

9.2 Financial Viability

The financial viability for each scenario was done over a 15-year period (2017 – 2031).

The financial viability included capital and operational costs of vehicles, infrastructure, services, and staff for solid waste management of LLM.

9.2.1 Capital costs

The capital costs are a combination of infrastructure and vehicle fleet costs per annum over the 15-year period.

9.2.1.1 Infrastructure

The following infrastructure costs were included for all the scenarios:

- Rehabilitation and remediation costs for McGregor WDF and Bessieskop WDF
- Extension of license for Ashton WDF
- Application for closure and rehabilitation of Ashton WDF

9.2.1.2 Other possible projects

The following project costs were included for all the scenarios:

- Annual external audits for all WMFs and WDFs
- Vehicle route optimisation study
- Application for closure and rehabilitation of Ashton WDF
- IWMP
- Waste by-law update
- Municipal waste management policy
- Outsourcing of waste education and awareness campaigns to a private company
- Provision of green bags for household food waste

9.2.1.3 Vehicles

All vehicles were assumed to be replaced after seven years of use. The capital costs are assumed to be the same as the fixed costs as these are dependent on the number and type of vehicle. These fixed costs include:

- Cost of Capital
- Depreciation costs
- Insurance cost
- Overhead administration costs

- Overhead operational costs
- Licence costs

The vehicles considered for the solid waste fleet all scenarios included:

- 19m³ compactor vehicles– assumed to transport domestic waste
- 3 tonne payload trucks– assumed to transport dry recyclables separated at source or garden and park waste
- Long haul road trucks with trailer

The following steps were taken in the calculations:

1. All vehicles assumed two trips per day for five days a week and 52 weeks per year (2trips x 5days per week x 52 weeks = 520 trips per year).
2. The number of vehicles was increased until the collective annual payload was greater than waste tonnage generated.
3. Once the type of vehicle and number of vehicles is decided a fixed cost is allocated.
4. The total capital cost for a given year is the sum of all the vehicle fleet capital costs for that year.

9.2.2 Operational Costs

The operational costs are combination of the operations and maintenance costs of the vehicles and the LLM operations as indicated in the current LLM budget. All operational costs were assumed to increase by 6% per annum to account for inflation.

9.2.2.1 Vehicles

The operational cost is dependent on distance and is assumed to include the following costs:

- Average tyre cost – average tyre last 60000km to 80000km depending on class of vehicle.
- Fuel costs – dependent on fuel consumption and price of diesel and were also estimated from LLM data.
- Oil cost – 5% of fuel cost.
- Repairs and maintenance – These were estimated from information provided by the LLM financial department.

O&M costs associated with use, such as fuel consumption and tyre wear were assumed to increase, linearly at 5% per annum, with age. The combined cost was estimated as Rands per km. Route distances were obtained from Google Earth. Costs were used to estimate distances covered by the vehicles. The distances were then multiplied by the cost per km to give an annual vehicle operational cost.

9.2.2.2 LLM operations

These costs include the expenses discussed in the expenditure section 6.6.2:

- Salaries, wages & allowances
- General expenditure, and
- Repairs and maintenance.

The operational costs were assumed to increase by 6% per annum to account for inflation. Since the figure is already an annual cost this figure was used.

9.2.3 Results

The results vary significantly in terms of cumulative cost over the 15-year period (Table 9-3 and Table 9-4). The base case cost for the 15-year period is approximately R 932 million. In comparison, no waste diversion (Scenario 4) results in a total cumulative cost for waste management of approximately R916 million over the 15-year period. These exclude the effects of having to build a new WDF or transport over a further distance to alternative WDFs. This shows the advantage of the current waste diversion practices that LLM implements.

Scenario 5 (Waste Minimisation + New Fleet) is the second lowest coming in at approximately R916 million. The best performing scenario is Scenario 2 as the cost of new fleet is less expensive because the operational and maintenance costs of the fleet. In addition, there is no extra cost from education and awareness campaigns. The total cost is approximately R898 million.

Table 9-3: Scenarios 1 – 3, Financial Analysis Results for 15 Year Period

Scenario 1: Base Case	Short Term					Medium Term					Long Term					Total Cost
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Waste Generated (Tpa)	33573	33805	34038	34273	34509	34747	34987	35229	35472	35716	35963	36211	36461	36712	36966	
Subtotal Capital Cost (000's of R/a)	10 045	9 550	20 689	14 509	17 754	16 939	16 963	17 489	17 516	17 545	17 575	18 900	22 952	22 988	23 779	
Subtotal Capital Cost (R/ton)	299	282	608	423	514	487	485	496	494	491	489	522	630	626	643	
Subtotal O&M Cost (000's of R/a)	27 003	26 091	29 341	31 102	41 346	37 979	40 258	42 674	46 569	49 363	52 325	55 464	58 792	62 320	66 059	
Subtotal O&M Cost (R/ton)	804	772	862	907	1 198	1 093	1 151	1 211	1 313	1 382	1 455	1 532	1 612	1 698	1 787	
Total Waste System Cost (000's of R/a)	37 048	35 640	50 030	45 611	59 100	54 919	57 221	60 163	64 085	66 908	69 900	74 365	81 744	85 308	89 838	932 880
Total Waste System Cost (R/ton)	1 104	1 054	1 470	1 331	1 713	1 581	1 636	1 708	1 807	1 873	1 944	2 054	2 242	2 324	2 430	
Scenario 2: New fleet	Short Term					Medium Term					Long Term					Total Cost
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Waste Generated (Tpa)	33573	33805	34038	34273	34509	34747	34987	35229	35472	35716	35963	36211	36461	36712	36966	
Subtotal Capital Cost (000's of R/a)	9 848	9 353	20 492	14 312	17 557	15 259	17 362	17 888	17 915	17 944	17 974	19 299	20 003	23 588	24 379	
Subtotal Capital Cost (R/ton)	293	277	602	418	509	439	496	508	505	502	500	533	549	643	659	
Subtotal O&M Cost (000's of R/a)	25 987	25 013	28 200	29 891	40 063	36 859	39 070	41 414	43 899	46 533	49 325	52 285	55 422	58 747	62 272	
Subtotal O&M Cost (R/ton)	774	740	828	872	1 161	1 061	1 117	1 176	1 238	1 303	1 372	1 444	1 520	1 600	1 685	
Total Waste System Cost (000's of R/a)	35 835	34 366	48 691	44 203	57 620	52 118	56 432	59 303	61 814	64 477	67 300	71 584	75 425	82 335	86 651	898 154
Total Waste System Cost (R/ton)	1 067	1 017	1 430	1 290	1 670	1 500	1 613	1 683	1 743	1 805	1 871	1 977	2 069	2 243	2 344	
Scenario 3: Waste Minimisation	Short Term					Medium Term					Long Term					Total Cost
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
Waste Generated (Tpa)	30325	30534	30744	30957	31170	31385	31602	31820	32039	32260	32483	32707	32933	33160	33389	
Subtotal Capital Cost (000's of R/a)	9 302	9 815	20 970	13 813	17 076	17 930	17 974	18 521	18 571	18 624	18 679	20 362	24 442	24 509	25 331	
Subtotal Capital Cost (R/ton)	307	231	638	385	463	508	505	525	522	519	517	553	712	708	737	
Subtotal O&M Cost (000's of R/a)	26 114	26 091	29 341	30 043	40 223	36 789	38 997	41 337	43 817	46 446	49 233	52 187	55 318	58 637	62 155	
Subtotal O&M Cost (R/ton)	861	867	968	1 019	1 305	1 198	1 261	1 327	1 397	1 471	1 548	1 630	1 770	1 864	1 962	
Total Waste System Cost (000's of R/a)	35 415	35 905	50 311	43 856	57 299	54 720	56 971	59 858	62 388	65 070	67 912	72 548	79 760	83 145	87 486	912 645
Total Waste System Cost (R/ton)	1 168	1 099	1 605	1 404	1 768	1 705	1 766	1 852	1 919	1 990	2 065	2 183	2 482	2 572	2 699	

Table 9-4: Scenarios 4 & 5, Financial Analysis Results for 15 Year Period

Scenario 4: No waste diversion	Short Term				Medium Term				Long Term				Total Cost		
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Waste Generated (Tpa)	33573	33805	34038	34273	34510	34748	34987	35229	35472	35717	35963	36211	36461	36713	36966
Subtotal Capital Cost (000's of R/a)	9 052	9 550	20 689	14 509	17 156	16 662	16 686	17 712	17 739	17 768	17 798	19 153	22 535	22 571	24 114
Subtotal Capital Cost (R/ton)	270	282	608	423	497	480	477	503	500	497	495	529	618	615	652
Subtotal O&M Cost (000's of R/a)	25 995	25 965	29 208	30 961	40 981	37 910	40 185	42 596	45 152	47 861	50 732	53 776	57 003	60 423	64 048
Subtotal O&M Cost (R/ton)	774	768	858	903	1 188	1 091	1 149	1 209	1 273	1 340	1 411	1 485	1 563	1 646	1 733
Total Waste System Cost (000's of R/a)	35 047	35 515	49 897	45 470	58 137	54 572	56 870	60 308	62 891	65 628	68 530	72 929	79 538	82 994	88 162
Total Waste System Cost (R/ton)	1 044	1 051	1 466	1 327	1 685	1 571	1 625	1 712	1 773	1 837	1 906	2 014	2 181	2 261	2 385
Scenario 5: Waste Minimisation+ New Fleet	Short Term				Medium Term				Long Term				Total Cost		
Year	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Waste Generated (Tpa)	30325	30534	30744	30957	31170	31385	31602	31820	32039	32260	32483	32707	32933	33160	33389
Subtotal Capital Cost (000's of R/a)	30325	30534	30744	30957	31170	31385	31602	31820	32039	32260	32483	32707	32933	33160	33389
Subtotal Capital Cost (R/ton)	9 105	9 618	20 773	14 610	16 879	16 250	18 373	18 920	18 970	19 023	19 078	20 761	21 493	25 108	25 931
Subtotal O&M Cost (000's of R/a)	300	239	645	392	453	451	528	538	535	532	530	557	615	740	755
Subtotal O&M Cost (R/ton)	25 097	25 013	28 200	28 832	38 940	36 789	38 997	41 337	43 817	46 446	49 233	52 187	55 318	58 637	62 155
Total Waste System Cost (000's of R/a)	828	836	935	984	1 264	1 198	1 261	1 327	1 397	1 471	1 548	1 630	1 770	1 864	1 962
Total Waste System Cost (R/ton)	34 202	34 631	48 972	43 442	55 819	53 039	57 370	60 257	62 787	65 468	68 311	72 947	76 811	83 745	88 086

9.2.4 Impact of Waste System Costs on Waste Tariffs

The impacts of the waste management system were also quantified to estimate the impact on the waste tariffs applied to ratepayers. The estimate is based on the cumulative waste tonnages and the cumulative waste system cost over the 15-year period. The average cost per ton is estimated at approximately R1108. However, this is assuming that all the capital projects are funded through revenue derived from the provision of waste services.

Scenario 1 has the lowest waste tariff increase (3.2% p.a.) because there are less capital costs required. Scenario 2 is the second lowest as operational costs of the fleet improves with the replacement of old high maintenance vehicles. Scenario 3 and 5 has the highest waste tariff increase (4.4% p.a.) because there is less waste but not a proportional decrease in fixed costs.

Although recycling and waste minimisation are costlier they have other benefits and therefore whilst the financial analysis provides a good idea of the costs of each scenario it is best to assess each scenario from a sustainability perspective. This is conducted in the section that follows.

Table 9-5: Impact of scenarios on waste tariff costs

Scenario	Waste generation (tonnes)	Cost (Rands)	Average Cost (R/ton)	Annual compound rate of change of tariff (%)
Scenario 1: Base Case	528 661	931 879 683	1 763	3.2%
Scenario 2: New fleet	491 696	898 153 610	1 827	3.4%
Scenario 3: Waste Minimisation	444 120	912 645 064	2 037	4.4%
Scenario 4: No waste diversion	491 696	916 487 468	1 864	3.6%
Scenario 5: New fleet + Waste Minimisation	444 120	905 887 666	2 024	4.4%

9.3 Sustainability

A sustainable approach using the pillars of the triple bottom line of sustainability (i.e. financial, environmental, and socio-economic impacts) was used to determine the best waste management scenario.

The sustainability was considered by rating each of the pillars of sustainability (i.e. financial, environmental, and socio-economic aspects) in terms of possible impacts. The impact categories are assessed as per DEA&DP (2012) along with a few additions:

- Financial:
 - Capital.
 - Operating Cost.
 - Maintenance Cost.
 - Borrowing.
 - Rates.
 - Cash Flow.
 - Administrative Burden.
 - Impact on tariffs.
- Environmental:
 - Energy usage/generation.
 - Release of greenhouse gases.
 - Air quality.
 - Noise Impact.
 - Land impacts.
 - Surface water quality and geohydrological quality impacts.
 - Aiding with environmental compliance.
- Socio-Economic:
 - Affordability.
 - Employment.
 - Community Involvement and co-operation.
 - Traffic.
 - Health and Safety.

