume. This small increase may be attributed to that fact that source separation was only implemented in a certain group of neighbourhoods and

not throughout the whole of the area where the data was received. If one looks at the statistics per neighbourhood, the increase in material recovery is reportedly 15%. With these relatively small gains in recovery, the Municipality should evaluate the economic feasibility of implementing a source separation system. It is still the preferred collection method, but expensive to implement and would probably receive lower priority as opposed to alternative strategies and action plans that need to be executed by the Municipality in the upcoming years.

Statistics obtained from the various “separate bag” collections as are currently practised on a private contract base in the City of Cape Town, indicate that separation at source participation rates of up to 85% are readily achievable in the middle and higher income groups. The degree of contamination in the “separate bag” is significantly lower and the average “tailings” percentage achieved is approximately 10%. (Source: WastePlan)

With the assumed strategy of source separation and “clean” Material Recovery Facilities where the source separated materials are sorted into its various groups and sub-groups, and assuming that only middle and higher income group communities will be participating in source separation, it can be calculated that the current (2016) recovery volumes will be as indicated in Table 13.

Table 13 Calculated volumes of recovery of sources of separated materials

Main Town	PAPER (t/a)	PLASTICS (t/a)	GLASS (t/a)	METAL (t/a)	GREEN (t/a)	BUILDERS (t/a)
Struisbaai	7.0224	0.912	3.344	0.912	36.48	24
Suiderstrand	0.3696	0.048	0.176	0.048	1.92	4
L'Agulhas	1.4784	0.192	0.704	0.192	7.68	8
Napier	3.696	0.48	1.76	0.48	19.2	8
Arniston	3.696	0.48	1.76	0.48	19.2	8
Elim	1.848	0.24	0.88	0.24	9.6	4
Bredasdorp	35.112	4.56	16.72	4.56	182.4	80
Total	53.22	6.91	25.34	6.91	276.48	136

Assumptions for Source Separation: 80% participation (Based on actual data from WastePlan)

21% recovery of available Paper and Cardboard

6% recovery of available Plastics

44% recovery of available Glass

10% recovery of available Metals

Data for recovery of green waste and builders' rubble is assumed at 100% as information is unavailable

The above “realistic” volumes can be increased when additional facilities such as buy-back centres are commissioned in low and very low income group communities.

- Paper and Cardboard**

Paper and Cardboard form the foundation for any recovery venture, due to the relative stable demand and numerous recycled products made from recovered paper.

Waste paper is transformed from one type to another during the recycling process. The supply and demand for waste paper, although stable, is cyclical in nature, and therefore marketing patterns have to be adapted accordingly.

Some of the factors that contribute to this cyclical demand for recovered paper are:

- difficulty for mills to carry large stock;
- periodic mill shut-downs result in fluctuations in demand;
- paper stock is considered perishable and thus hazardous to store; and
- space for storage of stock is limited and costly.

Some materials produced with recycled paper pulp include newspapers, packaging, bags, tissue and towels, corrugated boxes, shoeboxes and files, egg cartons and fruit packing layers. If paper and cardboard products are clean and separated into different types, significantly higher prices are fetched for the recovered materials.

- **Glass**

Glass recovery for recycling has had a very erratic history, due to only one recycler having a monopoly in the market. When the capacity of the kilns is full, the price used to drop dramatically due to an over-supply and no demand. Fortunately, this situation has stabilized and a constant market for recovered glass is currently prevailing.

The separation of glass is very successful in separation at source activities since it is easy to identify by the homeowners. Recent experience in the City of Cape Town has shown that most homeowners who participate in separation at source also wash their glass products before putting it in the recyclables bag.

- **Plastic**

Several types of plastics are typically recycled, i.e. PET (transparent plastic bottles e.g. 2 litre cool drink bottles), HDPE (milk containers), LDPE and mixed plastics. Recycled PET is used in the manufacture of small molded products, such as handles, sporting goods and furniture. Recycled HDPE is used for producing flowerpots, dustbins and a variety of other containers. Mixed plastics are normally used for the manufacture of outdoor furniture, pallets, and plastic timber.

The introduction of a levy on shopping bags has caused the amounts arriving at the landfill to reduce dramatically. Less plastic bags are disposed of, as they are recovered and are now manufactured of better quality and thicker plastic.

In order to recycle plastics using current traditional methodology, it has to be sorted into the various categories, and washed if contaminated by the other wastes. Alternative technologies are currently being evaluated (also in South Africa) that could eliminate the need for sorting of plastics.

- **Metal**

Metals are the single-most recoverable item in the waste stream. Very little degradation takes place during collection. It follows that a relatively small amount ends up in the waste stream, as all types of metal are removed for re-sale at various stages of the waste handling process.

One of the major components of ferrous wastes is the steel can (95% of all cans in the Metropolitan Areas). Non-ferrous metals such as Aluminium and Copper are very scarce in our waste streams, due to its extremely high salvaging value. These are usually removed at source.

Economic Sustainability of Waste Recovery

Although the recovery of materials of value from the waste stream for recycling or re-use is one of the basic operations in future integrated waste management, the question regarding its financial and economical sustainability should always be asked and answered.

Local experience over the last decade has shown that the South African recycling market, or rather the recycled product market, is very small and very susceptible to unforeseen activities, e.g. if one paper

mill burns down, the effect on the waste paper market, and the prices, is significant. The South African “market” is simply too small to absorb these types of setbacks.

For this reason, it is commendable that DEA&DP had a study conducted into sustaining the local recycling industry.

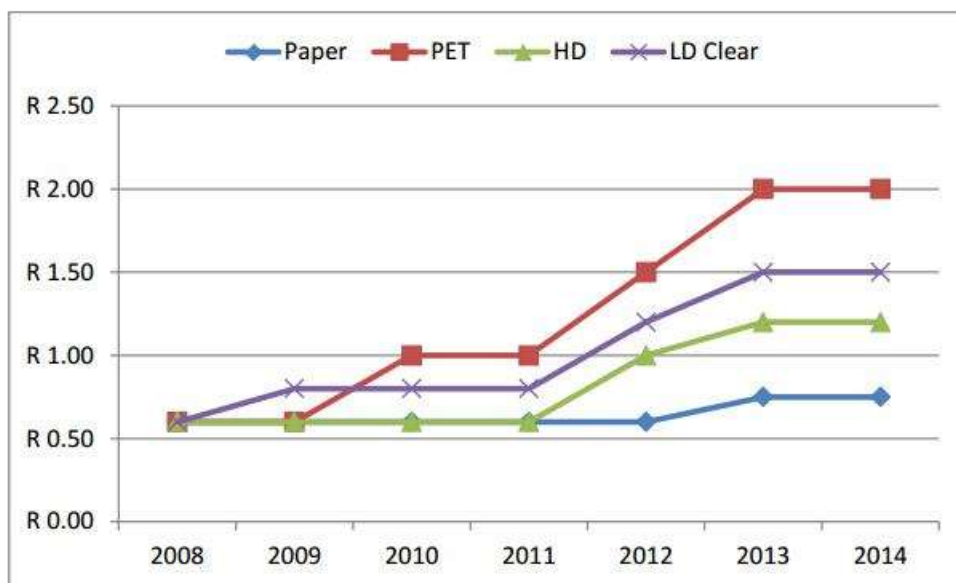
However, one must consider the economic sustainability and not only the financial sustainability. Economic sustainability considers the whole life-cycle cost and not only the rands and cents of a specific financial year and taking into consideration the avoided costs of airspace saving and the cost on the environment for the resultant smaller utilisation of virgin resources. An interesting stipulation in the Waste Act, Section 17 (1) (a), is that one may not recover materials from waste if it costs more environmental resources to recover, than it would to dispose of that material – a good example of the total or life-cycle costing principle.

Prices for recovered materials vary greatly from city to city and province-to-province, from baled to unbaled, from dirty to clean and from material type. External factors also play a significant role such as the oil price, e.g. due to a previous low crude oil price of approximately US\$43 per barrel had caused new plastic to be cheaper than recycled plastic – cheaper, not necessarily more economical. The result was that recyclers at that moment (January 2009) could not even give their LDPE plastic away where only a month before it was sold for R1500/ton.

The above does not imply or insinuate that recovery should not be supported, but that both recovery AND the establishment of a recycled goods market should be supported.

Benefits must also be shared. For example, if a municipality saves airspace due to recovery, portion of that saving (avoided costs) should be passed on to the recovery effort to ensure that it is sustainable. If not, as was proven in SA previously, the recovery effort closes down and the municipality loses its avoided cost saving.

The 2014 prices for recovered materials delivered in Cape Town are displayed in Figure 6.



*Price records only start from 2008

*Company does not collect glass and therefore does not have prices

Figure 6. Prices per kg of recovered materials in the past six years

(Source: <http://infrastructurene.ws/wp-content/uploads/sites/4/2015/01/Binda-M.-2.pdf>)

- **Priority Waste Streams**

Tyres

In accordance with the Tyre Regulations of 2008, the disposal of tyres to landfill in its current format was only allowed up to June 2011, where after all tyres that are landfilled, must be quartered. After June 2014, no tyres, quartered or otherwise, were allowed to be landfilled.

At present, farmers are recycling tyres, using them during certain periods and then returning them to the landfill. There are also some private contractors, which make use of the tyres. The municipality will have to develop an action plan in accordance with the Tyre Regulations to manage tyres generated within the municipal area.

2.2 WASTE AVOIDANCE

A hierarchical control approach to waste management is encouraged. Waste should preferably be managed in the following order of preference:

- **Avoidance:** using goods in a manner that minimises their waste components;
- **Reduction:** reduction of the quantity and toxicity of waste generated during construction;
- **Re-use:** removing an article from a waste stream for use in a similar or different purpose without changing its form or properties;
- **Recycling:** separating articles from a waste stream and processing them as products or raw materials;
- **Recovery:** reclaiming particular components or materials, or using the waste as a fuel;
- **Treatment:** processing of waste by changing its form or properties in order to reduce toxicity and quantity; and
- **Disposal:** burial, deposit, discharge, abandoning or release of waste by the entity creating the waste or a waste contractor.

Waste avoidance refers to a pro-active approach by industrial as well as domestic waste producers to minimize the volume of waste, by not creating the waste in the first place.

Waste avoidance is a “beginning of the pipe” action that can only work when people understand the full process depicted above.

Current trends in policy and legislation show that waste minimisation through recovery, reuse and recycling are priority areas for development and management.

It therefore follows that waste avoidance will be the ultimate and final step in this education process. In the home, waste avoidance can be practiced by similar efforts where items are used for different purposes than the original intent, possibly suggesting that one purchases alternative products to the norm. Home composting is also considered waste avoidance, as the waste material is converted into a useful gardening resource whilst avoiding the raw product entering the waste stream.