The pillars of sustainability were given equal weightings of 33.3% each, and collectively add up to a total of 100%. These pillars were then further subdivided into the impact categories listed above. These impact categories were also weighted and split to obtain a 100% since each pillar is 33.3%, these weighting for the impact categories were adjusted by multiplying them by 33.3%. Each of the impact categories were then rated in terms of the scale shown in the table below.

Table 9-6: Impact Ratings

Impact Rating	Description
1	Significant negative impact
2	Moderate negative impact
3	Low negative impact
4	Little or no impact
5	Low positive impact
6	Moderate positive impact
7	Significant positive impact

The ratings multiplied into the weightings add up to give a potential score of 1. The base case was given a rating of 4 for all impact categories as it is the basis for comparing the other scenarios to. The results are shown in Table 9-7.

Scenario 4 scored the worst in terms of sustainability as more waste than as per the base case is disposed of at the Ashton WDF and later the Worcester Regional WDF, which creates larger financial costs for operations but also greater environmental impacts for collecting and disposing of waste. The exclusion of recycling from scenario 4, means that no jobs are created, further compounding the non-viability of this scenario. In contrast, scenario 5 scores the highest because the operational costs are lower and because recycling creates jobs and reduces environmental impacts of waste to landfill.

The waste management scenarios scored as follows:

- Scenario 1: Base Case scored 0.57 out of 1.
- Scenario 2: New fleet scored 0.62 out of 1.
- Scenario 3: Waste Minimisation and Education scored 0.61 out of 1.
- Scenario 4: No Waste Diversion scored 0.44 out of 1, and
- Scenario 5: New fleet, waste minimisation, education and composting scored 0.65 out of 1.

Based on these results, Scenario 5 was chosen as the preferred waste management scenario as it was also the second lowest financial cost. The goals, objectives, policies and KPIs will be formulated around these.

Table 9-7: Sustainability Scores per Waste Management Scenario

Impact Category	Impact Category Weighting Factor	Impact Parameter	Impact Parameter Weighting Factor	Adjusted Impact Parameter Weighting	Scenario 1: Base Case		Scenario 2: New fleet		Scenario 3: Waste Minimisation		Scenario 4: No waste diversion		Scenario 5: Waste Minimisation + New Fleet	
					Rating	Score	Rating	Score	Rating	Score	Rating	Score	Rating	Score
Financial	0.33	Capital	0.30	0.10	4	0.06	3	0.04	4	0.06	3	0.04	3	0.04
		Operating Cost	0.30	0.10	4	0.06	6	0.09	5	0.07	3	0.04	6	0.09
		Borrowing	0.10	0.03	4	0.02	5	0.02	4	0.02	3	0.01	5	0.02
		Rates	0.10	0.03	4	0.02	4	0.02	4	0.02	3	0.01	4	0.02
		Cash Flow	0.10	0.03	4	0.02	4	0.02	4	0.02	3	0.01	4	0.02
		Administrative Burden	0.10	0.03	4	0.02	4	0.02	4	0.02	3	0.01	4	0.02
		Subtotal	1.00	0.33		0.19		0.21		0.20		0.14		0.21
Environmental	0.33	Energy usage/generation	0.10	0.03	4	0.02	5	0.02	5	0.02	3	0.01	5	0.02
		Release of greenhouse gases	0.20	0.07	4	0.04	5	0.05	5	0.05	3	0.03	5	0.05
		Air quality	0.20	0.07	4	0.04	5	0.05	5	0.05	3	0.03	5	0.05
		Noise Impact	0.10	0.03	4	0.02	4	0.02	4	0.02	3	0.01	4	0.02
		Land impacts	0.20	0.07	4	0.04	4	0.04	4	0.04	3	0.03	4	0.04
		Water quality	0.20	0.07	4	0.04	4	0.04	4	0.04	4	0.04	4	0.04
		Subtotal	1.00	0.33		0.19		0.21		0.21		0.15		0.21
Socio-Economic	0.33	Affordability	0.20	0.07	4	0.04	4	0.04	4	0.04	3	0.03	5	0.05
		Employment	0.30	0.10	4	0.06	4	0.06	4	0.06	3	0.04	5	0.07
		Community Involvement and co-operation	0.20	0.07	4	0.04	4	0.04	4	0.04	3	0.03	5	0.05
		Traffic	0.10	0.03	4	0.02	4	0.02	4	0.02	3	0.01	4	0.02
		Health and Safety	0.20	0.07	4	0.04	5	0.05	4	0.04	3	0.03	4	0.04
		Subtotal	1.00	0.33		0.19		0.20		0.19		0.14		0.22
Total	1			1		0.57		0.62		0.61		0.44		0.65

10 Goals, Objectives, and Policies

10.1 Goals, Objectives, and Policies

The goals developed for LLM were adapted from the NWMS. The goals are listed below together with the targets for each goal that must be met by 2016:

- Goal 1: Promote waste minimisation, reuse, recycling and recovery of waste.
- Goal 2: Ensure the effective and efficient delivery of waste services.
- Goal 3: Grow the contribution of the waste sector to the green economy.
- Goal 4: Ensure that people are aware of the impact of waste on their health, well-being, and the environment.
- Goal 5: Achieve integrated waste management planning.
- Goal 6: Ensure sound budgeting and financial management for waste services.
- Goal 7: Provide measures to remediate contaminated land.
- Goal 8: Establish effective compliance with and enforcement of the Waste Act.

The objectives were aligned with the needs and the policies were developed as a guideline as to what will be adopted to ensure that the objectives are met.

For the purposes of this report the NWMS has been used but it is acknowledged that the 2nd generation WCIWMP aligns with the NWMS. As the 2nd generation WCIWMP was received after the draft report was compiled, thus time constraints have not allowed for directly aligning this IWMP in terms of the 2nd generation WCIWMP in this report. However, cognisance of this relationship between the NWMS and the 2nd generation WCIWMP has been developed in the table that follows. The reader should keep this in mind when reading the sections that follow.

Table 10-1: Alignment between NWMS and 2nd Generation WCIWMP

NWMS	2nd Generation WCIWMP
Goal 1: Promote waste minimisation, reuse, recycling and recovery of waste.	Goal 3: Effective and efficient utilisation of resources: Objective 1: Minimise the consumption of natural resources Objective 2: Stimulate job creation within the waste economy Objective 3: Increase waste diversion through reuse, recovery and recycling
Goal 2: Ensure the effective and efficient delivery of waste services.	Goal 2: Improved integrated waste management planning and implementation for efficient waste services and infrastructure: Objective 3: Promote the establishment of integrated waste management infrastructure and services Objective 4: Ensure effective and efficient waste information management Goal 1: Strengthened education, capacity, and advocacy towards Integrated Waste Management Objective 3: Build and strengthen waste management capacity

Goal 3: Grow the contribution of the waste sector to the green economy.	Goal 3: Effective and efficient utilisation of resources: Objective 2: Stimulate job creation within the waste economy Objective 3: Increase waste diversion through reuse, recovery and recycling
Goal 4: Ensure that people are aware of the impact of waste on their health, well-being, and the environment.	Goal 1: Strengthened education, capacity, and advocacy towards Integrated Waste Management Objective 1: Facilitate consumer and industry responsibility in integrated waste management. Objective 2: Promote and ensure awareness and education of integrated waste management
Goal 5: Achieve integrated waste management planning.	Goal 2: Improved integrated waste management planning and implementation for efficient waste services and infrastructure: Objective 1: Facilitate municipal waste management planning Objective 2: Promote industry waste management planning
Goal 6: Ensure sound budgeting and financial management for waste services.	Goal 2: Improved integrated waste management planning and implementation for efficient waste services and infrastructure:
Goal 7: Provide measures to remediate contaminated land.	Goal 4: Improved compliance with environmental regulatory framework: Objective 2: Remediate and rehabilitate contaminated land
Goal 8: Establish effective compliance with and enforcement of the Waste Act.	Goal 4: Improved compliance with environmental regulatory framework: Objective 1: Strengthen compliance monitoring and enforcement Objective 3: Facilitate the development of waste policy instruments Objective 4: Promote self/co-regulatory measures

Table 10-2: Goals, Objectives, and Policies

Goal No.	Goal	Objective No.	Objectives	Policy No.	Policies
1	Promote waste minimisation, reuse, recycling and recovery of waste.	1.1	Develop waste tariff incentive for participating in recycling.	1.1.1	Develop a recycling register of households and link to ratepayers billing database.
				1.1.2	The incentive will be a rebate that is equivalent to half the cost of the savings that the municipality achieves because of reduced transport costs and WMF costs.
				1.1.3	Advertise incentive on website and newspapers.
				1.1.4	Include incentive as part of waste by-law and waste tariff.
		1.2	Promote waste minimisation in businesses.		Ensure that all businesses and industries have a waste management plan.
				1.2.1	The businesses waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.
				1.2.2	LLM Solid Waste Department should develop a waste flow register of all businesses which will include all waste flowing in, processes and products, by-products and waste produced.
				1.2.3	Ensure that the businesses waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.
		1.3	Develop stakeholder database to help waste businesses.	1.3.1	A comprehensive waste stakeholder database is important in aiding businesses who wish to apply for licenses.
		1.4	Implement household food waste collection.	1.4.1	Provision of green bags to households for collection of household food waste which will be collected and taken to Robertson Compost facility for treatment and sale. It will also ensure that 16% less waste is sent to the Ashton WDF.
		1.5	Buy-back centre or Swap shop pilot.	1.5.1	Pilot a swap shop in Bonnievale or McGregor that will enable the community to collect recyclables and sell it to the municipality in exchange for cash or other goods.
		1.6	Develop a Household Hazardous Waste Strategy	1.6.1	Develop a Household Hazardous Waste Strategy to divert hazardous waste from general waste WDFs.

Goal No.	Goal	Objective No.	Objectives	Policy No.	Policies
2	Ensure the effective and efficient delivery of waste services.	2.1	Improvement of waste service delivery to those currently receiving waste services.	2.1.3	Implement route as per findings and recommendations of waste collection and disposal vehicle route optimisation study.
				2.1.1	A dedicated solid waste complaints register should be maintained to improve maintenance and service delivery.
				2.1.2	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.
				2.1.3	Address cleansing/waste removal related complaints within 7 days.
				2.1.4	Remove waste from all business areas as per weekly schedule.
				2.1.5	Ensure that wheelie bins are provided to all households to prevent litter in the streets and illegal dumping.
3	Grow the contribution of the waste sector to the green economy.	3.1	Create business opportunities.	3.1.1	LLM Solid Waste Department should investigate the possibility of re-using their WWTW sludge by de-listing it and reselling it as fertiliser.
				3.1.2	LLM Solid Waste Department should develop a waste flow register of all businesses which will include all waste flowing in, processes and products, by-products and waste produced.
				3.1.3	Ensure that the business and industry waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.
4	Ensure that people are aware of the impact of waste on their health, well-being, and the environment.	4.1	Educate the public about solid waste management and pollution.	4.1.1	Ensure sufficient signage promoting clean environments and warning against littering.
				4.1.2	Annual solid waste pollution and solid waste management education campaigns to be held at schools, public libraries, and community centres. This will be run by a private company to free resources in the LLM Solid Waste Department.
5	Achieve integrated waste management planning.	5.1	Update waste legislation to be compliant with the Waste Act.	5.1.1	Include environmental objectives in LLM planning documents.
				5.1.2	Complete revision of IWMP.
				5.1.3	Develop a waste policy.
				5.1.4	Update waste by-law.

Goal No.	Goal	Objective No.	Objectives	Policy No.	Policies
6	Ensure sound budgeting and financial management for waste services.	5.2	Improve recording of waste types and quantities.	5.2.1	Report monthly on the IPWIS on waste volumes at Bonnievale, Montagu, Ashton, and Robertson.
		5.3	Improve institutional capacity of LLM Solid Waste Department.	5.3.1	Fill vacancies in LLM Solid Waste Management Department.
		6.1	Improved management of assets.	6.1.1	Replace vehicles older than 7 years every 7 years.
				6.1.2	Development of a comprehensive asset register for solid waste plant and equipment.
		6.2	Reducing costs of waste collection services.	6.2.1	Conduct a vehicle route optimisation study.
				6.2.2	Implement routes as per findings and recommendations of above mentioned study.
		6.3	Reporting on Solid Waste Management Performance	6.3.1	Submit the monthly statistics report by the 15th of the following month to the Director
				6.3.2	Submit the reconciled fleet statements monthly to finance
				6.3.3	Submit attendance register monthly to director with the attached copies of approved leave forms
				6.3.4	Attend to all correspondence received from internal audit
				6.3.5	Respond to all correspondence received within the Directorate
				6.3.6	Proper procurement practices with the adherence to the approved SCM policy to promote good governance
7	Provide measures to remediate contaminated land.	7.1	Rehabilitation and closure of WDFs.	7.1.1	Complete rehabilitation of McGregor WDF
				7.1.2	Completion of closure and rehabilitation process of Bessieskop WDF
		7.2	Management of solid waste pollution.	7.2.1	Disaster Management Department to include pollution spill events and associated response measures in Disaster Management Plan with input from LLM Solid Waste Department and DEA&DP.
				7.2.2	Establishment of a communication channel between the public for reporting pollution incidents.
8	Establish effective compliance with and enforcement	8.1	Legally and environmental compliance of WMFs.	8.1.1	Completion of closure and rehabilitation process of McGregor WDF
				8.1.2	Completion of closure and rehabilitation process of Bessieskop WDF
				8.1.3	Extension of license for Ashton WDF

Goal No.	Goal	Objective No.	Objectives	Policy No.	Policies
	of the Waste Act.			8.1.4	Application for closure and rehabilitation of Ashton WDF in future.
				8.1.5	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.
				8.1.6	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.
				8.1.7	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.
		8.2	Improved enforcement of Waste Act contraventions.	8.2.1	Train waste management superintendents via an EMI course which will enable them to enforce and monitor compliance of waste legislation by residents and businesses of LLM.
		8.3	Updating waste legislation.	8.3.1	Develop a waste policy.
				8.3.2	Update waste by-law.
				8.3.3	Complete revision of IWMP.

11 Projects, Tasks, and Key Performance Indicators

The policies developed in the previous section should be monitored and controlled by LLM Solid Waste Management division. In order to do this, key performance indicators (KPIs) for waste management were formulated by ensuring they meet the specific, measurable, achievable, realistic, time (SMART) criteria:

- Specific – give enough detail.
- Measurable – can be quantifiably compared to something e.g. waste service provision could be assessed in terms of number of households receiving waste services.
- Achievable – is capable of being achieved by the responsible party in terms of their resources.
- Realistic – targets are not too optimistic and are within the limits of the responsible party.
- Time – the time allocated to reach or measure the KPI must be sufficient.

The policies have been re-adapted into projects which are described in terms of tasks and KPIs over a five year period spanning from 2017/18 to 2021/22 (Table 11-1).

When compared to the first and second generation IWMPs, the third generation IWMP has covered the recommendations previously identified, with the addition of new recommendations. The recommendations which have been met are as follows:

- Awareness and Education - Talks are given to schools and organisations, Tedcor have a door-door campaign, Ashton MRF hosts site tours for schools and organisations
- Quantifying Prevention, Post Collection Recovery, Post Collection Composting & Data Collection - LLM is registered on IPWIS, Ashton MRF and composting in Robertson are assisting diversion of waste, Ashton RTS has been completed. The diversion target has been partially met and will be completed once the Bonnievale drop off facility has been completed.
- Engineered Waste Disposal Facilities & Monitoring of Waste Disposal - Closure and Rehabilitation applications have been submitted and non-compliances are being addressed
- Collection Service Review - Route Optimisation Study for waste collection services still needs to be done
- Cleansing (Waste collection services) - the municipality provides waste collection services.

The key projects are discussed in the subsections that follow.

11.1 Updating of Waste Legislation and Planning Documents

Currently LLM does not have an applicable waste by-law and so cannot impose penalties or fines or properly enforce or prosecute any persons or parties for contraventions of national and provincial solid waste legislation. The updating of waste legislation such as the waste by-laws and development of a waste policy are essential for establishment of a framework and guide for waste management. The completion of the review of the Integrated Waste Management Plan is also important to ensure that the progress of actions identified in this report are being carried out. The updating of the legislation is essential to ensuring that the municipality continues to improve its waste service delivery and maintains compliance with national and provincial waste legislation.

11.2 Filing in vacancies of Solid Waste Management Staff

The staff of the Solid Waste Management division, need to be adequately trained and staffed to ensure proper service delivery. Organisations have an annual staff turnover of approximately 10% on a given year and efforts must be taken by the Solid Waste Management Department and Human Resources Department to ensure that the vacancies are filled quickly and that the appropriately skilled personnel are appointed for these positions.

11.3 Implementing a household food waste collection system

Food households waste contributes to 32% of all household waste by mass. If LLM collects the food waste using a green bag system, then it can potentially extend the life of the Ashton WDF until the Worcester Regional WDF is operational. The food waste also ensures that the Robertson Composting Facility will have more feed and can then be sold to farmers in the LLM area. The collection of food waste will also decrease long haul transportation costs to Worcester Regional WDF and it will also reduce greenhouse gas emissions created by decomposing WDF waste.

11.4 Provision of wheelie bins to all households

Currently, street litter and illegal dumping is an issue in the towns especially in the lower income areas. This in turn leads to annual costs for illegal dumping and clean ups. Part of the problem, is due to a lack of proper waste receptacles for households to deposit their waste in for collection services. The current percentage of households with wheelie bins is approximately 45%. It is planned that the remaining households be provided with wheelie bins over a period of 4 years. It is envisaged that part of the roll out of wheelie bins will cater for the current backlog of 150 households that are not serviced.

11.5 Household Hazardous Waste Strategy

Currently, about 2% of household waste is hazardous and sent to Ashton WDF. It is proposed that a household hazardous waste management strategy be developed. The plan should include the mission, vision, goals and objectives for dealing with hazardous waste. It should also identify the types of hazardous waste as well as existing hazardous waste management practices and hazardous WDFs an opportunity for businesses to become involved. The strategy will form the basis of an annual household hazardous waste action plan for diverting household hazardous waste from general waste WDFs.

11.6 Buy-back Centre or swap shop for lower income areas

Another method to reduce street litter and illegal dumping is through the roll-out of buy-back centres or swap shops. The development of buy-back centres should be considered for job creation as well as the promotion of a cleaner environment. The municipality, in conjunction with the recycling industry, should undertake market research to establish the viability and associated costs of a buy-back centre before

funding is sought. Funding can be sought from the recycling industry, private companies and from the Poverty Alleviation Fund (administered by DEA).

Another approach is exchanging recyclables for food instead of cash. “Food for Waste Programme” is an Expanded Public Works Programme (EPWP) which was started in 2007 by the Department of Public Works. The programme was copied from a very successful waste-collection project in the town of Curitiba, Brazil, South America. It is based on the idea of hiring communities to collect and deliver household waste to a common point. The local municipality collects the waste in exchange for food parcels. The waste is then taken for recycling.

It is suggested that a pilot be conducted in McGregor or Bonnievale. The target should be to reduce street litter and illegal dumping. If proven successful, the buy-back centre can be rolled out to other low income areas such as Zolani and Nqubela.

11.7 Vehicle optimisation study

The sequencing of the projects is important to note. The vehicle optimisation study identifies routes and areas for service provision, suitable vehicles and is essential to the expansion of current waste services, reduction in waste management costs and determining areas of expansion for the recycling initiative and the determination of suitable waste collection points and drop off facilities. Thus, the dependent projects have been offset to commence at a later period once the vehicle optimisation study has been completed.

11.8 Education and Awareness campaigns

A private company should be outsourced to drive the waste education and waste awareness campaigns in LLM. The campaign will involve task at schools on an annual or bi-annual basis, and who organises recycling and waste competitions, clean up events. The outsourcing should free up time for the waste manager and waste superintendents to plan, report and manage waste management as well allow them to have time to enforce compliance as environmental officers.

The campaigns should focus on all aspects of integrated waste management including but not limited to collections, reuse, recycling, composting, farm waste, WMFs and WDFs, littering, waste streams, disposal, illegal dumping, enforcement, and general solid waste management. Sign boards for illegal dumping and relevant contact information have already been provided in lower income areas where it has been cited as an issue.

Part of the initiative should include engagement with local farmer forums to discuss suitable waste collection options that will prevent illegal backyard dumping of waste.

11.9 Recycling

Recycling has been adopted by businesses but the uptake by residents has been a bit slower and there is a lack of participation. The first step is to create awareness. The implementation of the education and

awareness campaigns will boost the awareness efforts and should be done in conjunction with the recycling efforts. The second step is to expand the operations to facilities to all areas which receive solid waste services and create a recycling database of all users. The municipality can then create an incentive for ratepayers to recycle. The incentive could be a reduction in rates charged by LLM for waste services, which is afforded to ratepayers who recycle.

11.10 Rehabilitation and Remediation of WDFs

The rehabilitation and remediation of McGregor and Bessieskop WDFs will ensure that the WDFs are legally compliant and will have little to no environmental impact on the surrounding environment.

11.11 Legal Compliance

Solid Waste Management Department must perform internal and external audits on their WDFs and WMFs and report to the Department of Environmental Affairs to ensure they are legally and environmentally compliant. Part of the requirements includes that the waste manager and the superintendents be sent on the Environmental Management Inspectorate (EMI) training.

Table 11-1: Projects, tasks and KPIs

Goal No.	Goal	Project	Project Description	Tasks and KPI per year				
				2017/18	2018/19	2019/20	2020/21	2021/22
1	Promote waste minimisation, reuse, recycling and recovery of waste.	1.1.1	Develop a recycling register of households and link to ratepayers billing database.	Develop a recycling register of households and link to ratepayers billing database.	-	-	-	-
		1.1.2	Waste tariff incentive for recycling.	A waste tariff recycling subsidy is to be developed.	A waste tariff recycling subsidy is to be implemented.		-	-
		1.1.3	Advertise waste tariff incentive.	Advertised in 2 local newspaper and on LLM website by end of year.			-	-
		1.1.4	Include recycling incentive as part of waste by-law and waste tariff.	-	Subsidy included in waste tariff by 2018.		-	-
		1.2.1	Ensure that all businesses and industries have a waste management plan.		All businesses have a waste management plan. Ensure that the businesses waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.	All businesses have a waste management plan. Ensure that the businesses waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.	Environmental officers to perform at least one random external audits per industry and company per annum. All businesses have a waste management plan. Ensure that the businesses waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.	Environmental officers to perform at least one random external audits per industry and company per annum. All businesses have a waste management plan. Ensure that the businesses waste management plan identifies areas where resources are being wasted and can be used more efficiently through re-use, the introduction of new technologies or selling waste to other businesses who could utilise the recovered material to produce new products or provide services.
		1.2.2	LLM Solid Waste should develop a waste flow register of all businesses which will include all waste flowing in, processes and products, by-products and waste produced.	At least 20% of the businesses should be registered including all waste flowing in, processes and products, by-products and waste produced.	At least 40% of the businesses should be registered including all waste flowing in, processes and products, by-products and waste produced.	At least 60% of the businesses should be registered including all waste flowing in, processes and products, by-products and waste produced.	At least 80% of the businesses should be registered including all waste flowing in, processes and products, by-products and waste produced.	At least 100% of the businesses should be registered including all waste flowing in, processes and products, by-products and waste produced.
		1.3.1	Business Waste Register and Stakeholder Database.	Development of Business Waste Register and Stakeholder Database which must be posted on LLM website.	Updating of Business Register and Stakeholder Database at the beginning of each financial year.	Updating of Business Register and Stakeholder Database at the beginning of each financial year.	Updating of Business Register and Stakeholder Database at the beginning of each financial year.	Updating of Business Register and Stakeholder Database at the beginning of each financial year.
		1.4.1	Provision of green bags to households for collection of household food waste which will be collected and taken to Robertson Compost Facility for treatment and sale. It will also ensure that 16% less waste is sent to the Ashton WDF.	Provision of green bags to households for collection and aim to have 25% of all food waste from households collected.	Provision of green bags to households for collection and aim to have 50% of all food waste from households collected.	Provision of green bags to households for collection and aim to have 75% of all food waste from households collected.	Provision of green bags to households for collection and aim to have 100% of all food waste from households collected.	Provision of green bags to households for collection and aim to have 100% of all food waste from households collected.