Presently the avoidance of waste in industry has a financially detrimental implication in most cases (e.g. alternative raw products), and only large companies are able to take the leading role through their international experience in this field. Regulatory controls will only be effective if fines result in legal compliance being cheaper than non-compliance. In South Africa, resource and disposal costs are low, providing no financial incentive to reduce consumption or waste in industry. It follows that regulatory instruments are required for implementation on a Municipal level to govern the avoidance of industrial waste in Cape Agulhas.

European governments often offer incentives / penalties to force the implementation of waste avoidance, in it is suggested that similar economic instruments be implemented in due course in Cape Agulhas (“pay-as-you-throw” principle). Regular audits should be conducted by an independent entity on the avoidance practices, to form a basis for applying incentives / penalties.

An important tool for monitoring purposes is a proper Waste Information System (WIS). The Cape Agulhas Municipality uses a Waste Calculator and reports on the Integrated Pollution and Waste Information System (iPWIS) developed by the Department of Environmental Affairs and Development Planning (DEA&DP). While this is an improvement on their not reporting at all, the Municipality will

need to report on the South African Waste Information System (SAWIS), in terms of section 69(1) (y) and (ee) of the Waste Act.

Waste avoidance will become a real and enforced issue in South Africa in the near future, and must be addressed in any Municipal Waste Strategy.

2.2.1 Existing Waste Avoidance in Cape Agulhas

In Cape Agulhas, waste avoidance has been promoted through public awareness campaigns throughout towns and schools. In addition, projects, which focus on recycling, have been implemented to promote recycling at the source as well as recycling at the various businesses distributed throughout the municipality. These efforts have been carried out on a continuous basis and must be undertaken accordingly in the future.

In addition, the Municipality could start implementing waste avoidance at some of the well-established industries on a voluntary basis. A joint venture effort between such industries and the Municipality may be mutually beneficial.

The industry will receive positive advertising of these “green” initiatives through the media, whilst the Municipality will be taking a leading role in South Africa through pro-actively promoting waste avoidance to the benefit of the community and the environment.

Successful waste avoidance will result in further lowering of the demand on the Cape Agulhas waste management infrastructure and the functions of collection, recovery and disposal will be done more efficiently.

2.3 COLLECTION SYSTEMS

2.3.1 Municipal Waste Collection Systems

The current fleet of collection vehicles in Cape Agulhas is tabled in Table 14.

Table 14. Municipal Collection Fleet

Reg. no.	Make	Model	Type	Max. Payload	Manufactured
CS 2336	Nissan	Cabstar	Caged Lorry	3500kg	2003
CS 10671	Nissan	Cabstar	Caged Lorry	3500kg	2015
CS 10674	Nissan	Cabstar	Caged Lorry	3500kg	2015
CS 14815	Nissan	Cabstar	Caged Lorry	3500kg	2016
CS 18639	Tata		Compactor	9000kg	2018
CS 7008	Nissan	-	Compactor	6000kg	2001

Collection vehicles should ideally not be operated beyond 7 to 8 years in age since the maintenance costs increase dramatically with age. The Cabstar 2003 was replaced with a new one in 2016. A need exists to procure a 12m³ REL Compactor Truck fitted with specialised lifters to accommodate the newly implemented wheelie bins, to execute efficient kerbside waste collection. The Compactor Truck is required as an additional 787 low cost housing units are currently being built in Bredasdorp. This vehicle is currently reflected in the MTREF budget for procurement in the 2020/2021 FY. A Skip Loader Truck is currently used on a term contract, to move skips from waste drop-off sites to the Bredasdorp landfill and will be considered for procurement to lower operating costs.

Currently, the municipality provides a waste collection service for all residents in urban areas. All formal residential erven are receiving a weekly door-to-door collection service. Residents are required to place their waste in refuse bags on the sidewalk for weekly collection.

2.3.2 Public Cleaning

Public Cleaning involves the cleaning of streets (kerbs and gutters), public open spaces (other than parks and storm water ditches) and areas of illegal dumping.

Currently all streets in all towns within the municipal area receive a street sweeping service.

2.4 WASTE REDUCTION

The Polokwane Declaration was formulated in 2001 by members of Government, whereby a commitment to waste reduction, re-use and recycling was made towards achieving the following goals:

- 50% reduction in waste generation and 25% reduction in waste disposal by 2012; and
- A plan for zero waste by 2022.

Waste reduction can be divided into three main categories, i.e.

- 1) Separation at source;
- 2) Recovery for recycling from post-collected waste; and
- 3) Composting of post collected garden waste.

The efficiency of waste minimisation can only be determined through the implementation and maintenance of a proper WIS. Presently, waste data is being recorded and stored separately at each waste disposal site. A more efficient, integrated system is required.

This WIS should provide information on an on-going basis regarding the following:

- The quantity, type, quality and sources of materials recovered;
- The quantity and quality of compost produced and garden waste processed;
- Industrial waste types and volumes, and possible opportunities for waste exchange;
- Public education initiatives and data on available literature at public facilities (e.g. libraries, waste minimisation clubs and projects);
- Household awareness campaigns on recycling opportunities; and
- Waste education (schools level) and training programmes available for the general public, waste workers and officials.

2.4.1 Recovery for Recycling

The average volumes of recoverable materials available for recycling in the Cape Agulhas waste stream is shown in Table 12 and the realistic volumes that can be recovered from that stream through source separation and a “clean” material recovery facility is shown in Table 13. From these two tables it is clear that, given the current state of public awareness and education, approximately 44% of the available recoverable materials can realistically be recovered by source separation for recycling. Should public awareness and education be raised further, it could, theoretically, be possible to increase this figure. Cape Agulhas Municipality presently engages the services of a contractor in support of recycling initiatives. The contractor collects the recyclables from various households, schools and businesses. Currently recycle material average = 150 t /m. This includes recyclables from separating at source from households and businesses. Contract with a recycler for sorting and bailing of collected material.

2.4.1.1 Waste Recovery Facilities in Cape Agulhas

There are presently two informal metal recovery facilities at the Bredasdorp landfill. Additional recovery practices have not yet been planned or initiated.

2.4.1.1.1 Composting

• Composting Facilities in Cape Agulhas

Household garden waste generated in the Cape Agulhas municipal area amounts to approximately 2 tonnes per week on average (estimated from the waste volume data from Bredasdorp landfill). In order to operate a central composting facility economically a minimum garden waste volume of 350 tons per month is required. It is clear that the residents of Cape Agulhas to economically sustain a central composting facility produce insufficient volumes of garden waste, but this should be verified through more detailed studies of the waste stream.

Not having sufficient quantities of garden waste does not imply that the garden waste must be disposed by landfill. Organic material that is disposed by landfill decomposes in the absence of oxygen, which is anaerobically, and produces methane gas and carbon dioxide while decomposing. These gases are greenhouse gases and must be minimised. Methane is 23 times as effective (having an adverse effect on the environment) as carbon dioxide as a greenhouse gas and all attempts must be made to prevent its generation. During the composting process, the decomposition takes place in the presence of oxygen (aerobic) resulting in no methane gas being generated. Even if the volumes of garden waste are small, the garden waste must not be subjected to anaerobic conditions. Even if the garden waste is simply chipped and used as mulch, is preferable above disposal by landfill. At present, garden waste is used for landfill and is disposed of at the waste drop off facilities and Bredasdorp landfill.

• Home Composting

Home composting in South Africa has traditionally been practiced for having an inexpensive and reliable source of compost for the garden. More recently, the realization that composting is a means of conserving resources, saving landfill airspace and the recycling of organic matter, has become the driving force for composting by individuals as well as clubs / associations. It has been shown that home composting can reduce the waste stream by 20% to 30% if carried out properly. This is a prime example of “reduction at source” or waste avoidance. This represents probably the only feasible means of composting kitchen waste, as large -scale post- collection composting has proven ineffective on many occasions in South Africa. Due to a lack of general information conveyed to the private composter in the past, many perceptions of home composting has become that of a stinking pile somewhere in the corner of the garden. This (and a change in lifestyles) has led to compost becoming a shopping list item to be bought at the supermarket. Leaflets or other methods of information should be made available to inform the public of the advantages and “recipe” for making good quality home compost. This should include:

- Bins / container design;
- Raw products;
- C:N ratio;
- Minimum volume;
- Preparation;
- Moisture content;
- Aeration;
- Monitoring; and
- Trouble-shooting.

Although the Waste Management Department supports the initiative of composting, the Parks Division of the Cape Agulhas Municipality usually carries out the type of awareness campaign described above. Home composting bins can be bought at selected nurseries throughout the Western Cape. These are normally one of two types. The first type is a moulded plastic bin which comes in two sizes as follows:

- Small – volume approximately 500 litres; and
- Medium – volume approximately 1000 litres.

The second type is one made from chicken wire around a plastic framework. This one is also of approximately 1000 litre capacity. The disadvantage to the chicken wire model is the possibility of leaching, flies and foul odours. However, it does allow for good aeration, whereas the plastic model may tend to result in anaerobic conditions (rotting) if not manually aerated by turning.

- **Vermicomposting**

Vermicomposting refers to the deliberate introduction of earthworms (typically) during early stages of the composting process. These would appear naturally at an advanced stage of natural composting, which would be after stabilization, where macro-fauna use some of the microflora as a substrate.

The earthworms have some of the following beneficial effects on the composting process:

- Reduction of particle size;
- Removal of old bacteria, stimulating the growth of new bacteria;
- Enriching the compost by excretions high in Nitrogen;
- Promotes penetration of oxygen into the compost;
- Increases pathogen control; and
- Produces worm castings, a good soil amendment.

Vermicomposting lends itself well to household-sized ventures, as it requires very careful control, but produces very high quality compost in a relative short period. It is a very clean process, which does not attract flies. This type of composting is typically done inside special bins designed for the purpose. Most kitchen-type wastes can be composted in this manner, although onions, citrus & other acidic foods should be avoided, as they can be toxic to the worms. The worms are also quite sensitive to extreme temperatures, humidity and rain. Therefore, this process does not lend itself to large-scale industrial composting. Also the ratio of worms: substrate is approximately 1:4; therefore, very large amounts of worms are required for the process. The worm mass doubles after approximately twelve weeks have passed.

2.5 WASTE DISPOSAL

2.5.1 Operating Landfills

Cape Agulhas Municipality currently utilises one licensed landfill for general waste, namely the Bredasdorp Waste Disposal Site (WDS). Refer to Figure 7 for an aerial image of the site.