Goal No.	Goal	Project	Project Description	Tasks and KPI per year				
				2017/18	2018/19	2019/20	2020/21	2021/22
2	Ensure the effective and efficient delivery of waste services.	1.5.1	Pilot a swap shop in Bonnievale or McGregor.	Pilot a swap shop in Bonnievale and or McGregor that will enable the community to collect recyclables and sell it to the municipality in exchange for cash or other goods. Maintain the previous project/s Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 25%.	If the pilot is successful then ensure that it is extended to one more low income community such as Nkqubela or Zolani. Maintain the previous projects. Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 25%.	If the pilot is successful then ensure that it is extended to one more low income community such as Nkqubela or Zolani. Maintain the previous projects Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 25%.	If the pilot is successful then ensure that extend to one more low income community such as Nkqubela or Zolani Maintain the previous project/s Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 25%.	Maintain the previous projects Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 25%.
		1.6.1	Develop a household hazardous waste strategy	Develop a household hazardous waste strategy for LLM	Develop an action plan from the household hazardous waste strategy	Implement action plan for household hazardous waste	Revise and implement action plan for household hazardous waste	Revise and implement action plan for household hazardous waste
		2.2.2	Solid waste complaints register.	Upkeep of complaints register.	Upkeep of complaints register.	Upkeep of complaints register.	Upkeep of complaints register.	Upkeep of complaints register.
		2.2.1	Provision of sturdy, good quality bins to LLM residents.	Ensure that 59% of households in LLM have bins.	Ensure that 73% of households in LLM have bins.	Ensure that 86% of households in LLM have bins.	Ensure that 100% of households in LLM have bins.	Ensure that 100% of households in LLM have bins.
		2.2.3	Waste Collection Vehicle Trip Records.	Record keeping of daily vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of daily vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of daily vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of daily vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of daily vehicle trips that document time, service points, areas serviced, bags collected etc.
		2.2.4	Meetings between residents and LLM.	Monthly meetings between residents and LLM to inform them of developments with respect to waste management projects and services at local library/community hall.	Monthly meetings between residents and LLM to inform them of developments with respect to waste management projects and services at local library/community hall.	Monthly meetings between residents and LLM to inform them of developments with respect to waste management projects and services at local library/community hall.	Monthly meetings between residents and LLM to inform them of developments with respect to waste management projects and services at local library/community hall.	Monthly meetings between residents and LLM to inform them of developments with respect to waste management projects and services at local library/community hall.
3	Grow the contribution of the waste sector to the green economy.	2.2.7	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.
		3.2.1	LLM Solid Waste Department should investigate the possibility of re-using their WWTW sludge by de-listing it and reselling it as fertiliser.	LLM Solid Waste Department should investigate the possibility of re-using their WWTW sludge by de-listing it and reselling it as fertiliser.	-	-	-	-
4	Ensure that people are aware of the impact of waste on their health, well-being, and the environment.	4.1.2	Annual solid waste pollution and management education campaigns at schools, public libraries, and community centres by private company.	All public schools, public libraries, and community centres must be given a 1 hour educational talk on solid waste management, recycling and littering per year by LLM Solid Waste Department to raise awareness. Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 50%.	All public schools, public libraries, and community centres must be given a 1 hour educational talk on solid waste management, recycling and littering per year by LLM Solid Waste Department to raise awareness. Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 50%.	All public schools, public libraries, and community centres must be given a 1 hour educational talk on solid waste management, recycling and littering per year by LLM Solid Waste Department to raise awareness. Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 50%.	All public schools, public libraries, and community centres must be given a 1 hour educational talk on solid waste management, recycling and littering per year by LLM Solid Waste Department to raise awareness. Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 50%.	All public schools, public libraries, and community centres must be given a 1 hour educational talk on solid waste management, recycling and littering per year by LLM Solid Waste Department to raise awareness. Success will be measured in terms of total reduction of illegal dumping and street litter clean-up costs. The target will be 50%.

Goal No.	Goal	Project	Project Description	Tasks and KPI per year				
				2017/18	2018/19	2019/20	2020/21	2021/22
5	Achieve integrated waste management planning.	5.1.1	Include environmental objectives in LLM planning documents.	LLM vision, policy, mission, and objectives must include environmental protection.	-	-	-	-
		5.1.2	Develop a waste policy.	Development of a waste policy for LLM.	-	-	-	-
		5.1.3	Complete update of waste by-law.	Updated waste by-law.	-	-	-	-
		5.1.4	Complete revision of IWMP.	Updated IWMP.	-	-	-	-
		5.2.2	Record and report waste quantities to SAWIS.	Annual waste quantity report to SAWIS.	Annual waste quantity report to SAWIS.	Annual waste quantity report to SAWIS.	Annual waste quantity report to SAWIS.	Annual waste quantity report to SAWIS.
		5.3.1	Recruit new staff.	Recruit staff to fill all vacancies as needed.	Recruit staff to fill all vacancies as needed.	Recruit staff to fill all vacancies as needed.	Recruit staff to fill all vacancies as needed.	Recruit staff to fill all vacancies as needed.
6	Ensure sound budgeting and financial management for waste services.	6.1.1	Assess solid waste vehicle fleet requirements with respect to waste streams and vehicle routes.	Replace vehicles older than 7 years immediately in 2015.	Replace vehicles older than 7 years.	Replace vehicles older than 7 years.	Replace vehicles older than 7 years.	Replace vehicles older than 7 years.
		6.1.2	Development of an asset register for solid waste plant and equipment.	Develop Solid Waste Plant and Equipment Asset Register.	Upkeep of asset register.	Upkeep of asset register.	Upkeep of asset register.	Upkeep of asset register.
		6.2.1	Conduct a vehicle route optimisation study.	Completed vehicle route optimisation study by end of financial year.	Implement routes as per findings and recommendations of the vehicle route optimisation study.	-	-	-
		6.3.1	Submit the monthly statistics report by the 15th of the following month to the Director of Engineering Services	12 reports per year.	12 reports per year.	12 reports per year.	12 reports per year.	12 reports per year.
		6.3.2	Submit the reconciled fleet statements monthly to finance	12 reports per year.	12 reports per year.	12 reports per year.	12 reports per year.	12 reports per year.
		6.3.3	Submit attendance register monthly to Director of Engineering Services with the attached copies of approved leave forms	12 attendance register per year.	12 attendance register per year.	12 attendance register per year.	12 attendance register per year.	12 attendance register per year.
		6.3.4	Attend to all correspondence received from internal audit	Attend to 90% of correspondence received from internal audit within 10 working days.	Attend to 90% of correspondence received from internal audit within 10 working days.	Attend to 90% of correspondence received from internal audit within 10 working days.	Attend to 90% of correspondence received from internal audit within 10 working days.	Attend to 90% of correspondence received from internal audit within 10 working days.
		6.3.5	Respond to all correspondence received within the Directorate	Respond to 90% of correspondence received within the Directorate within 10 working days of receipt.	Respond to 90% of correspondence received within the Directorate within 10 working days of receipt.	Respond to 90% of correspondence received within the Directorate within 10 working days of receipt.	Respond to 90% of correspondence received within the Directorate within 10 working days of receipt.	Respond to 90% of correspondence received within the Directorate within 10 working days of receipt.
		6.3.6	Proper procurement practices with the adherence to the approved SCM policy to promote good governance	zero successful appeals against procurement processes practices.	zero successful appeals against procurement processes practices.	zero successful appeals against procurement processes practices.	zero successful appeals against procurement processes practices.	zero successful appeals against procurement processes practices.
		7.1	Including pollution spill events and associated response measures in Disaster Management Plan.	Development of measures by LLM to manage spill pollution incidents.	Disaster Management Plan approved by DEA&DP for solid waste emergencies by 2018.	Recording of spill events, measures taken and outcomes.	Recording of spill events, measures taken and outcomes.	Recording of spill events, measures taken and outcomes.
7	Provide measures to remediate contaminated land.	7.2	Establishment of a communication channel between the public for reporting pollution incidents.	The phone number and email displayed on LLM website for solid waste accidents.	-	-	-	-
		8.1.1	Completion of closure and rehabilitation process of McGregor WDF.		Initiation of closure and rehabilitation of McGregor WDF at least 25% complete.	Closure and rehabilitation of McGregor WDF at least 50% complete.	Closure and rehabilitation of McGregor WDF at least 75% complete.	Complete closure and rehabilitation of McGregor WDF.
8	Establish effective compliance with	8.1.1	Completion of closure and rehabilitation process of McGregor WDF.		Initiation of closure and rehabilitation of McGregor WDF at least 25% complete.	Closure and rehabilitation of McGregor WDF at least 50% complete.	Closure and rehabilitation of McGregor WDF at least 75% complete.	Complete closure and rehabilitation of McGregor WDF.

Goal No.	Goal	Project	Project Description	Tasks and KPI per year				
				2017/18	2018/19	2019/20	2020/21	2021/22
	and enforcement of the Waste Act.	8.1.2	Completion of closure and rehabilitation process of Bessieskop WDF.	-	Initiation of closure and rehabilitation of Bessieskop WDF at least 25% complete.	Closure and rehabilitation of Bessieskop WDF at least 50% complete.	Closure and rehabilitation of Bessieskop WDF at least 75% complete.	Complete closure and rehabilitation of Bessieskop WDF.
		8.1.3	Extension of license for Ashton WDF.	Submission of license extension for Ashton WDF.				
		8.1.4	Application for closure and rehabilitation of Ashton WDF in future.				Application for closure and rehabilitation of Ashton WDF in future.	Commencement with Closure and Rehabilitation of Ashton WDF.
		8.1.5	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.
		8.1.6	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.
		8.1.7	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.
		8.1.8	Companies and industries should perform at least 1 waste management audit per annum.				Companies and industries should perform at least 1 waste management audit per annum.	Companies and industries should perform at least 1 waste management audit per annum.
		8.2.1	Train waste manager and superintendents to act as environmental officers which will enforcer and monitor compliance of residents and businesses within LLM	Train waste manager and superintendents via an EMI course which will enable them to enforce and monitor compliance of waste legislation by residents and businesses of LLM. Target is completion of training before the end of the year.	Target thereafter is resolving complaints and dealing with penalties that number 50 in total.	Target thereafter is resolving complaints and dealing with penalties that number 50 in total.	Target thereafter is resolving complaints and dealing with penalties that number 50 in total.	Target thereafter is resolving complaints and dealing with penalties that number 50 in total.

12 Programme and Budgets

The programme is based on the priority rankings developed earlier in the needs matrix and in conjunction with the project tasks from the previous section. The programme for the next five years is as per the budget and cashflow (Table 12-1). The table also shows the source of funding of the LLM waste management project tasks.

Most of the projects are for LLM Solid Waste Management staff (Solid Waste Manager and Solid Waste Superintendents) to be executing as part of their operations and so are funded from the operational budget. The following infrastructure costs were included in the budget:

- Closure and Rehabilitation of McGregor WDF.
- Closure and Rehabilitation of Bessieskop WDF.
- Closure and Rehabilitation of Ashton WDF.
- Application for extension of licence of Ashton WDF.

The costs shown for the capital projects in Table 12-1 represent the costs of paying the full capital cost as annual instalments over a 20-year period based on an inflation rate of 6% and a borrowing rate of 4%.

The other non-capital projects are signage, buy-back centre, the outsourcing of the waste vehicle optimisation and provision wheelie bins to all households.

There are three projects that should be outsourced or funded externally:

- Closure and Rehabilitation of McGregor WDF.
- Closure and Rehabilitation of Bessieskop WDF.
- Closure and Rehabilitation of Ashton WDF.

Possible sources of funding are the European Investment Bank (EIB), Environmental Protection and Infrastructure Programmes (EPIP) and the DEA Green Fund. The most likely source of funding is from the EPIP which has a Working on Waste (WOW) initiative. WOW provides funding support for the following types of projects (DEA, 2015):

- Development of Landfill Sites.
- Waste Transfer Stations.
- Buy-back/Recycling Facilities.
- Material Recovery facilities.
- Composting facilities.
- Street Cleaning.
- Domestic Waste Collection.
- Greenest Town Municipality Competition.
- Integrated Waste Management Plans.
- Youth Jobs in Waste.

The main criteria for obtaining EPIP funding are as follows (DEA, 2015):

- An application form filled on the EPIP online web-based system.

- The project must fall within the mandate of the department (EPIP Focus Areas).
- The project must be endorsed by the municipality (council resolution or a letter signed by the MM for each project).
- The budget must be more than R2.5 Million.
- An application must not be submitted by an individual for his/her sole benefit i.e. no community involvement, beneficiation, and ownership.
- The project must be labour intensive (main objective is not to solely purchase land or assets, training, development of plans)
- Proof of land dedicated for project implementation (where land is required).

The capital projects could be combined to meet all the requirements for registering for WOW funding.

Table 12-1: Project Budget and Cashflow

Goal No.	Goal	Project	Project Description	Budget per year (Rands)				
				2017/18	2018/19	2019/20	2020/21	2021/22
1	Promote waste minimisation, reuse, recycling and recovery of waste.	1.1.1	Develop a recycling register of households and link to ratepayers billing database.	Operational Budget				
		1.1.2	Waste tariff incentive for recycling.	Operational Budget	Operational Budget			
		1.1.3	Advertise waste tariff incentive.	Operational Budget				
		1.1.4	Include recycling incentive as part of waste by-law and waste tariff.		Operational Budget			
		1.2.1	Ensure that all businesses and industries have a waste management plan.		Operational Budget	Operational Budget	Operational Budget	Operational Budget
		1.3.1	Business Waste Register.		Operational Budget	Operational Budget	Operational Budget	Operational Budget
		1.4.1	Provision of green bags to households for collection of household food waste.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		1.5.1	Buy back centres or swop shop Pilots.	200 000	200 000	200 000	200 000	200 000
2	Ensure the effective and efficient delivery of waste services.	1.6.1	Develop Household Hazardous Waste Strategy	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		2.1.1	Conduct a vehicle route optimisation study.	450 000				
		2.1.2	Implement recommendations of vehicle route optimisation study.		Operational Budget	Operational Budget	Operational Budget	Operational Budget
		2.1.3	A dedicated solid waste complaints register should be maintained to improve maintenance and service delivery.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		2.1.4	Record keeping of vehicle trips that document time, service points, areas serviced, bags collected etc.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		2.1.5	Address cleansing/waste removal related complaints.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		2.1.6	Remove waste from all business areas as per weekly schedule.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
3	Grow the contribution of the waste sector to the green economy.	2.2.1	Ensure that all households have bins.	2 000 000	2 000 000	2 000 000	2 000 000	
		3.1.1	LLM Solid Waste Department should investigate the possibility of re-using their WWTW sludge by de-listing it and reselling it as fertiliser.	Operational Budget				
		3.1.2	LLM Solid Waste should develop a waste flow register of all businesses.	Operational Budget				
		3.1.3	Ensure that the business and industry waste management plan identify waste stream potential as resource and opportunities.		Operational Budget	Operational Budget	Operational Budget	Operational Budget

Goal No.	Goal	Project	Project Description	Budget per year (Rands)				
				2017/18	2018/19	2019/20	2020/21	2021/22
4	Ensure that people are aware of the impact of waste on their health, well-being, and the environment.	4.1.1	Ensure sufficient signage promoting clean environments and warning against littering.	Operational Budget - Signs are already prevalent in towns. Maintenance thereof is required.	Operational Budget - Signs are already prevalent in towns. Maintenance thereof is required.	Operational Budget - Signs are already prevalent in towns. Maintenance thereof is required.	Operational Budget - Signs are already prevalent in towns. Maintenance thereof is required.	Operational Budget - Signs are already prevalent in towns. Maintenance thereof is required.
		4.1.2	Annual solid waste pollution and management education campaigns at schools, public libraries, and community centres.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		5.1.1	Include environmental objectives in LLM planning documents.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
	Achieve integrated waste management planning.	5.1.2	Develop a waste policy.		250 000			
		5.1.3	Complete update of waste by-law.		250 000			
		5.1.4	Complete revision of IWMP and review annually.	70 000	100 000	120 000	100 000	300 000
		5.2.2	Record and report waste quantities to SAWIS.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		5.3.1	Recruit new staff.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
6	Ensure sound budgeting and financial management for waste services.	6.1.1	Assess solid waste vehicle fleet requirements with respect to waste streams and vehicle routes.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.1.2	Development of an asset register for solid waste plant and equipment.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.2.	Implement recommendations of vehicle route optimisation study.		Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.3.1	Submit the monthly statistics report by the 15th of the following month to the Director of Engineering Services.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.3.2	Submit the reconciled fleet statements monthly to finance.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.3.3	Submit attendance register monthly to director with the attached copies of approved leave forms.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.3.4	Attend to all correspondence received from internal audit.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.3.5	Respond to all correspondence received within the Directorate.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		6.3.6	Proper procurement practices with the adherence to the approved SCM policy to promote good governance.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
7	Provide measures to remediate contaminated land.	7.1	Including pollution spill events and associated response measures in Disaster Management Plan.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		7.2	Establishment of a communication channel between the public for reporting pollution incidents.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
8	Establish effective compliance with and enforcement of the Waste Act.	8.1.1	Completion of closure and rehabilitation process of McGregor WDF.		3 200 000	3 200 000	3 200 000	3 200 000
		8.1.2	Completion of closure and rehabilitation process of Bessieskop WDF.		1 800 000	1 800 000	1 800 000	1 800 000
		8.1.3	Extension of license for Ashton WDF.	1 500 000				
		8.1.4	Application for closure and rehabilitation of Ashton WDF in future.				5 200 000	5 200 000
		8.1.5	Perform an internal audit of landfill sites (Ashton, Montagu, Bonnievale) quarterly.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget
		8.1.6	Perform an external audit of landfill sites (Ashton, Bonnievale) annually.	300 000	320 000	340 000	360 000	380 000
		8.1.7	Report annually on compliance with the National Waste Management Strategy to the Department of Environmental Affairs.	Operational Budget	Operational Budget	Operational Budget	Operational Budget	Operational Budget

Goal No.	Goal	Project	Project Description	Budget per year (Rands)				
				2017/18	2018/19	2019/20	2020/21	2021/22
		8.2.1	Ensure that environmental officers act as enforces and monitor compliance of residents and businesses within LLM.	None – All costs for training including travel and accommodation are borne by DEA	Operational Budget	Operational Budget	Operational Budget	Operational Budget
Total Projects Budget (Rands)				4 520 000	8 120 000	7 540 000	12 760 000	10 780 000

13 Monitoring and Review

13.1 Overview

The Integrated Waste Management Plan should be monitored and reviewed to ensure that all the objectives and targets set out by the plan are met within the allocated 5-year period. This requires the use of a quality management systems approach .i.e. all processes are managed to improve the quality of goods or services.

Quality Management Systems (QMS) should be established that is in accordance with ISO9001:2015. The QMS is applied to the processes and components in a cyclic approach that ensures continuous improvement. The main stages of a QMS system are:

- Planning,
- Implementation,
- Monitoring and
- Evaluation.

The above steps are also commonly referred to as plan, do, check and act. The international standard for QMS, developed by the International Standards Organisation (ISO) is known as ISO 9001. The standard sets the precedent as to what activities an organisation should implement to achieve set quality standards.

In terms of the QMS, the IWMP can be considered as the planning phase, the implementation is when the projects and activities prescribed by the IWMP are carried out by the prescribed parties in the IWMP plan.

The monitoring and reviewing is when the targets and projects as prescribed are routinely checked against their KPIs to determine the success of the implementation. Information received from the monitoring of the objectives and targets will be reviewed to identify trends and problem areas. Problem areas will then need to be prescribed with remedial actions that will ensure that the objective targets can be met. This section will discuss how LLM should monitor and review their progress with respect to the IWMP objective targets.

13.2 Objectives

The monitoring and review process should aim to:

- Ensure that IWMP activities are progressing as planned
- Identify issues that need remedial action
- Fulfil legislative monitoring requirements including those prescribed by the Local Government Municipal Systems Act, and
- Provide waste related information to the public and IPWIS
- Report progress on IWMP targets to DEA&DP
- Report efficiency of monitoring to the DEA&DP

13.3 Planning and Monitoring Advisory Committee

A plan monitoring advisory committee should be established by the municipality. The committee will review the submissions of all waste management plans and reviews that are sent to DEA&DP for assessment and approval. The members should come from a diverse background including members from different regions, demographics, organizations, and technical backgrounds.

LLM needs to:

- Establish a plan monitoring advisory committee.
- Develop a terms of reference with a mandate for the plan monitoring advisory committee that should be approved by the IDP and municipal manager

The existing IDP steering committee could be used as IWMP Steering Committee to review the LLM IWMP. This will avoid duplication of efforts and resources.

13.4 Monitoring

The LLM Solid Waste Department collects an ample amount of data on their waste collection, labour, plant and machinery, waste treatment and waste disposal:

- Labour information:
 - Number of Vacant positions
 - Number of leave days taken
 - Total hours worked for each staff member per month
- Plant and Machinery
 - Number of days collection vehicles are out of service
 - Number of days vehicles are being serviced
- Waste Collection Services
 - Number of waste removal points
 - Total waste collected per vehicle (tpm)
 - Number of waste removal points from informal housing that are invoiced monthly
 - Number of waste removal points from informal housing that are not invoiced monthly
 - Number of cleansing programs
 - Total illegal dumping waste removed (tpm)
 - Total number of 30m³ skips collected per month
 - Percentage of households with wheelie bins
- Waste Quantities and Volumes
 - Total waste diverted (composting and recycling) tpm
 - Total compost (m³ per month)
 - Total recycling (tpm)
 - Total waste received at the waste management facilities (tpm)

The information is reported in two ways:

- Monthly reports of all the above information is sent to the Municipal manager/ Head of Engineering Services
- Monthly waste tonnages for the WMFs and WDFs are recorded and sent to IPWIS

13.5 Evaluation

The review process can be carried out through several mechanisms:

- The compliance of WDFs and WMFs with legislation can be reviewed through the internal and external audits
- The progress of the implementation of the recommended projects can be reviewed annually by the independent consultant appointed for the annual updates of the Langeberg IWMP.
- The annual review of the Solid Waste Department's performance by the Director of Engineering Services.
- The annual review of the Solid Waste Department's performance by a steering committee. The existing IDP steering committee could be used as IWMP Steering Committee to review the LLM IWMP. This will avoid duplication of efforts and resources. It will also ensure that Solid Waste Department projects are given the attention they deserve.

The actions stemming from the reviews will be subject to the DEA&DP, Director of Engineering Services and the IWMP Steering Committee.

The actions could include:

- Taking no action if the proposed actions in the IWMP are on track,
- Abandoning the initiative as it is not proving worthwhile given the amount of effort spent versus the return. This could be due to changes since the development of this report or because a key issue or "show-stopper" was overlooked.
- Revising the proposed project KPIs to accommodate the new changes.
- Use of financial penalties for KPIs that have not been met. These will be dealt to those who were tasked with the responsibility of the KPI.
- Assigning the KPI under question or review, to another responsible person or party.

13.1 Conclusion

It is recommended that LLM IWMP follows the recommendations of this Monitoring and Review section to ensure that LLM meets all the proposed KPIs for the proposed projects within the next five years.

14 Recommendations

Beyond the operational projects highlighted in section 12, it is recommended that LLM implement the capital projects as discussed in Section 10. The KPIs, programme and budget should be used as a guideline. The following projects should be included in the LLM IDP:

- Rehabilitation and closure McGregor WDF,
- Rehabilitation and closure of Bessieskop WDF,
- Vehicle Optimisation Study,
- Extension of Ashton WDF licence,
- Bonnievale Drop-off facility,
- Filling of vacancies in the Solid Waste Management Department,
- Annual external audits for all WMFs and WDFs,
- Vehicle route optimisation study,
- Application for closure and rehabilitation of Ashton WDF,
- Waste by-law update,
- Development of waste policy.
- Buy-back centre pilot projects, and
- Provision of wheelie bins.

The remainder of the projects can be funded through the operational budget for Solid Waste.

It is recommended that LLM IWMP follows the recommendations of this Monitoring and Review section to ensure that LLM meets all the proposed KPIs for the proposed projects within the next five years.

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Appendix A. DEA&DP IWMP Guideline Documents

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Appendix B. Waste Legislation

1.1.1.1 Constitution of the Republic of South Africa, 1996 (Act 108 of 1996)

The South African Constitution (Act 108 of 1996) is the supreme law of the land. Section 24 of the Constitution states that, it is the right of every person living in South Africa to experience an environment that is not harmful to their health or well-being. This imposes a duty on all organs of state to promulgate legislation and to implement policies that ensure that this right is upheld. Chapter 7 of the Constitution specifically describes the role and responsibility of local government as:

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

The municipality is responsible for refuse removal, managing waste disposal facilities and cleansing, as it sees it as part of the basic service and as per Schedules 4 and 5 of the Constitution.

1.1.1.2 National Environmental Management: Waste Act, 2008

Chapter 1, Section 2 of the Act describes the objectives of the Act as follows:

- a) "to protect health, well-being and the environment by providing reasonable measures for
 - i. minimising the consumption of natural resources
 - ii. avoiding and minimising the generation of waste
 - iii. reducing, re-using, recycling and recovering waste
 - iv. treating and safely disposing of waste as a last resort
 - v. preventing pollution and ecological degradation
 - vi. securing ecologically sustainable development while promoting justifiable economic and social development
 - vii. promoting and ensuring the effective delivery of waste services
 - viii. remediating land where contamination presents, or may present, a significant risk of harm to health or the environment
 - ix. achieving integrated waste management reporting and planning.
- b) to ensure that people are aware of the impact of waste on their health, well-being and the environment
- c) to provide for compliance with the measures set out in paragraph (a)
- d) generally, to give effect to section 24 of the Constitution in order to secure an environment that is not harmful to health and well-being."

The Act requires the drafting of a national waste management strategy for achieving the objectives of the Act. The Act sets waste service standards, covering areas such as tariffs, quality of service and financial reporting. The Act requires that each municipality designate a waste management officer.

The Act requires each municipality to produce an Integrated Waste Management Plan (IWMP) and to submit this plan to the MEC for endorsement. The approved IWMP must be included in the municipal Integrated Development Plan (IDP). Before finalising the IWMP the municipality is required to follow the consultative process as defined in section 29 of the Municipal Systems Act. This can be done either as a separate process or as part of the consultative process relating to its IDP.

1.1.1.3 National Environmental Management: Waste Amendment Act, 2014 (Act 26 of 2014)

The major amendments to the National Environmental Management: Waste Act, 2008 included in the Amendment Act are the changes to basic definitions such as waste and the involvement of Department of Environmental Affairs (DEA) in the integrated waste management planning and implementation processes.

Waste has been redefined as:

“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;

...but any waste or portion of waste, referred to in paragraphs (a) and (b), ceases to be a waste—

- a) 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;
- 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, “

More recognition is also given to re-using and recovering materials previously considered waste:

“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;”

Section 12 of the principal Act was amended by ensuring that the Department of Environmental Affairs (DEA) is involved with the integrated waste management planning in the following respects:

- Preparing Integrated Waste Management Plans for the province after consulting all other provincial departments
- Identification of measures to implement,
- Setting out the priorities and objectives,
- Planning of any new facilities for disposal and decommissioning of existing waste disposal facilities
- Describing how the IWMP requirements shall be met.

1.1.1.4 Environment Conservation Act No. 73 of 1989

The main purpose of this Act is to provide for the protection of the natural environment (Section 16) to control environmental pollution by prohibiting littering and controlling the removal of littering, and controlling waste management (Section 20) where the owner of a disposal landfill is required to apply for a permit from the minister of Water Affairs to operate such a facility. The Act further provides for the control of activities which may have a detrimental effect on the environment (Section 21).

The Act defines a disposal landfill as:

“A landfill used for the accumulation of waste with the purpose of disposing or treatment of such waste.”