The Bredasdorp landfill obtained a permit from the Department of Water Affairs and Forestry (now the Department of Water and Sanitation) in accordance with the Environmental Conservation Act on 11 December 1998 and is classified as a G:S:B- landfill.



Figure 7. Bredasdorp Waste Disposal Site
(Source: Google Earth)

This operating permit (no 16/2/7/G501/D1/Z1/P329) limits the site to a maximum rate of waste disposal of 150 tons per day and only general waste (i.e. residential, garden and builder's rubble), as defined in the Minimum Requirements documents. The anticipated lifespan of the WDS is until approximately 2056.

Aurecon conducted an external audit in June 2015 and the findings were documented in an audit report. The audit found that the WDS is well run with regard to waste management, however requires additional efforts in terms of the environmental controls. The site generally appears well kept, however, there is windblown litter at the working face, which should be better monitored, and the daily application of sufficient cover material should be undertaken more rigorously.

While waste is disposed of responsibly, the area is not adequately cordoned off and there is presently no separation of clean and contaminated Stormwater. This would need to be rectified. Efforts should also be made to prevent contamination of clean run-off from adjacent land being exposed to the waste on site.

There is continuous encroachment of informal housing into the buffer zone; however this is beyond the control of the WDS. There are also many informal reclaimers, who access the site for reclamation of recyclable materials. The Municipality should establish and implement a protocol with regard to dealing with waste reclaimers on the various waste sites throughout the municipality.

An informal material recovery facility has been established close to the Bredasdorp WDS. However the Municipality is in the process of applying for funding through a Municipal Infrastructure Grant (MIG) for the construction of a Materials Recovery Facility (MRF) and a Waste Transfer Station, as the municipality has a Medium Term Objective for final disposal at the Regional landfill site at Karwyderskraal within the next 5 years. P&B Lime has donated a 34-hectare piece of land close to the Bredasdorp WDS to Cape Agulhas Municipality. The site has a weighbridge and functional buildings, which will improve the Waste Management function. The transfer of ownership of this facility to the municipality is imminent after where a new Solid Waste Management facility will be managed and operated from.

Ideally, garden waste should be chipped and either composted or mulched, but not landfilled. In light of this, the Municipality has plans to establish facilities for the chipping of garden waste as well as the crushing of builders' rubble in 2018/2019.

Based on 2014 estimates, the WDS receives approximately 11,400m³ of waste per annum. Based on previous operational requirements, a compactor has been purchased for the WDS and a Dozer is used once a month through a private contractor. In addition, there is a 4-ton truck, which is used to service the site and collect recyclable materials. Lastly, new 10m³ skip has been purchased and is available for receipt of household wastes. The skip is also emptied on a daily basis.

2.5.2 Closed Landfills

Cape Agulhas has four closed landfills of which none has yet been rehabilitated. The old waste disposal site near L'Agulhas has been closed and is locked with a gate. There is a site near Struisbaai and, in order to prevent the dumping of general waste from Struisbaai, L'Agulhas and Suiderstrand communities, a public drop-off facility has been established in Struisbaai and is used to transfer the waste into containers for long haul transport and disposal at the Bredasdorp landfill. The old sites near Waenhuiskrans and Napier have been closed for general waste and public Drop-off facilities have been erected on these two sites for long haul transport and disposal at the Bredasdorp landfill.

All four these sites will have to be rehabilitated in the future and the Municipality have developed a Long Term Feasibility Plan to include rehabilitation of the closed landfill sites. The extensions of the closure permits were received for another 10 years. This includes Napier, Struisbaai, Waenhuiskrans and L'Agulhas.

2.5.3 Builder's Rubble Sites

Cape Agulhas has no dedicated builder's rubble sites; however, there are plans for the establishment of a facility for the crushing of builders' rubble at the Bredasdorp WDS.

2.5.4 Waste Transfer Stations

Cape Agulhas has no waste transfer stations since all towns are within economical distance from the Bredasdorp landfill. A Waste Transfer Facility is envisaged to be built within the next 5 years in Bredasdorp to facilitate the objective of final disposal at the Karwyderskraal Regional Site.

2.5.5 Public Drop-off Facilities

Public Drop-off facilities have to date been provided in Napier, Struisbaai and Waenhuiskrans. All these facilities are equipped with 30m³ skips. These facilities provide the residents the convenient opportunity to dispose waste, which they have not put out for collection, into containers for later removal by the municipality. Aurecon audited the drop-off facilities in June 2015 and the findings are discussed below.

2.5.5.1 Waenhuiskrans

The Waenhuiskrans solid waste drop-off facility (WDF) is located on Erf 260, Arniston and falls within the site boundary of the closed landfill site. Refer to Figure 8 for an aerial image of the site. The WDF was authorised under permit No. 12/9/11/P19 (06 March 2008) issued by the Department of Environmental Affairs and Tourism (now the Department of Environmental Affairs) in terms of Section 20 of the Environmental Conservation Act (No. 73 of 1989). The landfill permit was applied for to DEADP and renewed.



Figure 8. Waenhuiskrans Waste Drop-off Facility Site
(Source: Google Earth)

Overall, the facility is well managed in terms of both waste and environmental obligations. The site is also generally neat and tidy and access and site boundaries are well maintained. The following actions/items are required:

- Extension of permit;
- Accident Management Plan;
- Emergency Preparedness Plan;
- Annual internal audits;
- Biennial external audits; and
- Accurate reporting on volumes of waste.

2.5.5.2 Struisbaai

The Struisbaai WDF is located on Erf 857, Struisbaai and falls within the site boundary of the closed landfill site. Refer to Figure 9 for an aerial image of the site. The WDF was authorised under permit No. 12/9/11/P39 (3 September 2008) issued by the Department of Environmental Affairs and Tourism (now the Department of Environmental Affairs) in terms of Section 20 of the Environmental Conservation Act (No. 73 of 1989). While the permit is valid until 3 September 2028, which was extended for another 10 years.



Figure 9. Struisbaai Waste Disposal Facility Site
(Source: Google Earth)

There is also an informal metal recycling at the entrance to the site. A private contractor runs this facility.

The site has two waste skips for the collection of waste and these are cleared daily to ensure there is always room for additional waste. In general, the facility is poorly managed from both a waste and environmental perspective. Management of the facility will need to be improved. Many unauthorised personnel and informal waste reclaimers access the site. There is a dumping problem around the site, despite the installation of “no dumping” signs at the open spaces near the facility.

While the access road is still in need of repair, the fence has been repaired and the office has recently been upgraded.

It is important that an Emergency Preparedness Plan be devised for the site, as it is currently absent. There is also a need for firefighting equipment on site.

2.5.5.3 Napier

The Napier WDF is located on Erf 513, Napier and falls within the site boundary of the closed landfill site. Refer to Figure 10 for an aerial image of the site. The WDF was authorised under permit No. 12/9/11/P40 (3 September 2008) issued by the Department of Environmental Affairs and Tourism (now the Department of Environmental Affairs) in terms of Section 20 of the Environmental Conservation Act (No. 73 of 1989). While the permit is valid until 3 September 2028, it was reviewed and extended for a further 10 years.



Figure 10. Napier Waste Drop-off Facility Site
(Source: Google Earth)

The site has two waste skips for the collection of waste and these are cleared daily to ensure there is always room for additional waste. The site is well managed both in terms of waste and in terms of environmental obligations. Access roads, entrance points and the fence are all neat and in excellent repair.

An Emergency Preparedness Plan must be prepared for the site and fire-fighting equipment must be installed.

2.5.6 Disposal Facilities used outside the Cape Agulhas Boundaries

The Vissershok Waste Management Facility (VWMF), owned by an Enviroserv/Wasteman partnership and operated by Dispose-Tech, has a H:H operating permit from DWAF (now DWS). The site is situated some 800m west of the N7 at Vissershok and is operated and audited in terms of its permit conditions. All hazardous wastes generated in the municipal area of Cape Agulhas are disposed at this facility.

2.6 COSTS OF EXISTING WASTE MANAGEMENT SYSTEM

2.6.1 Financial Summary of Waste Management Services of Cape Agulhas Municipality

- Income**

Income for the Municipality is derived from service charges related to collection from domestic and business refuse removal, refuse coupons and sales of refuse bins.

- Expenses**

Expenses incurred are mainly staff and general expenses and is approximately 88% of the total expenses. Waste management is labour intensive and salaries make a large portion of the salary budget. The main services offered are refuse removal and street cleaning. Other expenses are for general administration costs and general office overheads. Table 15, shows the typical financial analysis of the Solid Waste Services for the Municipality.

Table 15. Financial analysis of solid waste services

Description	EXPENDITURE
Capital Charges (interest/depreciation)	R 1,279,461
Staff	R 4,337,232
Other Expenses	R 4,925,450
Totals	R 10,542,143

2.6.2 Staff Compliment of Existing Waste Management System

Waste management is labour intensive with low levels of skill required. The staff compliment is mainly labourers and a few vacancies exist. The table and graph indicates the staff compliment and the vacancies. The staff compliment has gradually grown over the years. The municipality’s staff compliment compare similar to another municipalities with similar infrastructure and service delivery needs according to benchmarks used. A number of organograms are provided to demonstrate the management structures within the Infrastructure Services Department. Refer to Figure 11 to Figure 15. Fleet and Waste Water has been moved away from the Solid Waste Management Department.