Sections 24 to 28 of the Act contain regulations regarding waste management, littering, noise, vibration and shock, environmental impact reports, limited development areas and general regulatory powers.

1.1.1.5 National Environmental Management Act No. 107 of 1998

The National Environmental Management Act (NEMA) was promulgated in November 1998 and is the key legislation for environmental management in South Africa. NEMA promotes social, economic and environmental sustainability, with a focus on the conservation of the environment. The Act requires environmental process to be transparent and to provide capacity for disadvantaged stakeholders to participate. NEMA promotes the need for cooperative governance where more than one government department may be involved in the decision-making for a development.

The EIA Regulations in terms of the NEMA was amended in 2014, providing a new list of activities that require environmental authorisation through different processes. The list describes those activities that require a basic assessment (BA) and those that require a full environmental impact assessment (EIA). Both the BA and EIA involve public participation, however the latter is a more detailed and involved process.

NEMA promotes some of the following key principles:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- Development must be socially, environmentally and economically sustainable. The Act further defines in considerable detail the approach to sustainable development.
- Environmental management must be integrated, acknowledging that all elements of the environment are linked and interrelated.
- Environmental justice must be pursued so that adverse environmental impacts are not in any way discriminatory to any part of the population.
- There must be equitable access to environmental resources, benefits and services to meet basic human needs and ensure human well-being.
- The participation of all interested and affected parties in environmental governance must be promoted throughout the life cycle of any project or programme and any decision-making process.
- Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and the recognition of all forms of knowledge, including traditional and ordinary knowledge.
- The social, economic and environmental impacts must be considered, assessed and evaluated.
- The process must be transparent.
- The rights of workers must be protected and the vital role of women and youth in environmental management and development must be recognised and their full participation promoted.

- There must be harmonisation between policies, legislation and actions relating to the environment and global and international responsibilities relating to the environment must be discharged in the national interest.

1.1.1.6 National Environment: Air Quality Act 39 of 2004

The objective 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 the 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 Act emphasises that the key to ensuring that air quality is improved is by the minimisation of pollution through vigorous control, cleaner technologies and cleaner production practices.

1.1.1.7 National Waste Management Strategy, November 2011

The NWMS is a legislative requirement of the Waste Act, 2008 (Act No. 59 of 2008). The purpose of the NWMS is to achieve the objects of the Waste Act. Organs of state and affected persons are obliged to give effect to the NWMS.

The overall purpose of the strategy is to give effect to the objects of the Waste Act, which are to protect health, well-being and the environment through sound waste management and application of the waste management hierarchy. The strategy provides a plan to give practical effect to the Waste Act, and as such it seeks to ensure that responsibility for waste management is properly apportioned.

The legacy of inadequate waste services, poorly planned and maintained waste management infrastructure, and limited regulation of waste management persistently threaten the health and wellbeing of everyone in the country. Addressing this legacy and its negative environmental and social consequences, advances people’s constitutional right to a healthy environment. The NWMS aims to redress the past imbalances in waste management. For example, waste licensing will not permit WMF sites within a particular radius of a human settlement.

The eight strategic goals around which the NWMS is structured are as follows:

Goal 1: Promote waste minimisation, re-use, recycling and recovery of waste

Focuses on implementing the waste management hierarchy, and with the ultimate aim of diverting waste from WMF

Goal 2: Ensure the effective and efficient delivery of waste services

Promotes access to at least a basic level of waste services for all and integrates the waste management hierarchy into waste services, including separation at source

Goal 3: Grow the contribution of the waste sector to the green economy

Emphasises the social and economic impact of waste management, and situates the waste strategy within the green economy approach

Goal 4: Ensure that people are aware of the impact of waste on their health, wellbeing and the environment

Seeks to involve communities and people as active participants in implementing a new approach to waste management

Goal 5: Achieve integrated waste management planning

Creates a mechanism for integrated, transparent and systematic planning of waste management activities at each level of government

Goal 6: Ensure sound budgeting and financial management for waste services

Provides mechanisms to establish a sustainable financial basis for providing waste services

Goal 7: Provide measures to remediate contaminated land

Addresses the massive backlog of public and privately owned contaminated land in South Africa

Goal 8: Establish effective compliance with and enforcement of the Waste Act

Ensures that everyone adheres to the regulatory requirements for waste management and builds a culture of compliance.

1.1.1.8 [White Paper on Integrated Pollution and Waste Management of South Africa, Government Gazette, No. 20978, March 2000](#)

The White Paper aims to view pollution and waste management from a holistic point of view by accounting for environmental, social and institutional issues.

The White Paper is proactive by placing emphasis on the waste hierarchy – reduction of waste, recycling and diversion from WMF.

It covers key issues of pollution and waste management, proactive measures, approach, strategic objectives and the roles of government.

The goals of the policy 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 in integrated pollution and waste management governance
- Goal 5: Empowerment and education in integrated pollution and waste management
- Goal 6: Information management
- Goal 7: International cooperation

IWMPs are identified as part of the short term deliverables for goal 1 because IWMPs inform and serve improve the functioning of local government by providing a roadmap for local government to effectively manage waste.

At national level DEAT was assigned the responsibility of integrated pollution and waste management in South Africa. DEAT are responsible for the following functions:

- Policy, strategy and legislation
- Coordination
- Enforcement
- Dissemination of information
- Participation and appeals (against government decisions, authorisations, etc.)
- Monitoring, auditing and review
- Capacity building.

Different departments are responsible for setting regulations, guidelines and standards for different types of waste but in consultation with DEAT.

DWAF is responsible for permitting of WMFs and waste regulations, guidelines and standards.

Department of Minerals and Energy is responsible for regulations and standards for mining, radioactive and coal combustion waste. The Department of Health sets regulations and guidelines for all medical wastes and treatment facilities. The Department of Agriculture is responsible for agricultural waste.

The functions of provincial government are as follows:

- “Develop a provincial environmental implementation plan
- Reviewing the first-generation integrated waste plans received from the municipalities and where necessary, assisting with the drafting of these
- Monitor compliance with provincial implementation plans
- Intervene if the implementation plans are not being complied with
- Develop provincial guidelines and standards
- Develop and enforce provincial regulations
- Act on environmental hazards as required
- Participate in the Committee for Environmental Co-ordination.
- Ensure that all industries have access to appropriate waste disposal facilities
- Assisting national government in drafting regulations and guidelines
- quality assurance of the Waste Information System
- developing and enforcing provincial regulations for general waste collection, and supporting local government in the implementation of waste collection services
- Implementing and enforcing waste minimisation and recycling initiatives, and in particular, promoting the development of voluntary partnerships with industry registration and certification of hazardous waste transporters, the waste manifest system and the establishment and control of hazardous waste collection facilities
- Supporting the Department of Environmental Affairs (DEA) in planning for a system of medical waste treatment facilities, and investigating the feasibility of centralised (regional) waste treatment plants.”

The functions of local government are as follows:

- 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 WMF =, especially for regionally based general waste WMFs.

1.1.1.9 National Water Act (Act 36 of 1998)

The National Water Act (Act 36 of 1998) serves as the basis of legislation for all water resources in South Africa.

Chapter 4 focuses on regulating water use (Chapter 4 Part1). The most applicable clause in this part of the document is clause 22(l) which states:

“22, (l) A person may only use water:

(c) in the case of the discharge or disposal of waste or water containing waste contemplated in section 2 l(j), (g), (h) or (j) must comply with any applicable waste standards or management practices prescribed under section 26(l)(h).”

Chapter 3 focuses on the protection of existing and future water resources. In Part 4 of Chapter 3 prevention and remedying the effects of pollution is discussed. Clause 19 is the most relevant in terms of waste management:

“(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.”

The Water Act is important to waste management as it enforces the polluter pays principle and also ensures that any waste released must be aligned with legislative requirements.

1.1.1.10 National Health Act, Act 61 of 2004

The main objectives of the National health Act are to provide clean, affordable, equitable and righteous services to all citizens in South Africa. The most applicable objective of the National Health Act in terms of waste management is:

b) “setting out the rights and duties of health care providers, health workers, health establishments and users”

The duties of National Health is to facilitate the provision of indoor and outdoor pollution control services (Chapter 3 Section 21.2 j)

The function of Provincial Health is to provide pollution control services (Chapter 4 Section 25.2 u)

The investigation of pollution at health facilities is designated to Health Officers (Chapter 10 Section 83.1)

Chapter 11 Section 90.1 (n) allows the Minister after Consultation with the Heath Council to develop regulations for “nuisance and medical waste”

1.1.1.11 Western Cape Health Care Waste Management Act No. 7 of 2007

The main objectives of this Act are as follows:

- a) “reducing the risks of health care waste to human health;
- b) preventing the degradation of the environment;
- c) preventing the illegal dumping of health care waste;
- d) promoting sustainable development, and
- e) ensuring responsible management of health care waste in the Province.”

The Act covers the topics of reporting and processes for spillage and dumping of health care risk waste, the appointment of inspectors and power thereof, penalties for contravention, reporting of incidents by municipalities to the department and relevant regulations.

The main duties of the municipality, as mentioned in terms of clause 12, are to:

- a) “enforce the relevant provisions of this Act within its area of jurisdiction;
- b) “notify the Department of any incident of spillage or illegal dumping;
- c) “perform audits of generators, transporters, treaters and disposers of health care waste within its area of jurisdiction to ensure compliance with the provisions of this Act;
- d) (d) report annually to the Provincial Minister:
 - i. the number of incidents of dumping and spillage of health care waste within its area of jurisdiction;
 - ii. the number of incidents of dumping of health care risk waste pursued in a court of law; and
 - iii. the number of incidents of health care waste successfully prosecuted in a court of law.”

1.1.1.12 Western Cape Health Care Waste Management Amendment Act, Act 6 of 2010.

This act amends the Western Cape Health Care Waste Management Act, 2007, so as to align the terminology with that used in the National Environmental Management: Waste Act, 2008.

1.1.1.13 National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) National Domestic Collection Standards

The National Domestic Collection Standards are very important for municipalities as it sets out what principles, level of services collection services should embody and should as a minimum be provide to citizens of the

municipality. It details pertinent issues such as the use of receptacles, frequency of collection and collection vehicles. It also mandates the provision of drop-off centres where viable, health and safety that meets the requirements, provision of good communication channels between the municipality and the community, the use of awareness campaigns to prevent littering and promote the use of collections, receptacles and drop-offs, a system to register complaints and the implementation of service standards for the collection of waste.

[1.1.1.14 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) National Norms and Standards for the Assessment of Waste for Landfill Disposal](#)

This Act prescribes the requirements of waste in terms of elemental and chemical composition leachable limits of the waste and the applicable tests. The aim of the acts is to prevent toxic waste from leaching into the surrounding environment. Waste must be within these tolerances to be accepted for disposal as general waste. Amounts surpassing the limits are considered as hazardous waste and will need to follow the processes as prescribed within the act.

[1.1.1.15 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) Amendments to the List of Waste Management Activities that have, or are Likely to Have a Detrimental Effect on the Environment](#)

This Act makes amendments to the definition of “Residue stockpiles or residue deposits” for both Category activity lists.

[1.1.1.16 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) List of Waste Management Activities that have, or are Likely to Have a Detrimental Effect on the Environment](#)

The Act prescribes the list of waste management activities that require a Basic Assessment (Category A), Environmental Impact Assessment (Category B) or Category C which must comply with the following standards:

- a) “Norms and Standards for Storage of Waste, 2013; or
- b) Standards for Extraction, Flaring or Recovery of Landfill Gas, 2013; or
- c) Standards for Scrapping or Recovery of Motor Vehicles, 2013”

The activities are listed in terms of storage, reuse, recycling or recovery of waste, treatment, disposal and construction of waste structures and infrastructure. The Act also makes provision for waste management license applications which were applied for under legacy legislation.

[1.1.1.17 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) National Waste Information Regulations](#)

The Act regulates the collection of data and information that enables the national waste information system to fulfil its functions.

The main aspects covered include the registration and application process for interested parties, reporting and recording of waste information and verification which enables the provincial authority DEA&DP to query the information provided. Non-compliance by responsible parties can result in offences and penalties.

[1.1.1.18 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) Notice of Approval of an Integrated Industry Waste Tyre Management Plan of the Recycling and Economic Development Initiative of South Africa](#)

The Act outlines the business plan of REDISA (Recycling and Economic Development Initiative South Africa). REDISA was initiated as a Non-Profit Company (NPC) by DEA to reduce the amount of tyre waste being sent to landfill and in so doing addresses the Waste Act objective of protecting health, well-being and the environment.

All tyre producers are required by law “part 3 of the Waste Tyre Regulation, must subscribe to an Integrated Industry Waste Tyre Management Plan (IIWTMP) approved by the Minister.” Failure to comply results in a penalty being given to the offender.

REDISA should be incorporated into the IIWTMP for tyre producers. The tyre producers must register with REDISA and will collect the tyres and transport them to their depots for re-use, recycling and recovery.

The Act details all the processes, responsibilities and actions required to ensure compliant IIWTMPs.