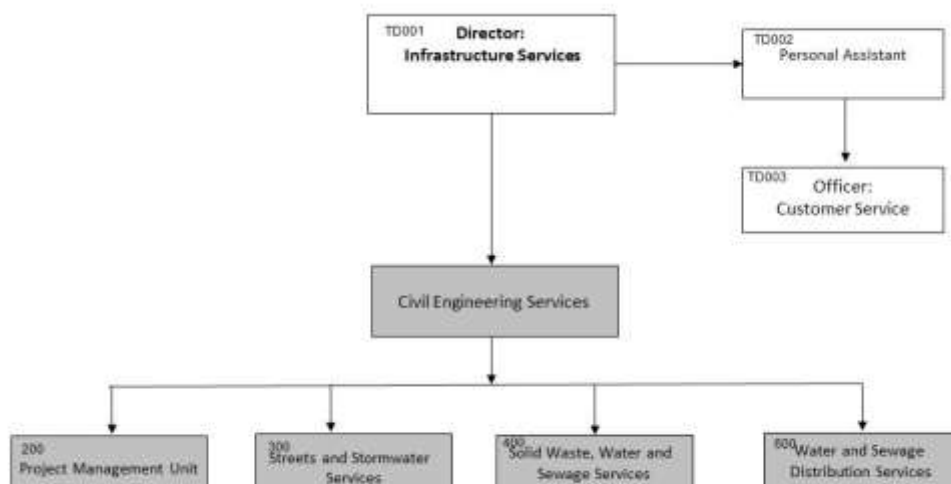


Figure 11 Organogram: Overall Structure of Department

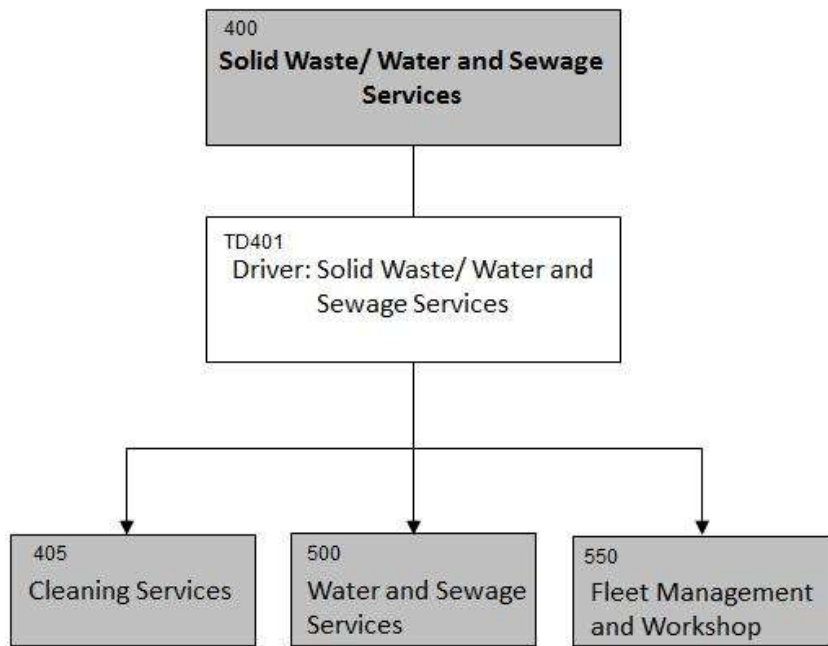


Figure 12. Organogram: Overall Solid Waste, Water and Sewage Department

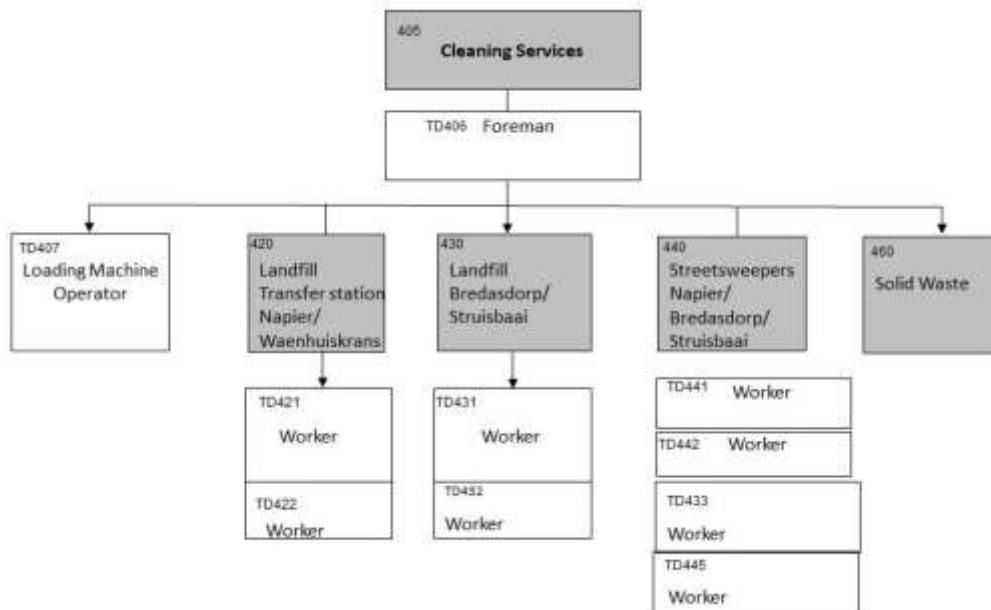


Figure 13. Organogram: Cleaning Services

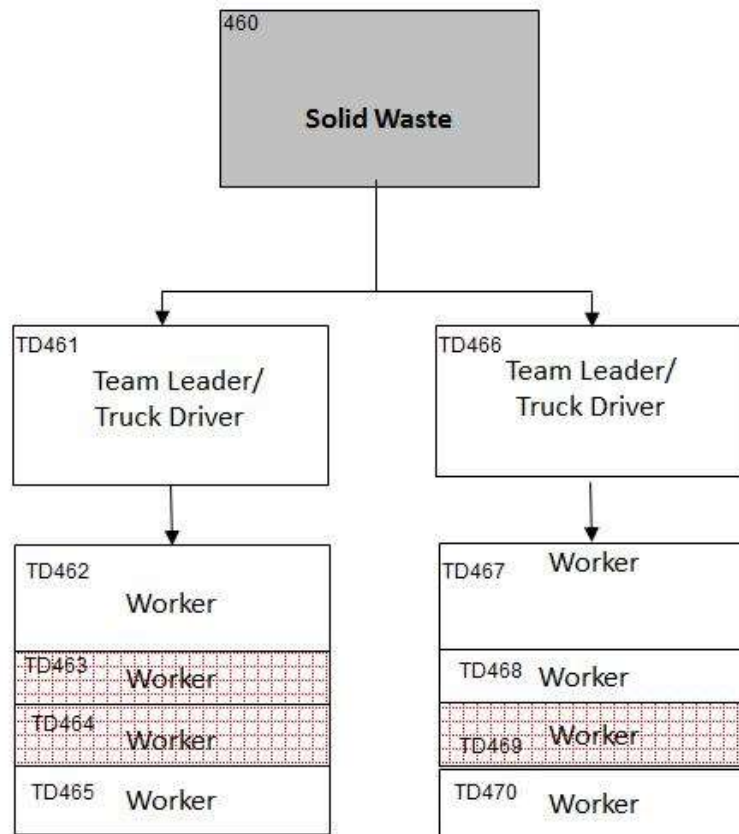


Figure 14. Organogram: Solid Waste 1

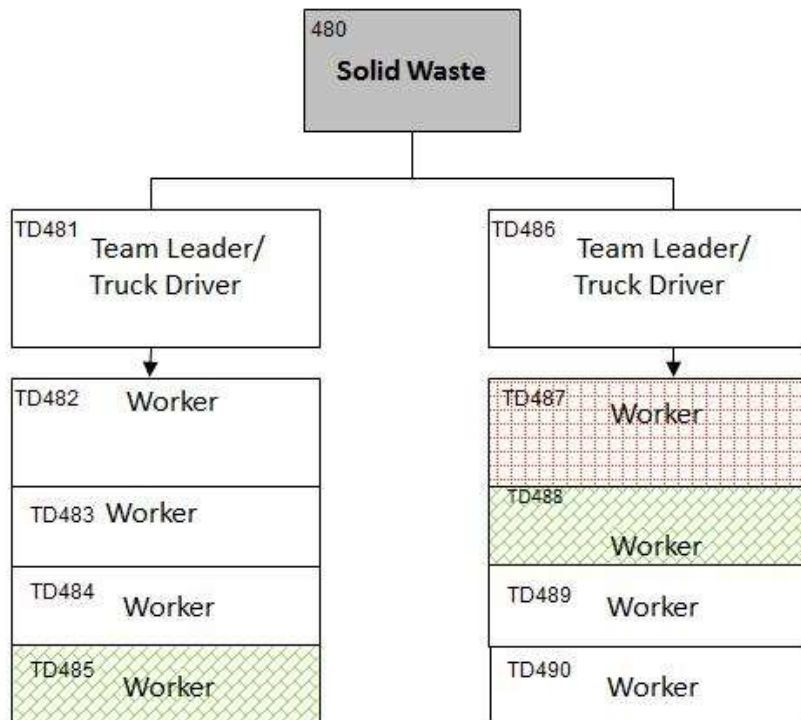


Figure 15. Organogram: Solid Waste 2

2.7 CURRENT WASTE MANAGEMENT PROBLEMS

Waste management in the Cape Agulhas Municipality appears to be prudently managed with respect to General Waste. The lack of accurate available data on all waste types contributes towards the shortcomings of the management systems. This is compounded by the absence of a weighbridge.

Achieving a sustainable integrated waste management system has eluded Cape Agulhas Municipality in the past for various reasons. These include:

- The lack of public awareness of the gravity of the problem of sustainable waste management. Our poor history of waste management in South Africa means that we pay little attention to our lifestyle insofar as how it affects the environment. However, when an environmental problem is noted and the public are made aware of the need for action, there is no stronger lobby. This was evident in the outcry over CFC containing aerosols in the late eighties. Once the problem was discovered and the people informed, a combination of international action and public pressure resulted in almost an immediate ban of these ozone-depleting substances. Creating awareness of the issue of sustainable waste management may have a similar outcome.
- Ignorance of the public. The public appears to be content to put out their waste and then it is somebody else's problem. Concepts such as waste avoidance, waste reduction, etc., while gaining ground, are not within the vocabulary of the majority of people. Feedback to public regarding the success of their efforts should be better disseminated. Currently, this information is supplied to the Council and Ward Committees. Figures should be included in campaigns, e.g. "so far you have saved xx volume of waste, let's continue to recycle..."
- Lack of information regarding waste generation types and volumes. Accurate data on waste generation has been almost non-existent since no proper measuring facilities existed. Recording of the data is also done in a haphazard manner in the absence of a Waste Information System. Despite reporting to iPWIS, the volumes are also not being reporting to SAWIS. A contract personnel member has been dedicated to improve the reporting capability at Cape Agulhas Municipality.
- Un-rehabilitated closed landfills. The closed waste sites near Napier, Struisbaai, Waenhuiskrans and L'Agulhas need to be rehabilitated.
- Lack of monitoring/auditing and reporting of facilities. Some monitoring and auditing has recently been initiated at the existing waste facilities, however they all fall short of full compliance with their relevant permits. In addition, the permit for Waenhuiskrans is expired and the review period for the permits of remaining facilities is fast approaching. The findings of the most recent external audits at these facilities must be addressed.
- Lack of permitting of special waste generators. The municipality has no or little data regarding the generators of special waste within the municipal boundaries or on the destination or disposal method of these wastes.
- Lack of monitoring of industrial waste. The generation of industrial waste is currently not being monitored with the result that the municipality has no data on the volumes and types generated or on its destination and treatment/disposal.
- Lack of policy on handling informal waste reclaimers on waste sites. Most of the waste facilities have informal waste reclaimers who access the site, to remove some of the waste. While the informal recycling, which takes place, is not negative in principal, the issue of a uniform approach to managing these informal waste reclaimers must be addressed.
- Garden waste and builders' rubble is going to landfill. At present, garden waste and builders' rubble goes to landfill; however, there would be no need for this if suitable chipping and crushing facilities respectively were established.