[1.1.1.19 Regulations Under Section 24\(d\) of the Environment Conservation Act \(Act No. 73 of 1989\) – Plastic Carrier Bags and Plastic Flat Bags, 2003](#)

The production and distribution of plastic bags is restricted to only those which meet the Compulsory Specification d in terms of the Standards Act, 1993 (Act No. 29 of 1993).

[1.1.1.20 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) Notice of Intention to Require the Paper and Packaging Industry, Electrical and Electronic and Lighting Industry to Prepare and Submit to the Minister Industry Waste Management Plans for Approval](#)

Industries must compile an industry waste management plan and submit it to the Minister for approval. The Industry Waste Management Plan must contain all information regarding waste such as waste generation, projections, processes, management of waste, stakeholders involved, measures in place, transportation and storage of waste, treatment, re-use and recycling of waste, job creation, training and development and an implementation plan for a 5 year cycle. The plan must also undergo a stakeholder consultation process by which comments can be made, before approval is granted.

This Act mandates industries to follow certain procedures when writing, submitting and seeking approval of their waste management plans.

[1.1.1.21 National Environmental Management Act: Waste Act, 2008 \(Act No. 59 of 2008\) Industry Waste Management Plans](#)

The DEA&DP promulgated a provincial notice requesting certain subsectors within the Consumer Formulated Sector to develop and submit Industry WMP's to the DEA&DP for assessment and approval.

This Act mandates that “Paint, Ink, Adhesive, Cosmetic, Pharmaceutical and Cleaning Chemicals subsectors of the Consumer Formulated Chemical Sector in the Western Cape producers who generate on average more

than 20 kg of hazardous waste per day”, must prepare and submit an Industry Waste Management Plan to DEA&DP for approval. The contents of the plan must include the following information:

- a) “the amount of waste generated;
- b) measures taken to prevent pollution or ecological degradation;
- c) targets for waste minimisation, which can include re-use, recycling, recovery, cleaner production and resource efficiency;
- d) (d) measures or programmes to minimise the generation of waste, that can include re-use, recycling or recovery, and the final disposal of waste;
- e) (e) measures or actions to be taken to manage waste;
- f) (f) measures to reduce or eliminate the use and generation of hazardous chemical substances;
- g) (g) opportunities for the reduction of waste generation through changes to packaging, product design or production processes;
- h) (h) mechanisms for informing the public of the impact of waste-generating products or packaging on the environment;
- i) (i) the extent of any financial contribution to be made to support consumer-based waste reduction programmes;
- j) (j) the period required for implementation of the plan;
- k) (k) methods for monitoring, evaluation and reporting; and
- l) (l) any other matters that may be necessary to give effect to the objects of the Waste Act.”

1.1.1.22 National Environmental Management Act: Waste Act, 2008 (Act No. 59 of 2008) Waste Classification and Management Regulations

The main objectives of the regulation are prescribed as follows:

- a) “regulate the classification and management of waste in a manner which supports and implements the provisions of the Act;
- b) establish a mechanism and procedure for the listing of waste management activities that do not require a Waste Management Licence;
- c) prescribe requirements for the disposal of waste to landfill;
- d) prescribe requirements and timeframes for the management of certain wastes; and
- e) prescribe general duties of waste generators, transporters and managers.”

LLM must ensure that they follow the requirements of the regulation in their collection, storage, transportation, treatment, recovery and disposal of waste.

1.1.1.23 Occupational Health and Safety Act (Act 85 of 1993)

The main aim of the act relevant to waste management staff is the:

- Provision of health and safety for persons at work.
- Protection of non-working persons exposed to hazards from a working environment

The employer is responsible for ensuring a safe working environment, identification and prevention of health and safety risks, prescribe actions and measures to be taken by workers in terms of health and safety and health and safety training and instructions.

In the case of the LLM Solid Waste division, LLM staff must be provided with resources and training and education concerning health and safety. This will include but is not limited to:

- The provision of personal protection equipment (PPE) to protect collection staff from being directly exposed to leachate produced from waste,

- ensuring that staff are loading and offloading waste safely,
- staff driving vehicles are following the rules and regulations of the roads,
- vehicles are roadworthy,
- and safety of staff at WMF.

1.1.1.24 Hazardous Substances Act (Act 5 of 1973)

The main purpose of this Act is to:

“To provide for the control of substances which may cause injury or ill-health to or death of human beings by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances, and for the control of certain electronic products; to provide for the division of such substances or products into groups in relation to the degree of danger; to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances and products; and to provide for matters connected therewith.”

The Inspectors are responsible for inspecting premises that are involved with operations including hazardous substances for the presence of improperly dumped hazardous waste materials (group I, II, III and IV).

The Minister is responsible for making regulations for:

“e. prescribing the precautions to be taken for the protection from injury, ill health or death of persons in control of or employed or engaged in the manufacture, operation, application or use of grouped hazardous substances or of any other persons who is likely to or may be exposed to grouped hazardous substances as a result of the manufacture, operation, application, use, disposal or dumping thereof;”

The relevance of this legislation to waste is with respect to operations of hazardous waste found in the waste stream such as electronic waste (Group III).

1.1.1.25 Municipal Structures Act

The responsibility for refuse removal, refuse dumps and solid waste disposal has been assigned to local government according to the Constitution. District and local municipalities have different roles and responsibilities as described in the Municipal Structures Act (Act No. 117 of 1998).

The following section gives a helpful summary of these roles and responsibilities:

“District municipalities have powers and functions related to the integrated, sustainable and equitable social and economic development of the district. Local municipalities are responsible for the provisioning of specific services, including the removal and disposal of waste. Municipalities (district and local) are encouraged to practice the principles of co-operative governance to avoid conflict between overlapping functions. Combining efforts where there are similar initiatives may achieve better results.

District municipalities are responsible for:

- Ensuring integrated development planning for the district as a whole. This includes the development of a framework for IDPs and ensuring that IWMPs inform the IDP process;
- Promoting bulk infrastructure development and services for the district as a whole. The infrastructure refers to the establishment of regional waste disposal WMFs and bulk waste transfer stations that can be used by more than one local municipality within the district;
- Building local municipality capacity – where a local municipality fails to perform its management functions, Waste management governance encompasses the legal framework and institutions involved in waste management. As such the main players are National Departments of Environmental Affairs and Co-operative Governance and Traditional Affairs, the various Provincial departments responsible for environmental affairs and Local government including Metropolitan, District and Local Municipalities. The district municipality can enter into a Service Level Agreement (SLA) with the local municipality to provide the service for a stipulated period until such time that the local municipality can offer the service;
- Promoting equitable distribution of resources between the local municipalities in its area, for example, ensuring that resources are deployed in municipalities within their area of jurisdiction, where it is most needed.

Specific Local Municipality functions include:

- Compiling and implementing IWMPs and integrating these into IDPs;
- Running public awareness campaigns;
- Collecting data for the Waste Information System;
- Providing waste management services which includes waste removal, waste storage and waste disposal services, which are in line with national norms and standards. Municipality specific standards for separation, compacting and storage of solid waste that is collected as part of the municipal service will, may be set and enforced by the municipality;
- Implementing and enforcing waste minimisation and recycling (including the encouraging of voluntary partnerships with industry and waste minimisation clubs). (CSIR 2011)

The general duties of a municipality are as follows:

“8.7.1 (1) A municipality must give effect to the provisions of the Constitution and —

- a) give priority to the basic needs of the local community;
- b) promote the development of the local community; and
- c) ensure that all members of the local community have access to at least the minimum level of basic municipal services.

(2) Municipal services must be: —

- a) Equitable and accessible:
- b) Provided in a manner that is conducive to:
 - i. the prudent, economic, efficient and effective use of available resources; and
 - ii. the improvement of standards of quality over time:
- a) Financially sustainable:
- b) Environmentally sustainable; and
- c) Regularly reviewed with a view of upgrading, extension and improvement”

1.1.1.26 Municipal Systems Act (Act No. 32 of 2000)

Sections 11, 12 and 13 of the Municipal Systems Act 2000 (Act No. 32 of 2000) describes the municipal functions and powers, and states that a municipality may exercise its executive authority through the adoption of policies and the passing of by-laws.

Municipal tariffs must be set according to processes defined in Section 74 of the Municipal Systems Act (2000).

Before finalising the IWMP the municipality is required to follow the consultative process as defined in section 29 of the Municipal Systems Act. This can be done either as a separate process or as part of the consultative process relating to its IDP.

1.1.1.27 Mineral and Petroleum Resources Development Act (Act 28 of 2002)

The Mineral and Petroleum Resources Development Act (Act 28 of 2002) is the basis for equitable access to and sustainable management of mineral and petroleum resources. The pertinent clauses are clause 20 which discusses disposal of material and 38 which discusses the environmental management of impacts

“20 Permission to remove and dispose of minerals

- 1) Subject to subsection (2), the holder of a prospecting right may only remove and dispose for his or her own account any mineral found by such holder in the course of prospecting operations conducted pursuant to such prospecting right in such quantities as may be required to conduct tests on it or to identify or analyse it.
- 2) The holder of a prospecting right must obtain the Minister's written permission to remove and dispose for such holder's own account of bulk samples of any minerals found by such holder in the course of prospecting operations conducted pursuant to such prospecting right.”

“38 Integrated environmental management and responsibility to remedy

- 1) The holder of a reconnaissance permission, prospecting right, mining right, mining permit or retention permit -
 - e) is responsible for any environmental damage, pollution or ecological degradation as a result of his or her reconnaissance prospecting or mining operations and which may occur inside and outside the boundaries of the area to which such right, permit or permission relates.”

1.1.1.28 Western Cape Spatial Development Framework (DEA&DP, 2014)

The Western Cape Spatial Development Framework; serves to set out strategies for development in the Western Cape in accordance with key goals. The strategies are to be incorporated in planning documents at provincial and municipal level such as IDPs. The SDF has been centred around three central themes namely resources, space economy and settlement:

- “Resources
 - 1: Protect Biodiversity and Ecosystem Services
 - 2: Safeguard Inland and Coastal Water Resources, and Manage the Sustainable Use Of Water
 - 3: Safeguard the Western Cape’s Agricultural and Mineral Resources, and Manage their Sustainable Use
 - 4: Recycle and Recover Waste, Deliver Clean Energy Sources, Shift from Private To Public Transport, Adapt to and Mitigate against Climate Change
 - 5: Safeguard Cultural and Scenic Assets
- Space Economy
 - 1: Use Regional Infrastructure Investment to Leverage Economic Growth
 - 2: Diversify and Strengthen the Rural Economy
 - 3: Revitalise and Strengthen Urban Space-Economies as the Engine of Growth
- Settlement
 - 1: Protect, Manage and Enhance Sense of Place, Cultural and Scenic Landscapes
 - 2: Improve Inter and Intra-Regional Accessibility
 - 3: Promote Compact, Mixed Use and Integrated Settlements
 - 4: Balance and Coordinate the Delivery of Facilities and Social Services
 - 5: Promote Sustainable, Integrated and Inclusive Housing in Formal and Informal Markets

The SDF identifies Robertson as a primary regional service centre, Ashton as a secondary regional centre in terms of social facilities and McGregor as a rural settlement with threshold to support permanent social services.

Regional facilities for waste management are described as having the ability to either “unlock opportunities or unnecessarily burden municipalities operationally.” This must be considered in any regional facility that is proposed for Langeberg Local Municipality

Major challenges raised by the report are:

- illegal dumping,
- A lack of hazardous waste facilities
- growing informal settlements and urban sprawls, and
- a lack of recyclable collection from homes.

The areas neighbouring the Breede River including LLM, were identified as a key area for agricultural intensification. This in turn implies more waste service provision for the rural communities which support the agricultural sector.

1.1.1.29 Western Cape Integrated Waste Management Plan (2011)

The main objective of this plan is to give effect to the Waste Act by improving waste management in the Western Cape Province through an integrated waste management approach. It provides a framework to enable the Western Cape government, municipalities, industry and the civil society to minimise waste, improve waste management and to enact on its obligations and responsibility to build a resource efficient society (Western Cape Integrated Waste Management Plan, 2011).