- Illegal dumping. Illegal dumping throughout the municipality is a concern. This causes a health and safety hazard as well as a visual deterrent to the areas in which dumping is taking place. It is important that the Cape Agulhas Municipality is aesthetically pleasing and health in order to attract tourists.

2.8 WASTE MANAGEMENT STRATEGIC OBJECTIVES

With the *status quo* of waste management as listed in the previous chapters and the current problems that are experienced by waste management, the way forward is to state the strategic objectives of the Municipality and then to develop action plans or implementation instruments how to achieve the strategic objectives.

Cape Agulhas Municipality is committed to a system of waste management that will see the least possible amount of waste going to modern engineered landfills. Education, law enforcement and material recovery and treatment plants will achieve this. New and emerging technologies, where applicable and affordable, will also play a part in overall waste management. The Waste Management Strategic Objectives for Cape Agulhas Municipality on which this Plan is based, commits the municipality to:

- Create an atmosphere in which the environment and natural resources of the region are conserved and protected.
- Develop a communication/information/education strategy to help ensure acceptance of 'ownership' of the strategic objectives among members of the public and industry throughout the municipality and to promote co-operative community action.
- Provide a framework to address the municipality's growing problem of waste management in accordance with best prevailing norms, financial capacity and best environmental practice.
- Provide solutions for the three main objectives:
 - The avoidance of waste generation;
 - The reduction of waste volumes; and
 - The safe disposal and management of waste.

2.8.1 Strategic Objectives

2.8.1.1 General

To ensure that Waste Management in the Cape Agulhas Municipal Area complies with South African and International environmental standards so that it is beneficial to industrial and agricultural growth and the public's right to a clean and healthy environment.

2.8.1.2 Waste Avoidance

To promote the minimisation of the generation of waste.

2.8.1.3 Waste Reduction

To promote the reduction of all waste so that nothing of value or anything that can decompose, gets disposed.

2.8.1.4 Waste Disposal

To store, dispose or treat all waste that cannot be avoided nor reduced at licensed facilities with regular operational and environmental monitoring and in accordance with regulatory requirements.

2.8.1.5 Definitions

According to the NEM:WA, 'waste' means—

(a) any substance, material or object, that is unwanted, rejected, abandoned, discarded or disposed of, or that is intended or required to be discarded or disposed of, by the holder of that substance, material or object, whether or not such substance, material or object can be re-used, recycled or recovered and includes all wastes as defined in Schedule 3 to this Act; or

(b) any other substance, material or object that is not included in Schedule 3 that may be defined as a waste by the Minister by notice in the Gazette, but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to

be a waste—

- (i) once an application for its re-use, recycling or recovery has been approved or, after such approval, once it is, or has been re-used, recycled or recovered;
- (ii) where approval is not required, once a waste is, or has been re-used, recycled or recovered;
- (iii) where the Minister has, in terms of section 74, exempted any waste or a portion of waste generated by a particular process from the definition of waste; or
- (iv) where the Minister has, in the prescribed manner, excluded any waste stream or a portion of a waste stream from the definition of waste.

WASTE AVOIDANCE is to avoid material entering the waste stream, e.g. when the generator of the material either re-uses it or gives the material to somebody else as product or raw material. Composting at home is regarded as waste avoidance.

WASTE REDUCTION is to reduce the quantity of waste that has been discarded by its generator, e.g. when recyclable materials are recovered at the sidewalk or at a transfer station, materials recovery facility or landfill. Composting of garden waste at a composting facility is regarded as reduction.

WASTE DISPOSAL is defined as the storage, treatment or disposal of waste at licensed facilities.

2.9 ROLE OF CAPE AGULHAS MUNICIPALITY

The role of the local authority in waste management is of vital importance. Cape Agulhas Municipality needs to provide a safe, robust, and secure system for the management of wastes generated in its administrative area.

It is essential that this system can respond to changes in the socio-economic situation, to changing waste composition and quantities, and to alterations in the public's perception of waste management issues. Cape Agulhas Municipality must adopt, therefore, a combination of options for handling waste, tailored to meet the needs and prevailing circumstances of its particular administrative area. The combinations utilised will undoubtedly vary over time - reflecting the changing needs of local residents and the environment.

The plans formulated by Cape Agulhas Municipality are specific to the area and its resources. They reflect the availability of suitable waste management facilities in the region, as well as local market demand for recovered materials. Special care must be taken to cater for the volatility of markets for recovered materials by ensuring that there are other suitable options to fall back on, if required. It is, therefore, highly desirable to be able to switch between waste management methods - further emphasising the hazards of relying too heavily on a single policy option instead of a combination of policies.

Cape Agulhas Municipality has therefore initiated an Integrated Waste Management Plan to be carried out over the following years. This plan is founded on South Africa's National Environmental Management: Waste Act and the National Waste Management Strategy and takes into account the Municipality's legal obligations regarding waste avoidance, recovery, disposal and general management.

The implementation instruments or action plans listed in the following section are laid out in a manner, which reflects the waste management hierarchy, putting the emphasis on waste avoidance, and minimisation, with specific waste streams looked at in detail. These actions plans form the strategic framework of how Cape Agulhas Municipality wants to move away from the traditional method of waste management towards a more sustainable management system.

3. CAPE AGULHAS MUNICIPALITY'S IMPLEMENTATION INSTRUMENTS

3.1 IMPLEMENTATION INSTRUMENTS FOR WASTE AVOIDANCE

Waste Avoidance is the primary focus of the National Waste Management Strategy and as such must be the priority of any Integrated Waste Management Plan. Waste Avoidance is defined as the action that avoids the entry of material into the waste stream, that is, when the generator of the potentially waste material exercises the decision to do something else with that material rather than to put it out for waste collection. The following are typical examples of waste avoidance:

- Composting of the organic/green waste at home;
- Self-delivery of glass/cardboard/newspaper/PET to recycling bins or school recycling projects;
- Re-use of empty jars as storage containers at home;
- Reprocessing of pips, peels and lees to produce tartaric acid and grape seed oil;
- Reclamation of drum containers;
- Recovery of wet or spilled grain for animal feed;
- Recovery of fruit and food solid waste component as animal feed;
- Recovery of chemicals from industries;
- Recovery of electronic equipment; and
- Changing raw materials of industrial processes to produce recoverable industrial waste.

From the above it is clear that waste avoidance will result not only in less material to be disposed but also in less material to be collected by the waste collection system.

The following are Cape Agulhas Municipality's plans for the promotion of waste avoidance in its area:

Action	General	Why?	When?
Public Awareness and Education	<p>Cape Agulhas Municipality will continue to undertake a public awareness and education campaign, putting special emphasis on waste avoidance and reduction at source.</p> <p>The campaign will endeavor to highlight ways in which the public can avoid or prevent waste generation, and to suggest alternatives to high waste producing products/ activities.</p> <p>The campaigns will promote sustainable waste management and it will introduce the concept of composting.</p> <p>Sufficient awareness programs/community consultation and monitoring with regard to the waste management system in Elim must also be conducted.</p> <p>In addition, once the results have been measured, the campaigns will include feedback to the public on the difference that their efforts have made in terms of volume or percentage of waste recycled.</p> <p>A workshop with industry should be set up to discuss the current state of waste management and possible solutions.</p> <p>An annual report on the public awareness and education</p>	<p>There are three principles listed in NEMA section 2 that are of particular importance when we discuss Integrated Waste Management in conjunction with public awareness and education. These principles are the following:</p> <ul style="list-style-type: none"> ▪ Public participation in environmental decision-making must be promoted. The participation of vulnerable and disadvantaged groups must be ensured. ▪ Decisions must be taken in an open and transparent manner and access to information provided in accordance with the law. ▪ The polluter must pay for the cost of remedying pollution, environmental degradation and adverse health impacts. <p>NEMA says that pollution can be many different things and to be called pollution it must change the environment now or in the future in a way that will affect your health and well-being, or harm the environment. Activities that could cause significant pollution are the storage, treatment and disposal of waste.</p> <p>The Constitution provides everyone in South Africa the right to information that is held by the government and that is needed by someone to protect their rights. The NEMA tells us in section 31 that amongst other information that you have the right to information about emissions to water, air and soil and also information about how Hazardous Wastes are generated stored and disposed of.</p> <p>The government in turn can get information about the environment; emissions to air, soil and water and the handling of Hazardous Waste from any private person and then one can obtain this information from the government. A person cannot refuse information about emission levels and waste products.</p> <p>Local authorities regulate many different issues and it is often not easy for an official to decide on the best course of action to take when faced with difficult environmental problem. Effective environmental management training will help officials to identify, predict and evaluate environmental, social or economic impacts and then to develop solutions to such environmental threats and integrate and co-ordinate the solutions into a total management plan for their area of jurisdiction. Training will contribute to the reduction of environmental degradation and its resultant negative impacts and greatly improve the quality of life for communities within their boundaries. It will also help to optimize the resources that are at a local authority's disposal.</p> <p>Chapter 5 of NEMA has provisions for Integrated</p>	<p>The public awareness campaign for both the generators of waste as well as the service providers should start once the IWMP has been approved by Council. The action however does not have an end date due to the continuous nature thereof.</p> <p>The workshop with industry representatives should be held in 2020/2021.</p> <p>The Public Awareness and Education report is to be compiled annually.</p>