The eight strategic goals around which this plan is structured are as follows:

Goal 1: Educate, strengthen capacity and raise awareness in integrated waste management

- Promote consumer and industry responsibility in integrated waste management
- Build the capacity of private and public sector with regard to basic waste management and integrated waste management
- Monitor progress and trends in implementing integrated waste management

Goal 2: Improve waste information management

- Ensure the waste information collection capacity
- Collect reliable waste information
- Continue to improve and update Integrated Pollutant Waste Information System (IPWIS) (soft & hardware)
- Provide access to reliable waste information

Goal 3: Promote sound, adequate and equitable waste management practices

- Capacitate waste managers in the public and private sectors with regard to the basic principles of sound waste management
- Ensure that basic waste management functions are executed in an environmentally and socially acceptable manner

Goal 4: Mainstream integrated waste management planning in municipalities and industry

- Facilitate and guide the development of municipal IWMPs and IndWMPs
- Build capacity in integrated waste management planning in both municipalities and industry

Goal 5: Mainstream sustainable waste management practices

- Promote principles, concepts and practices which are associated with sustainable waste management
- Maximise the diversion of waste from WMFs
- Promote waste recovery, recycling and re-use
- Improve the minimisation of waste throughout the product lifecycle
- Minimise the consumption of natural resources

Goal 6: Strengthen the waste regulatory system

- Licence all WMF
- Strengthen compliance monitoring and enforcement
- Remediate and rehabilitate contaminated land
- Goal 7: Ensure the safe and integrated management of hazardous waste
- Promote safe handling, storage, transportation and disposal of hazardous waste
- Treat and properly manage all hazardous, sector and priority waste before safe disposal
- Promote compliance monitoring and enforcement
- Reduce generation of hazardous waste

Goal 8: Facilitate access to funds to implement integrated waste management in the province

- Address funding constraints of waste management authorities
- Capacitate waste authorities on financial aspects with regard to improving waste management services
- Improve funding for waste management services

The following targets were set for 2014:

- The main target is to achieve a 15% waste diversion from WMF
- Other targets include licensing 80% of WMF and ensuring that 75% of households receive basic waste collection services

1.1.1.30 LLM Spatial Development Framework (2015)

Solid waste refuse is not mentioned in the SDF. The development plans from the SDF (CNdV, 2014) indicate that LLM has moderate growth potential and that most of the growth will be in terms of residential and industrial developments. The proposed developments for the towns are as follows:

- Robertson:
 - Industrial expansions along the Breede River
 - GAP social housing in Droehewuwel
 - Possible school and agricultural or mix use development between Droehewuwel and Moreson or alternatively adjacent to Nkqubela in the south
 - Possible market site in Robertson North
- Montagu:
 - Middle income housing in Bergsig and market related housing to the south near the .
 - Mixed use industrial and education areas for area south of Ashbury.
 -
- Ashton:
 - Residential areas expanded in Zolani and also along the abutting intersection with R60;
 - Emphasis on connecting Zolani and Ashton
- Bonnievale:
 - Mixed income residential properties amounting to approximately of 60 ha required in the future by Happy Valley and Mountain View
 - Extension to Industrial area.
- McGregor:
 - Low cost housing to be integrated with existing communities
 - Future residential area expansion to the south west of the town

1.1.1.31 International Treaties

South Africa is a signatory to the Basel and Stockholm Conventions. The key objectives of the Basel Convention are to:

- minimise the generation of hazardous wastes in terms of quantity and hazardousness;
- dispose of them as close to the source of generation as possible; and
- reduce the movement of hazardous wastes.

A central goal of the Basel Convention is “environmentally sound management”, the aim of which is to protect human health and the environment by minimising hazardous waste production whenever possible.

Environmental sound management means addressing the issue through an “integrated life-cycle approach”, which involves strong controls from the generation of a hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal (World Health Organisation, 2009).

The Stockholm Convention is “...a global treaty to protect human health and the environment from Persistent Organic Pollutants (POPs)” (Magulov, 2009). POPs are particularly carcinogenic and are toxic to both humans and wildlife. The burning of waste, whether open burning, on landfill WMF or incineration, has the potential to produce high volumes of POPs into the atmosphere.

The Act requires each municipality to produce an Integrated Waste Management Plan (IWMP) and to submit this plan to the MEC for approval.

Appendix C. Waste Characterisation Recordings

3777

0,14,25

25/10/16

Robertson - Nkubela

MYRTLE

Date:		Collected:		Sorted:		Data Capture																										
Bag no.	Address of origin	Description (black/ clear/ blue)	Unsorted mass (kg)		Plastic (soft)		Plastic (dense)		Paper		Cardboard		Glass		Metals		Organics (food & green waste)		Composite packaging/ tetrapak		e-waste (computers, electrical appliances, batteries, globes)		Household Hazardous waste (needles, medicine, labials, paint, cleaning products etc)		Knives, saws, tools, hammers & condoms		Other (wax, chips, packets, foil, clippings, wigs, shoes, sand, stones)		Total			
			Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)	Mass (kg)	Vol (L)		
1			6,38	0,28	100	0,10	20	2,22	100				0,34	10			1,40	100					0,10	10			1,82	75				
2			7,72	0,38	100	0,15	50	0,14	25	0,14	25	0,14	100													0,08	10	0,82	20			
3			2,36	0,16	20	0,24	25	0,16	50	0,34	20									0,04	20							0,09	0			
4			7,66	0,24	20	0,58	100	0,22	10	0,30	50	0,52	10										0,02	10			0,12	50				
5			2,24	0,06	75	0,26	50			0,18	75	0,36	20	0,10	10					0,10	75			0,10	10			0,92	50			
6			4,12	0,22	100	0,16	50	0,22	15	0,28	20					0,22	50						0,00	0			1,12	150				
7			6,44	0,14	100	0,38	100	2,54	100	0,28	50	0,14	10	0,12	10	0,04	10										2,62	100				
8			2,76	0,22	100	0,38	100	0,22	10	0,36	50					0,02	10															
9			4,52	0,18	110	0,26	10	0,22	10	0,22	50	0,06	10	0,18	15					0,08	10							1,18	10			
10			1,18	0,28	150	0,48	110			0,38	150					0,03	20											0,48	10			
11			2,130	0,32	100	0,18	15	1,52	50	0,44	50	0,36	10	0,12	10					0,00	0						0,40	10	0,40	15		
12			0,60	0,34	25	0,14	15			0,08	20																	3,36	100			
13			2,42	0,56	160			0,08	20	0,02	170					0,06	20											0,02	25			
14								0,00	0																			0,00	0			
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Robertson CBD

Date: 25/10/2014		Collective -		Sorted -		Data Captured:		Name: Simon								
Bag no.	Address of origin	Description (Black/Clear/Blue)	unopened mass (kg)	Plastic (soft)	Plastic (dense)	Paper	Cardboard	Glass	Metals	Organics (food & green waste)	Composite packaging/telescope	e-waste (computers, electrical appliances, batteries, etc)	Household Hazardous waste (Nipples, medicine, toilet, products etc)	Nappies, sanitary towels & condoms	Other (carpenter, chips packets, oil, cling wrap, faeces, sand, stone)	Total
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31 N. Happy Valley

BONNIEVALE MOUNTAIN VIEW

INFORMAL SETTLEMENT

BONNIEVALE CBD

Robertson

Date: 25/10/16		Collected:		Sorted:		Data Capture:		Mercia Simon		Other (rubbish, chips packing, clothing WFP, faeces, etc, none)		Nuclear, railway waste & containers		Household Hazardous waste (pesticides, medicine, labili, paint, cleaning products etc)		e-waste (computers, electrical appliances, batteries, globes)		Composits, packaging/ telepack		Organics (food & green waste)		Metals		Glass		Cardboard		Paper		Plastic (dense)		Plastic (soft)		unsorted (matt/ blue)		Description (Black/ Clear/ Blue)		Address of origin		Bag no.												
Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)	Mass (Kg)	Vol (L)											
3.17	0.34	120	1.08	75	0.38	120	0.38	75																																												
2.22	0.12	30	0.12	25	0.10	50	0.30	50																																												
2.28	0.84	30	0.80	20	0.78	25	0.84	25																																												
3.87	0.80	50	0.52	60	0.84	50	0.14	25	0.74	5	0.78	5	1.10	5																																						
4.90	0.78	75	0.58	75	0.06	15	0.06	10	0.08	10																																										
2.72	0.78	30	0.12	15	0.06	10	0.08	10																																												
3.26	0.54	20	0.52	100	0.14	25	0.94	120	0.50	10	0.06	10	0.70	50																																						
3.46	0.70	75	0.70	120	0.08	20	0.62	120																																												
5.10	0.70	70	0.12	15	0.75	120	0.56	75																																												
3.16	0.46	100	0.02	75	0.16	30	0.12	50																																												
7.18	0.26	100	0.70	50	0.18	30	0.20	30	0.32	75																																										
3.26	0.34	100	0.22	50	0.04	5	0.14	20																																												
1.00			0.32	75	0.20	75	0.08	25	0.14	5																																										
Lison CB D																																																				
1.44	0.04	4	0.08	5	0.02	5	0.30	50	0.78	5	0.02	10	0.38	10																																						
7.18	0.04	10	0.18	10	0.02	5	0.28	50	5.70	120	0.06	10	0.38	10																																						
4.48	0.30	75	0.12	10	0.10	20	0.04	5																																												
4.48	0.74	50	0.16	5	0.76	10	0.72	25	0.22	10	0.06	5	2.08	15																																						

BONNIEVAL HAPPY VALLEY

Date Collected: 23/10/2016

Date Captured: 23/10/2016

MAINTA

Bag No.	Address of origin	Description (Block/ Clear/ Blue)	Plastic (soft)		Plastic (dense)		Paper		Cardboard		Glass		Metals		Organic (food & green waste)		Composia packaging/telescope		e-waste (computers, mobile phones, battery, global)		Household hazardous waste (needles, paint, cleaning product etc)		Nappies, sanitary towels & condoms		Overswappers, chipz packets, oil, cling wrap, facese, sand, stone)		Total	
			Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)	Mass (kg)	Vol (l)
1			2.24	0.66	50	0.18	60	0.18	25	0.25	—	—	0.10	5	0.24	13	—	—	0.14	10	—	—	0.04	5	0.54	120		
2			1.40	—	—	0.08	25	0.02	20	0	—	—	—	—	1.04	25	—	—	—	—	—	—	—	—	0.34	50		
3			2.30	—	—	0.08	30	0.20	25	0.24	25	—	0.12	25	—	—	—	—	—	—	—	—	—	—	1.74	50		
4			1.60	—	—	0.06	30	0.18	25	0.42	70	—	0.06	20	0.40	55	—	—	—	—	—	—	0.80	30	2.44	70		
5			8.40	—	—	0.08	30	0.20	25	0.12	50	—	0.14	10.15	0.48	25	—	—	0.24	20	—	—	0.54	75	0.60	125		
6			2.48	0.02	10	0.22	50	0.12	25	0.30	70	—	0.06	10	0.54	50	—	—	—	—	—	—	—	—	0.22	70		
7			1.38	0.12	40	0.24	50	0.04	25	0.16	25	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
8			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
9			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
10			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
11			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
12			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
13			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
14			3.00	—	—	—	—	—	—	—	—	—	3.60	250	—	—	—	—	—	—	—	—	—	—	0.24	20		
15			5.32	1.26	70	0.50	25	—	—	1.13	50	—	0.82	25	5.38	60	—	—	—	—	—	—	—	—	0.40	25		
16			2.60	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
17			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
18			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
19			1.60	0.10	10	0.16	25	0.10	20	0.82	30	—	0.14	10	1.04	40	—	—	—	—	—	—	—	—	0.76	50		
20			2.55	0.14	50	0.22	20	0.02	16	0.22	40	—	0.14	15	0.72	25	—	—	—	—	—	—	—	—	1.22	75		
21			2.08	0.08	15	0.12	25	—	—	0.22	45	—	0.14	15	0.82	50	—	—	—	—	—	—	—	—	0.34	75		
22			1.84	0.10	35	—	—	1.64	75	0.82	25	—	0.72	10	0.98	20	—	—	—	—	—	—	—	—	0.96	60		
23			14.72	0.82	55	0.94	75	1.72	65	0.82	25	—	0.16	30	3.14	35	—	—	—	—	—	—	—	—	1.24	75		
24			1.40	0.04	25	0.10	25	0.28	25	0.08	30	—	0.16	30	0.16	35	—	—	—	—	—	—	—	—	0.18	75		
25			5.30	0.24	50	0.60	75	0.16	25	0.74	20	—	0.40	30	2.02	40	—	—	0.70	20	0.12	30	0.22	25	1.04	80		
26			11.32	1.34	75	0.64	25	0.82	30	1.28	75	—	0.94	25	0.82	15	—	—	—	—	—	—	—	—	0.74	80		
27			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
28			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
29			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
30			2.90	0.04	25	0.04	10	0.14	50	0.04	—	—	0.40	25	1.76	55	—	—	—	—	—	—	—	—	0.48	65		
31			0.74	0.04	—	0.12	10	0.24	50	0.04	—	—	0.02	25	0.50	40	—	—	—	—	—	—	0.02	10	0.26	75		
32			2.13	—	—	0.04	25	0.26	50	0.06	20	—	0.02	25	0.50	50	—	—	—	—	—	—	—	—	0.36	75		
33			2.55	0.04	10	—	—	—	—	—	—	—	0.02	10	0.48	60	—	—	—	—	—	—	—	—	0.06	80		
34			6.36	0.16	30	0.04	10	—	—	—	—	—	0.14	20	—	—	—	—	—	—	—	—	—	—	1.82	70		
35			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
36			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
37			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
38			—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		
39			4.32	0.06	102	0.14	10	1.11	50	—	—	—	0.03	10	1.96	50	—	—	0.04	35	0.10	20	0.10	15	0.40	75		
40			1.85	0.02	10	0.12	—	0.22	50	—	—	—	—	—	0.46	70	—	—	—	—	—	—	—	—	0.50	80		
41			2.72	0.2	10	0.06	10	0.02	5	0.24	50	0.20	—	—	1.72	50	—	—	—	—	—	—	—	—	0.46	70		

BONNIEVAL MOUNTAIN VIEW

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Date: 25-10		Collected:		Sorted:		Data Capture:																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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[illegible]

27/10/2016

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