	<p>campaigns carried out for that year is to be compiled. The report is to serve as a record of the type of public awareness and education activities undertaken for the year.</p> <p>All new staff are to be provided with training on the importance of considering the environment in waste management.</p>	<p>Environmental Management and if these provisions are not followed correctly, a member of the public could take them to court if they violated the NEMA.</p> <p>The above sections highlights the importance of complying with the various pieces of legislation concerning waste management, since one of our fundamental rights in the Constitution is the right to a clean and healthy environment that is not harmful to health and well-being.</p> <p>However, many of the Municipal employees are either not aware of all the requirements of the relevant legislation or they are simply not aware of the legislation itself. Since the Constitution provides the public with a fundamental right to the environment and NEMA provides them with the right to access to information surrounding waste management and in particular Hazardous Waste it is imperative that Municipalities ensure that they are doing everything right. If a member of public suspect that something is done in the wrong way, it is possible for them to obtain the necessary information to prove that the wrong decisions were taken or the wrong procedures followed. The public is increasingly well informed and takes much interest in environmental issues. In certain cases even better informed than the officials of the Municipalities themselves.</p> <p>This shows the importance of education in Integrated Waste Management at the various Municipalities at all different levels i.e. from the Head of the Waste Management Department to the person involved in collection.</p> <p>The Municipal officials should also be made aware of instruments that can be used to enforce waste avoidance, waste reduction and responsible disposal.</p> <p>We need a well-informed public that is willing and able to take collective responsibility for managing our valuable natural resource base. People should not only be provided with information but also be helped to use this information. This includes the ability to identify environmental problems, analyze their causes and contribute to solutions, whether this is local recycling or car-pooling or contributing meaningfully to public participation processes. Since the root of the problem is not waste itself, but the attitude towards the disposal of waste, the emphasis has been on changing the mindset of the population towards one of environmental care and consideration.</p> <p>Information booklets and/or flyers can be distributed at major shopping malls, clinics and hospitals. Industry and the agricultural sector should similarly receive these booklets and should be provided with the opportunity to receive an industry specific training seminar on Integrated Waste Management.</p>	
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Action	General	Why?	When?
Quantifying Prevention	<p>Cape Agulhas Municipality will assess the possibility of using statistics and other data collected to quantify the success of prevention measures employed within the municipality.</p> <p>This will be done by populating a GIS system with relevant data.</p> <p>The Council will co-operate with the Waste Minimisation groups in efforts to quantify waste avoidance with performance indicators and by other means.</p>	<p>Compiling information on waste management trends may assist in quantifying waste avoidance. It is important to ascertain whether waste avoidance targets are being reached and such information will help in the setting of realistic targets for the future.</p>	<p>The implementation of this action will depend on and follow the implementation of a waste information system.</p>

3.2 IMPLEMENTATION INSTRUMENTS FOR WASTE REDUCTION

Waste Reduction is the secondary focus of the National Waste Management Strategy in that all waste that cannot be avoided, must be reduced. In terms of definition it represents the actions required to, once the generator of waste has made the decision that a material(s) is waste and entered it into the waste stream, remove that material from the waste stream for re-use, recycling, treatment/conversion, composting, etc. and by such action prevent the material from being disposed. Typical examples of waste reduction are as follows:

- Separate collection of source separated materials.
- Separate collection of spent oils, solvents, print cartridges, x-ray and photographic developers by recovery contractors.
- Kerbside collection of recyclable material by informal salvagers.
- Composting of green wastes at composting facility.
- Recovery of recyclable material at Material Recovery Facility (MRF).
- Recovery of recyclable material at waste disposal site.

The following are Cape Agulhas Municipality’s plans for the reduction of waste within its functional area.

Action	General	Why?	When?
Post Collection Recovery	<p>Cape Agulhas Municipality will establish a Materials Recovery Facility at Bredasdorp Landfill where recyclable materials are recovered from the collected wastes so that only material of no value be forwarded for landfilling.</p>	<p>Recyclable material such as paper, cardboard, glass, certain types of plastic and metals have value when transformed or re-used as raw material. In maximising the recovery of these materials the usage of virgin raw material is reduced, thus saving natural resources. The sale of these materials also provides employment opportunities (approximately 1 sustainable job at minimum wage per 8 tons of domestic waste per day) for SMME’s.</p> <p>Recovery of the recyclable fraction of the waste stream also reduces the “lighter” fraction of the waste stream resulting in less risk of wind-blown litter at the disposal site. Although the mass of recovered materials is not always significant, the volume of airspace saved is, e.g. a 350 kg bale of PET (2 liter cooldrink bottles) requires 16m³ of bottles. These bottles do not compact in a landfill and huge savings in airspace are achieved through its recovery.</p>	<p>Cape Agulhas Municipality is in the process of applying for funding through a Municipal Infrastructure Grant. Should the grant be approved, this action is to commence immediately thereafter.</p>

<p>Post Collection Composting</p>	<p>Cape Agulhas Municipality will investigate the financial sustainability of a composting facility where the organic fraction of the collected waste stream is composted.</p>	<p>Organic materials decompose in time and when disposed in a landfill, the decomposition occurs anaerobically (without the presence of oxygen). During anaerobic decomposition greenhouse gasses such as methane and carbon dioxide are formed. These gasses have a detrimental effect on the earth's ozone layer and internationally the generation of these gasses is being minimised.</p> <p>Methane is twenty one times more effective as a greenhouse gas than carbon dioxide.</p> <p>Composting involves the aerobic (in the presence of oxygen) decomposition of organic matter and although carbon dioxide is also produced during this decomposition process, no methane is produced. Composting of organic material is therefore environmentally more beneficial than landfill it, even if the compost is afterwards landfilled.</p> <p>Compost produced from green waste (garden clippings, etc.) is more "acceptable" to the public for usage in residential gardens since it is perceived to be cleaner than compost that has been produced from the total organic waste fraction.</p> <p>On average approximately 35-50% of the total domestic waste stream is made up of organic materials that are compostable.</p> <p>Composting can therefore significantly reduce the volume of waste to be landfilled, however a mass of approximately 350 tons of garden waste is required per month for the financial sustainability of such a facility. The mass of garden waste produced in Cape Agulhas is unknown at this time, resulting in a request for an investigation.</p>	<p>This action, if the investigation proves that sufficient quantities do exist, requires the establishment of infrastructure of capital investment and for that reason requires financial budgeting. A timeframe of one to two years would be realistic.</p>
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3.3 IMPLEMENTATION INSTRUMENTS FOR WASTE DISPOSAL

The disposal of waste by landfill is considered the least desirable option in the Waste Management Hierarchy. The volume of waste to be disposed is a measurement of the success achieved with waste avoidance and waste reduction.

Although municipal waste disposal only takes place at the municipality’s licensed and engineered landfill at Bredasdorp, there is concern regarding illegal and informal dumping and also the storage/disposal of hazardous and health-care waste on premises inside the municipal boundaries. Limited information is also available on the disposal of hazardous and health-care waste outside of the municipal boundaries.

The following are the Municipality’s plans for the disposal of residual wastes within its functional area:

Action	General	Why?	When?
Engineered Waste Disposal Facilities	The disposal of non-recoverable waste will only be allowed at properly engineered waste disposal sites that are licensed by the relevant statutory authority and that operate and are audited in terms of the relevant permit conditions.	<p>Since the whole of Cape Agulhas is located in a sensitive environment, properly engineered waste disposal facilities that minimise the risk of environmental pollution and the degradation of the surrounding area are a prerequisite for local sustainability.</p> <p>Ground water resources are thus protected.</p> <p>The current storage of waste, Hazardous Waste and Hazardous Waste containers on industrial sites and farms are unacceptable and not in accordance with the NEM:WA.</p> <p>Properly engineered and operated waste disposal facilities are also beneficial to the exporters of industrial and agricultural produce in obtaining their international accreditation.</p>	This action is already partially being adhered to but implementation requires the continuous establishing of sufficient airspace (capacity) at these waste disposal facilities.
Rehabilitation of closed landfill sites.	Current landfill sites which have been closed need to be rehabilitated as soon as is financially viable. Rehabilitation is a key part of managing and mitigating the adverse environmental impacts of such facilities and cannot be ignored.	Landfill sites are to be rehabilitated in terms of permit requirements as well as the requirements of the National Environmental Management: Waste Act (No. 59 of 2000).	This is to be undertaken when sufficient funds are available as they are not an immediate health threat to the population.
Monitoring of Waste Disposal	All waste destined for disposal and disposal facilities shall be monitored for compliance with permit conditions, volumes received and for environmental impact.	<p>Currently monitoring of waste disposal facilities do not take place resulting in no available data on the status of environmental pollution that may or may not take place at the other waste facilities.</p> <p>Monitoring will also ensure that the Municipality is aware of the final destination of all waste, general, hazardous and health-care, which is generated within its boundaries.</p>	Implementation can be immediate.

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<p>Managing Waste Tyres</p>	<p>An action plan for waste Tyre Management will be devised in accordance with the Waste Tyre Regulations of 2008.</p>	<p>In accordance with the Tyre Regulations of 2008 the disposal of tyres to landfill in its current format was only allowed up to June 2011, where after all tyres that are landfilled, must be quartered. After June 2014 no tyres, quartered or otherwise, were allowed to be landfilled.</p> <p>At present, farmers are recycling tyres, using them during certain periods and then returning them to the landfill. There are also some private contractors which make use of the tyres. The municipality will have to develop an action plan in accordance with the Tyre Regulations to manage tyres generated within the municipal area.</p>	<p>Immediately</p>
<p>Garden Waste and Builders' Rubble</p>	<p>A facility for the chipping of garden waste and crushing of builders' rubbles is to be established at the Bredasdorp waste disposal site.</p>	<p>In efforts to reduce the volumes of waste entering the landfill (as well as to promote composting of garden waste in the future), garden waste and builders' rubble entering the site need to be chipped and crushed respectively.</p>	<p>Ongoing</p>
<p>Improve Waste Management facilities</p>	<p>Cape Agulhas Municipality is to provide skips for refuse removal at Kleinbegin, Zwelitsha and Selfbou areas.</p> <p>Once skips have been made available, this information must be shared with the public through a public awareness campaign.</p>	<p>The IDP has identified the need for additional waste management facilities in Kleinbegin, Zwelitsha, and Selfbou. Planning and feasibility assessments for these services must commence in 2016.</p>	<p>Planning and feasibility to commence upon approval of the IWMP. Placement of additional skips is to commence upon obtaining sufficient funds.</p>

3.4 IMPLEMENTATION INSTRUMENTS FOR WASTE MANAGEMENT IN GENERAL

Although the National Waste Management Strategy focuses mainly on waste avoidance, reduction and disposal and as such, these three activities form the heart of any Integrated Waste Management Plan, certain other waste management activities need also to be addressed in order to achieve proper waste avoidance, reduction and disposal.

The following are the municipality's plans for waste management in general:

Action	General	Why?	When?
Collection Service Review	Cape Agulhas Municipality will continuously review its waste collection operations, in order to make them as efficient as possible, with due regard to value for money in the area of municipal waste collection. The Municipality will examine the quality of their service, resource management and general working arrangements.	The collection of waste is the most expensive activity of the waste management system. The municipality must ensure that every waste generator within its boundaries receives a waste collection service at an acceptable level of service and at an affordable price. The waste collection system must therefore be optimised, in terms of level of service, type of containers, type of collection vehicle, etc., and must be sufficiently flexible to accommodate the long term goal of source-separated waste.	The implementation of this action requires detail investigations of service delivery and resources from time to time.
Data Compilation	Cape Agulhas Municipality will continue to gather accurate data regarding domestic, commercial and industrial waste generation and collection. The Municipality will endeavor to aggregate the data collected from each town for analysis.	Compilation of this data will enable analysis of the performance of the waste collection operations on a yearly basis. This in turn allows for improvements to be made in inefficient areas and reveals the more efficient areas of operation.	This action can be implemented immediately after a weighbridge has been installed at the Bredasdorp landfill.
Waste Information System	The Cape Agulhas Municipality will need to establish a Waste Information System in order to efficiently manage and collate all waste data for the region.	An efficient and effective manner of gathering and collating all data with regard to waste types and volumes must be devised. In addition, the system must accommodate information on recycling (i.e. volumes of waste recycled and types of recyclables).	Immediate implementation and annually reporting. Data is to be gathered on a continuous basis, but is to be fed into the annual reports.
Reporting of Waste Figures	The Cape Agulhas Municipality is required to report annually to SAWIS.	Reporting to SAWIS is a requirement of the NWMS. This information better informs decision makers and policies when carrying out their duties which will provide for more effective waste management not only in the cape Agulhas Municipality, but for the entire country.	Annually. Data is to be collected on a continuous basis and annual reports are to be made on SAWIS.

<p>Cleaning</p>	<p>The Cape Agulhas Municipality will ensure the general cleaning of the municipal area.</p>	<p>Whilst the Cleaning component of waste management is often dwarfed by the other key elements such as avoidance, recovery, collection, transfer transport and disposal, in essence it involves putting the “cherry on top of the cake” in terms of closing the loop on waste management.</p> <p>Without proper cleaning the success of the other key elements would not be apparent as the environment would be dirty, litter strewn and unkempt.</p> <p>The cleansing functions in a municipality may involve all or most of the following:</p> <ul style="list-style-type: none"> ▪ Litter picking – picking up of litter in streets, parks, beaches, sidewalks and public open areas. ▪ Street sweeping and cleaning of stormwater catch pits. This may involve the sweeping of all streets either mechanically or manually and removal of debris. Also the cleaning of stormwater catch pits and channels. ▪ Street washing / sanitising – washing down and sanitising streets and parking areas which are subjected to pollution, i.e., areas frequented by hawkers or secluded streets where the public urinate or defecate. ▪ Cleaning and sanitising of public ablution facilities <p>Weed control in roadways</p> <p>It is evident that failure to carry out the above functions will result in a very negative impact on the public and the environment, due to the high visibility thereof as well as the pollution that will result.</p>	<p>This action requires public awareness as well as awareness of the service provider. Implementation has already been done with all towns receiving a street sweeping service.</p>
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3.5 IMPLEMENTATION FOR ALL WASTE FACILITIES AUDITED IN 2019

Aurecon and Jan Palm Consulting Engineers carried out external audits on the active waste facilities within the Cape Agulhas Municipality during the time period till June 2019. Audits were conducted against the permit requirements for each site and the findings reported on separately. The non-compliances and requirements for rectification for each facility are discussed below.

3.5.1 Bredasdorp Waste Disposal Site

The requirements and actions for the Bredasdorp WDS are detailed in Table 16.

Table 16. Non-compliances and Related Actions for Bredasdorp Waste Disposal Site

Relevant Clause in Permit	Issue	Action Plan	Due
3.4	Adequate buffer zone	Determine when approval (if any) was granted to develop within the buffer zone. Inform DEA of the development within the buffer zone.	Immediately
3.5	Clean stormwater run-off diversion	Provision should be made for stormwater channels.	December 2021
3.6	Contaminated stormwater run-off collection and diversion	Design and construction of a cut-off and diversion berm on the upstream side of the landfill to intercept clean surface run-off and divert it around the site. A berm on the downstream side of the landfill should be constructed to intercept and retain contaminated run-off from being allowed to discharge into the environment. Locations should be allowed for where samples can be taken and tested.	Immediately
3.7	Water quality testing of contaminated stormwater run-off	Water quality testing to be done at least twice per year (during wet and dry season).	December 2021
3.8.1	Treatment of contaminated stormwater run-off	If tests reveal stormwater is contaminated measures should be implemented immediately to treat and prevent future contamination.	December 2021
5.5	Sufficient dust control	Implement dust control measures by procuring the service.	Immediately- Using water truck to control
5.6	Reclamation of waste	A permit amendment should be applied for that allows reclamation of materials on site. Reclamation of the waste should be formalised. Reclaimers should be educated and inducted to work on a landfill. Alternative living arrangements should be made with reclaimers living on the landfill site. Reclaimers should be made aware of the legislative compliance and dangers of a landfill site.	Immediately – Waste Pickers are employed
6.1.1	Surface water monitoring	Surface monitoring should be addressed when the water quality testing is done.	December 2020
8.1	Surface water testing	Surface water testing should be addressed when the water quality testing is done.	December 2020
10.2.1	All external audits available for study by current external auditor	External landfill site audits should be done during dry and wet season.	December 2020
10.3.2	Reporting of the surface water monitoring and test results annually to the Director	All findings of contaminated and surface water and audits should be reported to the DEA.	Immediately as incidents occur

3.5.2 Waenhuiskrans Drop-off Facility

The requirements and actions for the Waenhuiskrans WDF are detailed in Table 17.

Table 17. Non-compliances and related Actions for Waenhuiskrans Waste Drop-off Facility

Relevant Clause in Permit	Issue	Action Plan	Due
2.1.2	Records demonstrating compliance	Copies of records of internal and external audits, training received and CV's of the site staff must be made available.	Immediately
2.1.4	Accident management plan	An accident management plan must be drafted and communicated to staff and prominently displayed in the site office.	Immediately
5.1.12	Emergency preparedness plan and Business continuity plan	An emergency preparedness plan must be drafted and communicated to staff and prominently displayed in the site office. Review after each emergency or major accident and annually.	Immediately
9.1.2	Records to be provided as soon as reasonably practical	Relevant records as required by the permit must be available.	Immediately
9.1.4	Records to be retained for at least 5 years	Proper measures to be implemented to archive documents.	Immediately
9.3	Submission of Annexure II	Keep record and update all the related information.	Immediately
10.3.1	Submission of Annexure II	Keep record and update all the related information.	Annually
13.4	Permit validity	Apply for permit amendment/extension with the Director as a matter of urgency	Immediately

3.5.3 Struisbaai Drop-off Facility

The requirements and actions for the Struisbaai WDF are detailed in Table 17.

Table 17. Non-compliances and related Actions for Struisbaai Waste Drop-off Facility

Relevant Clause in Permit	Issue	Action Plan	Due
1.3.1	Unauthorised access	<p>Stricter control on the operation of the site must be enforced.</p> <p>Retraining of staff in the ability to fulfil their duties is required.</p> <p>Unauthorised people entering the Struisbaai Waste Drop-off Facility should be restricted.</p> <p>A maintenance programme should be implemented to repair broken fence.</p>	Daily – Access control at the facility available
1.3.3	Prevent informal recycling	A inclusive reclaiming plan must be created including but not limited to that:	September 2020

		<ul style="list-style-type: none"> a separate, lined area for waste sorting and recyclable storage should be provided; and an understanding reached that all waste must be stored in this area 	
2.1.1a	Not in accordance with a plan that minimises pollution	The management system of the facility must include risks of pollution.	August 2020
2.1.2	Records demonstrating compliance	Copies of records of internal and external audits, training received and CV's of the site staff must be made available.	Immediately
2.2.1	Emergency preparedness plan	An emergency preparedness plan must be drafted and communicated to staff and prominently displayed in the site Office. Review after each emergency or major accident and annually.	Immediately
4.1.5	Waste is to be covered with waterproof material	Waste containers must be covered to ensure the waste does not come in contact with water.	Daily
4.1.7	Construction of suitable stormwater drainage	A properly designed stormwater drainage system is to be constructed that has a convenient point for the collection of samples for testing.	December 2021
5.1.3	Prevention of nuisance conditions	Implement measures to prevent health hazards and nuisance conditions. The facility must be cleaned on a daily basis. Earthmoving machinery must be sourced to re-grade the entrance road and collect all the illegally dumped waste falling outside the site boundary.	August 2021
5.2.1	Submission of Annexure III	Records of waste information should be collated into a summary (Annexure III) and sent annually to the Director (DEADP).	Annually
5.2.2	Prevention of fugitive emissions	Implement appropriate measures to prevent or minimise fugitive emissions.	Immediately
5.2.3	Prevention of litter and mud from causing pollution	Implement appropriate measures to prevent or minimise litter and mud.	Immediately
5.2.4	Litter and mud is to be cleared on a daily basis	Implement appropriate measures to prevent or minimise litter and mud.	Immediately
5.2.8	Prevention of scavenging birds and animals	Implement appropriate measures to prevent or minimise scavenging by birds and animals.	Immediately
6.1.1	Testing in accordance with SABS	The municipality must carry out all tests required in terms of the Struisbaai Waste Drop-off Facility permit.	Immediately
6.1.2a	Surface water quality monitoring plan	A surface water quality monitoring plan is to be compiled and implemented. Surface water quality testing must be undertaken and Annexure IV should be populated to the specifications of Annexure II and sent to the Director.	
6.2	Submission of Annexure II and IV	Monitoring of runoff water quality must be conducted and recorded.	During each rainfall
8.1.2	Records to be provided as soon as reasonably practical	Relevant records as required by the permit must be available.	Immediately
8.1.4	Records to be retained for at least 5 years	Proper measures to be implemented to archive documents.	Immediately
8.3	Submission of Annexure III	Keep record and update all the related information.	Annually
9.3.1	Submission of Annexure III	Keep record and update all the related information.	Annually

3.5.4 Napier Drop-off Facility

The requirements and actions for the Napier WDF are detailed in Table 18.

Table 18. Non-compliances and related Actions for Napier Waste Drop-off Facility

Relevant in Permit	Clause	Issue	Action Plan	Due
2.1.2		Records demonstrating compliance	Copies of records of internal and external audits, training received and CV's of the site staff must be made available.	Immediately

2.2.1	Emergency preparedness plan	An emergency preparedness plan must be drafted and communicated to staff and prominently displayed in the site office. Review after each emergency or major accident and annually.	Immediately
4.1.7	Construction of suitable Stormwater drainage	A properly designed Stormwater drainage system is to be constructed that has a convenient point for the collection of samples for testing.	December 2021
5.2.1	Submission of Annexure III	Records of waste information should be collated into a summary (Annexure III) and sent annually to the Director (DEADP).	Annually
6.1.1	Testing in accordance with SABS	The municipality must carry out all tests required in terms of the Napier Waste Drop-off Facility permit.	Immediately
6.1.2a	Surface water quality monitoring plan	Surface water quality testing must be undertaken and Annexure IV should be populated to the specifications of Annexure II and sent to the Director.	During wet and dry season
6.2	Submission of Annexure II and IV	Monitoring of runoff water quality must be conducted and recorded.	During each rainfall
8.1.2	Records to be provided as soon as reasonably practical	Relevant records as required by the permit must be available.	Immediately
8.1.4	Records to be retained for at least 5 years	Proper measures to be implemented to archive documents.	Immediately
8.3	Submission of Annexure III	Keep record and update all the related information.	Annually
9.3.1	Submission of Annexure III	Keep record and update all the related information.	Annually

4. CAPE AGULHAS MUNICIPALITY'S IMPLEMENTATION SCHEDULE

The implementation of the above actions towards Integrated Waste Management must be scheduled in such a way that it is realistic, achievable, financially feasible and publically acceptable. An annual report on compliance with the IWMP is to be compiled and submitted to the Department of Environmental Affairs and Development Planning. The report need not be lengthy and can merely table the actions and the progress on each. Table 19 depicts the Capital Requirements to achieve the IWMP needs of the municipality.

Table 19. Short, Medium and Long Term Schedule

Term	Item	CAPEX Requirement
Short	1) Landfill Compliance Measures (Stormwater drainage)	1) R2,7 million
	2) Procure 12m3 REL Compactor Truck	2) R 1,8 million
	3) Procure Skip Loader Truck	3) R2,5 million
Medium	1) Construct Material Recovery Facility	1) R 8 million
	2) Construct Waste Transfer Station	2) R12 million
	3) Develop Composting Facility	3) R6 million
Long	1) Rehabilitate 4 x Closed Landfill	1) R73,3 million

The long-term landfill rehabilitation requirements are presented in the 2019 updated Long Term Financial Plan conducted by independent Financial Portfolio Managers. The medium term requirements are derived from the investigation conducted by JPCE Consulting Engineers into Regional Landfill Site Feasibility. The short-term requirements were obtained from operational requirements of the Waste Management Department.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The project team, with the assistance of municipal officials, has undertaken an analysis of the current municipal solid waste management activities within Cape Agulhas Municipality.

The chapters of this Integrated Waste Management Plan report describe the way in which the municipality is currently conducting solid waste management, which is mainly focused on collection and disposal, and how to strategically move towards a sustainable waste management system whereby the focus will shift to the avoidance and reduction of waste rather than to the disposal thereof. It also lists the strategies of the municipality in terms of Waste avoidance, waste reduction and waste disposal.

During the process of the implementation of the municipality's Integrated Waste Management Plan, and arising from the public consultation process that is forthcoming, further input and/or corrections to the report may come to light that will then be added as a revision to the report.

The analysis of the current waste management system has shown the following:

- all formal residential erven are receiving a weekly door-to-door waste collection service;
- all collected municipal waste are disposed at the municipality's licensed waste disposal site near Bredasdorp;
- all hazardous wastes generated within the municipal area are disposed or treated at facilities outside the municipal boundaries (at the moment this is happening at Vissershok);
- some waste recovery is currently done, although it is through illegal formal recovery units and informal waste reclaimers on the waste sites in the municipality;
- waste avoidance is achieved to some degree through recycling programmes;
- the waste facilities have recently been audited in terms of compliance with permits and non-compliances have been raised for the Municipality's action;
- some closed but not yet rehabilitated waste disposal sites exist near the smaller towns
- the organogram for the waste management staff has vacancies, however insufficient budget exists to fill all of them;
- Waste figures are not consolidated and reported to authorities; and
- Waste tyres are not being dealt with in terms of the Regulations.

With the current waste management system focusing on getting the waste into the waste stream and disposing of it in an acceptable manner, and with the future integrated waste management system focusing on waste avoidance and waste reduction, the municipality requires a set of strategic objectives on how to transform from the current management system to the future management system.

The strategic objectives for integrated waste management in Cape Agulhas Municipality can be summarised as follows:

- To ensure that Waste Management in the Cape Agulhas Municipal Area complies with South African and International environmental standards so that it is beneficial to industrial and agricultural growth and the public's right to a clean and healthy environment.
- To minimise the entrance of material of value into the waste stream.
- To reduce all waste so that nothing of value or anything that can decompose, gets disposed.
- To store, dispose or treat all waste that cannot be avoided nor reduced at licensed facilities with regular operational and environmental monitoring and in accordance with regulatory requirements.

For these strategic objectives to be met, a series of implementation instruments (action plans) will need to be implemented. These implementation instruments as well as time framework within which it should be addressed are described in this report but need to be fully detailed at a later stage. The instruments are the following:

- Public Awareness and Education;
- Quantifying Prevention;
- Post Collection Recovery;
- Post Collection Composting;

- Management Plan for Informal Waste Reclaimers;
- Engineered Waste Disposal Facilities;
- Rehabilitation of Closed Landfill Sites;
- Monitoring of Waste Disposal;
- Managing Waste Tyres;
- Garden Waste and Builders' Rubble;
- Improve Waste Management Facilities;
- Collection Service Review;
- Data Compilation;
- Waste Information System;
- Reporting of Annual Waste Figures;
- Cleaning;
- Addressing Non-Compliances Identified during the 2015 External Audits of Waste Facilities; and
- Annual reporting on progress in terms of IWMP actions.

The above instruments, through implementation via their action plans, will ensure that waste management in Cape Agulhas Municipality focusses on avoidance and reduction rather than collection and disposal, but simultaneously maintaining the practical balance between the various waste management functions.

Since the highest priority for improving on the current management system is undoubtedly depending on public acceptance and ownership, the Public Awareness and Education instrument will receive preference in the implementing framework.

5.2 RECOMMENDATIONS

An update to the Second Generation IWMP for solid waste management in the Cape Agulhas Municipal area has been done and the key strategies have been revised to support the municipality in achieving sustainable and integrated waste management.

It is therefore recommended that the actions provided in this IWMP are implemented as soon as possible. Given the limited resources and budget available to the Municipality, it would be the responsibility of the Municipality to review the resources available and prioritise the actions accordingly. It is important that progress reports in terms of the application of the IWMP be compiled. It is recommended that the following be prioritized:

- Address non-compliances from external audits of waste facilities;
- Waste Information System and reporting to SAWIS;
- Provision of necessary facilities;
- Waste tyre and informal waste reclaimers Action Plans; and
- Continued public engagement, particularly with the undertaking of the industry workshop in 2020/2021.

5.2.1 Public Awareness

The Municipality has been engaging the public on matters regarding waste management, recycling and prevention of illegal dumping. These efforts are to continue and future campaigns should include emphasis on reduction of waste at the source, home composting, as well as to provide feedback to the public with regard to the difference their efforts are making in achieving sustainability.

Should budget be available, a workshop with industry leaders in the regions could be held to inform them of waste issues and to brainstorm solutions. A good reason to focus on educating the public will cause a greater awareness of waste minimisation. This will reduce waste generation rates, which will in turn reduce transport volumes and costs. Should any new facilities or additions to existing facilities be provided, the public should be made aware of the location and purpose of these facilities. Public engagement efforts should be formally documented in an annual report to keep record of the various efforts and campaigns run by the Municipality.

5.2.2 Waste Collection and Transport

While most of the fleet is relatively new, there are a few items, which may require replacement in the near future. A Compactor Truck with lifters for the wheelie bins will be procured in 2020/2021 and a Skip Loader truck will be procured thereafter. An independent contractor is employed to support the collection of recyclables.

5.2.3 Waste reduction

Garden waste chipping and builder’s rubble crushing at the Bredasdorp landfill would significantly reduce daily volumes of landfilled waste. The establishment of the necessary facilities is planned for 2021/2022. The promotion of home composting would also serve to reduce waste to landfill.

5.2.4 Waste Disposal

It must be ensured that all waste management facilities are regularly audited, both internally and externally, as stipulated in each waste permit. Regular audits will ensure that these facilities are operated correctly and efficiently. Ensuring the correct operations will maximise the results of efforts of waste reduction and recovery and therefore the benefits thereof. Non-compliances identified in the most recent external audits (of June 2019) must be addressed with haste. With the information provided by the audits, the Municipality should continually evaluate the landfill available airspace to plan so that sufficient landfill capacity is always ensured.

Additional facilities that have been highlighted include the following:

- Chipping and crushing at Bredasdorp landfill;
- Materials recovery facility at Bredasdorp landfill; - Two-bag system for recycling.
- Post-collection composting facility; and
- Skips for refuse removal at Kleinbegin, Zwelitsha and Selfbou areas. EPWP projects are responsible for cleansing and job creation.

In addition, the situation with regard to informal waste reclaimers accessing the waste sites is not ideal and a policy for the management of these informal reclaimers must be established and rolled out to all facilities with urgency. Similarly, an action plan with regard to the management of waste tyres must be compiled in accordance with the Waste Tyre Regulations of 2008. This plan must be rolled out throughout the Cape Agulhas Municipality upon acceptance of this IWMP.

5.2.5 Waste Reporting and Data Management

It is important that accurate waste figures for each waste facility in Cape Agulhas Municipality be maintained and assimilated in one system. This would serve to provide a comprehensive overview of the situation in the region and would better support planning and strategies to effectively service the community. Reporting is currently conducted on the Waste Calculator and IPWIS System of Provincial DEADP system monthly.

5.2.6 Rehabilitation

A number of the Cape Agulhas municipal landfill sites are reaching capacity and needs to be closed and rehabilitated in the near future. The provision for rehabilitation of landfill sites has historically increased annually and the balance of the provision was R73.4 million as at FYE2019 as can be seen in Table 20.

Rehabilitation of the L’Agulhas Disposal Site needs to commence in FY2021 at an estimated cost of R4.7 million. This will be followed by the Napier Disposal Site (R18.7 million), Struisbaai disposal Site (R16.3 million), Waenhuiskrans Disposal Site (R3.7 million) and lastly, the Bredasdorp Disposal Site (R30.0 million). These estimates are based on current cost and an inflationary increase adjustment will be made to forecast the future cost of rehabilitation.

The rehabilitation of landfill sites includes operational and capital expenditure components. The following assumptions were made as to the years in which the rehabilitation costs will be incurred:

Table 20: Assumed Cash Flows – Landfill Rehabilitation Cost

R’000	Total	2020/21	2021/22	2022/23	2023/24	2024/25
Landfill		L’Agulhas DS	Napier DS	Struisbaai DS	Waenhuiskrans DS	Bredasdorp DS
Real Cost	73 400	4 700	18 700	16 300	3 700	30 000
Nominal Cost	93 720	5 231	21 952	20 191	4 840	41 506

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